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in Poznań

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MASTERS ATHLETICS

Social, biological and practical aspects of veterans sport

Poznań 2006

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Foreword

Sooner or later everyone has to face ageing. It is a well-known fact that the process of ageing starts already at birth. For some time now, however, this subject has gained greater and greater political and social importance which is also manifested [...] to a large extent in sport, as with the ageing population the society encounters new unfamiliar problems. [...] Thus, special social meaning should be attributed to sport. The healthier and more independent older people are, the higher the quality of their lives and the lower the costs they charge a society with. The problem of solitude of elderly people, known already today, could be significantly alleviated by stronger social recognition and support of masters movement. Sports activity unites people, strengthens social contacts, according to the motto: “Integration instead of isolation”. Therefore, it is not surprising that the European Veterans Athletics Association acts with the motto “One Family”. Masters athletics plays a special role in this context. It is one of the few disciplines in which one can participate in events until advanced old age, and in any case adequately to age. This is also reflected in the motto of the international federation of World Masters Athletics: “Athletics for life”.

Unfortunately, scientific studies of masters sport have only been available in the form of studies which are relatively short and narrow in scope. However, the monograph “Masters Athletics” by Krzysztof Kusy, PhD and Jacek Zieliński, PhD, Polish specialists in physical culture sciences, is the first so detailed, fundamental study in the area of athletics of the elderly, appropriately ambitious and systematised, which will be a benchmark for future publications. [...]

The monograph, prepared by the publishing house of the University School of Physical Education in Poznań and appearing during the 15th European Veterans Championships Stadia in July 2006, touches upon almost every aspect of masters athletics in a very impressive way. Both authors deserve many thanks for this long awaited work. They address to the same extent – as they mention in the authors’ note – scientists, instructors, coaches, students and masters athletes

themselves. Due to its methodical and comprehensive approach we should hope that the monograph will be widely circulated and will gain recognition as a standard work, and will inspire to more studies in the area.

Dieter Massin
President of European Veterans Athletics Association (EVAA)

(excerpts from the review)

Authors' note

The monograph we present is one of few attempts at synthetic, cross-sectional presentation of issues related to athletics of veterans, taking into consideration a current state of knowledge in various branches of physical culture sciences.

This volume is aimed for scientists, lecturers, coaches and instructors of athletics and students of universities and departments related to sport, to place at their disposal an up-to-date and reliable source of information in the presented area. The book is also intended for masters athletes themselves as an extension of knowledge of issues they deal with on an everyday basis. Perhaps people who so far have had no idea about the existence of masters athletics will also refer to this book. We hope that thanks to us they will obtain solid knowledge in the area and, first of all, will positively perceive veterans movement and perhaps will want to take part in this wonderful adventure as athletes, researchers or at least supporters of the phenomenon.

Due to the abundance of issues necessary to present, a rather short publishing cycle and the need to finalise the text in a reasonable size, writing a textbook was not an easy thing, although it was an intellectual challenge, provided a lot of satisfaction and extremely expanded our personal knowledge. We realise that the problem of veterans athletics has not been presented by us in an exhaustive manner. Those who hoped to see ready practical training solutions will feel disappointed (we hope that this will be the subject of our next book). During writing of this book we found that the number of questions exceeds the number of answers which we could provide in a short time to the best of our knowledge. But it is obvious that new information generates new problems to be solved. On many issues we have to refer the Reader to other, specialised items of literature. We believe however, that we have presented an image of a certain idea, a wonderful way to lead an active life and familiarised the Reader with the theoretic bases and practical issues of masters athletics. We take the responsibility for all imperfections and oversights. For their extensive and generous assistance we would like to express our heartfelt thanks to the following people:

- *Dieter Massin*, the president of the European Veterans Athletics Association (EVAA) – for inspiring us to write the monograph, for his valuable tips, information and spiritual support;

- *professor Łucja Pilaczyńska-Szcześniak*, the deputy vice-chancellor for Science of the University School of Physical Education in Poznań – for her trust and consent to publish the monograph in the University publishing house;
- the Foundation for the 15th European Veterans Athletics Championships Stadia Poznań 2006, in particular its treasurer *Maciej Struski* – for significant financial support which made it possible to translate the text into English and thus extend the circle of potential readers;
- *Karl-Heinz Flucke* – for making his excellent photographs available for the needs of the publication, which extremely increased the aesthetic and cognitive value of our work.

Authors

1. Introduction

1.1. Old age in the historical perspective

The old age follows the youth and maturity, and is the final stage of life. However, there is no single moment in a body's development which could perceptibly initiate the period of old age. Actually, it can be said that we age from the birth. The oldest existing description of ageing-related complaints was probably authored by Ptah-hotep, a vizier of the pharaoh Isesi, who lived 4500 years ago. The vizier complained: "How unbearable the fate of an old man is! He gets weaker every day; his eyesight deteriorates, his ears stop hearing, his powers leave him [...] he cannot remember what was yesterday" (Minois 1995).

In history old age has been treated in various ways and attitudes towards the elderly were affected by many cultural factors. Depending on the historical era and local conditions the whole range of attitudes towards the evening of life can be observed. In prehistoric times when longevity was exceptional, old age seemed supernatural and evoked respect. In some periods experienced old men were valued as advisors of kings, guards of tradition, played the role of experienced leaders. Healthy and vigorous old men were also considered to be a symbol of God's special grace as well as people who deserve the help of their neighbours. But not always and not everywhere were the members of the society kind for them. Indifferent treatment or reminding that it is not the age, but wisdom and virtue that matter, may be considered as gentle, not hostile attitudes. However, in many centuries and cultural circles old people shared the fate of the ill and the poor, hoping for alms and shelter. They were despised, old age was treated as a symbol of moral corruption, punishment for sins or curse of the gods'. Relations with the devil were also attributed to old people. Many times their disabilities and vices were the objects of mockery and scorn, their ugliness was showered with abuse. In extreme cases their fellow members of the community abandoned their seniors or simply expected their suicides when they became a burden for the community. Social situation of the elderly started to gradually improve in the 18th century when first pensions were introduced, initially for veteran soldiers, then for judges and employees of the post office (Minois 1995; Bois 1996).

Nowadays in developed countries elderly people have generally a good standard of living. Which does not mean that the discrimination of the elderly, that is denying a person some qualities only due to age, has been eliminated from our planet. Infantilisation and brutal treatment in old people's homes and even in family homes can be mentioned here. There are also subtle forms of discrimination. In the presence of old people they are often spoken of, but not to. A fast rate of social changes results in adaptive difficulties, e.g. problems with communication, because the elderly have the vocabulary and manners from dozens of years ago. In case of establishing the priority of patients waiting for a transplant of an organ an older person may be considered "less valuable" than a younger one. Discrimination of the elderly should be as concerning as racism and sexism. Therefore, the seniors should demand respecting their rights. Social awareness of issues related to old age and an honest approach to them are needed (Kirkwood 2005).

A stereotypical image of the old age is a decline of physical and mental powers, a state of ailing, disability, infirmity and inability to lead an independent life. The movement of veterans of athletics and sport in general are and excellent opportunity to break with this stereotype. The old age and related inconveniences cannot be finally avoided, but they can be reduced and delayed, using the gained time for the benefit of one's own and others.

1.2. The humanistic message of veterans sport

According to J. Lipiec (1999) sport is a generator and foundation of existential (health-related, ecological, praxeological) values, essential (cognitive, ethical, social, sacral, aesthetic) values and ornamental (ludic, entertainment, sociable) values. In respect to modern competitive sport the positive functions it plays are emphasised, but its imperfections or pathologies are criticised.

Sport is necessary as it meets the needs of everyday life, in particular in the light of rapid civilisation changes, unstable systems of values, industrialisation, urbanisation, impersonality and anonymity of a person in the society. It creates a relationship between people, becoming a substitute of what is missing in a work place, in a housing estate and what used to be present in a local community. Sport lets people experience together something which joins them, giving them a feeling of integrity, sharing feelings. It is a form of contact between people, allows for self-definition of an individual and a group which the individual represents. Sometimes it also fills in some cultural void, playing a role of former meetings, fairs, religious and secular processions and other forms of celebrations. It is one of the most

important elements of culture, perhaps even the most important one, in terms of the range of activity, universality of language and popularity (Lipiec 1988). By definition sport should play positive health-related, educational, integrative and social functions, satisfy psychological, economical and political needs (Łyko 2004).

On the other hand modern competitive sport is criticised, both negatively and constructively. Sport is accused, among other things, of anti-intellectualism and related lack of time for higher forms of activity, treating people like objects and judging them on the basis of their instrumental features (Zieliński 2005). Paradoxically, sport is seen as a source of divisions, not integration of people (intolerance, chauvinism, competing races, nations, regions, cities) as in sports rivalry there are always "us" and "them". Many believe that the worst features of human nature become apparent in sports activity (Lipiec 1988). Some universal features of sport, such as spontaneity, selflessness and unproductivity of effort, has disappeared in industrial societies as a result of applying rationalism and economy, the consequence of which are mercantilisation of sport and professionalisation of social roles in sport. The work of athletes, and later they themselves, have become goods, an investment, something for sale, subject to supply and demand. Unfortunately, investments are made only in athletes' bodies which are unscrupulously exploited, and the intellectual, moral and social spheres are completely ignored. Competitive sport has not been a synonym of health for a long time, it is rather linked to a risky, though lucrative elite profession. The main danger of competitive sport is excessive commercialisation. Other deformities are politicisation, corruption, and hooliganism on the stadiums (Krawczyk, 2003; Sahaj 2003, 2004).

But that is not all, even the cultural universality of the Olympic movement has turned out to be an illusion. Similarly, an illusion is the "equality" of all cultures in general which often embrace contradicting norms, values, behaviour models, beliefs and symbols (Kołakowski 2006). The Olympic movement as an intellectual movement is based on philosophical foundations of the European cultural circle and does not contain, or respect non-European elements. Hence the proposal to enrich the concept of *fair play* and Coubertin's "doctrine of mutual respect" (French: *respect mutuel*) with elements of Confucian philosophy, where an analogous concept of *yen* exists which means love and respect for another person. Equally worth noticing are *budo*, the ethics of Japanese samurai or Korean *hwarang-do* (Lipoński 2005). The Olympic movement is based nowadays on values close for some, and strange or even hostile for others – it includes elements which are not present or are rejected in Africa and Asia. The foundation of the Olympic movement is Platonic *kalokágathia* which assumes the dualism of spirit and body, whereas Asian philosophies do not know this division at all.

Sometimes restrictive cultural and religious bans do not allow for participation in the Olympic movement – Islamic women cannot bare their bodies and take part in sports competitions. To this historic conditions are added. The marathon is a symbol of victory for Greeks, and for Iranians, descendants of Persians, a symbol of defeat. Third World Countries may also treat Olympics as a specific reference to colonialism, a repeat of intellectual and spiritual subordination to the dictates of the West (Lipoński 2000).

How to place the veterans sport in the light of the above? What significance and functions should it be assigned? What values does it carry? It seems that veteran-athletes have an unique opportunity to use the positive features of sport, and avoid at the same time or at least minimise the deviations which plague competitive sport of the young generations. Veterans' movement may be perceived as a more universal and thus more useful than the Olympic movement which is marked by the above mentioned controversies. Sport of mature people has originated on the basis of personal internal needs of its participants and has developed spontaneously, without earlier "justification" with a specific tradition or idea, though of course it existed in a certain social and cultural context. A certain "flaw" may be the fact that field and track athletics originates from the western cultural circle, although it is spread and accepted worldwide. If we had to indicate a timeless and cultural-less, universal motive, to which the veterans' movement can refer it could be human body, its perfection and striving to achieve as good results as possible. Human body may be treated differently in different cultures, but everywhere it is real and universal as a fabric of cultural codes, symbols, metaphors connecting various fields of human experience (MacAloon 1982, quoted after: Lipoński 2000). Besides, veterans' movement is based on generally understandable values – friendship and co-operation between people – without reference to specific system of any culture or philosophy (including the philosophy of the Olympic Games) or historic conditions (*WMA Constitution* 2003, *EVAA Statutes* 2004). Its everyday tasks are rather prosaic: organisation of tournaments, promotion of physical activity and health, educational activity in terms of knowledge about sports training. The activists of the veterans' movement can be accused of intellectual "agnosticism", a lack of philosophical and cultural reflection and thus dissociation from deeper meaning, but paradoxically this attitude has positive consequences in practice. Veterans' movement, while not basing on regional cultural elements, does not cause misunderstandings and disputes over this. Veterans' sport is "lacking values" and through this probably morally purer, which can be seen clearly in comparison with Olympic sport where the gap between Coubertin's noble ideas and the reality in the stadiums verges on hypocrisy. The Olympic Games many times have

been the area of discrimination, political manifestos, an opportunity for bloody settling of the score, corruption and activities infringing the principle of equality of participants on the starting line. The most spectacular examples can be quoted here: “Anthropological Days” in St. Louis in 1904, disqualification of an American Indian Jim Thorpe in Stockholm in 1912 for alleged professionalism, the antiracist protest of black sprinters in Mexico in 1968 (excluded as a result from the USA team), the tragic end of the attack on Israeli athletes in Munich in 1972, boycotts of the Games in 1980 and 1984, allowing the professional US Dream Team to compete in Barcelona in 1992 without the obligation to undergo the anti-doping tests (!), and a rejection of candidacy of Athens to organise the jubilee Olympic Games in 1996 due to commercial reasons. The unwritten law saying that wars should be stopped for the duration of the games has not been respected (e.g. war in Yugoslavia during the Games in Barcelona in 1992), not to mention the fact that the Olympic idea is not strong enough to stop nations from waging wars (the Games were not held in 1916, 1940 and 1944).

Veterans’ athletic organisations declare neutrality in political and religious questions. In spite of the formal lack of a “moral manifesto” and a relatively short history (since 1975), world veterans athletics championships have been hosted in the parts of the world which the Olympic movement with over 100 years of tradition, involved in political connections and more and more commercialised, has not managed to consider in its plans – New Zealand, Latin America or Africa, which is the only continent which has not had the honour to organise the Olympic Games.

Veteran athletes are not subject to market laws in their sports activity. They are not paid, to the contrary, they finance their hobby out of their own pockets, thus maintaining their subjectivity and freedom of choice. If there is a threat of commercialisation or corruption in veterans’ athletics, it is due to people who make profit from the functioning of the movement, offering organisation of tournaments, hotel and tourist services.

The phenomenon of stadium hooliganism does not exist in athletics at all, and much less in veterans’ athletics. As to doping, we have devoted a separate chapter to it, and have been frank that this relates to some athletes advanced in years too.

Athletics of the elderly also has its limitations. It relates generally to societies which have exceeded a certain threshold of welfare. Sport as a need of higher order requires first satisfying basic biological needs of food, water, sleep, and safety. Many countries struggle with poverty, famine and wars, hence spontaneous participation of their citizens in any sports movement, additionally related to financial costs is impossible. That is why for example among current world veteran record holders

approx. 97% of men and 85% of women are athletes from the most developed countries: mainly from the USA and Canada, Germany, Australia and New Zealand, United Kingdom and other countries of Western Europe, Scandinavian countries (Sweden, Finland, Norway) and Japan. A small percentage of world records are held by athletes from such countries as Russia, Belarus, Ukraine, Romania, Kenya, Cuba, Jamaica and Mexico, which in spite of a lower economical level have a large sports potential in some events. In total world outdoor veteran records are held by representatives of only 38 countries, although representatives of about 100 nations compete usually in world championships.

To sum up, veterans sport seems to be more predisposed than competitive sport in its current form to be the source of values, mainly health-related, social, sociable and, what is most important, ethical. The question of aesthetic experience related to the competition of athletes at an older age may be disputed, just like the concept of beauty is disputed, which has been defined and explained in various ways throughout the ages (Eco 2005; Tatarkiewicz 1988). This in itself is a very interesting subject, but too extensive to dwell on it here; it can be mentioned however that an old person and his or her body is sometimes an inspiration for painters and photographers, for example due to its uniqueness and originality. Although it had to be admitted that artists consider as beautiful and glorify generally only young bodies of athletes (Bittner, Bryk 2005), and old age in art has almost become a scandal (Ostaszewski 2003). We often do not realise that bodies of young athletes are – if not on the outside, than on the inside – degenerated, exploited as a result of excessive training loads, pharmacological support, injuries and diet regime. The question is: is it the affirmation of life, or a road to self-destruction – often material to posthumous medical analysis or for the first pages of popular magazines (Hausmann, Hammer, Betz 1998; Brinkbäumer, Ludwig, Weinzierl 1996). Here the aesthetics inevitably meet the ethics in the form of moral beauty, less and less often seen in competitive sport.

Far from being too idealistic, we believe that veterans athletics implement the slogan of “sport for all”, joining not only generations but giving a new dimension of “meeting of civilisations” (Toynbee 1991), this time without violence, nationalism and racism. In 1989 Hans Lenk, a philosopher, suggested to complete the Olympic motto *citius, altius, fortius* with words *pulchrius et humanius* – more beautifully and in a more humanistic way (after: Lipoński 2000). We think that this supplement relating to the moral and aesthetic objectives for which the athletes should strive is a leading motto in veterans sport and the first motto only complements it.

2. Demographic changes in the contemporary world and masters athletics

2.1. The population

The documentation prepared by the United Nations Organisation (*Populations challenges...* 2005) shows that in 2005 the population of the earth reached 6.5 billion and is growing by 1.2% per year. It is expected that the population will increase by another billion in 13 years' time and will reach 9.1 billion in 2050, assuming a constant rate of growth. Approximately 1.2 billion people live in the most developed countries. In many of them, in particular in Europe, the number of residents will gradually decrease, as the birth ratios will fall below the replacement level. Some of the developed countries will maintain the growing trend thanks to international migration among other things. The population of many countries, in particular in Africa and Asia, will grow significantly in the coming decades from 5.3 billion to 7.8 billion by the middle of the 21st century (medium variant). Between 2000 and 2005 the world's population increased by 76 million people thanks to 22 countries only. The only developed country in this group is the USA the population of which increases mainly due to migration. The greatest growth of population was noted in India, which according to the forecasts will have the greatest contribution to the increase of the world's population in 2050 (570 million). Other countries with the greatest increase in population are: Pakistan, Nigeria, Congo, China, Bangladesh, USA, Uganda and Ethiopia. The greatest reduction in population will affect Russia, Ukraine, Japan, Italy, Poland, Romania, Germany, Belarus and Bulgaria. Europe is the continent where a decrease in population is most distinct. Figure 2.1 presents possible scenarios of changes in European population. In the constant-fertility variant there will be a gradual decrease in the number of Europeans from almost 730 million at present to approx. 550 million in 2050.

In 2005 the population inhabiting urban areas was 2.3 billion and it will probably increase to 5 billion in 2030. At the same time the number of people living in the countryside will decrease from 3.3 to 3.2 billion. In 1950 approx. 30% of people in the world lived in urban areas, now it is almost half of the population. In 2030 it may be as much as 61%. It is expected that in 2007 half of the population will live in urban areas and

the number of large conurbations will grow, although half of the residents of towns will remain in agglomerations smaller than 500,000 people. The changes relate to a larger extent to developed countries (fig. 2.2.).

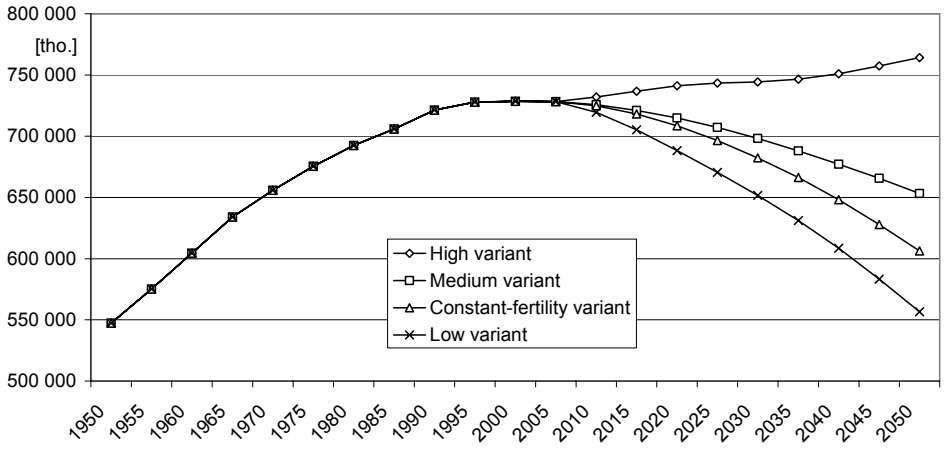

Fig. 2.1. Europe population trends 1950-2050. Drawn from data reported in: *World Population Prospects: The 2004 Revision; World Urbanization Prospects: The 2003 Revision*, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. *http://esa.un.org/unpp*, February 2006.

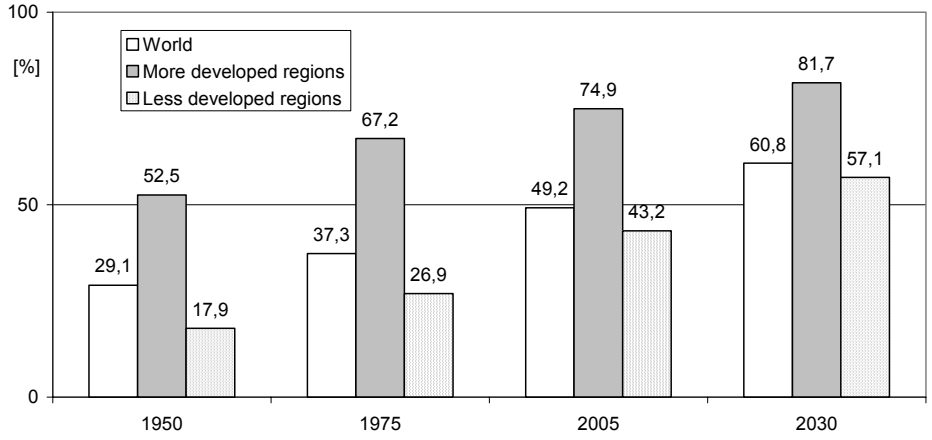

Fig. 2.2. Urban population per cent 1950-2030. Drawn from data reported in: *Population challenges and development goals*, 2005. Department of Economic and Social Affairs. Population Division. United Nations, New York. *www.un.org*

2.2. Ageing of societies and its consequences

For the first time in the history of civilisation we deal with a rapid and general growth in the number of elderly people, both in absolute numbers and as a percentage of the whole human population. According to the assessment of the experts of the United Nations Organisation the phenomenon will intensify. The average age of the inhabitants of the globe is now 28 and in half a century it will reach 38 years. At the beginning of this century the world's population included 600 million elderly people, three times more than 50 years earlier. Nowadays one in ten people in the world is over 60 (11% of the population) in 2050 it will be probably one in five (22% – approx. 2 billion people) and in 2150 one in three. The number of elderly people grows by 2% per year and this population in itself will also age. People over 80 are the fastest growing group, at the rate of 4.2% per year and the number of centenarians may increase from 145,000 in 1999 to 2.2 million in 2050. The majority of the elderly are women – 55% people over 60 years of age, 65% of over 80-year-olds and 81% of centenarians. The percentage of elderly people is closely related to the world's regions, the degree of economic development and urbanisation. The ageing of populations is very clear in the developed countries and in urbanised areas. The greatest contrast in this respect can be noticed between Europe (one in five inhabitants are over 60) and Africa (one in twenty). However, the rate of this phenomenon is faster in the developing countries which have thus less time to adapt to its consequences (Source: Population Division, Department of Economic and Social Affairs, United Nations Secretariat, www.un.org).

A larger number of elderly people is on the one hand a result of a lower birth rate, and on the other hand a consequence of lowering death rate of the population and related prolonging of life. The progress of medicine in the form of antibiotics and vaccines (Paton 1997, pp. 66-84) as well as insecticides has been of great significance here. Global life expectancy at birth which is approx. 65 years at the moment will extend to approx. 75 years in the next fifty years. The most developed countries have already reached this threshold and it is expected that by 2050 life expectancy there will be approx. 83 years. At the same time the difference between the more and less developed world regions decreases. As presented in figure 2.3. regardless of the region and the level of development of a country life expectancy of women is greater than that of men. In Japan already life expectancy of women is 85 years and will grow to exceed 90 years in the future (*Population challenges...* 2005).

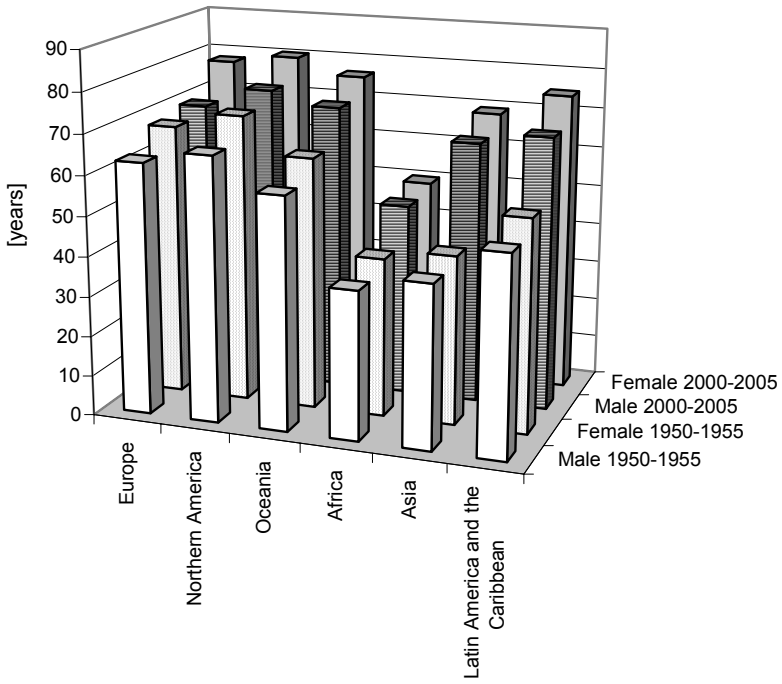

Fig.2.3. Life expectancy at birth by sex for major world areas. Drawn from data reported in: *Population challenges and development goals*, 2005. Department of Economic and Social Affairs. Population Division. United Nations, New York. *www.un.org*.

According to the UN experts ageing of the population is an unprecedented phenomenon in the history of humanity; it is a great challenge and a chance for the societies which have to prepare for the consequences. For the first time in history the number of elderly people will be (and in developed countries it already is) larger than that of young people. To a large extent this is a permanent and irreversible phenomenon. (*World Population Ageing: 1950-2050*, 2002). This is not only a problem of the elderly. An increase in their number has a direct influence on feeling of justice and solidarity between generations and within generations, which are the basis for the functioning of a society, among other things. Ageing of populations resulting from the extending of the average duration of life and a decrease in birth rate is the most characteristic demographic feature of populations of many countries, and an increase in the number and percentage of old people in the world is one of the factors which most affect the life of the whole societies, in particular the system of health and social care (Davis, Graham, Pearce 1999; Szatur-Jaworska 2002; Trafiałek 2003).

- Economy. The growing number of elderly people affects the economy, saving and investing money, the size and structure of consumption. Changes are perceived at the labour market where the percentage of older men decreases and that of older women increases. Fewer elderly people work in the rich countries (21%) than in less developed countries (50%) where the possibilities of retiring are limited and pensions are low. The young minority of the society finances the old-age pensions and disability pensions. The system of social care has to be more extended and taxes higher in order to support older citizens.
- Social sphere. The structure of family and living conditions, including housing conditions change. Older people require care from their families which gives rise to problems with a greater and greater professional activity of women. The parent support ratio (the number of people aged 85 and more in relation to people aged 50-64) was two 85-year-olds per 100 people in 1950, four in 2000 and in 2050 the ratio of 100/100 is predicted. The number of schools for young people falls and more care institutions are opened. There is a problem of education of the elderly and illiteracy which is generally disappearing, but with age the number of illiterate people increases. This is combined with the fact that the older population is feminised.
- Politics. Voting preferences change, groups representing the opinions and interests of the older generation citizens gain popularity.
- Health. General health in the society, deteriorating with age, requires greater expenditure and efforts in terms of long-term care from the younger generation.

2.3. The need for masters athletics

Demographic changes in a natural way include also the population of athletes. It can be illustrated by the example of sport veterans in Germany where this movement is thriving. In 2001 the number of athletes aged over 30 in sports clubs equalled the number of young athletes (8-29-years-old) and at the moment it is slightly higher. The forecast for 2050 indicates that the trend will continue and the proportions of approx. 54/38% will be reached. A group that is growing particularly quickly in Germany is athletes over 60 who approx. 20 years ago accounted for about 2% and now as much as 10% of the athletes (Maurer 2005b).

The need for sport of the elderly does not actually have to be justified as this phenomenon has been created and propagated by the

athletes themselves. One can only wonder what kind of personal and social needs the movement satisfies and what new values it brings into various spheres of life. Veterans athletics, in particular with respect to changes discussed in this chapter, generally only benefits the athletes and societies – in psychological, social, health-related, economic terms – the most important of the benefits, in our opinion, we present below.

- Satisfying internal (psychological) needs. Through sport veterans, like young people, satisfy their ambitions, the need of friendship, confirm their psycho-physical capabilities, maintain self-efficacy, meet their hedonistic needs (joy of sport) etc. All this positively affects the feeling of self-esteem and mental health in general.
- Self-reliance and independence in everyday life. The elderly people who do sport, by maintaining high activity and physical fitness, do not usually require the care of their families or social institutions in everyday lives. Thus, they are not a burden, but even a support for younger members of the society. Professionally active people are more efficient at work, make mistakes less often and do not take a sick leave.
- Lower social costs of health care. Older athletes are affected to a much less extent by typical diseases connected with civilisation resulting from sedentary life style (circulatory system diseases, obesity, diabetes, osteoporosis, hormonal disorders etc.). In this way they do not burden the state budget with costs of treatment of these chronic diseases or their complications. Detailed analyses indicate that not taking part in physical activity is economically more expensive and participation of a possibly large number of people in physical activity brings measurable material benefits to the society (Weiss 2002).
- Living promotion of an active life style. Veterans who undertake regular sports training by taking care of rational diet and hygienic life style, not abusing alcohol and rejecting the use of dangerous substances may be role models. We are certain that their example appropriately publicised in the society can do more than many campaigns or intervention programmes.
- Social integration. Veterans sport is an integral part of sport and is particularly predisposed to the propagation of the idea of “sport for all”. The division into sport of children and young people, competitive sport and veterans sport or sport of the disabled is conventional. Veterans sport integrates and connects generations. More and more often competitions are organised in which people of various ages, physical and intellectual fitness participate together or even compete with each other.

- Propagation of friendly attitudes towards other nations and cultures and sports competition in the spirit of fair play. Veterans sports movement is not governed by political or commercial reasons. Moreover, older athletes treat each other with greater mutual respect and approval for cultural differences. They are an excellent source of positive sporting and moral tradition for the younger generations.
- Economic factor. In many developed countries veteran athletes have a significant purchasing power. By allotting their savings and pensions for participation in sports movement, including to a large extent "sports tourism", they stimulate the market of trade and services. The producers of clothing, footwear, sports equipment and creators of new technologies assisting training shift the focus of their activities to mature amateur athletes. The benefit is mutual as seniors may use the developments of science and technology available so far only to elite competitive athletes, ensuring their greater comfort and effectiveness of training and minimising the risk of injury. The sports industry increases it profits directing its offer to a mass customer rather than to few outstanding athletes.
- Expanding the knowledge about mental and physical possibilities of people. Veterans sport, and athletics in particular, provides a lot of new information about human motorics in respect to the mature and old age, which are not well researched yet.
- Change in the cultural image of old age. Veterans of athletics become a part of the tendency of change in perception of old people. Contemporary old people less and less often remind those from a few generations ago. With their clothes, behaviour, physical and intellectual fitness, artistic activity, vigour they do not differ from young people as much as they used to, and in some aspects they even do better (Zadrożyńska 2001, pp. 99-124). They want to be active, enjoy life, make new friendships, travel, do sport. And it does not seem an attempt to "cheat time", to imitate "young style" or give in to the omnipresent "youth terror" in fear of rejection to the margin of social life, but an autonomous attitude resulting from an internal need as well as time and financial possibilities.

It should also be indicated that veterans athletics is not sport of former "retired" Olympic champions (this category of athletes is a small percentage, although it adds colour to the movement). This is a sport which creates completely new champions of mature age, open to participation for everyone who wants to join. Many veterans started their adventure with athletics only at an adult age.

3. Masters record holders

3.1. Age and record results in athletics

Breaking records in athletics is associated with achievements of relatively young people. And it is probably right as absolute achievements in this sport are held by people at the age of approx. 27 years, if you consider it in the form of the arithmetic mean. Table 3.1. shows that the age of current world record holders – both men and women – is within the range of 20 to 35 years of age. What is interesting, the upper limit of this range is exactly the same as the lower age limit for athletics veterans adopted in 2005. Before and after this stage of life the upper limit of record achievements of track and field athletes is lower. Hence the analogy with so called "sensitive periods" that is phases of ontogenesis with "an increased sensitivity to environmental stimuli, including training" (after: Szopa, Mleczko, Żak 1996, p. 117). This term may refer to individual properties, not average ones, like in our case, but it seems justified to state that in the life of each person there is a certain limited period when maximalisation of motor achievements is possible. Clearly the range between 20 and 35 years of age is optimal in this respect for high class athletes. Except for the obvious issue of genetic and morphological predisposition necessary to achieve champion results it may be explained as follows: In the period in question the processes of maturing and growth in the body have been finalised, and the athlete has earlier been through the stages of general and directed training which give the base for sports specialisation. On this basis training methods and means may be used which operate significantly higher loads than before, as well as shape those aspects of motorics the development of which in childhood or youthful years was not recommended due to health or training reasons (maximal power, strength endurance, anaerobic endurance – according to: Sozański, Tomaszewski 1995, p. 34). This high effectiveness of competitive training reaches its end when the first symptoms of involution processes appear and reactions of the body to training stimuli are weaker.

Tab. 3.1. Mean age of current world record holders in track and field events. Data obtained from the IAAF information updated in January 2006 (*www.iaaf.org* > *Statistics* > *Records*). *N* – number of record holders

	WOMEN				MEN			
	N	mean	min.	max.	*N*	mean	min.	max.
All events	*39*	26.6	20	35	*40*	27.2	20	35
Short runs	*5*	27.6	25	29	*5*	27.2	23	32
Middle distances	*4*	27.3	21	32	*4*	23.8	21	25
Long distances	*17*	26.6	20	33	*17*	26.2	20	34
Walking	*3*	29.7	23	35	*5*	31.4	24	35
Jumping	*4*	25.0	22	29	*4*	28.5	26	31
Throwing	*4*	24.5	22	26	*4*	27.8	24	31
Heptathlon/Decathlon	*1*	26	–	–	*1*	27	–	–

Thanks to modern training means and methods the duration of competitive sports career at a high level can now be extended beyond the age of 35 or 40, as shown by examples of some athletes: Merlene Ottey, Linford Christie (100 m and 200 m races), Alfred Oerter (discus throw) and Simon Vroemen (3,000 m steeple chase) (table 3.2.). However, breaking world records should not be expected at the end of sports career, although successes in the form of world championship and Olympic Games medals are still possible. It cannot be ruled out that the upper age limit for breaking records in athletics will be moved. Male and female walkers are the closest to it with a mean age of world record holders of 30-31 years (table 3.1.). Only this group includes 35-year-olds. It seems that the ultimate limit for participation in the competitive (professional) field and track athletics is at the moment the age of 45-50 which relates to individual cases.

In the 1960s actual age limits for greatest successes in sport in individual field and track events were narrower than now (N.G. Ozolin, after: Ważny 1971). It was assumed that the longer the distance in running events and the higher the degree of technique complication in jumping and throwing, the later the peak sports capabilities are achieved. So men sprinters and jumpers achieved their personal bests from the age of 22-24 (100 m race, high jump) to 25-28 (400 m hurdles, pole vault). Successes in middle and long distance races were expected at the age of 25-26 (800 m) to 28-30 (50 km walk). Throwers usually revealed their maximum capabilities from the age of 24-25 (shot put) to 26-30 (hammer throw). In case of women who competed in less than half of men's events (virtually not at all in long distance races), these limits were 2-3 years lower. Nowadays world records in events generally

considered as “young” (short sprint, jumps) are broken by athletes at ages exceeding not only previously accepted limits of optimum performance, but also exceeding what was considered in the past a period of maintaining high performance or continuing the career in general. The majority of current world record holders in sprint and jumps are about 30 years old, which used to be and advanced “sporting retirement”. In case of endurance distances a reverse phenomenon is observed. Some world records in medium and long races and walks are held by 20-23-year-old athletes, that is at an age which 30-40 years ago was the beginning of the career or the introduction to specialist training. It is clear then that the age limits for achieving maximum performance in competitive athletics extended, hence more and more often outstanding athletes at veteran age appear in stadiums.

Tab. 3.2. Examples of athletes aged 36 or more keeping their performances on top level (Data obtained from: *www.world-masters--athletics.org > Records News*)

Age		Country	Event	Results	Year
			MEN		
36	Mike Boit	KEN	1,500 m	3:33.91	1985
	Linford Christie	GBR	100 m/200 m	10.03 s/20.40 s	1996
37	Carlos Lopes	POR	10,000 m	27:17.48	1984
38	Rickard Bruch	SWE	discus	71.26 m	1984
	Carlos Lopez	POR	marathon	2:07.12	1985
	Brian Oldfield	USA	shot	22.19 m	1984
40	Troy Douglas	NED	200 m	20.64 m	2003
	Brian Oldfield	USA	shot	21.41 m	1985
41	Igor Astapkovich	RUS	hammer	81.35 m	2003
	Peter Blank	GER	discus	84.08 m	2003
43	Alfred Oerter	USA	discus	69.48 m	1980
44	Larry Jessee	USA	pole vault	5.50 m	1996
45	Alfred Oerter	USA	discus	66.12 m	1982
	Ivan Ivancic	YUG	shot	20.77 m	1983
			WOMEN		
36	Lyubov Gurina	RUS	800 m	1:56.53	1994
	Merlene Ottey	JAM	100 m	10.74 s	1996
	Larisa Peleshenko	RUS	shot	21.46 m	2000
	Marina Stepanova	RUS	400Hu	52.94 s	1986
40	Ellina Zvereva	BLR	discus	67.10 m	2001
42	Yekatarina Podkopayeva	RUS	800 m/1,500 m	1:59.25/3:59.78	1994
43	Merlene Ottey	SLO	200 m	22.89 s	2003
44	Merlene Ottey	SLO	100 m	11.09 s	2004
46	Yekatarina Podkopayeva	RUS	800 m/1,500 m	2:02.82/4:05.44	1998
	Tatiana Pozdnyakova	UKR	marathon	2:29:00	2002
50	Tatyana Pozdnyakova	UKR	marathon	2:31:05	2005

3.2. World records in athletics with consideration of athletes' age

A career of a competitive athlete, even taking into account the tendency to extend the period of competition at a high level, ends relatively quickly. It is interesting, how limits of human possibilities change within the period of life described conventionally as mature age and old age. What upper limit of physical fitness is possible to be achieved by the humankind after the age of 50, 70 or 100 years? At the time when involution processes in the human body are significantly advanced and it is struggling with signs of ageing. Athletics allows to answer this question to a large extent. Field and track events demand a lot from an athlete in terms of the level of motor fitness abilities (strength, speed, endurance) and co-ordination abilities (making it possible to learn and use an appropriate movement technique) therefore are a "natural" measure of physical fitness. It is very important too, that competition takes place in standard conditions, on standardised stadiums and using the equipment as strictly specified by the regulations. Sports performance is then generally comparable, irrespective of place or time. Additionally, athletics is a sports discipline which is done all over the world, so there is a huge number of data scrupulously recorded in many statistics which can be used for various analyses.

Tables 3.3. and 3.4. show record performances of men and women in most of classic field and track events in consecutive age categories. The results in the first column (category 20-35 years) are absolute achievements by competitive athletes. We treat them as a benchmark for performances of the masters. In the following age categories the level of records naturally lowers gradually. It is difficult to obtain comparative population data as in scientific studies non-training people are not subject to tests with such a high scale of difficulty (extreme exercise loads or a high level of technique complexity). It can be noted however that these are performances far from average, at extreme ranges of changeability for this type of fitness. For example, the results of 12-13 s in 100 m race, 35-40 minutes in 10 km race or a height of almost 4 m in pole vault achieved by 65-70 year olds, that is people at a retirement age, are unattainable not only for non-training people at the same age, but also for the majority of young people below twenty or in their twenties.

Progression, achieving absolute performances, and then their regression can be described with a high accuracy (error below 2%) using a parabola, expressing the age in the form of a common logarithm and results of races as a mean speed according to the general formula:

Tab. 3.3. Best world performances in chosen male events by age category. (*www.iaaf.org*) and other sources (*www.weteranila.phg.pl; www.gbrathletics.com; www.masterstrack.com;*)

Age [years] >>	20-35	35-40	40-45	45-50	50-55	55-60
100 m [s]	9.77	9.97	10.29	10.96	10.95	11.57
200 m [s]	19.32	20.11	20.64	22.13	22.58	23.37
400 m [s]	43.18	45.76	47.82	50.20	51.39	52.24
800 m [s]	1:41.11	1:43.36	1:50.69	1:54.18	1:58.65	2:03.70
1,500 m [min:s]	3:26.00	3:32.45	3:44.89	3:58.30	4:05.20	4:12.50
3,000 m [min:s]	7:20.67	7:37.23	8:05.08	8:27.70	8:49.20	8:57.28
5,000 m [min:s]	12:37.35	13:01.32	13:43.15	14:23.60	14:53.20	15:41.72
10,000 m [min:s]	26:17.53	27:17.48	28:30.88	30:02.56	30:56.08	32:46.50
Marathon [h:min]	2:04:55	2:07:12	2:08:46	2:15:51	2:19:29	2:25:56
R. Walk 20 km [h:min]	1:17:21	1:18:44	1:21:36	1:25:03	1:26:32	1:35:12
110 m Hu [s]#	12.91	13.11	13.73	14.70	–	–
100 m Hu [s] †#	–	–	–	–	13.57	14.49
80 m Hu [s] †#	–	–	–	–	–	–
400 m Hu [s]#	46.78	48.93	52.62	55.18	58.10	58.92
300 m Hu [s] †#	–	–	–	–	–	–
3,000 m St [min:s]	7:53.63	8:04.95	8:38.40	9:16.10	9:38.80	9:55.05
2,000 m St [min:s]†	–	–	–	–	–	–
High jump [m]	2.45	2.27	2.15	2.00	1.98	1.83
Pole vault [m]	6.14	5.86	5.50	5.10	4.73	4.26
Long jump [m]	8.95	8.50	7.68	7.27	6.84	6.35
Triple jump [m]	18.29	17.92	16.58	14.78	14.07	13.85
Shot put [m]#	23.12*	22.67	21.41	20.77	18.45	17.50
Discus [m]#	74.08*	71.26	69.48	66.12	68.40	64.58
Hammer [m]#	86.74	83.62	82.23	67.74	66.92	63.70
Javelin [m]#	98.48	92.80	84.08	70.96	70.71	64.17
Heavy weight [m] †#	–	25.17	22.52	19.58	21.54	19.70

† – non-classic event, IAAF-records are not registered
# – Note: In consecutive age categories, parameters of implements and equipment change due to
* – doping use revealed (according to *Arndt, Singler, Treutlein 2004*)

Drawn from WMA data (*www.world-masters-athletics.org*), IAAF data *www.geocities.com/aedziepak*). Updated in December 2005

60-65	*65-70*	*70-75*	*75-80*	*80-85*	*85-90*	*90-95*	*95-100*	*100+*
11.70	12.62	12.91	13.61	14.35	16.16	18.08	24.01	30.86
24.00	25.46	26.71	27.97	30.89	34.41	40.00	57.58	77.59
53.88	56.37	61.01	65.34	72.85	84.18	98.69	2:38.64	3:41.00
2:10.42	2:14.33	2:20.52	2:36.28	2:53.50	3:26.60	4:28.20	–	–
4:27.65	4:39.87	4:57.65	5:22.70	6:04.28	7:03.38	8:40.00	13:53.80	16:46.41
9:29.47	9:47.40	10:42.40	12:00.94	13:12.60	16:04.60	18:36.00	–	–
16:12.57	16:38.80	18:33.38	20:00.13	21:57.88	25:47.54	31:25.45	50:23.53	–
34:14.88	34:42.20	38:04.13	41:47.31	44:29.40	52:50.80	69:27.50	–	–
2:38:15	2:41:57	2:54:48	3:18:10	3:39:18	4:34:55	5:40:01	–	–
1:37:46	1:43:34	1:58:10	1:55:19	2:04:49	2:26:07	2:34:01	2:48:19	–
–	–	–	–	–	–	–	–	–
14.62	15.61	–	–	–	–	–	–	–
–	–	12.99	13.68	14.75	18.06	22.76	–	–
–	–	–	–	–	–	–	–	–
42.31	43.89	49.07	52.91	62.61	87.13	–	–	–
–	–	–	–	–	–	–	–	–
6:30.21	7:18.2	8:00.83	9:17.38	10:01.18	13:50.9	–	–	–
1.72	1.66	1.52	1.44	1.34	1.22	1.10	–	–
3.90	3.77	3.31	2.96	2.60	2.24	1.42	–	–
6.07	5.47	5.19	4.78	4.19	3.75	3.07	–	–
12.68	11.94	10.61	10.05	8.95	7.91	6.59	–	–
18.20	15.12	14.91	13.84	12.27	10.42	7.59	6.10	4.12
66.36	55.62	49.34	45.68	37.86	30.81	22.06	15.95	8.91
61.76	55.52	53.12	45.92	37.18	28.01	24.61	15.97	8.86
61.02	54.70	48.34	43.77	36.39	31.72	21.59	20.80	6.69
19.84	17.38	19.00	17.40	14.56	11.68	9.00		

the IAAF/ WMA rules

Tab. 3.4. Best world performances in chosen female events by age data (*www.iaaf.org*) and other sources (*www.weteranila.phg.pl; www.geocities.com/aedziepak*). Updated in December 2005

Age >>	20-35	35-40	40-45	45-50	50-55	55-60
100 m [s]	10.49**	10.74	10.99	12.25	12.50	13.30
200 m [s]	21.34	21.93	22.72	25.46	25.72	27.39
400 m [s]	47.60*	50.27	53.68	56.15	58.51	62.40
800 m [s]	1:53.28	1:56.53	1:59.25	2:02.82	2:16.05	2:22.47
1,500 m [min:s]	3:50.46	3:57.73	3:59.78	4:05.44	4:40.92	4:57.40
3,000 m [min:s]	8:06.11	8:23.23	9:02.83	9:17.27	10:08.83	10:38.80
5,000 m [min:s]	14:24.68	14:37.20	15:20.59	15:55.71	17:17.02	17:58.05
10,000 m [min:s]	29:31.78	30:30.26	32:12.07	32:34.06	35:37.0	37:47.95
Marathon [h:min:s]	2:15:25	2:24.35	2:26:51	2:29:00	2:31:05	2:52:14
R. Walk 20 km [h:min]	1:25:41	1:25:41	1:33:40	1:34.44	1:48:54	1:53:45
100 m Hu [s]	12.21	12.40	13.55	–	–	–
80 m Hu [s] †#	–	–	11.24	11.51	12.68	12.31
400 m Hu [s]	52.34	52.94	58.30	64.09	–	–
300 m Hu [s] †#	–	–	–	–	47.01	49.14
3,000 m St [min:s]	09:01.59	9:50.29	10:38.98	–	–	–
2,000 m St [min:s] †	–	6:30.83	7:05.06	7:16.90	7:43.99	7:58.43
High jump [m]	2.09	2.01	1.76	1.76	1.57	1.47
Pole vault [m]	5.01	4.22	3.60	3.50	3.25	3.05
Long jump [m]	7.52**	6.99	6.41	5.59	5.40	5.01
Triple jump [m]	15.50	14.42	12.48	11.98	11.45	10.20
Shot put [m]#	22.63**	21.46	19.05	16.95	14.85	14.47
Discus [m]	76.80*	69.60	67.10	64.09	45.48	43.36
Hammer [m]#	77.06	69.17	59.29	51.30	51.73	51.30
Javelin [m]#	71.70	66.00	64.06	47.74	41.50	44.44
Heavy weight [m] †#	–	14.01	17.24	15.96	13.75	14.94

† – non-classic event, IAAF-records are not registered
# – Note: In consecutive age categories, parameters of implements and equipment change due to
* – doping use revealed (according to *Arndt, Singler, Treutlein 2004*)
** – probably achieved under doping (according to *Arndt, Singler, Treutlein 2004*)

category. Drawn from WMA data (*www.world-masters-athletics.org*), IAAF *www.gbrathletics.com; www.masterstrack.com;*

60-65	*65-70*	*70-75*	*75-80*	*80-85*	*85-90*	*90-95*	*95-100*
13.89	14.29	15.16	15.91	18.42	21.18	23.18	–
28.87	30.46	31.45	34.40	41.11	48.36	82.29	–
67.30	68.21	78.26	88.17	1:40.45	2:13.68	3:06.85	–
2:36.94	2:41.81	3:04.44	3:31.37	3:45.00	5:00.58	6:59.18	–
5:18.14	5:43.61	6:12.14	6:42.13	7:32.22	10:33.40	–	–
11:41.91	12:17.49	13:27.53	16:33.0	20:41.04	24:08.62	–	–
19:14.8	21:20.30	22:52.05	25:14.44	28:32.67	37:02.30	–	–
39:21.1	44:19.97	47:22.51	52:08.73	58:40.03	86:55.70	–	–
3:14:50	3:28:10	3:48:14	4:10:07	4:49:50	6:53:50	8:53:08	–
1:57:43	2:06:41	2:27:57	2:39:46	3:25:09	–	–	–
–	–	–	–	–	–	–	–
13.78	14.27	16.10	20.04	24.34	–	–	–
–	–	–	–	–	–	–	–
51.64	55.69	67.16	89.00	–	–	–	–
–	–	–	–	–	–	–	–
8:47.61	10:23.82	11:24.25	–	–	–	–	–
1.41	1.34	1.26	1.15	1.00	0.94	–	–
3.10	2.32	2.16	1.90	1.40	–	–	–
4.75	4.64	4.15	3.77	2.78	2.19	–	–
10.03	9.51	8.09	6.95	5.65	5.50	–	–
13.20	12.21	11.02	7.91	7.71	5.93	5.37	4.72
39.24	37.62	31.62	22.44	20.50	15.21	12.10	9.85
46.09	44.38	37.24	26.39	22.60	18.62	13.13	11.37
41.28	36.79	28.89	23.02	19.86	18.56	10.58	8.13
14.49	14.03	13.66	10.12	7.46			

the IAAF/ WMA rules

where: $y = f(\log T)$

y – record performance
T – athlete's age.

If however we refer the record in a given age category (y) to the absolute record (y_{max}) according to the formula $y/y_{max,}$ the performance in youth categories rises dramatically and after reaching the absolute value curves slightly and then falls linearly. The curve of progress of record performance rises sharply to maximum and then on the right side changes its character and turns into a linear relationship of the result to age (Hegner 2006).

Figures 3.1. and 3.2. present the fall in the level of world records in age categories in reference to absolute records (achieved by athletes, men and women, aged 20-35 years) according to the formula y/y_{max}. Examples characteristic for each group of events were used. In races the time of covering the distance was translated into the speed of running. A relatively most gentle fall in the level of records is noted in 100 m race, then in 1500 m and marathon. Greater falls may be noted in field events – long jump, pole vault and women's discus throw.

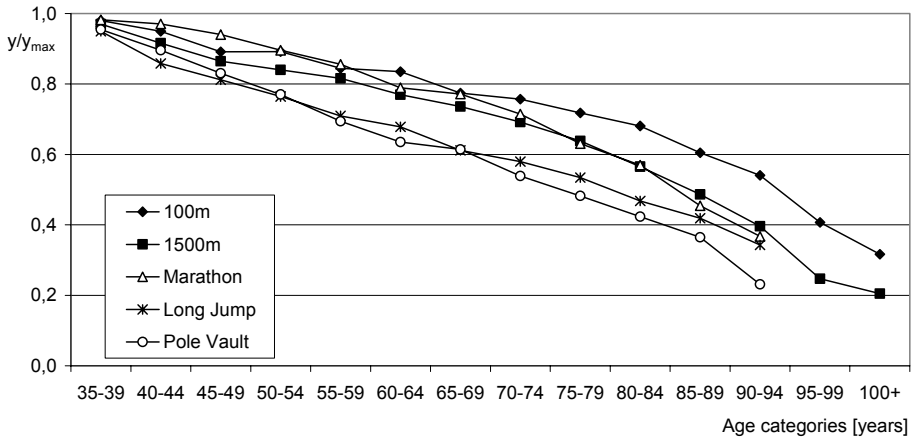

Fig. 3.1. Decrease of world records level in men in relation to absolute world records. Drawn and calculated from the official data of WMA (*www.world-masters-athletics.org*) and IAAF (*www.iaaf.org*)

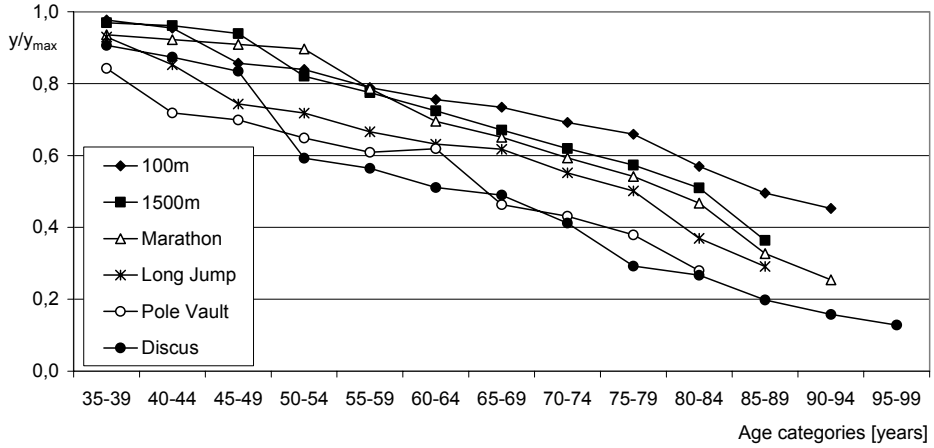

Fig. 3.2. Decrease of world records level in women in relation to absolute world records. Drawn and calculated from the official data of WMA (*www.world-masters-athletics.org*) and IAAF (www.iaaf.org)

Differences between record performances of men and women increase with age (tab. 3.5.). They are relatively smallest in 100 m race – from 7.4% in the category of 20-35 years to 17% in the category up to 80 years, only later they increase to approx. 30% (80-95 years). In case of 200 and 400 m races initial differences are approx. 10%, they gradually increase to over 30% in 80-85-year-olds, to reach abruptly even 105.7% in the oldest categories (200 m, category 90-95 years). In medium and long distance races the decrease in differences between men's and women's records is noted in categories 40-55 years in comparison to the initial ones, then the difference gradually grows to 50-65%. In the youngest age categories the greatest differences are noted in jumps, in particular in pole vault (28% in the category 35-40 years). In comparison with other events differences in jumps show greater stability and do not grow so dynamically in successive age categories. In this respect high jump is the most uniform, where for the age 20-35 the difference is 14.7% and for the age 80-85 25.4%, and in most categories it is below twenty percent. Different parameters of equipment and apparatuses for men and women in throws and hurdles do not make it possible to make similar comparisons.

Tab. 3.5. Differences (%) between world records of men and women in chosen track and field events (men's results adopted as 100%). Drawn and calculated from the official data of WMA (www.world-masters-athletics.org) and IAAF (www.iaaf.org)

Age [years]	20-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90	90-95
100 m	7.4	7.7	6.8	11.8	14.2	15.0	18.7	13.2	17.4	16.9	28.4	31.1	28.2
200 m	10.5	9.1	10.1	15.0	13.9	17.2	20.3	19.6	17.7	23.0	33.1	40.5	105.7
400 m	10.2	9.9	12.3	11.9	13.9	19.4	24.9	21.0	28.3	34.9	38.0	58.8	89.3
800 m	12.0	12.7	7.7	7.6	14.7	15.2	20.3	20.5	31.3	35.3	29.7	45.5	56.3
1,500 m	11.9	11.9	6.6	3.0	14.6	17.8	18.9	22.8	25.0	24.6	24.1	49.6	–
3,000 m	10.3	10.1	11.9	9.8	15.0	18.9	23.3	25.6	25.7	37.7	56.6	50.2	–
5,000 m	14.2	12.3	11.8	10.7	16.1	14.5	18.7	28.2	23.2	26.2	30.0	43.6	–
10,000 m	12.3	11.8	12.9	8.4	15.1	15.3	14.9	27.7	24.4	24.8	31.9	64.5	–
Marathon	8.4	13.3	14.0	9.7	8.3	18.0	23.1	28.5	30.6	26.2	32.2	50.5	56.8
Walk 20 km	10.8	8.8	14.8	11.4	25.8	19.5	20.4	22.3	25.2	38.5	64.4	–	–
High Jump	14.7	11.5	18.1	12.0	20.7	19.7	18.0	19.3	17.1	20.1	25.4	23.0	–
Pole Vault	18.4	28.0	34.5	31.4	31.3	28.4	20.5	38.5	34.7	35.8	46.2	–	–
Long Jump	16.0	17.8	16.5	23.1	21.1	21.1	21.7	15.2	20.0	21.1	33.7	41.6	–
Triple Jump	15.3	19.5	24.7	18.9	18.6	26.4	20.9	20.4	23.8	30.8	36.9	30.5	–

Tab. 3.6. The oldest track and field world record holders. Drawn from WMA data: *www.world-masters-athletics.org* > Records news

Name	*Age*	*Country*	*Event*	*Result*	*Date*
		WOMEN			
Ruth Frith	95	Australia	Shot	4.72 m	21.10.2004
			Discus	9.85 m	02.10.2004
			Hammer	11.37 m	25.09.2005
			Javelin	8.13 m	18.09.2004
Nora Wedemo	90	Sweden	100 m	23.18 s	09.08.2003
Rosario Iglesias	92	Mexico	200 m	82.29 s	08.07.2003
	90		400 m	3:06.85	13.07.2001
			800 m	6:59.18	09.07.2001
Mavis Lindgren	90-95*	USA	Marathon	8:53:08	28.09.1997
		MEN			
Philip Rabinowitz	100	RSA	100 m	30.86 s	10.07.2004
			200 m	77.59 s	17.12.2004
Erwin Jaskulski	100	Austria	400 m	3:41.0	13.03.2003
Leslie Amey	100	Australia	1,500 m	16:46.41	01.04.2000
Fauja Singh	90-95*	Great Britain	Marathon	5:40:01	28.09.2003
Waldo McBurney	100	USA	Shot	4.12 m	04.07.2003
Everett Hosack	100	USA	Discus	8.91 m	01.06.2002
			Hammer	8.86 m	30.06.2002
John Whittemore	100	USA	Javelin	6.69 m	18.03.2000

* – exact age not given

Table 3.6. shows the list of the oldest athletics world record holders. No doubt a unique record is already reaching such an advanced age and maintaining at the same time high physical fitness that allows to take part in sports competition. Hence various questions related to longevity, fitness and activity and their mutual relations arise. One of the most frequent ones relates to whether activity and maintaining a relatively high level of physical fitness contributes really to the extension of human life. There is no scientific evidence to confirm it, however so called active life style, also based on participation in masters sport, certainly improves quality of life and allows for better use of biological potential of our bodies.

3.3. Laws of progress of sports results

Like in competitive sport, in masters athletics we encounter the problem of progression of record results and their forecasting. Probably precise determining the ultimate limit of human capabilities is not possible here either, the more so because the number of factors which affect the sports performance seems to increase rather than decrease in comparison with young athletes. However, the progress of sports results of veterans can be followed and attempts to forecast them can be made using appropriate statistical methods. This research problem has not been yet pursued in relation to veterans, that is why we use here the results of works relating to athletics in general, in order to suggest possible ways of future analyses, and then try to specify the stage of development of records of masters of athletics.

The researchers analysing the progression of best results in athletics in the world and formulating forecasts on this basis, stated already relatively early that changes in these unique sports achievements in time are best described by so called logistic curve shaped like a more or less flattened letter S (Skorowski 1969; Hernig, Klimmer 1980). Contemporary analyses confirm the usefulness of such a statistical model of progression of record results (Nevill, Whyte 2005). Figure 3.3. presents the above curve which shows at the same time three phases of development of top results in any field and track event. In the initial phase (first years of existence of the event) when the level of results is relatively low we note greater and greater dynamics of development of records. The acceleration phase is characterised by a stable dynamic, generally exponential increase in the level of results. In the stagnation phase the results develop very slowly, getting closer in the given conditions to presumable limits of human capabilities, which is expressed by asymptote accompanying the upper part of the logistic curve.

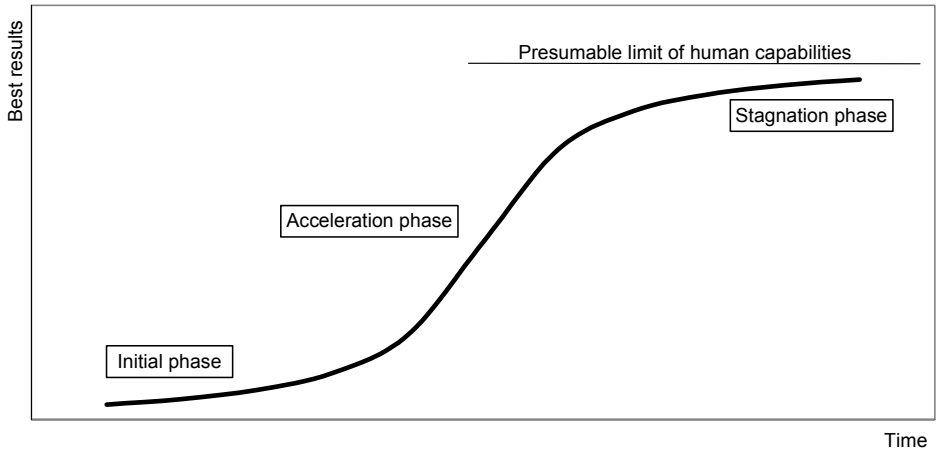

Fig. 3.3. Theoretical S-shaped logistic curve describing the progress of world records in track and field athletics. According to *Skorowski (1969)* and *Hernig/Klimmer (198*0)

When this model is referred to each year's achievements for example of ten world's best young athletes, the phase of development of a given event can be usually determined on the basis of the current dynamics of growth in the level of results. Thanks to it further progress or its deceleration may be forecast and new ways of overcoming further barriers may be searched for. As far as young athletes are concerned we know for example that at the moment only women's pole vault is in the acceleration phase which is shown not only by the rate of growth, but the frequency of setting world records (six times in 2004). The majority of other events, i.e. sprint, middle and long distance races (in particular women's 1,500 m race), jumps and throws are in the more or less advanced stagnation phase (Gębski 2001; Nevill, Whyte 2005; Ważny 2001). The absolute records set are on such a high level that they play a role of "asymptote" which the next generations of athletes are trying to get near to. Of course these type of statements should always be treated with a kind reserve, as it is not the first time when the end of human capabilities is "announced", too optimistic or only partially accurate forecasts are given (Hernig, Klimmer 1980; Khomenkov 1980, Ważny 1981) which results from imperfection of forecasting methods, subjective assessment of the experts or appearance of unpredictable factors and events.

The factors affecting the sports level, which is expressed in measurable sports in the form of record results, can be divided into accelerating and decelerating ones (Skorowski 1969; Hernig, Klimmer 1980; Gębski 2001; Nevill, Whyte 2005).

1) *Accelerating factors*: development of training methods (physical and mental) and sports techniques, new methods of biological regeneration, means of pharmacological support, rational diet, medical care, improvement of equipment and sports facilities, propagation of sport in the world, development of science of sport, professionalisation of the coach's function, efficient selection in sport, increase of financial expenditure on the development of sport and system of competition (financial incentives for wins, medals and records), growing social recognition for sport, in particular in case of women. The stimulating role can also be played by the appearance of a group of athletes with special motor and volitional predisposition as it was the case for example in middle and long distance races which have been dominated by Africans.
2) *Decelerating factors* are mainly psychomotoric properties (limitations) of the human body and sports regulations, as well as periods of stagnation in the economic and scientific progress.

These are "intra-sports" factors. The progress of results and sport in general is also affected by external factors, existing outside physical culture and affecting various areas of social life, and, indirectly, the development of sports results. They are, among other things, social and political system and the state of economic development (industrialisation, income, level of living etc.) as well as levels of education, health care or hygiene in a given country with their all consequences (Skorowski 1968).The influence of both types of factors – internal and external – on the development of sport is a reflection on the one hand of the technical progress (or in a broader sense: the progress of civilisation) and on the other hand the progressing process of globalisation. Therefore, there are attempts to use the frequency of setting records in athletics for non-sport purposes as well, e.g. in economic sciences to explain changes in distribution of income, as the only available measure of technical progress and globalisation and their mutual relations (Munasinghe, O'Flaherty, Danninger 2001).

In the initial phase of development of a given athletics event the power of accelerating factors is greater than that of the decelerating ones, in the acceleration phase they are in a relative balance and in the stagnation phase decelerating factors prevail. Then human capabilities for given conditions of training and competition (equipment and facilities, sports regulations) are exhausted, and the same progress requires more and more financial expenditure, training loads and is more time-consuming. Certainly greater possibilities of development are open to field and track events with a greater degree of technical complexity as the progress is achieved on a wider range thanks to perfecting of the technique – apart from the development of fitness abilities of the athletes

and introduction of new equipment, facilities or track. This is proven by the dynamic of growth in the level of world's ten best results in men's jumps between 1951 and 1999. The values are growing in the following order: long jump (0.21%), triple jump (0.27%), high jump (0.32%) and pole vault (0.70%) that is by the order of technical complexity of these events (Gębski 2001). But this "reserve" in the form of complex movement structure has been exhausted in the recent years. The same author suggests that events in which leading motor abilities are characterised by greater flexibility (strength, endurance) than events based on various manifestations of speed have greater possibilities of development. This is indicated by greater increases in the level of results in the above period in 3,000 m steeple chase compared to 110 m hurdles.

Apart from general logistic law of development the best results are affected by two types of cycles; conditions-related and Olympic cycles (Skorowski 1969). Conditions-related cycles are related to the occurrence (often unpredictable) of one of the above mentioned accelerating factors. The breakthrough may take place for example as a result of change in regulations of competitions, improvement in equipment and track, better technique or innovative training methods and means. Typical examples known from history are the introduction of tempo training in long distance races before the Second World War, the change in the regulations of high jump in 1936 which made it possible to use the flop technique (it was allowed to come over the bar head first), the appearance in the 1960s of elastic pole, the use of new technique of shot put by Parry O'Brien and at the same time the introduction of power training on a large scale in athletic throws in the 1950s, the use of beneficial for sprinters and jumpers Tartan track at the end of the 1960s, the introduction of the flop technique in high jump by Dick Fosbury in 1968 and the appearance of a very large, well predisposed group of African runners in endurance races in the 1990s.

Until the 1980s the four-year Olympic cycle had been related to distinct fluctuations in the level of results of athletes in the successive years (progression in the Olympic year, regression in the following year, then a slight progress and then approaching the trend line). The Olympic year was abundant with world records and national records, in particular in the region where the games were taking place; an increased recruitment of young people to sports clubs could be observed. Nowadays the influence of this cycle on the rate of development of results in athletics is practically none (Gębski 2001). This is because apart from the Olympic Games the World Championships are held (since 1983, currently every 2 years) as well as commercial meetings which for many athletes are a better source of income and motivation than the traditional Olympic Games. Add to this the continent championships

which have been held for years and indoor tournaments. The four-year cycle of Olympic preparations has changed into annual training cycles so that each season athletes are ready to compete at the highest level.

A factor which is difficult to control and reveal is also banned doping, including genetic doping, possible to use in the near future. The reliability of some athletics world records is doubtful even today, especially if they were set 20 and more years ago and have not been broken to this day, in spite of a great progress in the scientific knowledge and technology of sports training. Even if the doping tests were negative, by using unique statistical methods taking into account previous greatest achievements it can be assessed whether a record result is within the range of performance possible to achieve in accordance with the regulations, or whether it significantly exceeds predicted border values. Such calculations have been made in case of a phenomenal world record in women's 3,000 m race from 1993 set by one of Chinese athletes (Robinson, Tawn 1995). Although statistics do not discover the reason for an exceptional result and are not the evidence of guilt, they allow the experts to follow the progress of results more precisely and control athletes more accurately. Anti-doping tests were negative for the runner in question, that is why a high level of predisposition and appropriate training must be assumed as the basis of her success. We may be dealing with a situation similar to this in men's long distance races, where a group of runners from a certain region in Africa appeared showing particular predisposition to endurance effort without the need to resort to banned methods and substances.

3.4. Prospects of progress of sports results in veterans athletics

The problem of progress and forecasts of results in veterans athletics is still awaiting detailed and reliable scientific analysis. Therefore, the comments below are to a large extent of general nature and should be treated as hypotheses and suggestions for the directions of research. Nevertheless, we make an attempt to outline them.

At the beginning we have to make an assumption – which has not been contradicted by anything so far – that athletics of people at a mature age is subject to the same general laws of development as its younger counterpart and sport in general. So the progress of results proceeds according to the described logistic law; moreover, we deal here with conditions-related cycles and a mutual interaction of various accelerating and decelerating factors.

Let us try to establish approximately the phase of development of masters athletics. The first club of "old" athletes in the world was

founded in the early 1930s. However, the beginnings of the organised activity on a large scale and dynamic spreading of the idea of veterans athletics, including the foundation of the world federation and continental federations dates back only to the 1970s. In comparison with the history of athletics, this sport as performed by mature people is a good 100 years younger than the whole of the modern athletics movement and is approximately 30-35 years old. By date of birth this would correspond to the beginnings of the 20th century in modern athletics, that is rather an early period. It seems however that the masters movement has gone beyond the initial phase very quickly and is currently at the stage of acceleration, that is a rapid, dramatic development. This is because mature athletes have based on regulations, equipment, training methods and organisational solutions which had been developed earlier. Apart from a few exceptions, almost all national federations gathering veterans are integral parts of the home athletics federation. The task has been inasmuch easier as elements unique for masters sport had "only" to be introduced to the existing structures. This was favoured by the change in social attitudes in many countries towards health-related physical activity and sport for all, including in particular women's sport which has taken place in late 1960s. Initially, the movement of veterans athletics was a part of the trend of the development of forms of physical activity specified by a common name of aerobic exercise, the scientific foundations of which had been described by Henry K. Cooper, and popularised in practice by the guru of joggers in the USA, Jim Fixx (Cooper 1986).

A precise establishment of the stage of development and a forecast of sports results of masters athletes would require detailed statistical analyses which have not been so far an object of scientific interest. Observing, of necessity rather superficially, the development of world veterans records it can be noted that new records are now set mainly in older age categories. Every year a dozen to a few dozen records are set. Probably the progress of record results in younger categories is close to the stagnation phase. The reason is, among other things, the participation in veterans movement of outstanding athletes who retire from their competitive careers and directly afterwards compete for some time in masters competitions on the basis of competitive training. Moreover, the World Masters Athletics recognises also as world records the results of competitive athletes competing outside the masters movement, but achieving appropriate age. In this situation it is difficult to expect the records of 36-50-year-old stars of athletics referred to in chapter 3.1. (tab. 3.2.) to be broken. The situation here is similar to this in most events of "young" athletics. It seems however that the progress of results in categories over 50 years of age will remain to be dynamic for a long time.

The progression or regression of results in sport is affected by many factors, the most important of which have been listed in chapter 2.3. A question arises which of them and to what extent affect also veterans athletics. Below, among stimuli affecting the progress of sports results in masters athletics, we distinguished in the first group stimulating factors, the possibilities of which are not fully used at the moment. In the second group we placed neutral factors which probably do not influence veterans sport as much as the sport of young people. The third group includes decelerating factors. We restricted the factors to those closely sport-related, although reference to non-sport problems will be inevitable.

Factors of progress of results in veterans athletics:

A. Stimulating factors

- Development of sports sciences, in particular search for new training methods. There is still a big gap to fill. It is training methods and solutions adjusted to the demands of the age, the gradual loss of fitness and deteriorating adaptive capabilities of the body. On the one hand, they have to ensure the development or maintaining of the level of physical fitness and on the other hand they have to guarantee health safety (avoidance of injuries, overstrain and over-training). Copying the training model of young athletes by masters may not only be ineffective, but also dangerous for health and life.
- New methods of biological regeneration. Their spread and rational use may allow for easier toleration of training loads, speeding up recovery processes and supercompensation in the training process.
- Pharmacological support may no doubt play a stimulating role in the progress of results. It has two faces: on the one hand, a treatment of diseases and ailments inevitably related to age, and on the other hand taking substances improving the effects of training. It is significant to make a sharp divide between supplementation and banned doping.
- A rational diet is a necessary element which combines with physical training. A diet appropriate for a given age and specifics of the athletic event will certainly contribute to an improvement (maintaining) of physical fitness and sports results. A condition for triggering this factors is extending and spreading of knowledge in this area.
- Medical care. It should include the health diagnosis in medical categories, including functional tests, but also prevention and treatment of diseases, advice in terms of choice of medicines etc.

Here the knowledge and awareness of the athletes themselves has to play a great role.

- Professionalisation of the coach's function. The majority of veterans train on their own. Those who have earlier extensive sports experience or are coaches or physical education teachers, who deal with sports training on an everyday basis, are in the best position. Introduction of the function (profession) of coach specialising in masters athletics with appropriate knowledge about older people training would be a step forward.
- Increasing financial expenditure on veterans sport. Athletes finance themselves, treating sport as a hobby. In richer countries they are supported by home federations. Including other institutions or sponsors in the financing on the local and national level would make it possible for many very good athletes who cannot afford to cover the costs of taking part in sports at a higher level to join in the competition. Even in developed countries the funds earmarked for masters sport by state institutions are a small percentage of amounts spent on sport of young people and competitive sport. The disproportion is getting wider and wider, as in some countries the number of mature athletes exceeds the number of young athletes (Maurer 2005b) and the health effect for the societies would be extremely positive.
- Social recognition and promotion of veterans sport. Although veterans sport is not condemned, it still causes surprise or distaste in some people. Masters athletes share the fate of disabled athletes (who are actually very fit physically). On the one hand this is related to ignorance, and on the other hand to difficulty in accepting different opinions and behaviour of these people. Even if in the sphere of attitudes and declarations masters are accepted, in the area of concrete activities (funding) they are ignored. It is forgotten that like competitive athletes, they represent their cities, regions or nations, sometimes in a more dignified and effective way than sports youth. Besides, they propagate and present an active and healthy life style.

B. Neutral factors

- Development of sports techniques. It cannot be denied that individual technical abilities of a given athlete contribute to the improvement of his or her sports performance. It seems however that in the scale of the whole veterans movement the factor of development of new techniques will not affect the progression of results. New techniques of athletic events have always developed on the basis of greater and greater physical fitness of next generations

of athletes. Gliding shot put, hammer throw with four turns or a running (hitch-kick) technique of long jump turned out to be possible only at a certain level of speed, strength and movement co-ordination of an athlete. Masters strive rather for a more or less successful imitation of competitive techniques. One can talk about adaptation of existing solutions rather than creation of completely new ones. In the oldest generation of veterans simplification, hence a kind of involution of technique, is observed – a standing start instead of a crouch start in sprint, standing throw instead of throw with a run-up or turns, using hand support during clearing obstacles in 2 and 3 km races etc. It also seems problematic to adopt new motor habits at a certain age, in particular in a situation when an athletes "remembers" the technique he used at a younger age.

- Improvement of sports equipment and facilities. New stimuli for development should not be expected here. Masters use the same equipment and facilities as younger athletes modifying their parameters appropriately for their age category. As a principle athletic regulations are changed very rarely, which one the one hand does not stimulate development, and on the other hand makes the results comparable for over 100 years and thus is a part of a rich tradition.
- Selection to veterans sport. There is no such a thing in veterans athletics. This is a sports movement which actually does not limit the participation in any respect, one does not have to meet any set somatic, motor ability criteria or show any particular inborn predisposition in order to start training. Limitations result only from the self-assessment of physical possibilities of an athlete and the motivation to participate in sport. The equivalent of selection is propagation of masters sport and winning over the largest possible number of participants of the movement.
- Competitors with special predisposition. It is very doubtful that in the near future a group of athletes should appear in veterans field and track athletics which would increase in a dramatic way the level of competition as it happened in competitive sport thanks to African runners (unless, rather than retire, they begin the masters adventure). The main "predisposition" to doing athletics at a mature age is longevity and an active, healthy life style, which occur mainly in countries with a high standard of living.

C. Decelerating factors

- Psychomotoric properties of a human body are a factor which in an obvious way limits the progress of sports results and its effect becomes more and more visible for a veteran in time.

Paradoxically, it may be the source of the development of athletics of mature people. Visible progress of science, in particular medicine, may result in a significant extension of human life with maintaining physical fitness.

- Sports regulations. The significance of this factor seems smaller than in athletics of young people. It limits the progress of masters results in a long term, but its activity is eliminated to a large extent by stimulating factors.
- Periods of stagnation in the economic and scientific progress. At the moment this factor is "dormant" in developed countries.

It is difficult to establish the influence of conditions-related cycle on the progress of results in masters athletics. Probably creating more thriving veteran organisations and holding international events in successive continents has contributed to the progress. The recent lowering of the border age entitling to participate in competition may have also been a factor in progression. The Olympic cycle is insignificant for the veterans. Every four years the World Masters Games are held, but they are not as important for mature athletes as the Olympic Games for young competitors; besides every year large international outdoor and indoor events take place as well as road races.

In the context of forecasting the progress of sports results it should be explained whether the disproportion in the regression of record performance results from not as good a use of the body potential by the athletes in medium and long distance races, or whether it is caused by a faster regression in endurance abilities, determined by natural laws of involution and less visible in case of speed. If the former is the case, it would be possible to forecast a significant improvement in results in endurance races, if more athletes would not allow their endurance fitness to deteriorate using an appropriately planned training. On the other hand, we can observe the biggest regression for events requiring mastering of the movement technique (and hence a high co-ordination level) as well as speed and strength abilities.

Finally, although breaking records is the core of athletics and sport in general, in case of masters movement striving for extreme performance for a given age is more like an excuse for self-perfection, undertaking physical activity and maintaining social relations than an objective in itself. This is as much a sports as a social movement. Therefore, its origins and development have not been determined by typically sports factors only.

4. The history of veteran movement

Even the most fervent fans of athletics who follow closely the current state of affairs on tracks and fields of the world do not always realise that there is a huge current of this discipline which includes athletes at mature and elderly ages. The masters athletics movement involves hundreds of thousands men and women athletes in the whole world who have been making its history for a long time – they break records, have their stars, dramatic duels of champions, experience joy of victory and bitterness of defeat, have their own organisations, a system of sports competition with its unique regulations, web sites, magazines etc. Outstanding veteran athletes are usually athletes who did not win the most prestigious international trophies when young. They can however, by regular training, maintain an unusually high physical fitness. Often former Olympic champions have to admit the superiority of masters athletes in a direct confrontation. The fact that all this does not happen in the limelight, watched by cameras and hundreds of journalists, does not diminish the ambitions and efforts of the athletes, but results from little interest of the mass media in broadcasting such tournaments. The criteria for the broadcast of a television programme are so called viewing figures. Perhaps the viewers and press readers really do not feel like watching the coverage of “oldies” competition. Or perhaps they do not have any opportunities to get to know them better. In order to introduce this interesting and important current of sports activity we present below the most important events and the most outstanding individuals of a few decades of history of masters athletics. The review was made on the basis of the following studies: “The history of masters/veteran athletics” by D. Farquharson and B. Oxley (*World Masters...* 2005, pp. 27-46), M. Hoernecke-Gill (2005), J. Pełka (2005), W. Kudelski (1996) and the *Senioren Leichtathletik* magazine (2005, Nr. 1-7) and the web site of the International Masters Games Association *(www.imga-masters.com*). Table 4.1. presents a schedule of the most prestigious outdoor sports events gathering veterans of athletics.

Tab. 4.1. The calendar of world and European track and field masters championships stadia and world masters games. Prepared on the basis of data available in: *World Masters Athletics Handbook 2003-2005, www.evaa.nu, www.imga-masters.com*

Nr	Year	Days	Country	City	No of countries	No of participants	World records
			WAVA/WMA CHAMPIONSHIPS				
1	1975	11 - 16.08.	Canada	Toronto	32		
2	1977	8 - 13.08	Sweden	Göteborg		2,750	
3	1979	27.07 - 2.08	Germany	Hannover	57	3,400	
4	1981	7 - 14.01	New Zealand	Christchurch	51	2,400	
5	1983	23 - 30.08	Porto Rico	San Juan			
6	1985	22 - 30.06	Italy	Rome		4,360	
7	1987	29.11 - 6.12	Australia	Melbourne		4,800	
8	1989	27.07 - 6.08	USA	Eugene	58	5,000	
9	1991	18 - 28.07	Finland	Turku		>5,000	
10	1993	7 - 17.10	Japan	Myazaki	78	>12,000	
11	1995	13 - 23.07	USA	Buffalo		5,500	58
12	1997	17 - 27.07	RSA	Durban	76	5,788	58
13	1999	29.07 - 8.08	Great Britain	Gateshead		6,000	
14	2001	1 - 14.07	Australia	Brisbane	80	5,000	40
15	2003	1 - 13.07	Porto Rico	Carolina		2,700	26
16	2005	22.08 - 03.09	Spain	San Sebastian	91	>6,000	
17	2007	28.08 - 09.09	Italy	Riccione			
18	2009	13 - 25.08	Finland	Lahti			
			EUROPEAN VETERANS ATHLETICS CHAMPIONSHIPS STADIA				
1	1978	10 - 16.09	Italy	Viareggio		1,193	
2	1980	6 - 10.08	Finland	Helsinki			
3	1982	14 - 18.07	France	Strasbourg			
4	1984	20 - 25.08	Great Britain	Brighton			
5	1986	28.07 - 02.08	Sweden	Malmö			
6	1988	25.06 - 02.07	Italy	Verona			
7	1990	30.06 - 07.07	Hungary	Budapest			
8	1992	26.06 - 04.07	Norway	Kristiansant			
9	1994	3 - 12.06	Greece	Athens			
10	1996	19.07 - 27.07	Sweden	Malmö			
11	1998	11.09 - 19.09	Italy	Cesenatico		4,291	
12	2000	6 - 16.07	Finland	Jyväskylä			
13	2002	15 - 25.08	Germany	Potsdam			22
14	2004	22.07 - 01.08	Denmark	Århus, Randers	40	3,703	45
15	2006	19 - 30.07	Poland	Poznań		3,000	
16	2008	06 - 17.08	Slovenia	Ljubljana			
			WORLD MASTERS GAMES				
1	1985		Canada	Toronto	61	8,305*	
2	1989		Denmark	Herning, Aalborg, Århus	76	5,500*	
3	1994		Australia	Brisbane	74	24,500*	
4	1998		USA	Portland	102	11,400*	
5	2002	5 - 13.10	Australia	Melbourne	98	24,886*	
6	2005	24 - 31.07	Canada	Edmonton	52	3,082**	
7	2009	10 - 19.10	Australia	Sydney			

** all sports*

*** track and field athletics*

4.1. The world and Europe

The origins

The history of veterans athletics was started informally at the turn of the 19th and 20th centuries by middle-aged people – men and women – – who wanted to enjoy again the pleasures and health coming from physical fitness. The first typically veteran organisation was Veteran's Athletics Club of England founded in 1932, one of the strongest centres of masters athletics in the world to this day.

The first to appear in the role of veteran athletes were road race participants, although a few long-standing records have been set by sprinters, jumpers and throwers. It is worth mentioning here the results of two 40-year-olds, Don Finlay of Great Britain in 110 m hurdles in 1949 – – 14.4 s and Egon Nillson of Sweden in high jump in 1966 – 205 cm and 55 years old Karl Hein from the Federal Republic of Germany who achieved 52.01 m in hammer throw in 1964. In the 1960s it became fashionable to run to improve health and physical fitness, the result of which among other things was direct competition in road races. In order to meet the needs of the growing number of runners who wanted to compete in their age groups an organisation called Interessen-Gemainschaft Älterer Langstreckenläufer was formed in 1968 (IGÄL, German, lit.: Community of Interests of Elderly Long-Distance Runners) and inaugural Championships in Marathon were held in Holland. The pioneers of IGÄL were Artur Lambert, Meinrad Nagelle, dr Van Aaken from Germany and Jacques Serruys from Belgium.

At the same time, totally independently of the movement of road race runners, masters of field and track athletics in many countries started to associate. In 1965 Bill Bowerman, a leading USA coach, during his visit in New Zealand was invited by a group of "forty-something" runners to take part in a local race. It turned out that in New Zealand running is a way of life and Bowerman himself, to his amazement, was beaten in a running confrontation with 70-year-olds. The revelations told by him on his return to his homeland led to the formation of USA Masters Track and Field Team. Its members, San Diego Attorney and David Pain, were the first to introduce 5-year age categories, from 40 to 85 years of age, and organise annual national championships. In 1971 Helen and David Pain during their stay in Europe suggested that during the Olympic Games in Munich in 1972 American veterans should compete with their contemporaries from the Old Continent. The idea gained recognition in the whole world and a group of American, Canadian and Australian masters held the first truly international veterans athletics meeting, organised by Woodworf Green Athletic Club in the Crystal Palace in London. Then the group visited

other European countries (Finland, Norway, Sweden, Denmark and the Federal Republic of Germany) and everywhere was welcomed enthusiastically.

1975

When the international contacts had been established, there was an obvious need for holding world championships. Canadian veterans led by Don Farquharson organised in Toronto from 11 to 16 August 1975 a tournament sponsored by the Canadian National Exhibition (CNE) in which male and female athletes from 32 countries took part. Multi-medallists were Theo Orr of Australia and Al Guidet of the USA (they won four gold and one silver medal, each) as well as Anne McKenzie of South Africa and Jack Greenwood of the USA (four gold medals each). Among others, 90-year-olds Duncan MacLean of Scotland, called “the Tartan Flash”, took part in the competition.

During the Championships at the meeting at the University in Toronto the founding of a world organisation associating masters of athletics was proposed. Jack Fitzgerald of Great Britain became the chairman of the steering committee. Clem Green of New Zealand suggested the name of the organisation: the World Association of Veteran Athletes (WAVA). The Committee met again in the Coventry City Hall in England during the IGÄL Championships. It was when the problem of amateur status of veterans arose. The International Amateur Athletics Federation (IAAF) did not consent to the start of athletes who lost their amateur status, irrespective of how long ago this happened, in the following world championships. The situation was close to a split among the masters. Some of them were in favour of persuading the IAAF to recognise the “double status”, others did not want any links with the IAAF.

1976

The official foundation of the World Association of Veteran Athletes (WAVA).

1977

The following World Veterans Championships held in Swedish Gothenburg from 8 to 13 August 1977 gathered 2,750 participants. The Slottskogvallen stadium witnessed mainly an exciting clash of two titans of discus throw: a recent Olympic medallist from 1972 Ludvik Danek of Czechoslovakia and many times gold Olympic medallist, American Al Oerter, who won the competition. Women took part in the competition very actively and in large numbers. Everybody remembered Fritz Assmy,

a blind sprinter from Germany, who dominated his age category. “The Tartan Flash”, already 92-years-old, provided a thrilling performance in sprint. The president of IAAF, Adriaan Paulen, who saw the great joy shown by athletes during their competition concluded that a favourable decision for the masters status should be made. A few months later the WAVA was given the right to decide who can take part in veteran competitions, provided that it will relate to men over 40 and women over 35. Paragraph 53 of the IAAF regulations was changed accordingly. During these championships the first Executive of the WAVA was elected on 9 August. Don Farquharson became the president, Jacques Serryus – the vice-president, Roland Jerneryd – the secretary. Hazel Rider of Great Britain became the representative of women in the executive. Continental representatives – of Asia, Europe, Oceania, South America, North America and Africa – formed an Executive Council.

1978

On the initiative of Italian Cesare Beccalli and Swede Roland Jerneryd, the European Veterans Athletics Association was founded in September in an Italian town of Viareggio. National masters athletics associations had already been founded earlier in various European countries, it was then a natural results of associating of veterans in the Old Continent.

In the same year, the first European Championships took place in Viareggio, in which 1193 athletes took part. From this moment this biennial event started to develop rapidly to reach a maximum number of participants in Cesenatico in Italy in 1998 (4,291 people).

1979

The following World Championships took place from 27 July to 2 August in Hanover in Germany. A novelty was a starting fee which was charged from the participants to cover organisation costs incurred by the WAVA starting from this event. 3,400 athletes from 57 countries took part in the event; many more throwers, jumpers and pentathletes competed than in the pervious championships. The hosts entered an over 1,000-strong team which achieved excellent results. Also some athletes from smaller countries: Island, New Zealand and Northern Ireland showed themselves to their best advantage. The blind sprinter Fritz Assmy amazed everyone with his excellent performance. The generally liked and respected “Tartan Flash” unfortunately could not start.

A General Assembly of the WAVA took place during which the Executive was elected; the main change was the election of a new representative of women, Jean O'Neil of Australia.

At the same time the IGÄL veterans association was very active, and under the leadership of Arthur Lambert held annual Road-Racing Championships at the distance of 10 km and 25 km alternately with marathon.

1981

The following World Championships which were supposed to take place between 7 and 14 January in Christchurch in New Zealand were awaited with a certain concern. It was feared that travels costs and the distance will reduce the number of participants in a way which would endanger the running of the event. Eventually, to everybody's joy, 2,400 men and women masters from 51 countries took part in the competition and New Zealanders turned out to be wonderful hosts of the event. Attempts were made to boycott the participation of the representatives of the Republic of South Africa, but the organisers did not allow this. The 700-strong Australian team dominated the competition and the team from the far-away Europe, still without the countries of the then socialist bloc, kept up with Australia. The news of death of "the Tartan Flash" was received with great sorrow. Duncan MacLean, the personification of veteran spirit, had died a month before at the age of 96.

1983

It was expected that the best offer for hosting the 5th World Championships will be made by Greece, however finally the organisers from Puerto Rico were successful. And it was there, in San Juan that the tournament was held from 23 to 30 August. Due to a radical change in the place of holding the event and the time difference the period of break between championships was longer than usual, but the masters did not wait doing nothing, as at that time national and continental championships were organised regularly. Shortly before the competition in San Juan problems with the participation of representatives of the Republic of South Africa appeared again and most of them withdrew from the competition. Additionally, there were organisational difficulties at the beginning of the sports part of the event. Fortunately, the opening and closing ceremonies completely covered over these unfavourable impressions, leaving the spectators breathless and surpassing all previous shows.

The stars of the competition were: Tim Johnson, Maurice Morrel (Great Britain), Gilberto Gonzales-Julia, Ovidio de Jesus (Puerto Rico),

Thane Baker, Phil Conley, Jim O'Neil, Bill Stuart (USA), Manuel Ulacia (Venezuela) and Jim MacNamara (Ireland).

In the same year the IAAF decided to form a Veteran Wing as a recognition of the role of the WAVA in the development of the system of competitions and proposed to continue this activity under its leadership. A committee was called made up of three IAAF members and ten masters, chaired by Hans Skaset. The WAVA Assembly voted unanimously to authorise the Executive to continue talks with the IAAF.

1985

It was the year of the 6th World Championships. They were held in Rome from 22 to 30 June. They promised to be excellent, as Italian veterans had been so far the most ambitious and active. Vice-mayor of Rome and a few council members had presented their offer already in San Juan. As expected, the championships in the Eternal City turned out to be the largest of all championships so far and gathered 4,360 participants. They were honoured by the presence of Primo Nebiolo, the president of the IAAF and the FIDAL (Italian Athletics Federation). Veterans had also an opportunity to meet the Pope, John Paul II. Four thousand athletes with their families were received by the Holy Father at the St. Peter's Square.

The competitions were held on four excellent stadiums, including the Olympic stadium of 1960. The gigantic undertaking was managed by Cesare Beccalli. The event was a great success. So many records were set that it is difficult to list all achievements here. The greatest stars were: Georg Smith (Canada), Wendy Ey (Australia), Jean Van Onselen (Belgium), José Ubarri (Puerto Rico), Fritz Assmy and Peter Speckens (Germany), Ron Taylor (Great Britain), Derek Turnbull (New Zealand), Parry O'Brian and Gabrielle Anderson (USA) and Luciano Acquarone and Armando Zambaldo (Italy).

At the General Assembly of the WAVA a new constitution was adopted and the candidates to host the following championships were considered. The chairman of IGÄL, Jacques Serruys declared the will of his association to join the WAVA.

In Toronto, Canada, the first World Masters Games were organised, an equivalent of the Olympic Games for veterans. The motto of the event was "The year of the masters". 8,305 athletes from 61 countries were competing, including many track and field athletes.

1986

The efforts of the WAVA focused mainly on the discussion with the IAAF. During the 35th congress of the IAAF held in Stuttgart in August a draft agreement was presented. The legitimacy of the agreement was

not questioned, but the Congress decided that the partnership with the WAVA will not be considered as long as the members of the association include the organisation of masters from the Republic of South Africa. A joint WAVA and IAAF Veterans Committee was disbanded unilaterally. In its place the IAAF called its own Veterans Committee consisting of four members of the WAVA Council and a representative of the United States veteran organisation.

1987

Over 4,800 athletes participated in the 7th World Veterans Championships held in Melbourne from 29 November to 6 December and in spite of three days of bad weather the event was a success. Many new records were set again. The stars undoubtedly included New Zealander Derek Turnbull who won six gold medals in the category of 60-year-olds and ran marathon in under three hours with the best time on the one-mile-long special stage. Ed Benham of the USA, an 80-year--old former jockey, won five times setting new records. Australian Shirley Brasher shone among women setting new records in the category of 60-year-old women. Australian Jack Ryan, aged 67, was a little short to run one mile below 5 minutes. In the category of 45-year-olds Mexican Antonio Villanueva followed his example and ran 10 km race in slightly above 30 minutes.

During the General Assembly of the WAVA president Don Farquharson had to step down according to the statute. He had been leading the organisation since its foundation. During this time the WAVA turned from a group of loosely related enthusiasts into a global organisation able to organise the largest athletic championships in the world. Hence a certain stage in the masters movement finished. Cesare Beccalli was elected as a new president. Talks with the IAAF were undertaken again on the form and conditions of co-operation.

The delegates present at the General Assembly adopted point 3 of the Statute which said that national veteran organisations whose national athletic federations are suspended by the IAAF shall not be accepted. As a result the contacts with the Veteran Association of South Africa were severed.

1988

The IGÄL organised its last championships before joining the WAVA. The event took place in Lake Pomun Kyongju in Korea from 6 to 9 October. After that both organisations were completely integrated.

1989

From 27 July to 6 August Eugene in the United States hosted the 8th World Championships. During the opening ceremony a Kenyan runner Kip Keino lit the flame to the applause of the crowds. Almost 5,000 athletes entered the competition, which in total was 13,000 individual participations in events. Efficiency and devotion of the organisers were accompanied by perfectly prepared facilities; the integration of residents of Eugene and neighbouring Springfield with athletes from 58 countries will be long remembered. The chairman of the IAAF Veteran Committee, Hans Skaset who was present was full of admiration for the organisers. 33 world records were set by men and 37 by women. Well-known recent Olympic athletes competed in a new role of masters. Many more fans appeared than before. For the first time an athlete from Russia took part in the competition.

The General Assembly of the WAVA made a decision about separate organisation of championships in road races, every two years starting from 1992. There were some divergences in terms of co--operation with the IAAF. Some members of the WAVA Council thought the best solution is co-operation with the IAAF with independence preserved, others favoured complete autonomy.

In Bruges, Belgium, the first European championships in road races were held under the aegis of the EVAA. Over three thousand runners and walkers competed.

Three Danish cities, Herning, Aalborg and Århus hosted the 2nd World Masters Games under the motto “Sport for Life”. In 37 sports disciplines in total 5,500 athletes from 76 countries competed.

1991

In Budapest the unofficial World Veterans Indoor Athletics Championships were held in which approx. 500 people took part.

Finnish Turku hosted the 9th World Championships between 18 and 28 July. Problems for the organisers were caused by the activities of nationalist groups for whom the traditional parade of athletes during the opening of the Championships and the sight of many foreign flags could be a pretext. Therefore, the chairman of the organisational committee cancelled at the last minute this popular parade in order to avoid trouble. Few spectators were aware of the reasons which caused disappointment until the background of this sensible decision was revealed.

The weather and facilities were excellent and over 5,000 participants were inspired to rivalry by a statue of an outstanding Finnish Olympic athlete Paavo Nurmi, erected in his home town. The event resulted in many world records. It should be noted that 95-year-old

Joginder Sing of India set six world records and 65-year-old Jack Greenwood of the USA broke three world records and led two national relay teams to victory. Again blind Fritz Assmy broke records (twice) this time guided by his grandson.

As usual the General Assembly of the WAVA gathered to accept changes in the Executive and to vote on amendments to the Statute and regulations. Among other things, authorisation of anti-doping tests during future world championships was introduced and finally the birth date was established as a criterion for qualifying to age categories.

1992

The first WAVA Non-Stadia Championships in 10 km and 25 km road races took place from 29 to 30 August in Birmingham. Due to a short period of preparation the event was attended by "only" 2,500 people, including only 302 people from seven European countries and a symbolic representation of the USA. The venue of the competition was the area around the National Exhibition Centre – traffic-free streets and large exhibition halls near the finish line.

A silver medallist of the Olympic Games in Los Angeles in 1984 in 10 km race, Mike McLeod of Great Britain won the 10 km race with a good time of 30 minutes 40 seconds. He overtook his countryman Mike Fromant and Ingo Sensburg of Germany. Brownwyn Cardy-Wise of Britain (who won all long distance races in Eugene) triumphed among women. In the 25 km race the winners were Dave Hill and Liz Hughes of Britain. The British won also all team races.

Many potential participants were deterred by high starting fees charged by the WAVA so some of them chose to take part in other road races which are held regularly in many places in Great Britain.

1993

From 7 to 17 October veterans of athletics stayed in Japanese city of Miyazaki on the island of Kiusiu. The 10th World Championships were held in three neighbouring venues in a wonderful pine forest at an ocean coast. The opening ceremony was honoured by His Imperial Highness Prince Akishimo with his wife. The widespread involvement of the residents of Miyazaki was unique as they presented their ancient culture in a friendly and kind way. The President of the WAVA, Cesare Beccalli expressed the feelings of all participants when he said: "We will remember this for the rest of our lives". One has to have a lot of respect for the organisational abilities of the hosts as they did their duties with over 12 thousand (!) athletes entered from 78 countries, each of whom competed in 2-3 events. Over 9,000 Japanese competed and during the opening and closing ceremonies there were 50 thousand spectators in

the stands. So far this was the largest athletics event of this type. A larger number of participants competed only in a few largest marathons.

It is impossible to present all outstanding athletes. The elite included, among others, a serial multi-medallist Australian Reg Austin, American Phil Mulkey, who scored 8,546 points in decathlon and won a handful of medals in other events, an excellent sprinter from the USA, Evelyn Ashford (she also lit the flame), Phil Rashker with eight gold medals, the oldest participant, dr Paul Spangler competing in most races between 200 m and 10,000 m, a German thrower Johanna Luther with four gold medals, 60-year-old Ralph Romain from Trinidad and Tobago with the result of 54.92 s in 400 m race and many more.

The WAVA appointed a new Executive and Council. Also new standing committees were called: Organising Advisory, Law & Legislation and Doping Control Committees. The efforts of Roy Foley of Australia were successful, as on his initiative weight pentathlon was introduced to the programme of the World Championship. Also 30 km men road walk was introduced and the proposal to calculate the age of athletes by year and not precise date of birth and date of tournament was rejected. The masters movement had been developing rapidly, therefore three cities were competing for the next championships – Buffalo (USA), Malmö (Sweden) and Durban (RSA).

1994

The 2nd WAVA Non-Stadia Championships were held in Scarborough in Canada on 30-31 July. Due to a wide range of masters events there were only 600 participants from 27 countries and that in spite of introducing 20 km walk into the programme.

In Brisbane, Australia the 3rd World Masters Games were held. As many as 24,500 participants from 74 countries competed in 30 events, including field and track athletics. “The Challenge never ends” was the motto of the event.

1995

The 11th World Championships in Buffalo (USA) gathered 5,500 participants from 13 to 23 July. The main venues of the competition were two university stadiums. The sports level was very high – 58 world records were noted. The main difficulty was very hot weather. Temperature in the shadow reached 36 degrees Celsius. Cross country races were stopped as due to the shortage of ambulances the organisers could not meet the requirements of medical assistance, needed by too many runners exhausted by the heat. At the end of the competition there was a torrential rain which, however, did not extinguish

the enthusiasm of the participants. There were some problems with the quality of surface in one of the stadiums and the lack of roof in the venues, which with high temperatures did not favour the athletes or the fans. In spite of this there were lots of thrills as usual. The audience were rendered breathless during the unforgettable duel of high jumpers, Jim Barrineau and legendary Dwight Stones.

In Seoul in Korea on 25 October the International Masters Games Association was founded. The members became international sports federations the disciplines of which, including athletics, are in the programme of the World Masters Games. The central ideal of the organisation is promotion of sports competition and friendship between mature athletes irrespective of their age, sex, race, religion and sports level. Its main tool is the World Masters Games, a sports festival for everyone held every four years.

1997

Due to the statutory abolition of apartheid in the Republic of South Africa in 1991 the reason for isolating the country was not longer there. There was nothing to prevent the 12th World Championships from taking place in Durban from 17 to 27 July. The event was held for the first time in Africa and many masters were looking forward not only to the sports competition, but also to experiencing the unique, exotic culture. Those interested could see wild animals in their natural habitat, travel to picturesque neighbouring countries, e.g. to see the Victoria Falls or to ride a camel. The accommodation in hotels at the beach made it possible to admire the view of the Indian Ocean and sunrises. The beauty of the nature was equalled by the kindness of the hosts. Although transportation was working perfectly, volunteers gave lifts in minibuses to athletes who were late for the competition. Inexperienced organisers made however many mistakes which caused some organisational problems at the beginning of the event, prevented thanks to the assistance of foreign officials. The opening ceremony was filled with rhythmic African music and its rock version complete with a show of laser lights. The whole crowd was on their feet to dance.

5,788 men and women athletes from 76 countries took part in the event. 58 world records were broken (four were not accepted because of the lack of data on the wind speed). Unrivalled Phil Rasher of the USA won ten gold medals and broke 6 world records. Derek Turnbull of New Zealand performed an unusual feat by winning six gold medals in races from 800 m and longer, including the marathon and broke three world records. Vittorio Colo of Italy in the category of 85-year-olds won 7 gold medals (and set two world records). Other multi-medallists were the 80-year-old Torsten Stale of Sweden (six gold medals), 56-year-old Ron

Robertson of New Zealand, 85-year-old blind Ivy Granstrom of Canada, 75-year old Jose Waller of Great Britain (five gold medals each). Nine athletes won 4 gold medals each, 21 three each, and 47 two each. During the General Assembly of the WAVA Torsten Carlius of Sweden became the new president.

The European Veterans Athletics Association (EVAA) organised European Veterans Indoor Championships for the first time. They took place in Birmingham, in Great Britain, and were also attended by athletes from America and Africa. In the following years the championships are held every two years with a break in 2003: Malmö 1999, Bordeaux 2001, Eskilstuna 2005, Helsinki 2007.

1998

The World Masters Games were held in Portland, in the USA for the fourth time. Athletics was in the programme of the event among 28 disciplines in which 11,400 athletes from 102 countries competed.

1999

This time British Gateshead hosted masters athletes from 29 July to 8 August in very well prepared venues. The organisation of the event was supported by many volunteers (1,000 people). In total 6,000 athletes competed, including as many as 4,200 people from outside Great Britain. The competition was again on the highest sports level. Karl Trei of Canada won 7 gold medals in the category of 80-year-olds, and Olga Kotelko was on the highest podium six times in the category of 90-year-olds. Karla Jortikken of Finland (age category: 75) and Alan Bradford (60) and Ruth Frith (85) of Australia won five gold medals each. The oldest athlete was Waldo McBurney of America competing in the category of 95 years.

During the debates of the WAVA a discussion was held on the relations between the WAVA and the IMGA (International Masters Games Association) the interest and objectives of whose coincide. The Council put forward a proposal to change the name of the organisation to World Association of Masters Athletes (WAMA). The change was justified by frequent misunderstandings using the term “veteran”, which apart from that is not attractive for potential sponsors. The proposal was rejected due to a lack of required majority of votes.

The programme of events held outside stadium was extended and cross-country and road relays were included in it.

2000

In July Don Farquharson died at the age of 75 – the pioneer of organised veteran athletics movement and president and official of WAVA of long standing.

2001

The World Championships were held in the Australian continent in Brisbane from 1 to 14 July. The organisers set new standards in servicing of the event and significantly raised its level. Almost 5,000 athletes from 80 countries competed, of which 3,600 people came from outside Australia. 40 world records were set and most often they were established in older age categories. The most outstanding athletes were Ron Robertson of New Zealand who broke records on 1,500 m, 5,000 m and 2,000 m steeple chase in the category of 60-year-olds and Ed Whitlock (70-year-old) who set best results in 5,000 m and 10,000 m races. Rosario Iglesias y Rocha of Mexico set first records in 400 m and 800 m races in the category of 90-year-old women. However, a special milestones were the first world records in the category of 100-year-olds. They were set by Leslie Amey of Australia in 100 m and 1,500 m races.

Suspensions for doping were given a lot of publicity. The case polarised the athletics masters circles. Some believed that anti-doping control should be used firmly, like in non-veteran events. Others expressed the opinion that the WAVA should be given a free hand in the interpretation of international regulations. As a result the Council of the WAVA formulated a decisive motion for formal acceptance of anti-doping procedures used by the IAAF, establishing arbitration and agreement with the World Anti-Doping Agency (WADA). The motion was accepted by the Assembly with only one vote against.

Some changes in the regulations were made. Competing of men and women in one group was allowed and records set in these competitions would be approved. The distance of the cross-country race was set at 8 km. It was allowed to wear during tournaments clothes approved by national federations.

A significant decision was the change of the name of the organisation. Finally the name World Masters Athletics (WMA) was accepted by 93 votes to 16.

2002

There was a conflict between the IMGA and the WMA. The IMGA granted the organisation of the 2005 games to Canada without consultation with the local masters athletics association and coinciding in time with the World Masters Championships in Athletics planned by the

WMA in San Sebastian in Spain. Fortunately, a compromise was reached.

From 24 to 26 May an Italian town of Riccione at the Adriatic Sea hosted the participants of road events within the framework of the next WAVA Championships. 800 people finished 10 km race and 1,300 finished the half marathon. In 10 km walk 130 men and women took part. Also 20 km and 30 km walks were held. 50 teams took part in the team competition, of which the Italian, German and British ones turned out to be the best. Following the events of September 2001, the USA team did not start.

The 13th European Championships were held in Potsdam during which 131 Championships records, 39 European records and 22 world records were set. Also, it was there where on the initiative of Wilhelm Koster and Dieter Massin, the European Masters Sports Association was founded, gathering currently more than ten sports disciplines. The plans were made to hold European Masters Games, similar to the world games.

The 5th World Masters Games were held in Australian Melbourne, gathering 24,886 participants from 98 countries, competing in 26 disciplines.

2003

The 15th World Masters Championships took place in Carolina in Puerto Rico from 1 to 13 July. In spite of excellent organisation the number of participants was much smaller than usual. The reason was a still strong fear of flying after the terrorist attack in New York in 2001 and deadly SARS epidemic. 2,700 people competed, including 442 from USA, 275 from Germany and 182 from Great Britain. 26 world records were set. The hosts took the opportunity and won as many as 55 medals. The novelty was posting of results on the Internet immediately after the end of each event.

The General Assembly of the WMA with enthusiastic approval of the delegates reduced the lower age limit for men competing in masters tournaments to 35 years. In this way the difference in treatment of men and women was eliminated, and athletes who took part in masters tournaments, as most national federations allowed 35-year-olds to national events, were included in the competition. The motion for approval of this decision was put forward to the IAAF.

2004

3,703 athletes competed in the 14th European Championships held from 22 July to 1 August in two Danish cities of Århus and Randers. 8,000 individual participations in events were noted and 1,566 medals

were given to the participants from 40 countries. 181 Championships records, 64 European records and 45 world records were set, of which a large part (12 European and 11 world records) in a "young" event of weight throw. A unique record was also the large number of volunteer and judges – 700 people. The scale of these and other veteran tournaments is shown also by the fact that 20,000 hotel beds were booked and 2,600 commemorative T-shirts, over 4,000 occasional postcards and 7,000 pictures from the competitions were sold. The web site of the Championships was visited 50,000 times during the event.

For the first time the representatives of the IAAF and the WMA jointly chose the world's best athletes of the year. The titles of "the IAAF Best Masters" were given to: a multi-medallist of flat sprint races and hurdles, Guido Müller of Germany (the category of 65-year-olds) and Jeanette Flynn of Australia, running medium distance in the category of 50-year-old women. Also European veterans decided to grant titled of "the EVAA Best Masters".

2005

In March in Swedish town of Eskilstuna the 5th European Veterans Indoor Championships were held. 1,216 athletes from 31 countries took part.

In July Edmonton in Canada organised the 6th World Masters Games. 3,082 athletes from 52 countries entered. One of the outstanding figures of the field and track tournament was 95-year-old Trent Lane who broke 5 world records in his age category (hammer, javelin, discus, shot put, weight pentathlon). Eight other world records were set by Olga Kotelko (weight pentathlon), Nina Naumienko (800 m), Ed Burke (hammer), Rietje Dijkman, James Stookey and Daniel Bulkley (300 m hurdles), Emerich Zensch (high jump), Tim Berett and Jennie Binning (5 km walk).

On 12 August during the 10th World Championships in Helsinki the IAAF Congress, with 89 votes for and 77 against, made a decision to officially recognise the M35 category, that is men aged 35-39 competing in masters tournaments. Thus, the youngest age categories for men and women were made equal. A representative of the French federation proposed instead to increase the minimum age for masters women to 40 year, however strong arguments of Cesare Beccalli and the position of the IAAF Council determined the results of the vote.

Within the framework of the Helsinki World Championships "Master Challenge" competition was held for the first time. Qualifications tool place in Lahti and the finals took place at the main stadium of the Championships during the marathon race. 350 athletes from 10 countries competed, mainly from Finland. Disabled athletes in

wheelchairs also took part. For 2006 European Championships in Gothenburg similar combination of tournaments for “the young” and “the old” was planned.

In August in Donostia – San Sebastian in Spain the 16th World Masters Athletics Championships took place. Over 6 thousand men and women athletes from 91 countries took part in them, including approx. 1,500 from outside Europe. Over nine thousand spectators watched an excellent opening ceremony in the Anoeta stadium. An outstanding American triple jumper, Willy Banks debuted as a veteran in the category of 45-year-olds. During the press conference he declared his aim is winning a gold medal. The event with his participation was watched closely by the fans and the media. After an exciting duel with Wolfang Knabe of Germany (14.78 m) Willy Banks had to settle for the silver medal (14.64 m). As usual the biggest applause accompanied the competition of the oldest participants of the championships. In the category of 95-year-olds the only contestant was Alfred Prokesch of Austria (discus throw – 10.53 m, javelin throw – 5.17 m and shot put 3.65 m). In the track events Rosario Iglesias y Rocha of Mexico was cheered on in 100 m (57.58 s) and 200 m (1:59.45) races in the category of 90-year-old women. German Albert Olbrecht competing in the category of 90-year-olds took part in as many as eight running events at the distances from 100 m to 10 km and in a cross-country race for 8 km, winning medals in each event (three gold, three silver and two bronze medals). In the same age category Max Springer of USA was a multi-medallist too (distances from 200 m to 1,500 m, long jump and triple jump) who won four times and was second twice. One of the outstanding athletes in this age category was also German sprinter Friedrich Mahlo (gold in 100 and 200 m) and throwers: Antonio Antunes Forseca of Brazil (three gold medals and one silver), Trogeir Brandvold of Norway and Mario Riboni of Italy.

During the competition Torsten Carlius of Sweden stepped down as a president of the WMA. In the autumn the news of his death arrived. Cesare Beccalli of Italy was elected in his place. Also the IAAF Best Masters of 2005 were chosen. The title was awarded to Rietje Dijkman of Holland (category 65) and Earl Fee of Canada (category 75). The ceremony of awarding the titles took place in September in Monaco.

2006

In March in Austrian Linz the 2nd World Masters Indoor Athletics Championships took place, in which over 3,000 athletes took part.

In 2006 the 15th European Championships will take place in Poznań, Poland. Due to its favourable geographical location in the centre of the continent and attractiveness of the city the organisers are

hoping for participation of many athletes. The local organisation committee, co-operating with the EVAA, includes the staff of the University School of Physical Education, representatives of the city authorities and of course the representatives of the Polish Veterans Athletics Association. Apart from the sports programme a seminar on anti-doping and athletics training is planned. An additional undertaking is also a research programme proposed and planned by the authors of this monograph – the participants of the Championships from many European countries will undergo physiological, anthropometrical, biomechanical and social tests.

2007

The 6th European Veterans Indoor Championships will take place in Helsinki, Finland, European Veterans Non-Stadia Championships will be held in German Regensburg and the 17th World Masters Championships will be held in Riccione in Italy.

2008

The capital of Slovenia Ljubljana will host the 16th European Veterans Championships.

2009

The 18th World Masters Championships will take place in Lahti in Finland and World Masters Games will be held in Australian Sydney.

4.2. Poland

The informal beginnings of the masters athletics movement in Poland go back to the late 1970s. The most thriving centre is now Toruń where the Polish Veterans Athletics Association (Polski Związek Weteranów Lekkiej Atletyki – PZWLA) was founded. The most active people are: Gabriel Mańkowski, Janusz Nath, Julian Pełka and Wacław Krankowski. Big contributors in the functioning of the association are veterans from other regions of Poland: Kazimierz Dulat from Koszalin – the author of statistical studies, Jerzy Jurkowski from Szczecin – the author of the first edition of the web site, Tadeusz Dziekoński from Białystok – the co-ordinator of road race tournaments, Mirosław Łuniewski from Reda – the co-ordinator of walking competitions. Other active centre and their activists are: Stargard Szczeciński – Włodzimierz Różyczka, Trąbki Wielkie near Gdańsk – Sylwester Maliszewski and Wiesław Kempa, Sopot – Zbigniew Werling, Zduńska Wola – Wojciech

Kikowski, Puck – Krzysztof Jędrzejewski, Szczecin – Henryk Radzikowski and Cigacice – Janina and Jan Dec.

The number of PZWLA members is growing steadily. Currently the association has over 300 members. In spite of small numbers the members of the PZWLA have something to be proud about. In all championships tournaments so far they have won in total 399 medals, including 117 gold, 135 silver and 147 bronze medals (tab. 4.2.) We can also pride ourselves on the fact that the Poles have been on the lists of best results in Europe and in the world.

Tab. 4.2. Number of medals earned by Polish track and field masters. Drawn from data reported by: J. Pełka, *www.weteranila.phg.pl* – Statystyka. Updated in March 2006

Event	Number of medals			
	Total	Gold	Silver	Bronze
World Masters Championships – Stadia	126	38	46	42
World Masters Championships – Non Stadia	26	4	12	10
World Masters Championships – Indoor	22	8	7	7
European Veterans Championships – Stadia	156	43	44	69
European Veterans Championships – Non Stadia	6	3	1	2
European Veterans Championships – Indoor	41	8	18	15
World Masters Games	22	13	7	2
Total	399	117	135	147

The leader of Polish masters is still Anna Włodarczyk, whose sports achievements include eleven gold and three silver medals in the world and European championships. She is also the current triple jump indoor world record holder (10.69 m) and European record holder in long jump (5.20 m) and in triple jump (11.37 m) in an open stadium in the category of 50-year-olds. It would be difficult to list all outstanding athletes here. Due to a large number of titles and medals won in international championship events particularly outstanding are: Florian Kulczyński, Jerzy Przyborowski, Krystyna Pieczulis, Janina Fijałkowska (the best result in the world in 20 km walk, category of 65-year-old women – 2:06.41), Ryszard Krzesiński, Jerzy Krawczyk (European record holder in hammer throw in the category of 80-year-olds – 34.58 m), Janina Łuniewska, Mieczysław Rutyna, Andrzej Piączkowski, Bogdan Bułakowski, Aleksander Saków and many more (tab. 4.3.). The oldest Polish medallists of international events are ladies aged 65-70: Janina Fijałkowska (walk), Janina Rosińska (long distance races) and

Zofia Turosz (walk, long distance races) and gentlemen in the category 80-85 years: Jerzy Krawczyk (throws), Marian Parusiński (marathon) and Kazimierz Spychała (sprint, triple jump). It is an interesting point that the list of veterans includes also Robert Korzeniowski, who at the age of 35 year "accidentally" set an indoor world record in this category in 3 km walk in 2004.

Tab. 4.3. The best 20 of Polish masters by number of medals earned in world and European championships and world master games. Prepared on the bassis of data reporter by: M. Łuniewski, *www.weteranila.phg.pl* – Statystyka. Updated: 31 of March 2006

		Gold	Silver	Bronze
1. Anna	Włodarczyk	11	3	–
2. Florian	Kulczyński	9	2	3
3. Jerzy	Przyborowski	6	7	9
4. Krystyna	Pieczulis	6	5	1
5. Janina	Fijałkowska	6	1	–
6. Ryszard	Krzesiński	5	9	10
7. Jerzy	Krawczyk	5	3	3
8. Janina	Łuniewska	4	4	1
9. Henryk	Radzikowski	4	2	2
10. Mieczysław	Rutyna	3	8	5
11. Andrzej	Piączkowski	3	7	7
12. Bohdan	Bułakowski	3	6	5
13. Aleksander	Saków	3	4	5
14. Antoni	Kargol	3	3	2
15. Stanisław	Szydłowski	3	1	–
16. Janusz	Kociszewski	3	–	–
17. Elżbieta	Krzesińska	3	–	–
18. Marianna	Biskup	2	4	3
19. Gabriel	Mańkowski	2	3	5
20. Adam	Domicz	2	3	–

Every year many athletics events are organised for Poland especially for veterans – cyclical events or one-off meetings. These are for example Polish Indoor Championships in Pole Vault, Polish Cross-country Championships, Polish Championships in Half Marathon, Marathon and Supermarathon (100 km), International Polish Championships in Throwing Events, Championships of the Pomerania

Region, Championships of the Wybrzeże, Championships of the Puck Land in Throw Tetrathlon, integration meetings.

1978

A group of Polish athletics masters from Gdańsk started the organisation of Championships of the Wybrzeże (Polish Coast).

1983

Wojciech Kikowski organised for the first time in Zduńska Wola the all-Polish Veterans Athletics Meeting which is held to date. The participants of the competition were Polish Olympic champions, world record holders and outstanding athletes, among others Janusz Sidło, Zbigniew Radziwonowicz, Władysław Komar, Jacek Wszoła.

1986

Before this year only Poles who had settled abroad and represented their new countries competed in international masters competitions. One of them was Bogdan Gierajewski, a former Olympic athlete, hurdler who lived in Great Britain and competed in its colours.

For Poles living in their homeland participation in tournament abroad and contact with masters from other countries was difficult, as in spite of turbulent political changes the country was still in socialist bloc and related isolation. Obtaining a passport, a permission to go abroad and a visa was not easy. The first official Polish representation at international tournament was six people and competed at the 5th European Veterans Athletics Championships in Malmö. As there were no official contacts with the Swedish Veterans Athletics Federation Polish athletes turned to the president of EVAA, Italian Cesare Beccalli, with a request to allow their participation. Soon they received brochures on the championships and an invitation which was the basis for obtaining Swedish visas. The Polish participation was successful as the team won five medals to make a good start. Ryszard Krzesiński became the first Polish gold medallist at the championship level winning the hammer throw competition of 45-year-olds (56.84 m). Silver medals were won by Zofia Turosz (5 km walk – 27:50.98 and 10 km race – 54:46, 45-year-old women) and Gabriel Mańkowski (high jump of 40-year-olds, 185 cm). Stanisław Kowalski won a bronze medal in hammer throw in the 50-year-old category (48.56 m).

1988

The 6th European Athletics Championships in Verona finished with Poles winning three medals. Ryszard Krzesiński won gold again and Gabriel Mańkowski two bronze medals: in high jump and triple jump. In a small eight-strong team there were also Edward Korolko, W. Sobecki and H. Rutkowski.

1989

The Polish team debuted at the World Championships in Eugene in USA. Three people coming from the home country competed – Gabriel Mańkowski, Paweł Iwiński and Ryszard Szczerkowski. They were supported by Poles living in the United States – Elżbieta Krzesińska, a former long jump world record holder and Olympic champion in 1956, Andrzej Krzesiński, Mieczysław Rutyna and Ryszard Katus. This small team won in total seven medals (three gold, two silver and one bronze). Ms Krzesińska showed particularly great form in the category of 55-year-old women as she won three gold medals (80 m hurdles, long jump and triple jump). Also Paweł Iwiński reached the podium having won the pole vault of the 40-year-old. Mieczysław Rutyna triumphed twice over his rivals and Ryszard Katus (110 m hurdles) and Andrzej Krzesiński (pole vault) won silver medals, and Andrzej Szczerkowski – bronze (decathlon). During the competition an idea was born to create an organisation gathering veteran field and track athletes in Poland.

In the same year a founding convention of the Polish Veterans Athletics Association took place near Toruń and it was attended by forty former athletes aged over 40. The result of the meeting was a statute of the association and sending a motion for registration of the association to the court.

1990

The procedure to approve the statue by the Civil Department of the Provincial Court in Toruń took a few months and on 26 February 1990 the Polish Veterans Athletics Association (the PZWLA) with its seat in Toruń was entered into the register of registered charities. Its founder and first chairman was Gabriel Mańkowski and the secretary general – Ryszard Kowalski. The PZWLA is a physical culture association, a member of the World Masters Athletics (WMA) and the European Veterans Athletics Association (EVAA). Every year the PZWLA organises summer and indoor Polish championships and trips of the Polish team to world and European championships, it also participates in other athletic masters tournaments.

Before the official foundation of the PZWLA indoor veterans competition took place. This was not Polish championships yet, but the 1st Veterans Indoor Athletics Meeting. The competition tool place in Grudziądz in the "Olimpia" hall. Since then indoor Polish Veterans Championships take place every year.

The 7th European Veterans Athletics Championships in Budapest were attended by 18 Poles, but only Jerzy Przyborowski won a bronze medal in triple jump in the category of 60-year-olds.

1991

During the World Masters Indoor Championships in Budapest 14 representatives of Poland won nine medals (four gold, three silver and two bronze). The gold medallists were Julian Pełka, Gabriel Mańkowski, Jerzy Przyborowski (triple jumpers) and Stanisław Szydłowski (long jump).

On 29 June in Kielce the Polish Veterans Athletics Championships were inaugurated. In the first Championships 81 people took part, including 11 women and 70 men. A few Poles living abroad came, from London and Chicago to name only two places. Among new Polish champions the best results were achieved by Barbara Drąg and Piotr Kaczmarek in long jump, Gabriel Mańkowski in high jump, Stanisław Szydłowski in triple jump, Bronisław Szmytke, Andrzej Kuryłowicz and Bronisław Walczak in 5,000 m race and Mieczysław Rutyna in 5 km walk. Their results became long-standing Polish records.

In Turku in Finland during the 9th World Masters Championships in an open stadium 34-strong Polish team won nine medals (three of each colour). Jumpers did best: Stanisław Szydłowski set a World Championships record in long jump in the category of 40-year-olds (7.12 m) and excellent Anna Włodarczyk beat all her rivals in long jump and triple jump.

1992

During the European Championships in Kristiansant in Norway the Polish team of 24 athletes won seven medals (two gold, one silver and four bronze). Again Stanisław Szydłowski was first in long jump and Mieczysław Rutyna in 20 km walk.

Since that year the Polish Veterans Indoor Athletics Championships have been held.

1993

Due to the great distance and high costs only five Poles went to the largest ever World Championships in Miyazaki in Japan. They took the opportunity to win five medals (one gold, two silver and two bronze). Jan Stuczyński was the proud winner of gold in 3 km steeple chase in the category of 50-year-olds. Jan Bułakowski won two medals: in 5 km walk (silver) and 20 km walk (bronze) in the 40-year-olds category, Ryszard Krzesiński was second in hammer throw of 50-year-olds and Gabriel Mańkowski third in triple jump of 45-year-olds.

1994

A 37-person Polish team went to the 9th European Championships in Athens to win seven medals. This time the Poles did not win any gold medals – they won one silver and six bronze medals.

During the World Veterans Championships Non Stadia in Toronto Bogdan Bułakowski represented Poland winning a bronze medal in 20 km walk. It was the first Polish medal in this Championships.

1995

25 Poles competed in the 11th World Championships in Buffalo (USA) bringing home twelve medals (four gold, two silver and six bronze). Unrivalled Anna Włodarczyk broke the long jump record of this event in the category of 40-year-olds (5.79 m) and added to it a gold in triple jump. The list of double medallist included also the names of Kazimierz Jankowski (discus – gold, weight pentathlon - bronze) and Bogdan Bułakowski (5 km and 20 km walks; gold and silver, respectively) in the category of 40-year-olds and Aleksander Saków (bronze in javelin and weight pentathlon)

1996

In the 10th European Championships in Malmö Poland was represented by 52 athletes who won twenty two medals (nine gold, five silver and eight bronze). A unquestionable star of the Polish team was Janina Rosińska in the category of 60-year-old women, who was first in the marathon and won silver medals in 10 km and 1,500 m races. In long jump Grzegorz Cybulski, a long-standing Polish record holder, left his mark by winning in the category of 40-year olds. Wojciech Seidel, Ryszard Krzesiński and Mieczysław Rutyna won two medals each (100 and 200 m race; hammer, weight pentathlon; walk, respectively). Besides, Zbigniew Radziwonowicz and Piotr Bielczyk (javelin) and Jerzy Krawczyk (hammer) won gold.

1997

This year abounded in sports events. It started with the 1st European Veterans Indoor Championships in Birmingham in which seven Polish athletes took part. They won four medals (one gold, one silver and two bronze) all in high jump. Jacek Wszoła, the Olympic Champion from Montreal in 1976 and world high jump record holder (235 cm) put up an outstanding performance in the category of 40-year-olds by jumping 201 cm.

The 7th Polish Championships were held in Poznań on 7 June in which 220 men and women athletes entered and finally 187 competed. For the first time the organisers – the staff of the Athletics faculty of the University School of Physical Education in Poznań – ensured the setting of the event worth its prestige. The honorary committee, apart from representatives of central government and city authorities, included outstanding Polish coaches and athletes such as Jan Mulak and one of the members of his famous "wunderteam" Eugeniusz Wachowski, a discus thrower, later a professor of Poznań University School of Physical Education (died in 2000), Irena Szewińska, the most outstanding Polish field and track athlete and Zdobysław Stawczyk, three-time academic world champion, a participant of the Olympic Games in Helsinki in 1952, then a long-standing member of staff and professor of the Poznań University School of Physical Education, awarded a *kalos kagathos* medal (died in 2005). During the opening ceremony of the event a parade of the teams and performance of dancing groups took place. Apart from medals prizes in kind funded by sponsors were given out. The main prize was a long-haul flight ticket to any destination drawn among the winners of individual events and age categories. The lucky winner was Marian Parusiński.

On track and field we could see again the stars of Polish athletics in great form. Ludwika Chewińska, Grzegorz Cybulski, Leszek Dunecki, Władysław Kozakiewicz, Lucyna (Langer) Kałek, Bogusław Mamiński, Zbigniew Radziwonowicz, Tadeusz Ślusarski, Jacek Wszoła, Kazimierz Zimny competed in their key events. Grażyna Rabsztyn debuted as a shot putter. A duel of Wojciech Lipoński, currently a professor of the Adam Mickiewicz University and the University School of Physical Education in Poznań, with his rival from young years and his victory after a defeat over 30 years ago provided unforgettable excitement. Sports celebrities were almost outshone by the vigour and fitness of over--70-years-old Jan Niedźwiedzki, a living symbol of the competition, who competed in seven events (all races from 100 to 5,000 m as well as long jump and shot put) and after finishing each of them he performed a gymnastic somersault! Mr Niedźwiedzki signed up for more events, but

the schedule of one-day competition did not allow him to participate in all of them.

Władysław Komar, an outstanding shot putter and Olympic champion, did not start but he gave a lot of autographs, and at the banquet at the end of the event he put on a how of his acting and singing talents, entertaining and moving the masters. Who could think that in this way Poznań said goodbye to our two Olympic champions. One year later, on 18 August 1998, Władysław Komar and Tadeusz Ślusarski were killed in a tragic car accident...

After this good practice the 27-person Polish team set off for Durban in the Republic of South Africa for the 12th World Veterans Championships. The team brought home 14 medals (four gold, six silver and four bronze). On the list of gold medallists were throwers Florian Kulczyński, Andrzej Piączkowski and Ryszard Krzesiński and an excellent middle-distance runner, Mirosław Żerkowski.

1998

The function of the PZWLA chairman was taken over by Julian Pełka and Janusz Nath became a secretary. Their great involvement resulted in improved functioning of the association, better information flow, increased possibilities of taking part in sports life and integration of stadium and road events. Thank to this the number of members of the association began to grow

During the 4th World Masters Games in Portland (USA) the Poles won three gold and one silver medal. The best result was achieved by walker Bogdan Bułakowski who won two gold medals. Florian Kulczyński won gold in hammer throw and Krystyna Kasperczyk was second in steeple chase.

A large group of 70 Polish athletes took part in the 11th European Veterans Athletics Championships in Cesanetico in Italy. They won 13 medals (two gold, two silver and nine bronze). Two hammer throwers stood on the highest podium: Florian Kulczyński again and one of the oldest Polish masters, Jerzy Krawczyk.

1999

The 2nd European Veterans Indoor Championships in Malmö did not result in any wins for the Polish team, only two silver and two bronze medals. The results were slightly better at the 13th World Veterans Championships in Gateshead, where the perfect hammer thrower Jerzy Krawczyk won a gold medal in the category of 75-year-olds. The 33-person Polish team won also two silver and ten bronze medals. Mirosław Włodarczyk (long jump and high jump) and Ryszard Krzesiński (hammer, weight pentathlon) stood on the podium twice each.

2000

In the jubilee 10th Polish Championships held in June under the aegis of Aleksander Kwaśniewski, the President of the Republic of Poland, 211 people of which 18 were women, took part. One of the honorary guests of the championships was Irena Szewińska, the chairman of the Polish Athletics Association. "The Meeting of Generations" the aim of which was the integration of athletics community and further popularisation of masters sport – was attended by many sports champions, the best athletes of today and long ago. The championships were on a very high sports level. 48 Polish records and 13 Polish Veterans Championships records were set. The cups funded by the President of Poland for the best results of the competition were awarded to Urszula Kielan from Warsaw in high jump in the category of 35-year-olds with the result 165 cm and Florian Kulczyński from Kołobrzeg in hammer throw in the category of 50-year-olds with 62.73 m. The cups for the oldest participants of the championships were given to Janina Fijałkowska and Kazimierz Spychała, both from Łodź. Włodzimierz Kalinowski from Warsaw competing in shot put and Paweł Iwiński from Bydgoszcz in pole vault won awards in events devoted to the memory of Władysław Komar and Tadeusz Ślusarski.

The Polish representatives won as many as 27 medals (eight gold, five silver and fourteen bronze) during the European Championships in Jyväskylä in Finland. The outstanding athletes who won gold medals in the 58-person team were: Florian Kulczyński (hammer), Mirosław Włodarczyk (high jump), Henryk Radzikowski (shot put), Jerzy Kaduszkiewicz (triple jump), Aleksander Saków (javelin throw), Janina Fijałkowska (10 km walk), Janusz Kociszewski (800 m race), Benedykt Michałowski (weight pentathlon).

2001

The 3rd European Veterans Indoor Championships in Bordeaux resulted in four medals for the Polish team of 16 athletes. Two gold medals were won by Jerzy Przyborowki: in 60 m hurdles and in triple jump (category of 70-year-olds). Additionally, Janusz Leśniewicz won silver in high jump and Zbigniew Werling bronze in shot put.

The Poles brought home 23 medals (seven gold, ten silver and six bronze) from the 14th World Championships in Brisbane. Anna Włodarczyk set a world record in triple jump in the category of 50-year-old women (11.37 m). She was also second in 80 m hurdles. In the 40-strong team Janina Fijałkowska (5 km and 10 km walk) and Jerzy Krawczyk (hammer, weight pentathlon) who also won silver in discus throw, won gold twice each. Multi-medallist Jerzy Przyborowski was on the podium three times (80 m and 300 m hurdles and triple jump). It

should be noted that Jerzy Krawczyk's medals were the first Polish medals in the category of 80-84 years at a championship event.

2002

Another year abounding in sports events in Poland and abroad. 252 athletes took part in the 12th Polish Championships in Sopot. During the Championships new authorities of the PZWLA were elected. Wacław Krankowski from Toruń became the chairman for the following four years.

At the 13th European Championships in Potsdam a record number of 153 Polish athletes competed. They won a record number of medals – 28 (eleven gold, seven silver and ten bronze). The group of European record holders was joined by Jerzy Przyborowski from Radom in 80 m hurdles in the category of 70-year-olds (14.06 s) and Krzysztof Dziamski from Poznań in pole vault in the category of 40-year-olds (4.80 m). Janina Fijałowska and Janina Łuniewska won waking events twice, Jerzy Przyborowski triumphed in hurdles, and over-80-year-old Marian Parusiński was first in the marathon in his age category. During the Championships Poland was awarded the right to hold the 2006 European Championships. They will take place in Poznań.

In the 6th World Masters Non-Stadia Championships which were held in Riccione in Italy, a 28-person Polish team competed who won in total six medals (two gold, two silver, two bronze). Janina Fijałkowska (20 km walk) and Krystyna Pieczulis (10 km race) won gold medals.

In the autumn the World Masters Games in Melbourne were held. 2,500 athletes from 97 countries took part. A five-person team for Poland won four medals (three gold and one silver). Gabriel Mańkowski (triple jump) and Janusz Leśniewicz (high jump), Florian Kuczyński (hammer throw) and Andrzej Semborowski (shot put) stood on the podium.

2003

Jerzy Krawczyk from Rąpin become the European record holder in hammer throw in the category of 80-year-olds (34.58 m).

In the 4th European Indoor Championships in San Sebastian 23 masters of athletics from Poland took part. They won nine medals (three silver and six bronze). Maria Kędziora (shot put) and Stanisław Chmielewski (long jump, triple jump) won silver medals. Kazimierz Spychała was in a great form and won two bronze medals in 60 m race and triple jump in the category of 80-84 years.

In the 8th European Veterans Non-Stadia Championships in Upice (the Czech Republic) a 25-person Polish team took part winning first

medals in this event, six in total (three gold, one silver and two bronze). Krystyna Pieczulis stood out by winning two medals.

29 athletes from Poland brought 19 medals from the 15th World Championships in Puerto Rico (seven gold, ten silver and two bronze). Anna Włodarczyk competing in the category of 50-year-old women performed an exceptional feat. She won as many as five gold medals (!) – in heptathlon, high jump, long jump, triple jump and 80 m hurdles – becoming the star of the competition. Krystyna Pieczulis (10 km) won gold as did Mariusz Gurzęda (discus throw).

2004

During the 14th Polish Championships in Częstochowa on 3 and 4 July, 256 athletes competed.

In the 1st World Masters Indoor Championships in Sindelfingen in Germany (10-14 March) approximately 2,600 athletes took part, including 38 from Poland (three women and 35 men). They won 13 medals (four gold, four silver and five bronze).

The 14th European Championships in an open stadium held in Denmark (Århus/Randers) brought another medal record for the Poles – 43 medals (nine gold, twenty silver and fourteen bronze) won by 95-person team. The Polish national anthem was played twice to Janina Łuniewska (5 km and 10 km walk) and Aleksander Saków (javelin throw, weight pentathlon), and once to Donata Jancewicz (high jump), Mieczysław Szpak (discus throw), Janusz Kociszewski (800 m), Marianna Biskup (triple jump) and Krzysztof Dziamski (pole vault). Three Polish relays were on medal positions. One of the doyens of Polish veterans, over-80-year-old Jerzy Krawczyk won bronze medals in shot put and hammer throw.

At the 7th World Masters Non-Stadia Championships (road races and walks) held from 18 to 24 April in Auckland in New Zealand, Krystyna Pieczulis won a silver medal in 10 km race.

Janina Fijałkowska from Łódź achieved the best world result in 20 km walk in the category of 65-year-olds (2:06.41 hours).

2005

In Swedish Eskilstuna the 5th European Veterans Indoor Championships were held. Our athletes, 27 of them, won 20 medals in total (five gold, eleven silver and four bronze). Marianna Biskup (triple jump), Adam Domicz (high jump), Antoni Kargol (weight throw), Zbigniew Niczko (800 m) and Grzegorz Pawelski (shot put) were unrivalled in their categories. Jan Białous, Janina Łuniewska (walk) and Ryszard Nowakowski (200 and 400 m) were also excellent, winning two medals each.

On 9 and 10 July the 15th jubilee Polish Veterans Athletics Championships were held at the stadium of the City Athletics Club in Toruń. The honorary patrons included Jerzy Ciszewski, Undersecretary of State in the Ministry of National Education and Sport, Piotr Nurowski, the chairman of the Polish Olympic Committee, Irena Szewińska, the Chairperson of the Polish Athletics Association and Robert Korzeniowski, an outstanding walker, currently the Head of Editors of Sports Programmes of Channel 1 of the Polish Television (TVP S.A.). 304 athletes took part in the competition. It was on a high sports level. 22 Polish records and 38 Polish championships records were set and two were equalled. The stars of the tournament were Zofia Więciorkowska and Dorota Szczepanik who set three records each and the unrivalled Jerzy Przyborowski who set as many as six Polish records (!). The oldest participant was Kazimierz Spychała, 85, of Łódź.

Also in July a group of Polish veterans took part in the World Masters Games in Edmonton in Canada. Only a few people strong, but very ambitious and well-prepared group of athletes brought 14 medals (7-5-2) and seven Polish records. Florian Kulczyński won three gold medals: in shot put, weight throw and weight pentathlon. Krystyna Pieczulis won twice: in 10 km road race and 5 km track race, and Andrzej Semborowski one in shot put, winning also silver in discus throw. Krzysztof Wardecki won three silver medals – in 200 m race, long jump and pentathlon, Józef Lasik was second in long jump and third in triple jump and Jan Dec won a bronze medal in javelin throw.

51 Poles entered for the 16th World Championships in Donostia – San Sebastian held in August, of which 45 competed. Our representatives did not disappoint and won 24 medals (seven gold, nine silver and eight bronze), the largest number at the world championships so far. Two third of the medals (16) were won by our excellent throwers, including Andrzej Piączkowski, the winner of two gold (weight pentathlon, hammer) and one silver medal (weight throw). Jerzy Przyborowski did well again winning in 80 m hurdles and taking second place in 300 m hurdles and high jump. Other gold medallists were Antoni Kargol (hammer throw), Henryk Radzikowski (shot put), Janusz Kociszewski (800 m) i Michał Krukowski (javelin throw). One of the oldest Polish athletes, Jerzy Krawczyk, aged over 80, won a silver medal in hammer throw. The Polish accent in the Basque Country was a stand promoting the 2006 European Championships in Poznań which attracted a lot attention. About 3,000 brochures advertising the event and the capital of the Wielkopolska region were handed out and the representatives of the Organisational Committee were welcomed very warmly during a Regional Assembly of European federations, where they presented the status of preparations and the programme of competition.

2006

In Austrian Linz the 2nd World Masters Indoor Athletics Championships were held. The Polish team included 54 athletes. As usual they did very well. A small team won 17 medals, including two gold, eight silver and seven bronze medals. Experienced athletes multi-medallists: Michał Drohomirecki (javelin of 80-year-olds) and Henryk Radzikowski (shot put, 45-year-olds) stood on the highest podium. Among the “novices” Dariusz Bednarski achieved an excellent result and vice-championship in high jump in the category of 50-year-olds.

5. Organisation of masters athletics movement

The organisational structure of the masters athletics movement is presented in figure 5.1. The main and the oldest organisation is WMA – World Masters Athletics, which has its continental sections, including national associations. WMA cooperates with IAAF, where a special commission for veteran affairs has been set up. Organisations involved in the entire veterans sports movement are a separate branch. They have not established any formal cooperation with WMA and IAAF but they respect sports regulations and most of the decisions concerning athletics, created by these specialized organisations. The objectives of all these institutions are common, as are their activities – organisation of competitions, promotion of physical activity and health, support of international friendship and cooperation, educational activities related to promotion of knowledge about sports training and last but not least – anti-doping campaign.

MASTERS ATHLETICS ORGANISATIONS	ALL-SPORT ORGANISATIONS
World Masters Athletics (*144*) – IAAF Masters' Committee	
Africa Masters Athletics (*32*)	International Masters Games Association
Asia Masters Athletics (*22*)	
European Veterans Athletics Association (*43*)	European Masters Sports Association
North and Central American & the Caribbean Regional Association of WMA (*21*)	
Oceania Association of Veteran Athletes (*12*)	
Asociation Sudamericana de Atletas Veteranos (*14*)	

Fig. 5.1. Organisational structure of masters athletics in the world and their relation (in brackets – number of associated countries). According to *World Masters Athletics Handbook 2003-2005.*

5.1. World Masters Athletics – WMA

WMA was established in 1976. Its current president is Cesare Beccali from Italy. The statutory aims include organisation, control and administration of the athletic movement of women and men aged over 35 years, organisation of Veteran Athletes World Championships and other veteran athletes competitions, approval and registration of veterans' world records in 5 age groups and collection of other outstanding results of veteran athletes. WMA also supports international friendship, understanding and cooperation through the masters athletics movement.

WMA has seven committees: Stadia Committee, Non-Stadia Committee, Doping and Medical Committee, Law & Legislation Committee, Records Committee, Women's Committee and Organisational Advisory Committee.

Types of competitions organized by WMA:

- World Masters Athletics Championships Stadia – in odd years;
- World Masters Athletics Championships Non-Stadia, presently held as WMA Championships Stadia;
- World Masters Athletics Championships Indoor – in even years.

5.2. IAAF Masters' Committee

The Committee was established in 1983 in consultation with WMA. Its president is Cesar Moreno Bravo (Mexico). IAAF does not organize any separate competitions for veterans. In recent years, as a result of the work of WMA and Veterans' Committee, first meetings of veteran athletes were organized as part of the World Championships (Helsinki 2005) and European Championships (Göteborg 2006) held under the auspices of IAAF.

5.3. Continental associations – European Veterans Athletics Association (EVAA)

The association was established in 1978. Its president is Dieter Massin from Germany. The statutory aims include organisation, regulation and administration of athletics in Europe for veterans, promotion of European veteran athletics meetings within Europe, ratification of IAAF and WMA regulations and all directives and sanctions of IAAF and WADA related to anti-doping activity, registration of European veteran athletics records and best performances in each age

group. The Association is a guardian of the interests and good image of veteran athletes in Europe and supports the international cooperation between its members. It is a non-commercial organisation, politically and religiously independent and neutral. EVAA, with 43 associated states, is the largest and most dynamic continental organisation. In addition to technical matters, related to the organisation of competitions (other association often restrict their activity to technical matters), it puts strong emphasis on anti-doping campaign and education of veteran athletes as well as promotion of a healthy lifestyle. EVAA's president is the initiator and editor of the journal "Senioren Leichtathletik".

Types of competitions organized:

- European Veterans Athletics Championships Stadia (EVACS) – in even years;
- European Veterans Athletics Championships Non-Stadia (EVACNS) (street races, cross-country races) – in odd years;
- European Veterans Athletics Championships Indoor (EVACI) – in odd years.

Associated countries: Albania, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Gibraltar, Great Britain, Greece, Holland, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Malta, Moldova, Norway, Poland, Portugal, Romania, Russia, San Marino, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, Yugoslavia.

5.4. International Masters Games Association (IMGA)

IMGA is an associated member of the General Assembly of International Sporting Associations GAISF/AGFIS). It is a non-profit organisation established in 1995 under the Swiss law. Its current president is Kai Holm from Denmark.

The statutory aims include promotion of all life sports competition, friendship and understanding between mature athletes, irrespective of their sex, race, religion and sports status, promotion of the "sport for life" philosophy, building permanent positive attitudes to sport, physical fitness and health.

IMGA organizes World Masters Games, probably the largest multi--event competitions in the world, held every four years. Being of a certain age is one of the few requirements to participate in the competitions (30 years in the case of athletics). Another is membership in the national sports association corresponding to a given sports discipline. No national teams participate, each contestant represents him/herself. In team sports teams can be formed from competitors from

different countries. The programme includes permanent events and 10 additional events, selected prior to the Games. The permanent events include: field and track, badminton, basketball, canoeing, cycling, football, gold, orienteering, rowing, shooting, squash, swimming, tennis, table tennis, triathlon, weight lifting.

6. Changes in athletic fitness with age

Each one of us would like to be physically fit for as long as possible. However, physical fitness has not been given to us once and for all and has not been given to everybody equally. We can, however, improve or sustain it at a proper level. Physical fitness of elderly people is not the same as that of 20-year-olds but if training is continued at the old age, elderly people are fitter than an average 20-year-old. If properly sustained, physical fitness can be phenomenal and serve as testimony to the exceptional abilities of human body. Johnny Kelley, at the age of 83, completed 60 marathon races. Wally Hayward, at the age of 79, ran Charity Challenge (80 km) at 9 h 44 min and 15 s, and took 5482nd place among 11,234 competitors (Spirduso 1995). Veteran athletes are better in their sports than their counterparts in the events that they practice and in which they compete at competitions for veteran athletes.

In an attempt to present the changes in athletic fitness with age in the population of veteran athletes, we analysed the results (average values) obtained by competitors in selected events held during the 14th European Veterans Championships in Århus-Randers in 2004. Until today, analyses were only made of changes in the record results made by veteran athletes (Moore 1975; Riegel 1981; Stones, Kozma 1980, 1981, 1982a, 1982b, 1986; Schulz, Curnow 1988). The analyses revealed that with age both women and men gradually achieve worse results compared to the world records; however, considerably worse results are achieved at the age of 80 years. Women tend to achieve worse results faster than men. Results in race events deteriorated each year compared to the world records by 1% whereas in discus throw – by 2% (Stones, Kozma 1982a, 1982b). The analysis of the results obtained by 50-60-year-old men reveals that the results are at the level achieved by young men – competitors of secondary school age. Long-term examinations of champion racers reveal that despite a high level of training in all race events, from a one-mile race to the marathon, the results deteriorate by about 1% every year between 27 and 47 year of age (Trappe et al. 1996a). The analysis of men's 100 m race and 10 km race revealed a 1% deterioration in results compared to the record results every year between 25 and 60 years of age (Wilmore, Costill 1999).

Results obtained in athletic competitions can serve as a measure of changes in motor abilities, since:

- the competitions are a well-documented and tangible measure of changes in physical capabilities;
- competitions involving masters athletes are held in the fair play spirit;
- competition regulations, weather, equipment and sports facilities provide for fair and objective measurement of results;
- competitors take part in the competitions on a voluntary basis and, because of that, they are highly motivated;
- many competitors train regularly in clubs and therefore they are well prepared for the competitions, using new technology helping them to obtain very good sports results.

The analysis of the results obtained by masters athletes can serve as a reminder to all elderly people and gerontologists that physical fitness can be maintained at an exceptionally high level for a very long time.

6.1. Sprint

With the passage of time the level of speed abilities, even in persons in intensive training, tends to decrease. G. Nowicki (1989) analysed the results of a 60 m race and found considerable changes (decrease) in speed, depending on the age and professional work.

We know that intensified physical activity is one of more important factors that decelerate the ageing process and regression of motor abilities, including speed abilities (Osiński 1993, 2003). Zieliński and Król-Zielińska (2000) analysed a men's 100 m race over 10 years of the contestants' participation in different competitions of veteran athletes (world championships, European championship, national championships, international meetings), who were divided into four age groups: 40-49, 50-59, 60-69, and 70-79. A small regression in speed abilities was found. Results were worse particularly in the third and fourth decades of life.

100 m race

The analysis of changes in the results of the men's and women's 100 m race is presented in figures 6.1. and 6.2. and in tables 6.1. and 6.3. The best average result in men was recorded in the M35 age category (11.93 s), whereas in women it is recorded in the K35 category (13.38 s), the worst – M85 (22.00 s) and K80 (25.10 s). Men in the M50 age category (16.63 s) had better average results than their younger colleagues in the M45 category (12.77 s); a similar situation was observed between M85 and M90 age categories.

Tables 6.2. and 6.4. present the dynamics of result changes in the men's and women's 100 m race in absolute figures and as a percentage. The biggest average difference in results is observed between M80 and M85 and K70-K75 age categories, respectively, –5.25 s (–31.3%) and –4.34 s (–22.7%). The biggest deterioration of the results compared to the 35 age category was found in the M85 and K80 age categories; it was, respectively, –10.07 s in men and –11.72 s in women, which indicated a worse result on average by –84.4% and –87.6%.

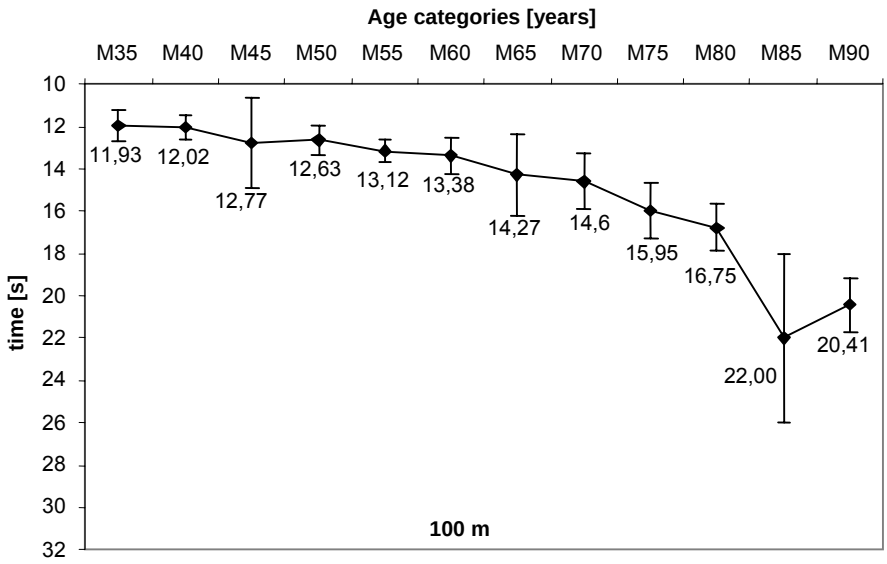

Fig. 6.1. Changes of results in men's 100 m race. Average values ± SD

Tab. 6.1. Average changes of results in men's 100 m race

	M35	M40	M45	M50	M55	M60	M65	M70	M75	M80	M85	M90
N	19	54	53	41	46	46	48	25	23	16	6	2
$\overline{x}$ (s)	11.93	12.02	12.77	12.63	13.12	13.38	14.27	14.60	15.95	16.75	22.00	20.41
SD	0.73	0.60	2.15	0.68	0.55	0.83	1.93	1.32	1.28	1.12	3.99	1.27
min.	11.11	11.06	11.43	11.53	12.25	12.57	12.68	13.14	14.22	15.27	16.57	19.51
max.	13.52	14.43	24.68	15.25	15.55	17.47	24.59	19.17	18.57	19.15	25.85	21.31

Tab. 6.2. Dynamics of result change in men's 100 m race in absolute figures and as a percentage

	Average change of results between consecutive age categories		Average change of results in reference to age category M35	
Age	$\overline{x}$ [s]	$\overline{x}$ [%]	$\overline{x}$ [s]	$\overline{x}$ [%]
M35			0	0
M40	–0.09	–0.8%	–0.09	–0.8%
M45	–0.75	–6.2%	–0.84	–7.0%
M50	0.14	1.1%	–0.7	–5.9%
M55	–0.49	–3.9%	–1.19	–10.0%
M60	–0.26	–2.0%	–1.45	–12.2%
M65	–0.89	–6.7%	–2.34	–19.6%
M70	–0.33	–2.3%	–2.67	–22.4%
M75	–1.35	–9.2%	–4.02	–33.7%
M80	–0.8	–5.0%	–4.82	–40.4%
M85	–5.25	–31.3%	–10.07	–84.4%
M90	1.59	7.2%	–8.48	–71.1%

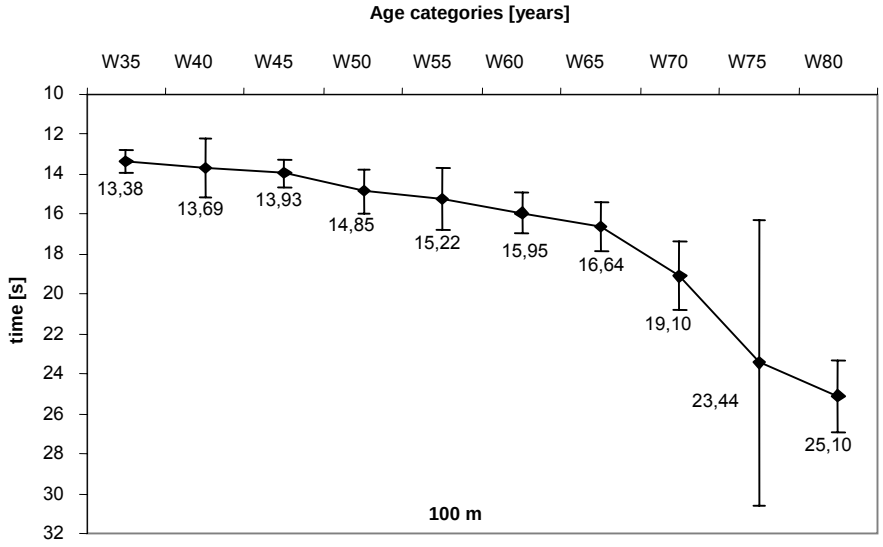

Fig. 6.2. Changes of results in women's 100 m race. Average results ± SD

Tab. 6.3. Average changes of results in women's 100 m race

	W35	W40	W45	W50	W55	W60	W65	W70	W75	W80
N	20	43	22	50	47	24	19	20	3	3
$\overline{x}$ (s)	13.38	13.69	13.93	14.85	15.22	15.95	16.64	19.10	23.44	25.10
SD	0.55	1.45	0.70	1.08	1.56	1.05	1.23	1.74	7.13	1.81
min.	12.59	12.68	13.1	13.39	13.43	14.57	15.1	16.64	19.06	23.86
max.	14.61	21.62	15.68	17.52	23.18	18.53	19.86	22.79	31.67	27.18

Tab. 6.4. Dynamics of result change in women's 100 m race in absolute figures and as a percentage

Average change of results between consecutive age categories			Average change of results in reference to age category W35	
Age	$\overline{x}$ [s]	$\overline{x}$ [%]	$\overline{x}$ [s]	$\overline{x}$ [%]
W35	–0.30	–2.3%	0	0
W40	–0.24	–1.8%	–0.30	–2.3%
W45	–0.92	–6.6%	–0.55	–4.1%
W50	–0.37	–2.5%	–1.47	–11.0%
W55	–0.72	–4.8%	–1.84	–13.8%
W60	–0.69	–4.3%	–2.57	–19.2%
W65	–2.46	–14.8%	–3.26	–24.3%
W70	–4.34	–22.7%	–5.72	–42.7%
W75	–1.66	–7.1%	–10.06	–75.2%
W80			–11.72	–87.6%

400 m race

Figure 6.3. and 6.4. and tables 6.5. and 6.7. present the analysis of the changes in the results in the men's and women's 400 m race. The best average result among men was recorded in the M35 age category (53.19 s), whereas among women in the K35 category (61.21 s). The worst average result was recorded in the M85 (114.81 s) and K70 (94.71 s) categories. Women in the K65 category obtained a better average result (77.37 s) than their younger colleagues in the M60 category (79.54 s).

The dynamics of changes in the results in the men's and women's 400 m race in absolute figures and as a percentage is presented in tables 6.6. and 6.8. The biggest average difference in the results was

recorded between age categories M80–M85 and K65–70, which was, respectively, –32.81s (–40.0%) and –17.34s (–22.4%). The biggest deterioration of the results with respect to the 35 age category was recorded in the M85 and K70 categories, respectively, –61.62 s in men and –33.50 s in women, which indicated worsening of the result in that race by an average of –115.9% and –54.7%.

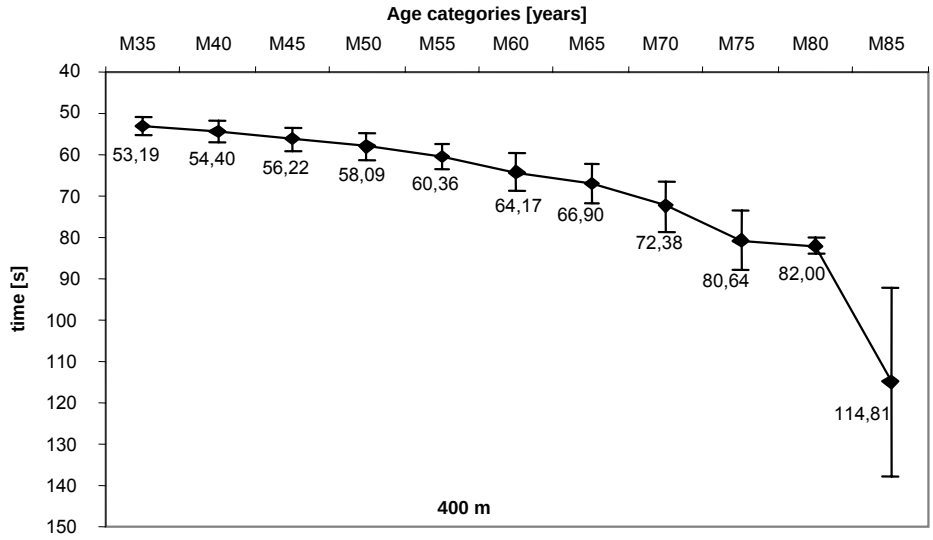

Fig. 6.3. Changes of results in men's 400 m race. Average values ± SD

Tab. 6.5. Average changes of results in men's 400 m race

	M35	M40	M45	M50	M55	M60	M65	M70	M75	M80	M85
N	5	81	60	53	48	27	44	22	16	3	6
$\overline{X}$ (s)	53.19	54.4	56.22	58.09	60.36	64.17	66.9	72.38	80.64	82.00	114.81
SD	2.28	2.65	2.95	3.34	3.03	4.73	4.82	6.04	7.24	1.92	22.79
min.	50.81	47.81	51.45	51.68	55	57.15	56.4	64.8	69.19	80.29	89.97
max.	56.29	61.84	65.69	70.51	70.83	76.41	82.01	91.06	98.76	84.08	137.88

Tab. 6.6. Dynamics of result change in men's 400 m race in absolute figures and as a percentage

Average change of results between consecutive age categories			Average change of results in reference to age category M35	
Age	$\overline{x}$ [s]	$\overline{x}$ [%]	$\overline{x}$ [s]	$\overline{x}$ [%]
M35	–1.21	–2.3%	0	0
M40	–1.82	–3.3%	–1.21	–2.3%
M45	–1.87	–3.3%	–3.03	–5.7%
M50	–2.27	–3.9%	–4.9	–9.2%
M55	–3.81	–6.3%	–7.17	–13.5%
M60	–2.73	–4.3%	–10.98	–20.6%
M65	–5.48	–8.2%	–13.71	–25.8%
M70	–8.26	–11.4%	–19.19	–36.1%
M75	–1.36	–1.7%	–27.45	–51.6%
M80	–32.81	–40.0%	–28.81	–54.2%
M85			–61.62	–115.9%

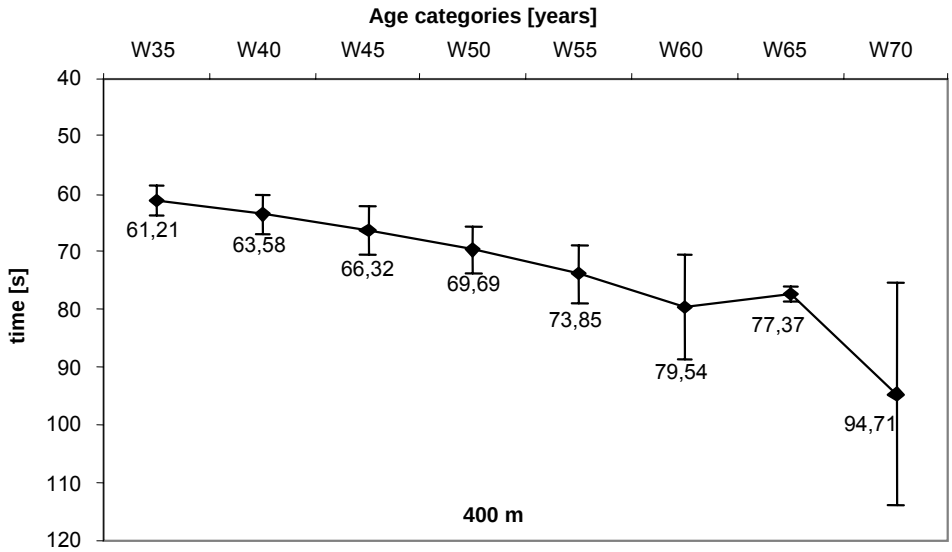

Fig. 6.4. Changes of results in women's 400 m race. Average values ± SD

Tab. 6.7. Average changes of results in women's 400 m race

	W35	W40	W45	W50	W55	W60	W65	W70
N	27	28	46	27	24	17	6	3
$\overline{X}$ (s)	61.21	63.58	66.32	69.69	73.85	79.54	77.37	94.71
SD	2.51	3.53	4.14	4.11	5.04	9.06	1.34	19.37
min.	56.31	57.91	60.36	62.75	67.81	70.33	74.83	82.15
max.	67.73	73.25	81.98	80.91	86.25	111.3	78.62	117.02

Tab. 6.8. Dynamics of result change in women's 400 m race in absolute figures and as a percentage

Average change of results between consecutive age categories			Average change of results in reference to age category W35	
Age	$\overline{X}$ [s]	$\overline{X}$ [%]	$\overline{X}$ [s]	$\overline{X}$ [%]
W35	–2.37	–3.9%	0	0
W40	–2.74	–4.3%	–2.37	–3.9%
W45	–3.37	–5.1%	–5.11	–8.3%
W50	–4.17	–6.0%	–8.48	–13.8%
W55	–5.69	–7.7%	–12.64	–20.7%
W60	2.17	2.7%	–18.33	–29.9%
W65	–17.34	–22.4%	–16.16	–26.4%
W70			–33.50	–54.7%

6.2. Middle distances

800 m race

Figures 6.5. and 6.6. and tables 6.9. and 6.11. present the analysis of the changes in the results in the men's and women's 800 m race. The best average result among men was recorded in the M35 age category (125.88 s – 02:05.9 min), whereas among women in the K35 category (141.24 s – 02:21.2 min). The worst average result was recorded in the M85 (204.02 s – 03:24.0 min) and K70 (217.32 s – 03:37.3 min) categories.

The dynamics of changes in the results in the men's and women's 800 m race in absolute figures and as a percentage is presented in Tables 6.10 and 6.12. The biggest average difference in the results was

recorded between age categories M65–M70 and K60–65, which was, respectively, –21.85s (–14.0%) and –20.40s (–11.4%). The biggest deterioration of the results with respect to the 35 age category was recorded in the M85 and K70 categories, respectively, –78.14 s in men and –76.09 s in women, which indicated worsening of the result in that race by an average of –62.1% and –53.9%.

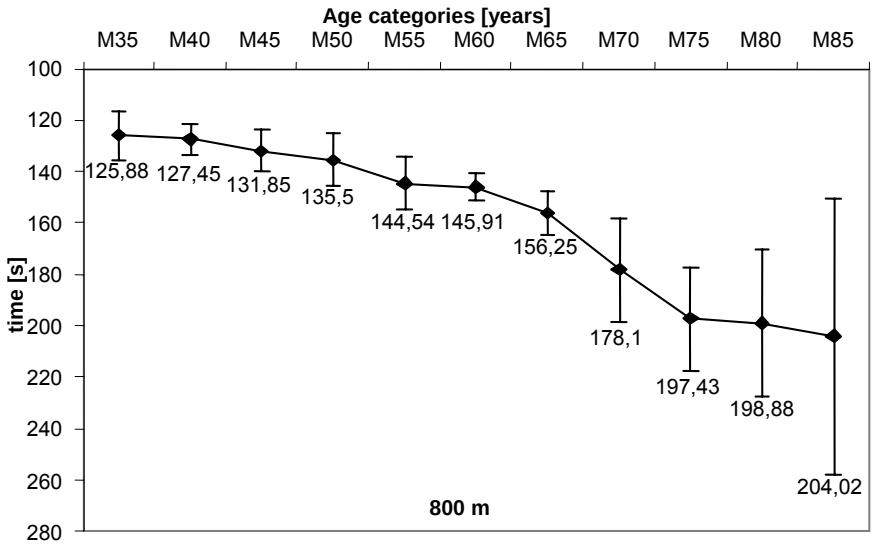

Fig. 6.5. Changes of results in men's 800 m race. Average values ± SD

Tab. 6.9. Average changes in the results in men's 800 m race

	M35	M40	M45	M50	M55	M60	M65	M70	M75	M80	M85
N	7	54	49	47	44	41	31	9	10	3	5
$\overline{X}$ (s)	125.88	127.45	131.85	135.5	144.54	145.91	156.25	178.1	197.43	198.88	204.02
$\overline{X}$ (min)	2:05.9	2:07.5	2:11.8	2:15.5	2:24.5	2:25.9	2:36.3	2:58.1	3:17.4	3:18.9	3:24.0
SD	9.40	5.72	8.31	10.19	10.37	5.44	8.55	20.14	20.15	28.85	53.70
min.	116.55	119.18	123.61	122.94	134.16	137.61	142.25	152.52	178.13	198.88	204.02
max.	144.19	145.89	181.61	178.58	178.77	165.24	183.16	208.96	232.71	250.11	332.57

Tab. 6.10. Dynamics of result change in men's 800 m race in absolute figures and as a percentage

Average change of results between consecutive age categories			Average change of results in reference to age category M35	
Age	$\overline{x}$ [s]	$\overline{x}$ [%]	$\overline{x}$ [s]	$\overline{x}$ [%]
M35	–1.57	–1.2%	0	0
M40	–4.40	–3.5%	–1.57	–1.2%
M45	–3.65	–2.8%	–5.97	–4.7%
M50	–9.04	–6.7%	–9.62	–7.6%
M55	–1.37	–0.9%	–18.66	–14.8%
M60	–10.34	–7.1%	–20.03	–15.9%
M65	–21.85	–14.0%	–30.37	–24.1%
M70	–19.33	–10.9%	–52.22	–41.5%
M75	–1.45	–0.7%	–71.55	–56.8%
M80	–5.14	–2.6%	–73.00	–58.0%
M85			–78.14	–62.1%

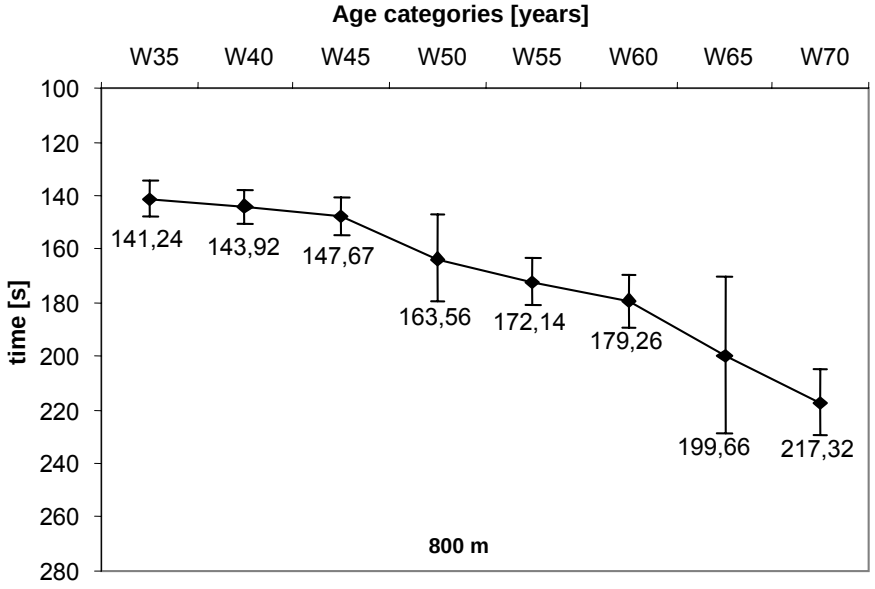

Fig. 6.6. Changes of results in women's 800 m race. Average values ± SD

Tab. 6.11. Average changes in the results in women's 800 m race

	W35	W40	W45	W50	W55	W60	W65	W70
N	10	25	24	29	22	9	6	3
$\overline{X}$ (s)	141.24	143.92	147.67	163.56	172.14	179.26	199.66	217.32
$\overline{X}$ (min)	2:21.2	2:23.9	2:27.7	2:43.6	2:52.1	2:59.3	3:19.7	3:37.3
SD	6.71	6.34	7.13	16.16	8.75	9.99	29.07	12.46
min.	133.61	134.16	136.57	147.96	162	164.77	171.3	203.94
max.	156.28	161.53	164.33	221.83	199.08	195.71	244.22	228.6

Tab. 6.12. Dynamics of result change in women's 800 m race in absolute figures and as a percentage

Average change of results between consecutive age categories			Average change of results in reference to age category W35	
Age	$\overline{X}$ [s]	$\overline{X}$ [%]	$\overline{X}$ [s]	$\overline{X}$ [%]
W35	–2.68	–1.9%	0	0
W40	–3.76	–2.6%	–2.68	–1.9%
W45	–15.89	–10.8%	–6.44	–4.6%
W50	–8.58	–5.2%	–22.33	–15.8%
W55	–7.12	–4.1%	–30.91	–21.9%
W60	–20.40	–11.4%	–38.03	–26.9%
W65	–17.66	–8.8%	–58.42	–41.4%
W70			–76.09	–53.9%

6.3. Long distances

5,000 m race

Figures 6.7. and 6.8. and tables 6.13. and 6.15. present the analysis of the changes in the results in men's and women's 5,000 m race. The best average result among men was recorded in the M40 age category (968.45s – 16:08.4min), whereas among women in the K40 category (1111.79 s – 18:31.8 min). The worst average result was recorded in the M85 (2131.48 s – 35:51.5 min) and K75 (2143.08 s – 35:43.1 min) categories.

The dynamics of changes in the results in the men's and women's 5000 m race in absolute figures and as a percentage is presented in Tables 6.14 and 6.16. The biggest average difference in the results was recorded between age categories M80–M85 and K70–K75, which was, respectively, –424.22 s (–24.8%) and –538.03 s (–33.5%). The biggest deterioration of the results with respect to the 35 age category was recorded in the M85 and K75 categories, respectively, –1151.71 s in men and –972.15 s in women, which indicated worsening of the result in that race by an average of –117.5% and –83.0%.

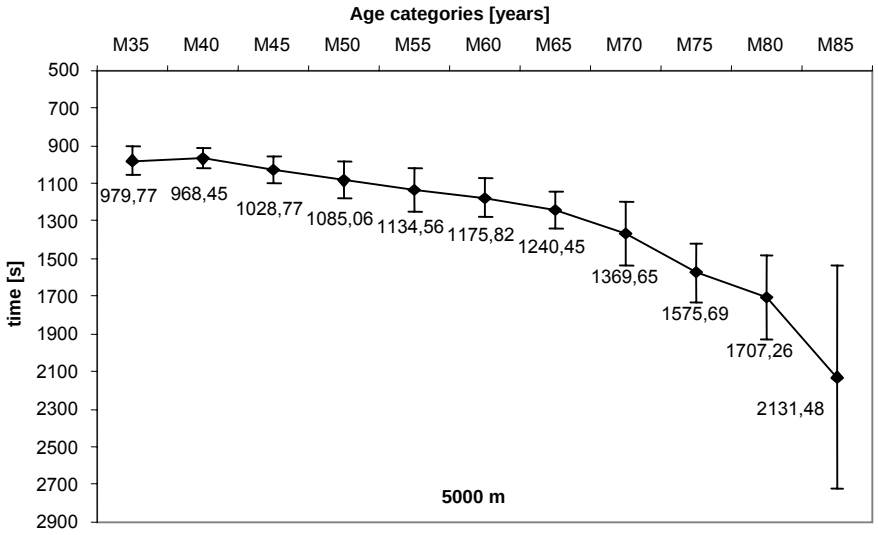

Fig. 6.7. Changes of results in men's 5,000 m race. Average values ± SD

Tab. 6.13. Average changes in the results in men's 5,000 m race

	M35	M40	M45	M50	M55	M60	M65	M70	M75	M80	M85
N	8	30	36	44	25	25	23	24	9	6	2
$\overline{x}$ (s)	979.77	968.45	1028.77	1085.06	1134.56	1175.82	1240.45	1369.65	1575.69	1707.26	2131.48
$\overline{x}$ (min)	16:19.8	16:08.4	17:08.8	18:05.1	18:54.6	19:35.8	20:40.5	22:49.7	26:15.7	28:27.3	35:31.5
SD	78.46	55.24	75.39	99.09	118.51	100.82	100.68	171.73	153.75	222.50	591.02
min.	893.38	866.95	905.84	961.82	980.65	1032.88	1118.92	1167.77	1348.9	1517.07	1713.56
max.	1132.09	1083.23	1193.51	1274.11	1388.8	1446.78	1496.11	1810.5	1767.81	2011.06	2549.39

Tab. 6.14. Dynamics of result change in men's 5,000 m race in absolute figures and as a percentage

	Average change of results between consecutive age categories		Average change of results in reference to age category M35	
Age	$\overline{x}$ [s]	$\overline{x}$ [%]	$\overline{x}$ [s]	$\overline{x}$ [%]
M35	11.32	1.2%	0	0
M40	–60.32	–6.2%	11.32	1.2%
M45	–56.29	–5.5%	–49.00	–5.0%
M50	–49.5	–4.6%	–105.29	–10.7%
M55	–41.26	–3.6%	–154.79	–15.8%
M60	–64.63	–5.5%	–196.05	–20.0%
M65	–129.2	–10.4%	–260.68	–26.6%
M70	–206.04	–15.0%	–389.88	–39.8%
M75	–131.57	–8.3%	–595.92	–60.8%
M80	–424.22	–24.8%	–727.49	–74.3%
M85			–1151.71	–117.5%

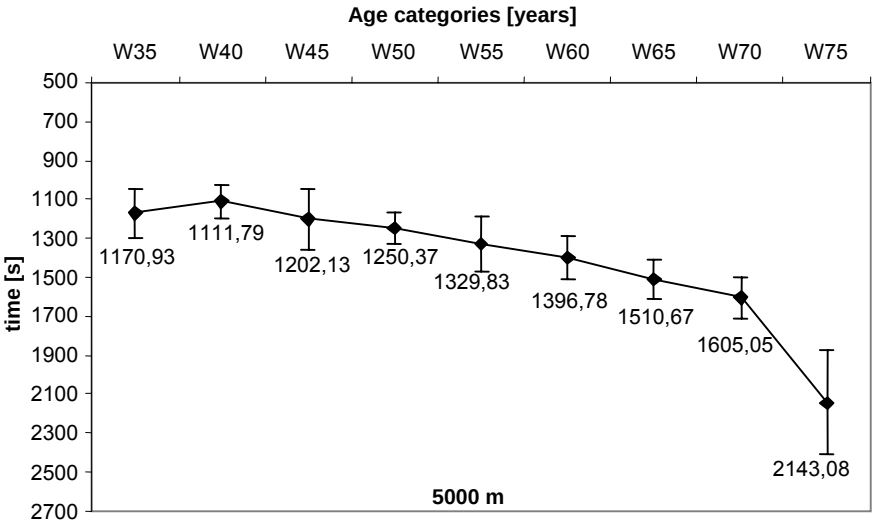

Fig. 6.8. Changes of results in women's 5,000 m race. Average values ± SD

Tab. 6.15. Average changes of results in women's 5,000 m race

	W35	W40	W45	W50	W55	W60	W65	W70	W75
N	9	14	14	15	16	14	10	5	2
$\bar{x}$ (s)	1170.93	1111.79	1202.13	1250.37	1329.83	1396.78	1510.67	1605.05	2143.08
$\bar{x}$ (min)	19:30.9	18:31.8	20:02.1	20:50.4	22:09.8	23:16.8	25:10.7	26:45.1	35:43.1
SD	128.68	89.62	160.44	80.67	139.26	110.84	101.16	102.26	266.66
min.	1058.79	1015.36	1005.77	1148.19	1166.94	1255.5	1335.65	1469.93	1954.52
max.	1443.58	1266.07	1646.1	1465.45	1548.4	1607.05	1643.43	1745.61	2331.63

Tab. 6.16. Dynamics of result change in women's 5,000m race in absolute figures and as a percentage

	Average change of results between consecutive age categories		Average change of results in reference to age category W35	
Age	$\bar{x}$ [s]	$\bar{x}$ [%]	$\bar{x}$ [s]	$\bar{x}$ [%]
W35	59.14	5.1%	0	0
W40	–90.35	–8.1%	59.14	5.1%
W45	–48.24	–4.0%	–31.20	–2.7%
W50	–79.46	–6.4%	–79.44	–6.8%
W55	–66.95	–5.0%	–158.90	–13.6%
W60	–113.89	–8.2%	–225.85	–19.3%
W65	–94.38	–6.2%	–339.74	–29.0%
W70	–538.03	–33.5%	–434.12	–37.1%
W75			–972.15	–83.0%

6.4. Jumping events

Triple jump

Figures 6.9. and 6.10. and tables 6.17. and 6.19. present the analysis of the changes in the results in men's and women's triple jump. The best average result among men was recorded in the M35 age category (13.58 m), whereas among women in the K35 category (10.81 m). The worst average result was recorded in the M85 (6.20 m) and K65 (7.51 m) categories.

The dynamics of changes in the results in the men's and women's triple jump in absolute figures and as a percentage is presented in tables

6.18. and 6.20. The biggest average difference in the results was recorded between age categories M80–M85 and K60–K65, which was, respectively, 1.32 m (17.6%) and 1.18 m (13.5%). The biggest deterioration of the results with respect to the 35 age category was recorded in the M85 and K65 categories, respectively, 7.38 m in men and 3.25 m in women, which indicated worsening of the result by an average of 54.4% and 30.0%.

Fig. 6.9. Changes of results in men's triple jump. Average values ± SD

Tab. 6.17. Average changes of results in men's triple jump

	M35	M40	M45	M50	M55	M60	M65	M70	M75	M80	M85
N	3	25	25	8	6	25	9	6	6	3	3
$\bar{x}$ (m)	13.58	12.59	12.45	11.58	11.18	10.30	9.53	9.24	7.69	7.52	6.20
SD	0.45	0.92	0.70	1.54	0.79	0.79	1.04	1.01	1.66	0.69	1.27
min.	13.11	10.88	10.85	9.32	10.32	8.76	7.24	8.04	4.33	6.73	5.23
max.	14.01	14.54	13.71	13.65	12.24	12.38	10.7	10.55	8.67	8	7.63

Tab. 6.18. Dynamics of result change in men's triple jump in absolute figures and as a percentage

	Average change of results between consecutive age categories		Average change of results in reference to age category M35	
Age	$\overline{x}$ [s]	$\overline{x}$ [%]	$\overline{x}$ [s]	$\overline{x}$ [%]
M35	0.99	7.3%	0	0
M40	0.14	1.1%	0.99	7.3%
M45	0.87	7.0%	1.13	8.3%
M50	0.41	3.5%	2.00	14.7%
M55	0.88	7.9%	2.40	17.7%
M60	0.77	7.4%	3.28	24.2%
M65	0.30	3.1%	4.05	29.8%
M70	1.55	16.8%	4.34	32.0%
M75	0.17	2.2%	5.89	43.4%
M80	1.32	17.6%	6.06	44.6%
M85			7.38	54.4%

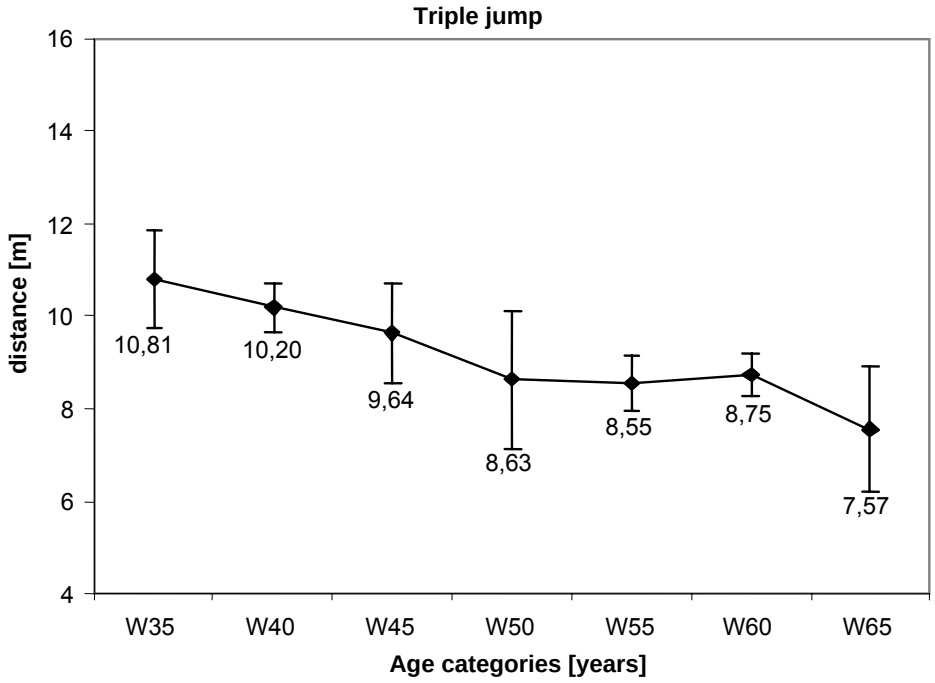

Fig. 6.10. Changes of results in women's triple jump. Average values ± SD

Tab. 6.19. Average changes of results in women's triple jump

	W35	W40	W45	W50	W55	W60	W65
N	9	6	8	8	6	2	4
$\bar{x}$ (m)	10.81	10.20	9.64	8.63	8.55	8.75	7.57
SD	1.04	0.53	1.08	1.50	0.60	0.46	1.35
min.	8.91	9.61	8.16	6.67	7.88	8.42	6.18
max.	12.21	11.1	10.8	10.85	9.5	9.07	8.95

Tab. 6.20. Dynamics of result change in women's triple jump in absolute figures and as a percentage

	Average change of results between consecutive age categories		Average change of results in reference to age category W35	
Age	$\bar{x}$ [m]	$\bar{x}$ [%]	$\bar{x}$ [m]	$\bar{x}$ [%]
W35	0.61	5.7%	0	0
W40	0.56	5.5%	0.61	5.7%
W45	1.00	10.4%	1.17	10.9%
W50	0.09	1.0%	2.18	20.1%
W55	–0.20	–2.3%	2.26	20.9%
W60	1.18	13.5%	2.07	19.1%
W65			3.25	30.0%

High jump

Figures 6.11, and 6.12, and tables 6.21. and 6.23. present the analysis of the changes in the results in men's and women's high jump. The best average result among men was recorded in the M40 age category (1.74 m), whereas among women in the K35 and K40 categories (1.49 m). The worst average result was recorded in the M90 (0.96 m) and K75 (0.94 m) categories.

The dynamics of changes in the results in the men's and women's high jump in absolute figures and as a percentage is presented in Tables 6.22 and 6.24. The biggest average difference in the results was recorded between age categories M50–M55 and K65–K70, which was, respectively, 0.17 m (10.2%) and 0.14 m (12.3%). The biggest

deterioration of the results with respect to the 35 age category was recorded in the M90 and K75 categories, respectively, 0.78 m in men and 0.55 m in women, which indicated worsening of the result by an average of 44.9% and 36.9%.

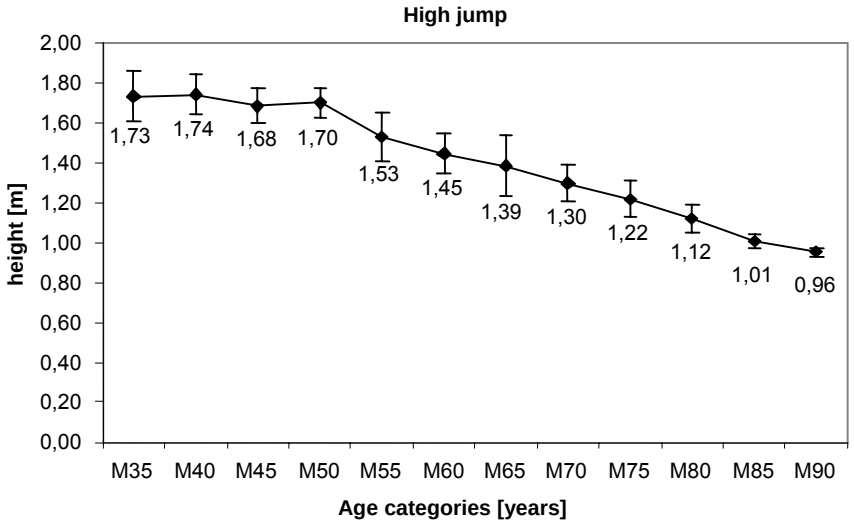

Fig. 6.11. Changes of results in men's high jump. Average values ± SD

Tab. 6.21. Average changes of results in men's high jump

	M35	M40	M45	M50	M55	M60	M65	M70	M75	M80	M85	M 90
N	3	15	13	6	11	16	6	12	10	7	4	2
$\bar{x}$ (m)	1.73	1.74	1.68	1.70	1.53	1.45	1.39	1.30	1.22	1.12	1.01	0.96
SD	0.13	0.10	0.09	0.07	0.12	0.10	0.15	0.09	0.09	0.07	0.04	0.02
min.	1.60	1.60	1.55	1.60	1.30	1.25	1.20	1.15	1.06	1.06	0.97	0.94
max.	1.85	1.95	1.85	1.80	1.75	1.60	1.61	1.45	1.36	1.24	1.06	0.97

Tab. 6.22. Dynamics of result change in men's high jump in absolute figures and as a percentage

	Average change of results between consecutive age categories		Average change of results in reference to age category M35	
Age	$\overline{x}$ [m]	$\overline{x}$ [%]	$\overline{x}$ [m]	$\overline{x}$ [%]
M35	–0.01	–0.6%	0	0
M40	0.06	3.4%	-0.01	-0.6%
M45	–0.02	–0.9%	0.05	2.8%
M50	0.17	10.2%	0.03	1.9%
M55	0.08	5.3%	0.21	11.9%
M60	0.06	4.3%	0.29	16.5%
M65	0.09	6.1%	0.35	20.1%
M70	0.08	6.2%	0.43	25.0%
M75	0.10	8.1%	0.51	29.7%
M80	0.11	10.0%	0.61	35.4%
M85	0.05	5.2%	0.73	41.9%
M90			0.78	44.9%

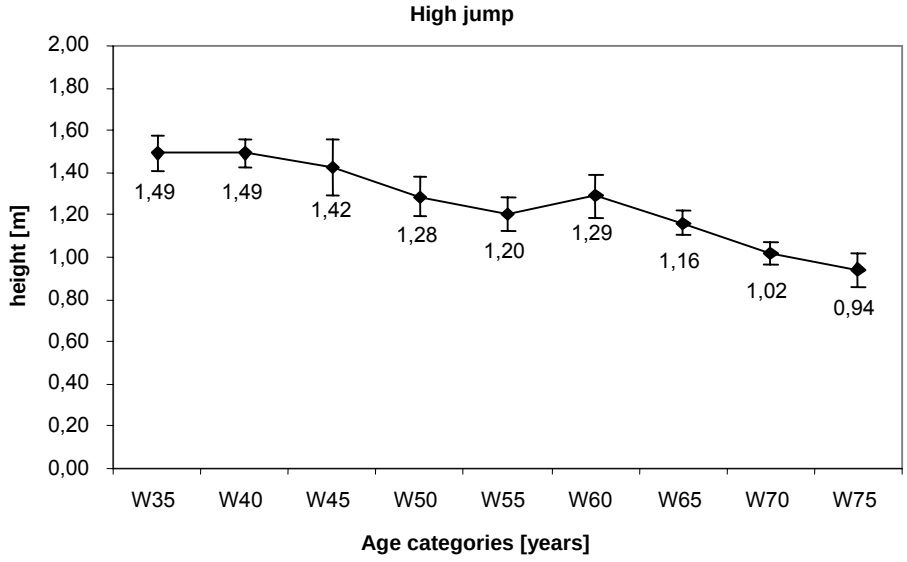

Fig. 6.12. Changes of results in women's high jump. Average values ± SD

Tab. 6.23. Average changes of results in women's high jump

	W35	W40	W45	W50	W55	W60	W65	W70	W75
N	8	9	8	13	6	6	6	4	3
$\bar{x}$ (m)	1.49	1.49	1.42	1.28	1.20	1.29	1.16	1.02	0.94
SD	0.08	0.07	0.13	0.09	0.08	0.10	0.06	0.06	0.08
min.	1.40	1.35	1.25	1.15	1.10	1.17	1.09	0.97	0.85
max.	1.62	1.55	1.63	1.45	1.30	1.41	1.24	1.10	1.00

Tab. 6.24. Dynamics of result change in women's high jump in absolute figures and as a percentage

	Average change of results between consecutive age categories		Average change of results in reference to age category W35	
Age	$\bar{x}$ [m]	$\bar{x}$ [%]	$\bar{x}$ [m]	$\bar{x}$ [%]
W35	0.00	0.1%	0	0
W40	0.07	4.5%	0	0.1%
W45	0.14	9.7%	0.07	4.5%
W50	0.08	6.6%	0.21	13.8%
W55	–0.09	–7.5%	0.29	19.5%
W60	0.13	10.1%	0.20	13.4%
W65	0.14	12.3%	0.33	22.1%
W70	0.08	7.6%	0.47	31.7%
W75			0.55	36.9%

Pole vault

Figures 6.13. and 6.14. and tables 6.25. and 6.27. present the analysis of the changes in the results in men's and women's pole vault. The best average result among men was recorded in the M35 age category (4.28 m), whereas among women in the K40 category (3.05 m). The worst average result was recorded in the M80 (1.80 m) and K65 (1.70 m) categories.

The dynamics of changes in the results in the men's and women's pole vault in absolute figures and as a percentage is presented in Tables 6.26 and 6.28. The biggest average difference in the results was recorded between age categories M75–M80 and K60–K65, which was,

respectively, 0.44 m (19.6%) and 0.40 m (19.0%). The biggest deterioration of the results with respect to the 35 age category was recorded in the M80 and K65 categories, respectively, 2.48 m in men and 0.40 m in women, which indicated worsening of the result by an average of 58.0% and 39.3%.

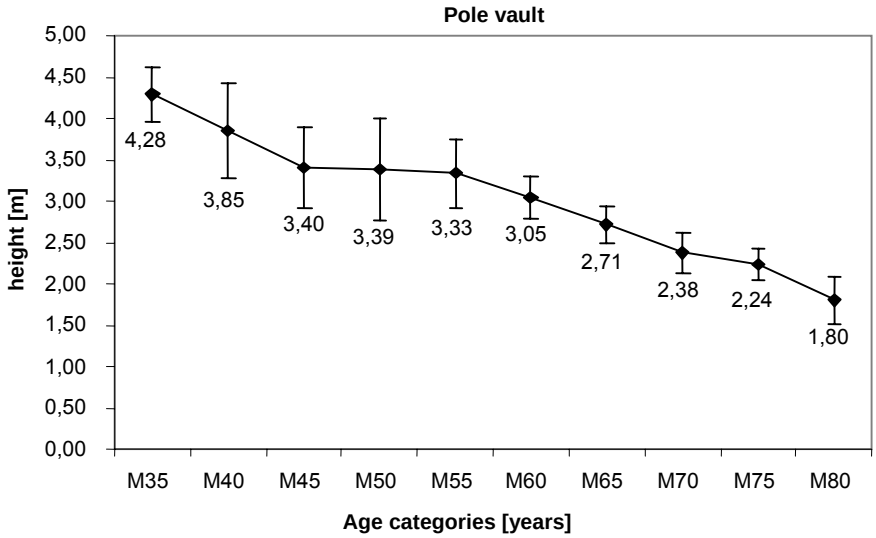

Fig. 6.13. Changes of results in men's pole vault. Average values ± SD

Tab. 6.25. Average changes of results in men's pole vault

	M35	M40	M45	M50	M55	M60	M65	M70	M75	M80
N	6	10	16	8	13	14	11	12	5	4
$\bar{x}$ (m)	4.28	3.85	3.40	3.39	3.33	3.05	2.71	2.38	2.24	1.80
SD	0.34	0.57	0.50	0.61	0.41	0.26	0.22	0.25	0.19	0.29
min.	4.00	3.00	2.80	2.80	2.70	2.60	2.30	1.80	2.10	1.50
max.	4.80	4.70	4.42	4.51	4.00	3.55	3.15	2.80	2.50	2.10

Tab. 6.26. Dynamics of result change in men's pole vault in absolute figures and as a percentage

	Average change of results between consecutive age categories		Average change of results in reference to age category M35	
Age	$\overline{x}$ [m]	$\overline{x}$ [%]	$\overline{x}$ [m]	$\overline{x}$ [%]
M35	0.43	10.1%	0	0
M40	0.45	11.7%	0.43	10.1%
M45	0.01	0.4%	0.88	20.6%
M50	0.06	1.7%	0.89	20.9%
M55	0.28	8.5%	0.95	22.2%
M60	0.33	10.9%	1.24	28.9%
M65	0.34	12.5%	1.57	36.6%
M70	0.14	5.7%	1.91	44.6%
M75	0.44	19.6%	2.04	47.7%
M80			2.48	58.0%

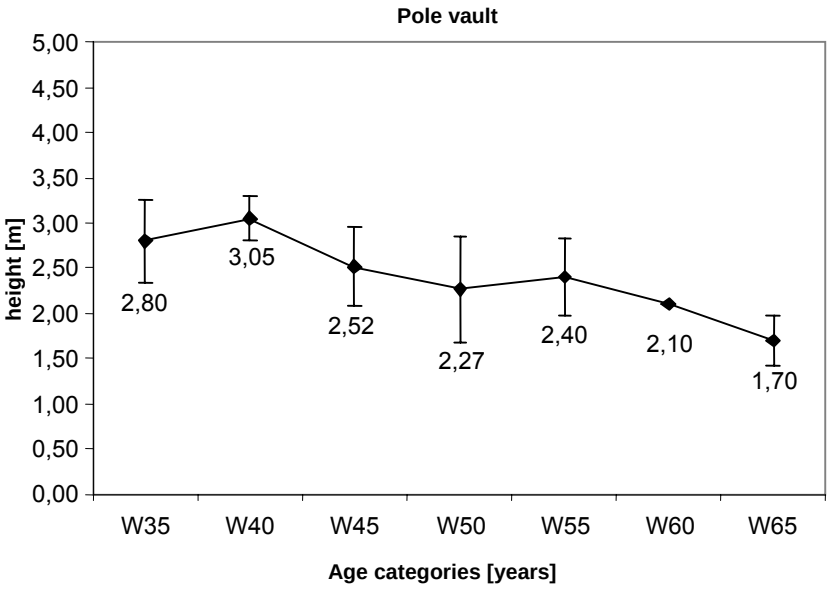

Fig. 6.14. Changes of results in women's pole vault. Average values ± SD

Tab. 6.27. Average changes of results in women's pole vault

	W35	W40	W45	W50	W55	W60	W65
N	10	4	2	3	2	3	2
$\bar{x}$ (m)	2.80	3.05	2.52	2.27	2.40	2.10	1.70
SD	0.46	0.25	0.45	0.59	0.42	0.00	0.28
min.	2.40	2.70	2.20	1.60	2.10	2.10	1.50
max.	3.90	3.30	2.83	2.70	2.70	2.10	1.90

Tab. 6.28. Dynamics of result change in women's pole vault in absolute figures and as a percentage

	Average change of results between consecutive age categories		Average change of results in reference to age category W35	
Age	$\bar{x}$ [m]	$\bar{x}$ [%]	$\bar{x}$ [m]	$\bar{x}$ [%]
W35	–0.25	–8.9%	0	0
W40	0.54	17.5%	–0.25	–8.9%
W45	0.25	9.9%	0.29	10.2%
W50	–0.13	–5.9%	0.53	19.0%
W55	0.30	12.5%	0.40	14.3%
W60	0.40	19.0%	0.70	25.0%
W65			1.10	39.3%

6.5. Throws

Discus throw

Figures 6.15. and 6.16. and tables 6.29. and 6.30. present the analysis of the changes in the results in men's and women's discus throw. Because of the changing discus weight in men's throw it is difficult to make analogous calculations. In women's discus throw discus weight in all age categories is the same, namely 1kg, and it is the only throw event, which can be objectively analysed. The best average result among women was recorded in the M40 age category (36.28 m), and the worst in the K80 category (14.15 m).

The dynamics of changes in the results in the women's discus throw in absolute figures and as a percentage is presented in tablet 6.31. The biggest average difference in the results was recorded

between age categories K70–K75, which was 5.08 m (23.8%). The biggest deterioration of the results with respect to the 35 age category was recorded in the K80 category – 19.17 m, which indicated worsening of the result by an average of 57.5%.

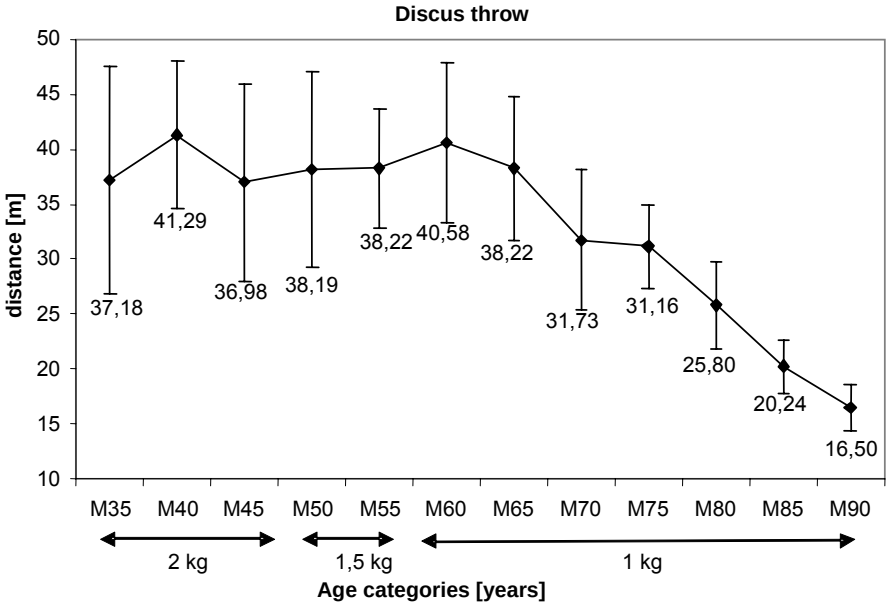

Fig. 6.15. Changes of results in men's discus throw. Average values ± SD

Tab. 6.29. Average changes of results in men's discus throw

	M35	M40	M45	M50	M55	M60	M65	M70	M75	M80	M85	M90
N	9	15	14	26	20	31	18	22	13	7	5	4
$\bar{x}$ (m)	37.18	41.29	36.98	38.19	38.22	40.58	38.22	31.73	31.16	25.80	20.24	16.50
SD	10.40	6.67	8.99	8.92	5.36	7.27	6.60	6.38	3.78	4.00	2.47	2.13
min.	22.56	26.55	11.44	19.10	30.96	25.51	23.54	19.82	26.09	19.32	18.50	13.96
max.	49.86	50.50	46.98	54.84	49.51	60.23	47.53	40.96	36.73	31.42	24.38	19.18
	2 kg			1.5 kg		1 kg						

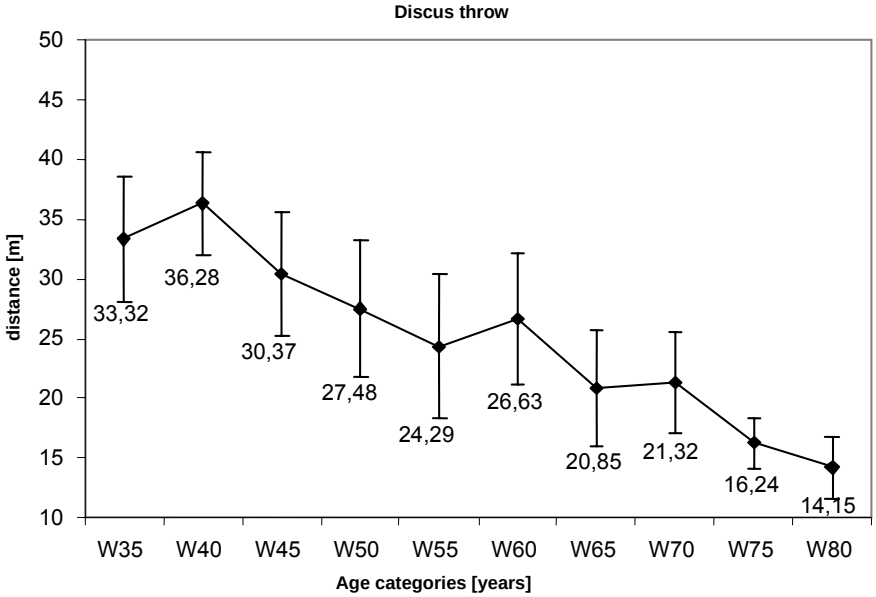

Fig. 6.16. Changes of results in women's discus throw. Average values ± SD

Tab. 6.30. Average changes of results in women's discus throw

	W35	W40	W45	W50	W55	W60	W65	W70	W75	W80
N	12	13	17	13	22	15	10	7	10	5
$\bar{x}$ (m)	33.32	36.28	30.37	27.48	24.29	26.63	20.85	21.32	16.24	14.15
SD	5.26	4.34	5.21	5.80	6.07	5.46	4.90	4.20	2.09	2.59
min.	25.60	27.30	21.74	14.86	13.15	19.76	13.40	16.07	12.81	10.38
max.	43.45	42.32	38.31	34.71	35.45	36.37	30.58	26.82	20.44	16.50

Tab. 6.31 Dynamics of result change in women's discus throw in absolute figures and as a percentage

	Average change of results between consecutive age categories		Average change of results in reference to age category W35	
Age	$\overline{x}$ [m]	$\overline{x}$ [%]	$\overline{x}$ [m]	$\overline{x}$ [%]
W35	–2.96	–8.9%	0	0
W40	5.91	16.3%	–2.96	–8.9%
W45	2.88	9.5%	2.95	8.9%
W50	3.19	11.6%	5.83	17.5%
W55	–2.34	–9.6%	9.02	27.1%
W60	5.79	21.7%	6.68	20.1%
W65	–0.47	–2.3%	12.47	37.4%
W70	5.08	23.8%	12.00	36.0%
W75	2.09	12.9%	17.08	51.3%
W80			19.17	57.5%

6.6. Summary

The following conclusions can be drawn from the analyses discussed above:

- The number of people in the oldest age groups, particularly among women, is very small, which can be caused by the lack of social support and approval for more active physical activity and participation in sports event by older women,
- The results in the M35 category were worse than in the M40 category probably because the latter category appeared for the first time in sports competitions of this type,
- An average percentage change in the results in women in all competitions is higher with respect to the starting category than in men,
- The average change in results was highest (over 100%) in women's and men's 400 and 5000m race and the lowest in jumps,
- The greatest deterioration of results was found in the oldest age categories, both among women and men.

The regression of physical fitness observed in athletic events is directly rooted in the biological changes taking place in the body. They are connected to a large extent to the irreversible ageing processes. It is known, however, that the deterioration of physical fitness and activity

with age is also caused by psychological and social factors. In the subsequent part non-physiological factors are presented, which can make it very difficult for veteran athletes to achieve good results.

A. Lower training quality

Although empirical results of studies are rare, many scholars interested in elderly people who practice sports are of the opinion that the frequency and intensity of training are gradually reduced with the ageing of veteran athletes. Older people train less for a few reasons:

- Many of them work full time and have many duties connected with professional work and household chores and consequently they do not have much time for training.
- Older people cannot freely choose their training time, unlike younger people.
- Older athletes can set records in their own age categories only; these are the so-called relative records, whereas 20-30-year-olds try to set absolute records and to win in all age categories.
- The destructive power of time is inexorable for the body. Sustained training regime is difficult not only psychologically but also, first of all, physically. Older athletes sustain muscular and orthopaedic injuries more frequently than younger ones; such injuries also require longer rehabilitation.

B. Smaller enthusiasm for competition

- The enthusiasm and passion of elderly people for competitions and training is lower than those of younger people.
- Victories in age categories promote a certain life style among elderly people and absolute victories (world or European championships) are a source of income for young people (sport as a profession).
- Older athletes are less willing than their younger colleagues to continue extreme physical effort during competitions. Their main objective is to meet their old friends and not to win at any price (Kavanagh et al. 1989).
- Younger athletes probably more often abuse prohibited substances, such as steroids, growth hormones and other pharmacological substances in order to get better results. Older athletes usually started their careers when use of such substances was not as common as today. Young athletes know that life in good health does not last for ever but that prospect is too distant to them to treat the problem seriously. Consequently, they risk their lives to get the best possible result more often than older athletes.

Besides, masters competitions usually do not attract competitors, who make big results on international arenas or, alternatively, there a few such competitions are organized. Such competitions attract often persons, who have never been competitors before, which affects their results. In older age categories, above 80 years of age, there are only few competitors with varied fitness, which is not conducive to the creation of the atmosphere of competition.

Considerable interest in the development of veteran sports has been observed for some time now. The number of competing athletes is growing. In his analyses Ericsson (1990) recorded better results after 11 years over which the competitions have been held (1979-1990). Likewise, Stones and Kozma (1980) recorded a 10% improvement of results. Some competitors have sponsors, who finance their participation in competitions. Many athletes started to train more often and more intensively.

7. The impact of athletics training on health and fitness of masters athletes

7.1. Health benefits

Numerous studies indicate the positive impact of physical activity, including sports training, on mental health and psychological well-being. However, it must be stated that the findings of some of those studies are inconclusive and it has been difficult to establish a clear cause and effect relationship. First and foremost it is unclear whether physical activity is an independent factor or whether the effects may be attributed to social factors (contact with other people) and physical factors (e.g. sunlight) accompanying physical activity (Dishman, Washburn, Heath 2004, pp. 307-352). According to W.P. Morgan's Profile of Mood States, athletes, compared to non-athletes, achieve higher vigour indexes, while at the same time experiencing reduced levels of tension, depression, anger, fatigue and confusion. Physical exercise reduces the sense of urgency, excess of competitive drive, hostility, anxiety, phobias, as well as cardiovascular reactivity to mental stress. It has also been suggested that there exists a correlation between physical exercise and positive changes to the self-concept and self-esteem, which result chiefly from greater physical fitness, and thus an improved body image, affecting the physical self-concept. Such personality features as self-confidence, feelings of control, imagination, self-sufficiency or even intelligence seem to improve as well. There is a rise in assertiveness and emotional stability, the memory gets better, the stamina and the ability to cope with stress also pick up. People who exercise generally declare a better sense of life quality than those that do not. Researchers are trying to explain the above-mentioned effects of physical activity both by physiological and psychological mechanisms. The first include functional and structural changes in the brain: increased blood flow, changing levels of neurotransmitters (noradrenaline, dopamine and serotonin) and better oxygenation. The popular hypothesis related to the rise in endorphin levels is questionable, as during exercise higher endorphin levels are observed solely in the blood, but the substance has not been proved to cross the blood-brain barrier (although it may indirectly affect the neurotransmitters). The physiological effect of physical activity can

also be explained by improved functioning of endocrine glands on the hypothalamic-pituarity-adrenocortical axis.

The two less popular and largely unsubstantiated hypotheses stipulate that the mood is improved by rising body temperature (thermogenic model) or by a rising number of afferent impulses from muscles and the autonomic system (visceral-afferent-feedback hypothesis) during physical activity. The reduction in muscle tension also plays a part. Other psychological factors, apart from the ones already mentioned, include positive social interaction, opportunity for fun and enjoyment, a welcome break from daily chores and worries. The self-efficacy theory developed by A. Bandura also has its followers. The sense of self-efficacy turned out to be closely linked with the degree of involvement in physical exercise (Brown 1992; Frederick, Ryan 1993; McAuley, Rudolph 1995; Netz et al. 2005; Nieman et al. 1993; Schomer, Drake 2001; Swoap et al. 1994; Taylor, Sallis, Needle 1985; Weinberg, Gould 2003). The positive changes related to mental health affect both young and elderly people (Paluska, Schwenk 2000).

The reverse relationship has also been investigated – sports performance improves or deteriorates as the mental health of an athlete changes. The review of related studies compiled by Raglin (2001) indicated that there is a 70-85% chance of identifying successful or unsuccessful athletes based on general psychological investigation of their personality structure and mood state.

The ageing process entails negative somatic changes and ailments. The musculoskeletal system deteriorates (muscles, bones, cartilages, tendons and ligaments), there is rising incidence of peripheral vascular disease, perlipidemia, hypertension, diabetes, osteoarthritis, decline in body balance and other (Bass 2005). The role of physical exercise in preventing and treating those ailments has been the subject of a huge volume of studies, therefore it is impossible to present all the findings here. The studies concerned the relationship between physical activity and the morbidity and mortality resulting from certain types of ailments and risk factors. Their thorough review can be found in the monograph entitled *Physical activity epidemiology* by Dishman, Washburn and Heath (2004). In the case of coronary heart disease a marked preventative effect of physical exercise has been noted, i.e. lowered susceptibility to the disease and lower mortality rate, regardless of other risk factors (blood pressure, body mass, blood lipids, blood thickening factors). The impact of physical activity on the incidence of cerebrovascular disease and stroke is unclear, however, some studies indicate a reduction in risk regardless of age, sex and ethnic background; physical activity is definitely responsible for the reduced risk of arteriosclerosis, which is the chief cause of strokes. Regular physical activity may reduce or prevent mild hypertension, although in the studies

it is difficult to control other factors accompanying hypertension (hyperlipidemia, obesity). In hyperlipidemia (high cholesterol levels, LDL, triglycerides, and low HDL) and diabetes, physical activity is recommended, as it has a positive impact on metabolism, while the effects are independent of age, sex and weight loss. Similarly, such a preventative effect has been noted in osteoporosis sufferers. Track and field events are of particular benefit here, as running and jumping improve bone density and reduce the risk of fracture, while such benefits are not observed in swimmers, for instance. Close to half of the studies indicate reduced incidence of prostate cancer in physically active men. Preventative impact has also been noted in the case of breast cancer in women. Around 80% of studies extending across various nations and ethnic groups show a preventative effect of exercise in the case of colon and rectal cancer (reduction of morbidity from 20 to 75%). Since the 19th century it has been clear that muscular contractions lead to the rising white blood cell count during and right after physical effort. It also seems that regular physical activity of moderate intensity may increase the resistance to respiratory infections. This effect has not been documented by experimental research, but remains plausible. We do not know whether physical activity affects the immune system to the extent large enough to significantly reduce the risk of developing cancer – research on humans has not indicated such an impact, although the tests on animals have shown that moderate physical activity may slow down the growth of clinically-induced tumours.

Shephard et al. (1995) monitored the health of 756 athletes competing in Toronto Masters Games in the 40-81 age group. Over a 7-year period of a longitudinal study only 1.4% of the subjects (10 athletes) developed serious heart disease, which corresponds to the morbidity rate of 2 cases per 1000 people per year, while in the Canadian population alone the morbidity rate due ischaemic heart disease of men alone stood at 4 cases per 1000 people per year. Only 4% of the subjects developed hypertension during the period of the study (a rate of 5.5 per 1000 people per year) and only 7 cases of diabetes were noted (0.4 cases per 1000 people per year). The majority (76%) declared they felt less susceptible to common cold.

Body balance is also positively related to increased physical activity. During a clinical and functional balance test conducted while walking, masters athletes achieved better results than the control group comprising people who were not physically active (Brown, Mishica 1989). The sense of balance protects the elderly from falls and the resulting injuries and health and life-threatening complications.

However it needs to be stated that too much physical activity, i.e. overtraining, can cause negative physiological and psychological changes. The physiological disorders are related to hypercortysolaemia

and hypothalamic dysfunction as a response to insulin-induced hypoglycaemia. The psychological disorders cover a wide range of symptoms, ranging from decreased libido to psychomotor retardation imitating symptoms of depression (Paluska, Schwenk 2000). There have also been, albeit very rare, cases of addiction to physical exercise, e.g. a "running addiction". In those cases sports activities lead to the lack of commitment to work, family and social contacts, as well as to ignoring medical advice (Dishman, Washburn, Heat 2004).

7.2. Cardiorespiratory endurance

Cardiovascular system

Studies by many authors have shown that the functioning of the cardiovascular system deteriorates with age (Kasch et al. 1988, 1995; Pollock et al. 1974, 1987, 1997; Trappe et al. 1996a; Makrides et al. 1990; Ogawa et al. 1992; Kavanagh et. al. 1988; Kavanagh, Shephard 1990; Douglas, O'Toole 1992; Rogers et al. 1990; Hawkins, Wiswell 2003).

The reduction of the maximal cardiac output (Ogawa et al. 1992) and the maximal heart rate (HR_{max}) has also been proved (Kasch et al. 1995, Pollock et al. 1974, 1987, 1997; Trappe et al. 1996a; Makrides et al. 1990; Ogawa et al. 1992; Kavanagh et al. 1988; Kavanagh, Shephard 1990; Heath et al. 1981).

That, in turn, contributes to the reduction of the aerobic capacity $\dot{V}_{O_2max}$ (Kasch et al. 1988, 1995; Pollock et al. 1974, 1987, 1997; Trappe et al. 1996a; Makrides et al. 1990; Ogawa et al. 1992; Kavanagh et al. 1988; Kavanagh, Shephard 1990; Rogers et al. 1990; Heath et al. 1981; Kohrt et al. 1991).

In cross-sectional studies of masters athletes Pollock et al. (1974) discovered that HR_{max} decreased by the average of 2.5% per decade. Fuchi et al. (1989) and Tanaka et al. (1997) noted a reduction in the heart rate by 3%, Pimental et al. (2003) by 3.5%, while Heath et al. (1981) by 4%. The greatest changes in HR_{max}, amounting to 5%, were noted in the studies by Barnard et al. (1979) and Wiebe et al. (1999). Shephard (1987) showed the average reduction in the heart rate during intense physical training by 5-10 beats per decade. Spirduso (1995) found the average maximal heart rate in young athletes (24-28 years) to be 187.89 beats $\cdot$ min^{-1}, while the maximal heart rate of master male athletes (50–68 years) was 168.01 beats $\cdot$ min^{-1}. Rogers et al. (1990) demonstrated that master male athletes who engaged in regular

vigorous exercise (running or cycling) avoided the typical reduction in HR_{max}.

Those findings were confirmed by longitudinal studies. Trappe et al. (1996a) found in their 22-year study of elite male runners that those, who continued to train and compete at high levels, had an average decrease in HR_{max} of 11 beats · min^{-1} within a decade (3%). In a 28-year-long study of men, Kasch et al. (1995) discovered a decrease in HR_{max} from 180 beats · min^{-1} initially to 158 beats · min^{-1} at follow-up. The mean age of the subjects was 43.2 and 71.3, respectively. There was a loss of 22 beats · min^{-1} in 28 years, however, these findings did not correspond to the previous study by the same author (Kasch et al. 1988). Pollock et al. (1997) followed a group of elite male track athletes for 20 years (mean age 51.2 initially and 70.4 at follow-up), who continued to train at high intensities, and found a decrease in HR_{max} of 13 beats · min^{-1} (4% per decade). A similar 4-percent drop was noted by Katzel et al. (2001) and Hawkins et al. (2001) in their studies of masters athletes. It is generally accepted that the maximal heart rate declines at the rate of 1 beats · min^{-1} per year, i.e. 10 beats · min^{-1} per decade. Thus, it appears that years of endurance training at a high level slow down the loss of HR_{max} to 4-7 beats · min^{-1} per decade.

Maximum aerobic capacity $\dot{V}_{O_2max}$

$\dot{V}_{O_2max}$ decreases approximately 10% per decade after the age of 25. The rate of $\dot{V}_{O_2max}$ decrease for masters athletes is half of their sedentary peers (Kasch et al. 1988, 1995; Trappe et al. 1996a; Rogers et al. 1990; Hawkins, Wiswell 2003). Cross-sectional studies show that masters athletes achieve much higher $\dot{V}_{O_2max}$ in the particular decades than physically active elderly people or their sedentary peers (Spirduso 1995). Pollock et al. (1987) found that masters athletes could maintain their $\dot{V}_{O_2max}$, if they maintained a high level of physical activity. That is why following an intensive training regimen is key to keeping performance.

Kavanagh and Shephard (1977), studying masters athletes in the 35 to 65 age group, discovered an average decrease in oxygen transport by 0.28 ml · kg^{-1} · min^{-1} per year, while the study by Heath et al. (1981) found this average to be 0.32 ml · kg^{-1} · min^{-1}. A slightly higher annual decrease appeared in the study of masters athletes by Kavanagh et al. (1989) – men experienced an average drop of 0.43 ml · kg^{-1} · min^{-1}, women of 0.41 ml · kg^{-1} · min^{-1}. Pollock et al. (1974) discovered an average decrease of 0.42 ml · kg^{-1} · min^{-1}, Saltin and Grimby (1968)

of 0.42 ml · kg^{-1} · min^{-1}. Shephard (1986) showed that the drop in aerobic capacity in masters athletes ranges from less than 0.50 to 0.60 ml · kg^{-1} · min^{-1} per year.

Trappe et al. (1996a) in his study of runners who used to be elite competitors in their youth and went on to compete in masters championships, found a decrease of 5.2% in absolute $\dot{V}_{O_2max}$ (l/min) and a drop of 13.4% in relative $\dot{V}_{O_2max}$, compared to body mass (ml · kg^{-1} · min^{-1}).

Kavanagh et al. (1989), in a cross-sectional study of track and field athletes in various age groups with a similar training regimen, noted an average decrease in the aerobic capacity of around 3 ml · kg^{-1} · min^{-1} per decade between the ages of 30 and 59. After another 10 years, at the age of 69, that decrease amounted to around 4.2 ml · kg^{-1} · min^{-1} per decade. In the eighth decade of life, when the training regimen of athletes is significantly reduced, the aerobic capacity decreases by 5.8 ml · kg^{-1} · min^{-1} in men and 4.8 ml · kg^{-1} · min^{-1} in women. The aerobic capacity of sedentary 65-year-olds declined by 20–30 ml · kg^{-1} · min^{-1}, where the aerobic capacity of 65-year-old men stood at 36.1 ml · kg^{-1} · min^{-1} and women at 31.7 ml · kg^{-1} · min^{-1}, on average. Dehn and Bruce (1972) and Pollock et al. (1987) discovered a 25 percent decrease in $\dot{V}_{O_2max}$ per decade, Katzel et al. (2001) noted a 29 percent decline per decade, while in the study by Hawkins et al. (2001) that value stood at 24.5 percent.

Many long-term studies of masters runners indicated an age-related decline in aerobic capacity, cardiovascular system functions and a change in muscle fibre composition (Kasch et al., 1995; Pollock et al., 1997; Trappe et al., 1996a, 1996b; Widrick et al., 1996a, 1996b). The athletes were examined over a period of 20-28 years, throughout which they continued training and competing. A 5-6 percent drop in $\dot{V}_{O_2max}$ (ml · kg^{-1} · min^{-1}) per decade was noted (Pollock et al., 1997; Trappe et al., 1996a, 1996b). The athletes who ceased training noted a 15 percent decline in $\dot{V}_{O_2max}$ (ml · kg^{-1} · min^{-1}) per decade (Trappe et al., 1996a, 1996b).

For 22 years Wilmore and Costill (1999) studied changes in $\dot{V}_{O_2max}$ (ml · kg^{-1} · min^{-1}) in 4 groups: 25–50-year-old non-training males, fit and training male joggers, training masters male athletes and 50–80-year old fit males. The greatest percentage drop of $\dot{V}_{O_2max}$ (ml·kg^{-1}·min^{-1}) was noted in the 25–50-year-old non-training males group and 50–80-year-old fit males – over 30%. Fit and training

male joggers noted an over 20 percent decline, while the smallest decrease of several percent concerned the training masters male athletes.

The same researchers investigated the impact of ageing and training on the changes in $\dot{V}_{O_2max}$ (ml · kg^{-1} · min^{-1}). They concluded that regardless of the lifestyle $\dot{V}_{O_2max}$ declines with age, however, the process is slower in persons engaging in intensive training.

Rogers et al. (1990) in their study of masters athletes over a period of 7.5 years found a 5.5 percent drop in $\dot{V}_{O_2max}$ per decade and a 12 percent drop in $\dot{V}_{O_2max}$ per decade in the group of sedentary age – matched control individuals.

Kasch et al. (1988), evaluating cardiovascular function in 15 active men over a 20-year period (from the age of 45 to 65), found a 3% decline in $\dot{V}_{O_2max}$ after 18 years, which was not statistically significant. However, over the whole 20-year period of study that decline amounted to the total of 12%.

Kasch believes that the study participants were able to maintain their $\dot{V}_{O_2max}$, because they:

- followed a consistent training regimen over the 20 years,
- were at their optimal body weight,
- had possible genetic factors,
- had normal resting blood pressure and low peripheral vascular resistance and myocardiac oxygen uptake (MVO_2),
- had relatively high energy output per week (approximately 2100 to 2300 kcal/wk of exercise),
- had above average cardiac reserve.

Pollock et al. (1997) noted a significant decrease in $\dot{V}_{O_2max}$ over a 20-year longitudinal study. In the first decade the decline amounted to 8 percent (mean age 51.2–60.4), followed by 15 percent in the second decade investigated (mean age 60.4–70.4). A similar acceleration of $\dot{V}_{O_2max}$ reduction in the sixth decade of life was discovered by Kasch et al. (1988).

Pollock et al. (1987) followed the changes in the masters athletes' aerobic capacity in longitudinal studies through the period of over 10 years, between the age of 50 and 60. The group of subjects was divided into two subgroups: the first continued competing, the

second did not compete. The average reduction in $\dot{V}_{O_2max}$ amounted to 0.09 ml · kg^{-1} · min^{-1} and 0.66 ml · kg^{-1} · min^{-1} per year, respectively.

7.3. Strength abilities

Numerous studies have shown that there is a decrease in muscular strength associated with ageing (Aniansson et al. 1983; Davies et al. 1986; Coggan et al. 1990; Fiatarone et al. 1990; Klitgaard et al. 1990; Frontera et al. 1991; Sipilä et al. 1991; Fiatarone, O'Neill 1994; Judge et al. 1994). The decreased strength has a direct and detrimental effect on the ability to perform daily activities (Frontera et al. 1988; Fiatarone et al. 1990; Bassey et al. 1992; Evans 1992; Fiatarone, O'Neill 1994). This is mainly due to the decrease in physical activity and muscle mass. The loss of muscle mass can be largely attributed to age-related lower muscle protein synthesis and the loss of motor units related to fast-twitch muscle fibres, type II. Lexell et al. (1988) found an average reduction in muscle mass of 40% from the age of 20 to 80 years. On the other hand, Frontera et al. (1988) and Pyka et al. (1994) concluded that high intensity strength training in the elderly leads to muscle hypertrophy, related to the increase in the size of both type I slow-twitch and type II fast-twitch fibres. Coggan et al. (1990) found that masters runners have similar muscle fibre type as performance–matched younger runners, but have a lower percentage of type I fibres than very competitive younger runners. Aniansson and Gustafsson (1981), Larsson (1982), Frontera et al. (1988) and Fiatarone et al. (1990) analysed the impact of physical training lasting 2-6 months and found a significant growth in muscle strength and the mass of striated muscles.

In a study of elderly people who exercised to maintain fitness, Klitgaard et al. (1990) found that elderly runners and swimmers have similar profiles of muscle fibre type as age-matched control individuals. Sipilä et al. (1991) tested the strength of different muscle groups in people of various activity: ST – strength training (discus throwers and weightlifters), SP – speed training (sprinters and jumpers), EN – endurance training (long-distance runners, orienteering runners, cross-country skiers) and a control group (a random selection of men aged 70-81). The athletes in the SP group demonstrated greater muscle strength in knee extension and trunk flexion than in the EN group. The centre of gravity was higher in the vertical jump among the athletes than in the control group. The SP group performed better in vertical jump than the ST and EN groups. The study has shown that not only speed and strength athletes, but also endurance athletes demonstrate a greater level of strength parameters tested than the age-matched control group.

However, ST and SP athletes generally show a higher level of absolute muscle strength, while the EN group demonstrates the greatest relative strength (in relation to body weight).

The impact of long-term training on changes in human muscles was studied by Rikli and Busch (1986) and Suominen et al. (1980, 1989). The studies indicate that people who exercise (engage in active lifestyle) perform better in muscle strength tests than those with a sedentary lifestyle. While endurance training prevents the loss of muscle mass with ageing only to a slight extent, strength training can help maintain or increase the number of striated muscle fibres in elderly women and men. Exercise cannot stop the biological ageing process, but may reduce the impact of age on performance in competitions (Wilmore, Costill 1999).

7.4. Anaerobic power

The decline in fitness related to anaerobic changes has been investigated to a much lesser extent. Grassi et al. (1991) found a 50% decrease in performance of 75-year-olds in vertical jump compared to young control group.

The studies have also shown age-related variations in the levels of lactic acid in the blood following a maximum treadmill effort. In women aged 25 the levels increased by around 1%, in women aged 35 by 4%, in 45-year-olds by 11%, in 55-year-olds by 13% and in 65-year-olds by 12%. The findings indicate a rapidly declining tolerance for anaerobic exercise after the age of 35 (Foster et al. 1989).

7.5. Body composition

Kavanagh et al. (1989) conducted cross-sectional body composition studies on a large number of masters athletes in six decades: from 20–29 to 70–79 years. Women's average body weight in the first decade stood at 58.0±7.0 kg, in the last decade at 56.5±3.0, while in the remaining four decades it ranged between 61 and 62 kg. Men's average body weight in the first decade amounted to 80.2±6.7 kg, in the last decade to 72.0±11.7 kg. The lean body mass changed only to a slight extent and, in the case of women, ranged from 44.0 kg in the 30-39 decade to 40.7 kg in the 70-79 decade, while in men the lean body mass amounted to 61.3 kg and 57.9 kg, respectively. The increase in the body fat content in female and male athletes was slightly higher compared to the increase of body fat content in their sedentary peers.

The percentage body fat content in young people, women and men aged 18–24 is similar to that of 40-63-year-old masters runners. A much higher body fat content was noted in female and male non-athletes aged 45-60 (Wilmore, Costill 1999).

A longitudinal study of elite male long-distance runners who continued training between the age of 25 and 47 found that the percentage body fat content was very low and grew from 7.4% to 12.6% over a 22-year period. The body weight of the athletes in the respective period rose by 4 kg on average (Trappe et al. 1996a).

7.6. Hazards of sports training

The somatic and mental health benefits, as well as social benefits associated with rational and sensible sport training by the elderly always outweigh the risks and potential harm that may be sustained. Risk cannot be fully eliminated, however, it can be significantly reduced. This issue is of particular importance for masters athletes, as some of them resume vigorous sports training after many years or take up sports for the first time in their life. Moreover, vigorous sport training may reveal risk factors, disorders and defects that remain symptomless when resting or performing light recreational exercise.

Health assessment

Some chronic diseases may constitute an obstacle to certain types of exercise and vigorous effort, however, many types of moderate intensity exercise can be performed safely. Serious chronic illness, a recent injury or surgery may all be considered a contraindication to exercise. Taking medication may also limit physical activity or increase the risks. Severe infections can be considered a temporary contraindication. Thus, health monitoring aims to establish the risks and provide appropriate medical advice.

A simple ”do-it-yourself” method that helps in the decision to take up physical activity is the Canadian PAR-Q Physical Activity Readiness Questionnaire (Thomas, Reading, Shephard 1992; Marcus, Forsyth 2003, pp. 108-111). It may be used before a one-off effort or fitness tests, as well as before starting a regular training regimen. The questionnaire includes seven questions, quoted below after Marcus and Forsyth (2003):

1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?
2. Do you feel pain in your chest when you do physical activity?

3. In the past month, have you had chest pain when you were doing physical activity?
4. Do you lose your balance because of dizziness or do you ever lose consciousness?
5. Do you have a bone or joint problem that could be made worse by a change in your physical activity?
6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
7. Do you know of any other reason why you should not do physical activity?

This questionnaire is applicable for persons aged 15 to 69. In the case of a temporary illness, e.g. fever or weakness, the planned physical activity should be postponed. If, during training, the health condition changes compared to the above profile, a doctor should be consulted immediately. Generally, the above questionnaire is used with the view to eliminating all individuals who provide at least one positive answer. However, as a consequence a large percentage of people interested in physical activity would have to be rejected, and that number would rise with age. Therefore it is best to combine the questionnaire with a complementary medical check-up assessing the consequences of the particular type of physical activity for the person concerned. In many cases such a person is considered fit to take up exercise, but this is done on the basis of a thorough medical check-up.

As masters athletes are people over 35, i.e. at an age when we already have negative symptoms of ageing and specific ailments, each athlete engaging in training should undergo a thorough medical examination and repeat check-ups at yearly intervals or more frequently. Moreover, the intensity and scope of sports training always significantly exceeds the level of health training recommended for the given age group. In practice it is suggested for the standard health assessment to include lifestyle factors (type and intensity of training, nutrition, stimulant use, medication taken and leisure activities), measurement of heart rate, arterial blood pressure and resting electrocardiography. Also essential is an endurance test on the ergometer or treadmill combined with electrocardiography. It is recommended that physically active persons undergoing examination should reach their maximal heart rate (supervised by a doctor), rather than just 85% of HR_{max}, when the test is normally interrupted. The reason is that in many people suffering from symptomless heart disease, anomalies in the electrocardiogram appear only at the greatest intensity of physical exercise (Cooper 1986). Echocardiography is also recommended, as it provides a good picture of anatomy of the heart and some of its functions. The lipid blood profile (cholesterol and its fractions), glucose and uric acid levels in the blood should also be checked, urine should be tested. It is also worth

calculating the BMI (body mass index) and the WHR (waist to hip ratio) (Kuński 2002, pp. 159-160). Such detailed tests enable us to establish a safe and effective level of physical activity and choose the type of activity that provides the greatest health benefits. Self-assessment of endurance tolerance and abiding by contraindications to certain types of exercise are also important.

Sudden death during exercise

Probably the most spectacular case of sudden death during exercise was the death of Jim Fixx, a 52-year-old American, who suffered a myocardial infarction on July 20, 1984 during his afternoon session of running training in Vermont. Jim Fixx was a legend and the joggers' guru, a synonym of running and the author of a famous bestseller *The Complete Book of Running*, published in 1977. After the news of his tragic death, the community of recreational joggers became hysterical – it turned out the activity that was supposed to ensure health, could kill. In response to these panicky reactions K. H. Cooper published a book entitled *Running without fear* in 1985. He explained the reasons for Fixx's death and the rules of conduct that could minimise such risk. The autopsy showed that the most likely cause of Fixx's death was a congenital cardiomyopathy and the lack of the cool-down stage following training. K.H. Cooper (1986) lists the most common reasons for sudden death during exercise: (1) arteriosclerosis, (2) anatomical heart defects (e.g. idiopathic hypertrophic subaortic stenosis, hypertrophic cardiomyopathy), (3) abnormal cardiac enlargement and thickening of heart tissue, (4) anomalous origin of coronary arteries (5) myocarditis and (6) valvular heart disease. All these anomalies usually do not give any symptoms and are revealed only during very intense physical training, unfavourable external conditions (e.g. high temperature), fatigue or infection. The same author presents the following risk factors for developing atherosclerosis and sudden death during exercise:

- Hereditary (genetic) factors related to heart disease. The presence of such factors is suggested by cases of early death from heart disease in the closest family and they are usually identified in history taking. The latest genetic studies confirm that sudden death during exercise may have genetic causes, possibly due to the mutations in the cardiac ryanodine type 2 receptor (RyR2) gene, which is related to catecholaminergic polymorphic ventricular tachycardia. Such mutations were found during autopsies of three people aged 12±2, who performed heavy exercise right before their death. No anatomical changes in the heart were found (Creighton et al. 2006).

- Stress and personality structure (type A is particularly susceptible).
- Hypertension.
- High cholesterol and triglycerides in the blood.
- Diabetes and increased glucose in the blood.
- A diet rich in animal fats.
- Smoking.
- Excess weight and obesity.
- Abnormal resting electrocardiogram.
- Oral contraceptives.
- Too little physical activity.

All these factors are interrelated and usually combine as reasons for cardiovascular disease. Duraković et al. (2002) examined 5 cases of sudden death of elderly people during or directly following recreational exercise (tennis, jogging, swimming). In all five cases the autopsy showed coronary heart disease. Only one person had suffered from hypertension and previous chest pain. The remaining four had not suffered any warning symptoms. In three cases myocardial scars were discovered. In all five the thickness of the left ventricle wall was over 15 mm (up to 25 mm), which may have constituted a risk factor in persons without any previous symptoms.

Fornes and Lecomte (2001) examined 29 cases of people aged 13-60 who died suddenly during various types of sports activity (including 11 cases of death during running training). The identified causes of death were: coronary artery disease (9 cases), congenital anatomic anomaly of a coronary artery (1), hypertrophic cardiomyopathy (5), right ventricular dysplasia (3), myocarditis (2), endomyocardial fibrosis (1), bridging of the left anterior descending coronary artery (2), stroke (2), rupture of aortic aneurysm (4). Only 4 of the deceased had been aware of their condition.

Northcote, Flannigan and Ballantyne (1986) analysed 60 cases of sudden death among squash players aged 22-66. The identified causes of death were coronary artery disease in 51 cases, valvular heart disease in four, cardiac arrhythmia in two cases, and hypertrophic cardiomyopathy in one case. 45 people had had symptoms of these disorders before (most frequently chest pain), while 22 suffered from cardiac system ailments (most frequently hypertension).

In the majority of 72 cases of people over 30 studied by Waller (1988) the cause of death was coronary artery disease.

In young athletes (up to the age of 30-35) sudden death is mainly associated with cardiomyopathies, congenital coronary artery abnormalities, myocarditis and congenital anomalies or inherent abnormalities of the conducting system, however, that age group may already also suffer from coronary heart disease (Amsterdam, Laslett,

Holly 1987; Firor, Faulkner 1988; Jensen-Urstad 1995). Less frequent types of heart disorders related to sudden death among athletes include anomalous origin of the coronary arteries, aortic rupture associated with Marfan's syndrome, myocarditis, mitral valve prolapse and various arrhythmias (Noakes 1998).

The cited studies indicate that physical activity as such is not the cause of sudden death, but the death is almost always related to a pre-existing cardiovascular system disorder, often symptomless, which the person engaging in exercise is not aware of or which he or she does not consider to be serious enough. Moreover, Jouven et al. (2005), having examined 5137 apparently healthy men aged 42-53, found that sudden death during exercise can be predicted on the basis of the resting, exercise and recovery heart rate. Over a period of 23 years, 81 subjects died of a heart attack. It turned out that the risk was greater (1) in people with a resting heart rate higher than 75 beats · min^{-1}, (2) in people in whom the increase in the heart rate during a standard endurance test was lower than 89 beats · min^{-1} and (3) in people in whom the decrease in the heart rate following exercise was lower than 25 beats · min^{-1}. Thus the cases of sudden death during exercise can be indirectly linked to low physical capacity and endurance tolerance. However, we must remember that a high level of physical activity and fitness does not provide complete immunity to sudden death, as other factors also play a part, such as a balanced diet, ability to cope with stress, avoiding harmful stimulants, etc. Moreover, it is impossible to fully stop the age-related process of developing arteriosclerosis.

This shows the importance of thorough medical check-ups for minimising the risk. In the case of young athletes in Europe it has been suggested that all candidates for sports training should undergo examination in order to identify chiefly hypertrophic cardiomyopathy and other potentially fatal types of heart disease. It is recommended to use a test protocol based on at least a 12-lead ECG (Corrado et al. 2005). It seems that this recommendation should apply equally, if not to an even greater extent, to masters athletes.

It must be noted that chronic diseases which increase susceptibility to cardiovascular problems during exercise are extremely rare among athletes and their incidence is estimated at 1 per 10,000 to 1 per 200,000 sportsmen (Noakes 1998) or 0.24 potentially fatal cases per 10,000 hours of training (Bass 2005, p. 507). In a Croatian study the death rate among the elderly during recreational physical activity amounted to 1 per 114,000 people over a three-year period or 1 per 573,000 people over the period of 14 years (Duraković et al. 2002). Also according to Thompson (1996, quoted after: Dishman, Washburn, Heath 2004), the death rate during physical exercise is low – around 7.7 and 1.3 deaths per one million of men and women and 60 cases per one

million middle-aged men per year. Siscovick et al. (1984) established the sudden death rate among men during sports tournaments at 1:15,000 to 1:50,000. What is significant, the death rate during physical exercise is a few times lower among individuals who engage in regular physical activity than among people with a sedentary lifestyle, and the victims are mainly the so-called “weekend warriors”. Therefore, for people more susceptible to certain disorders, intensive sports training may constitute a passing risk while performing, but in the long term a passive, sedentary lifestyle can be considered a far greater risk.

Injuries

In the years 1990-1996 U.S. Consumer Product Safety Commission (CPSC) noted a 54 percent rise in the number of sports-related injuries in people over 65, while the number of injuries sustained during aerobics and weight training exercise increased by 173 percent. At the same time the number of people practising sports in that age group rose only by 8% (Hill 2001). This indicates the need to pay particular attention to the safety of exercise and preventing injuries in the physically active elderly.

Nevitt, Cummings and Hudes (1991), on the basis of a review of relevant literature, compiled a list of factors increasing injury risk in elderly people during physical exercise:

- Advanced age and female gender.
- A history of previous falls and injuries.
- History of hypotension or sudden drops of blood pressure.
- Hearing impairment and poor vision, slow reaction time.
- Clumsiness associated with the lack of practice and skills, a deterioration of balance, unstable hip and knee joints, a reduced foot lift.
- Obesity increasing the strain on tendons.
- Low body weight, especially if associated with severe muscle wasting (the so-called sarcopenia).
- Shortening of tendons due to many years of inactivity.
- Failure to perform an adequate warm-up.
- Violent bursts of movement, especially rapid twisting and excessive stretching.
- Too rapid a progression of training loads, continuing training despite fatigue and excessive stress on the motor system (typical of type A personalities).
- Performing exercise on a hard or uneven surface, poor condition of or unsuitable outfit, sports equipment and training devices.
- Footwear with poor ankle support.
- Osteoporosis increasing the risk of fracture due to falls.

This list can be complemented by such factors as too quick resumption of vigorous exercise following illness or injury, mistakes in the training programme, weather conditions and direct sporting competition (Garlicki 1988).

Orthopaedic injuries in masters athletes can be partly attributed to tendon, cartilage and bone ageing. The most common injuries include rotator cuff injury, quadriceps tendon rupture, Achilles tendon rupture, degenerative meniscus tears, focal articular cartilage defects and stress fractures (Maharam et al. 1999). This can be linked to age-related negative changes in the musculoskeletal system, especially after the age of 50. These changes include, apart from the risk factors mentioned above, the following:

- decreased collagen water content and decreased flexibility,
- decreased glycosaminoglycan in tendons (stiffer),
- decreased intervertebral spinal disc water/cells/proteins,
- decreased lean body/muscle mass (up to 35% per decade),
- decreased ligament tensile strength (by 50%),
- decreased muscle strength (around 10% per decade),
- decreased Type II (fast-twitch) muscle fibres (by 50%),
- decreased Type XI articular cartilage,
- increased muscle collagen (decreased flexibility),
- loss of bone mass (0,4% men, 1-7% women),
- lower articular cartilage chondrotin sulfate/chonodrocyte content (decreased strength) (Hill 2001).

The incidence of joint and muscle injuries varies depending on the type of physical activity and the location of the injury. Most injuries occur during running training, to a lesser extent during resistance exercise training and stretching for flexibility. In North America the number of people who suffer an injury while engaging in running or jogging ranges from 35 to 65% per year. This is equivalent to 2.5 to 12.1 cases of injury per 1000 hours of running training. The risk of sustaining an injury while walking among men aged over 45 is 33% lower than among runners. Only 1.4% walkers suffer an injury each month. During resistance exercise training that rate stands at 2.4% per month, which amounts to around 2.8 cases per 1000 hours of training. Most injuries concern lower limbs, especially knees and ankle joints, while the runners suffer tendon injuries (Dishman, Washburn, Heath 2004).

Canadian studies conducted on masters athletes (including runners) indicate that over a period of 7 years 56.7% of them suffered at least one injury that forced them to interrupt training for more than a week. 23% sustained injuries while training, 18.8% while competing. Most injuries concerned endurance running (37.2%), followed by swimming (19.3%), cycling (17%), team sports (16.5%), weight-lifting (2.3%) and other sports (7.7%). The majority of injuries were located in

the lower limb area (34.2%) and knee (22,2%). The remaining areas prone to injury included upper limbs (26.5%) and back (13.8%). There were also some cases of hernia (3.4%) (Shepard et al. 1995).

Running-related injuries, the most common, are caused by several factors. However, most of them result from overuse, which is an indirect consequence of the reluctance of running enthusiasts to limit their training. When treating and preventing injuries in runners the following elements should be considered: the weekly running mileage, the number of kilometres covered in long runs, weekly increases in mileage, history of previous injuries, weight loss and menstruation. The length of cross-training, area and surface on which the athlete usually runs, stretching exercises and the type and wear of footwear are also important (Rosen, Scuderi, McCann 2005).

Masters athletes' injuries should be treated just as seriously as injuries in younger athletes. Doctors and physiotherapists should pay close attention to the pains reported by masters athletes, including exacerbated chronic pains. Mature athletes often tolerate a certain level of pain, only its exacerbation can lead to motor impairment. It seems that improved function and reduced pain, rather than its complete alleviation is sometimes a better solution than a violent surgical intervention, which carries a greater risk of complications in the elderly (Kahn, Kim 2005).

The direct causes of sports injuries are of course physical factors: muscle imbalances, collisions, falls, overtraining and fatigue. However, psychological factors also play an important part. They include certain personality factors and attitudes, but mainly the level of life stress related to various events and life changes. Athletes with a higher level of stress sustain more injuries. Too much stress in a sports situation disrupts concentration, narrows the field of vision and significantly increases muscle tension. The drive to perform the task at all cost and to give it more than a hundred percent is also conducive to injuries. Athletes with a low self-esteem, pessimistic, low in hardiness and with a higher level of anxiety are more susceptible to injury (Weinberg, Gould 2003). Greater susceptibility to injury is also linked to a greater level of depression and fear (Raglin 2001).

Susceptibility to infections

Intensive exhausting physical exercise increases susceptibility to upper-respiratory infections – several studies confirmed this hypothesis in the case of marathon running and cross-country skiing. Athletes covering the distance of a marathon or with a heavy training regimen (over 37 km per week) caught infections a few times more often than athletes who did not participate in a marathon or covered shorter running

distances (less than 16 km per week). Following heavy and long-lasting effort the lymphocyte count may drop below the normal level for up to 6 hours after exercise and even up to 24-48 following a marathon. That period of immunosuppression may increase susceptibility to infection if the athlete comes into contact with pathogens. Winter training and inhaling cold dry air constitute an additional risk factor, as they weaken the barrier for bacteria and viruses. Exercise should definitely be avoided if the symptoms of infection are located below the neck, as in the case of flu and high fever (Dishman, Washburn, Heath 2004, pp. 281-304).

Gotsch et al. (2002, after: Dishman, Washburn, Heath 2004, p. 384) present a list of risks associated with intense physical activity. Apart from cardiovascular problems and musculoskeletal problems already mentioned, they also point out certain individual risk concerning the pulmonary system (e.g. exercise-induced bronchospasm), gastrointestinal disorders (irritable bowel, Gl blood loss in runners), allergy (exercise-induced anaphylaxis, skin welts), gynaecological problems (delayed menarche, amenorrhea, oligomenorrhea), endocrinologic disorders (hypoglycemia in diabetics), renal disease (hematuria, proteinuria), hematological disorders (anaemia – usually apparent, induced by plasma volume expansion with a normal red blood cell count) and thermal discomfort (heat cramps, heat exhaustion, heatstroke, frostbite, hypothermia).

8. Anti-doping in masters sport

8.1. Reasons for doping in masters sport

Before embarking on a discussion, let us recount two press reports:

On 31 January 2004 doping was detected in a sample from the USA marathon record holder (category M40, time 2:12:46 in 2003), of Belgian origin. He was suspended for two years (*Senioren Leichtathletik*, 2005, issue 1-2., p. 4).

On 11 September 2004, during the DAMM finals (Deutsche Altersklassen-Mannschafts-Meisterschaft – German Team Masters T&F Championships) in Luebeck, three competitors tested positive in doping tests. The use of the diuretic drug hydrochlorothiazide was confirmed in a 40-year old, while anabolic steroids: testosterone and oxymetholone were found in a 50-year old and 60-year old respectively. The three veterans were suspended for two years. (*Senioren Leichtathletik*, 2005, issue 6, p. 4; issue 8, p. 4-5).

Such releases prove that masters' athletics is not free from doping. The phenomenon is likely a result of the fact that cheating tends to appear whenever people compete for records and prestige. After all, masters do not contend for cash prizes – they are not awarded any cash bonuses for outstanding achievements or medal positions.

In the competitive sport of young people, there are three basic groups of reasons for using pharmacological doping agents (Anshel 1991): 1) physical (to increase physical efficiency, boost the competitive spirit, reduce pain, treat injuries, regulate body weight), 2) psychological/emotional (to relax, reduce the fear of losing, improve self-esteem, superman complex) and finally 3) social (to emulate sports idols, fulfil the need of social support, for fun/entertainment). The reasons are diverse, depending on the type of illegal agents used, sports discipline, gender and situational factors. It is believed that illegal doping is commonplace in sports, although – for obvious reasons – the exact scale of the phenomenon cannot be ascertained. In anonymous questionnaires, more than 70% of respondents declared they were aware of doping use by fellow athletes representing their sports club (Anshel 1991). Similarly disturbing results are found in surveys in which 28.6% of sportsmen

regard the use of doping agents as acceptable for the sake of improving sports results. Even though a considerable proportion of surveyed people (83.1%) regards doping as dangerous and unnecessary, 11.3% believe that doping agents are useful and do not pose any risks, while for 4.3% doping is considered dangerous, but useful (La Torre et al. 2001). Adverse consequences of using many pharmacological agents for mental and physical health have been well-known and emphasised for a long time (e.g. Lefavi 1990; Chrostowski 1991; Parrot 1994; Rewerski, Pasierbski 1995; Siri, Roques 2003).

A question thus arises whether veterans' athletics is equally badly tainted by doping as its younger counterpart. Definitely the use of prohibited pharmacological agents is not only the domain of young people, an observation confirmed by questionnaires (Korkia, Stimson 1993, quoted in Rychta 1995), however it seems that the pathological phenomena underlying illegal doping in competitive sport – mostly commercialisation, politisation and corruption, as well as the shift from the idea of amateurship – do not apply to master athletes to a great extent. A thesis can be put forth that the majority of reasons why young athletes use prohibited doping substances and methods disappear in masters' sport or their importance is considerably reduced. Table 8.1. lists the main reasons for doping use in sport. The section of the table referring to masters is largely based on conjectures, as the scale of doping usage and the motivation behind it has not, as yet, been investigated with regard to older sportsmen. Certainly, biological and medical reasons play a considerable role in veterans' sport. Masters are likely to reach for doping agents in order to relieve the consequences of an injury, however the main reason seems to be the prevention of ageing processes and the consequent unavoidable reduction of physical fitness that older competitors find hard to accept.

Biologically older bodies no longer tolerate high training loads, while an illegal energy boost "resolves" the issue. The possibilities in this domain are constantly increasing and pose a great temptation. The problem can be associated with the general habit of taking drugs for relatively trivial reasons (headaches, insomnia, general ill-being, mood depression, concentration problems), with sports doping becoming yet another element of this peculiar "drug-addiction". A yet another group of significant reasons for doping use among masters is related to ambition. Record-beating, fame (even on a local scale), competition with other athletes, striving to achieve the best results are sport-inherent goals that some sportsmen decide to pursue using dishonest means. Age is probably not a decisive factor here. A debatable problem is the intent to imitate sports idols or being an idol as a cause of doping in masters' athletics, depending on how the concept of an idol is to be understood

(certainly, teenagers and masters with many years' experience in competing will have different views on the issue).

Tab. 8.1. The main reasons why young and masters athletes use doping. The list compiled on the basis of data drawn from: Arndt, Singler, Treutlein 2004, pp. 17-18; Anshel 1991

Reason	Young	Masters
To relieve pain and consequences of injury	*yes*	**yes**
To halt the ageing processes	*yes*	**yes**
To beat records	*yes*	**yes**
Excessive training loads	*yes*	***yes?***
Doping under the pressure of competitors that use doping	*yes*	*no?*
Sports selection, fulfilment of result standards	*yes*	*no*
Expectations of sports clubs and associations	*yes*	*no*
Too frequent participation in events	*yes*	*no*
Medical possibilities to improve physical efficiency	*yes*	**yes**
Stress reduction, relaxation	*yes*	*no*
Inferiority complex, fear of losing	*yes*	*no*
Reduction of depressive tendencies through sports successes	*yes*	*no*
Drug-taking habit	*yes*	**yes**
Imitation of sports idols, being an idol	*yes*	*no?*
Need of social support	*yes*	*no*
Entertainment, fun	*yes*	*no*
Mass-media presence	*yes*	*no*
Limited period of sporting career	*yes*	*no*
Unconscious doping (illegal agents administered by coaches)	*yes*	*no*

In the case of older sportsmen, it is hard to regard the remaining doping reasons as significant, if at all probable. Psychological and social motives (stress, depression, inferiority complex, the need of social support, entertainment) do not seem decisive, since masters' sports are practised by grown-up, mentally mature people who compete out of their own free will, not under any external pressure, while sport itself for them is an antidote to undesirable mental states, not a cause requiring compensation. Furthermore, masters' track and field does not know the phenomenon of competitor selection. Veterans do not need to meet any result standards in order to be eligible for participation in trainings, while the expectations of clubs and associations are mainly limited to an active involvement and regular payment of membership fees (the membership itself is voluntary). Consequently, there is no external pressure and no resulting stress. Participations in masters' events are not so frequent as to necessitate the use of doping agents, although the offer of events is

steadily becoming broader. Similarly, it is hard to consider the appearance on the covers of magazines or on TV as a serious motivation behind doping use, as veteran sports are practically nonexistent in the media. Also, the aspect of a short-lived sporting career (and – consequently – very limited time available for the achievement of titles and money), though critical for very young competitors, is immaterial for older athletes, since their sporting activity, if treated as a regular element of a healthy lifestyle, lasts much longer and serves totally different purposes. Moreover, it does not seem probable that veterans could use doping agents unconsciously, taking illegal agents administered by deceitful sporting activists or coaches.

8.2. The position of the masters' movement on doping

The notion of doping is defined in the Rule 32, item 2 of IAAF anti--doping rules and regulations (*Competition Rules 2006-2007*). Doping is defined as the occurrence of one or more of the following anti-doping rule violations:

- the presence of a prohibited substance or its metabolites or markers in an athlete's body tissues or fluids,
- the use or attempted use of a prohibited substance or prohibited method,
- the refusal or failure, without compelling justification, to submit to doping control having been requested to do so by the responsible official or otherwise seeking to evade doping control,
- the evaluation of 3 missed out-of-competition tests in any period of 18 consecutive months,
- tampering, or attempting to tamper, with any part of the doping control processes or its related disciplinary procedures,
- the possession of a prohibited substance or prohibited method,
- trafficking in a prohibited substance or prohibited method,
- the administration, or attempted administration, of a prohibited substance or prohibited method to an athlete or assisting, encouraging, aiding, abbeting, covering up or engaging in any other type of complicity involving an anti-doping rule violation or attempting violation,
- competing, or attempting to compete, whilst provisionally suspended or ineligible under these Anti-Doping Rules.

From the point of view of athlete intentions, two types of doping can be distinguished: doping used consciously and purposefully and unintentional doping, used through negligence. The proportions between the two types seem different in professional and veteran sport. In the case of an overwhelming majority of young professional athletes testing

positive for prohibited pharmacological substances and methods, doping is used deliberately, with full consciousness of its function or – in any case – with their full knowledge. Often the financially profitable risk involved in possible control and doping detection is calculated. Common explanations offered after "doping slip-ups" involve claiming that doctors have prescribed a wrong kind of cough syrup. Such excuses seem to be nothing but clumsy attempts to cover up dishonesty and – at best – are evidence for blatant unprofessionalism. Another aspect of the problem is the surprisingly high incidence of asthma among competitive athletes, particularly in endurance sports…

In the case of veterans, cases of effectively blameless doping are much more common. Despite the undeniably positive effect of physical activity on bodily functions – e.g. prolongation of the period of life marked by high physical efficiency, reduction of mortality rate in human populations – the number of people requiring medication due to various acute or chronic diseases or sport injuries grows with age (Bass 2005, Kahn, Kim 2005, Rosen, Scuderi, McCann 2005). The group of unconscious dopers increases accordingly, particularly among those athletes who undertake more serious sports training already at a mature age or resume it after a long break from sporting activities. A long period of sedentary lifestyle provokes numerous unfavourable consequences, usually related to the cardio-vascular system (peripheral vascular disease, hyperlipidemia, hypertension, coronary artery disease), endocrine system (diabetes, hormone disorders), skeletal system (muscle mass reduction, osteoporosis, osteoarthritis, weakened tendons and ligaments, changes in the composition of articular cartilage) and the immune system, obesity, body balance disturbances, as well as mental disorders (anxiety states, depression) (Bass 2005, Dishman, Washburn, Heath 2004). It often happens that, in parallel to their sporting practice, people suffering from the conditions listed above continue their doctor-prescribed pharmacological treatment, taking – in good faith – medicinal substances that can be found in the list of substances prohibited by the WMA and IAAF.

The position of the veterans' movement on the doping problem is, however, perfectly clear – both doping types, be it conscious or unconscious, are punishable. Therefore, doping occurs also when a given prohibited substance is taken unintentionally or upon doctor's orders, without any will of manipulation on the part of the athlete concerned. Doping agents give sportsmen an unjustified increase in physical efficiency in relation to their opponents, regardless of whether they are taken in order to cheat or through inattention (Nickel 2005a, 2005b). Consequently, in masters' track and field special emphasis is placed on competitor education and doping prevention. There are several means to achieve that. On the one hand, there are doping

controls and sanctions are imposed. On the other hand, however, information dissemination, doping prevention and scientific research are regarded as equally important. The World Masters Athletics organisation, in close cooperation with the IAAF, implements an anti--doping policy, with the following basic assumptions *(www.world--masters-athletics.org* – Anti-doping – WMA Anti-Doping Policy):

- IAAF anti-doping rules and procedures are adopted.
- Anti-doping testing is performer at each WMA World Championships.
- There are plans to initiate discussions with the World Anti-Doping Agency (WADA) on possible future cooperation.
- The WMA Council takes all decisions related to the WMA anti--doping programme according to the instructions of the WMA Doping and Medical Committee.
- The WMA Doping and Medical Committee is responsible for doping control at all WMA World Championships and instructs issues guidelines to the WMA Council on all issues relating to doping.
- WMA establishes an Arbitration Panel that considers all appeals in doping cases.
- WMA stimulates its regional organisations to set up their own anti--doping programmes and perform doping tests at regional competitions.

8.3. Competitor education

Competitors are recommended to comply with the specially developed "Prohibited List" which should become a staple component of each veteran athlete's equipment, similarly to his or her outfit or implements (available at *www.wada-ama.org* – Prohibited List). The list should be taken for each medical check-up. Usually, physicians are able to suggest an alternative treatment, excluding prohibited substances. A part of the awareness-raising campaign is the organisation of events, seminars and workshops and the publication of booklets devoted to anti--doping. During the European Veteran Athletics Championships Indoors in Eskilstuna in 2005, talks were held among the management of the European Veterans Athletic Association (EVAA) on the launch of an anti--doing campaign. In consequence, a meeting was held with representatives of the World Masters Athletics (WMA) organisation and the International Association of Athletics Federations (IAAF), which resulted in the adoption of action lines. During the European Veterans' Athletic Championships Stadia that will be held in Poznań in 2006, a

seminar on anti-doping will be held for all participants interested in this topic.

However, athlete education in terms of knowledge of doping, prohibited substances and health risks does not translate in a straightforward manner into the development of desirable attitudes and behaviours (Rychta 1991, 1995). A reduction in doping use can be achieved in the greatest extent by actions focused predominantly on moral attitudes towards sporting competition. Research has shown that the system of ethical values subscribed to by competitors is essentially linked to the actual doping use. Winner-oriented sportsmen following a Machiavellian ethical system ("the end justifies the means") tend to use prohibited substances more frequently than fairness-oriented athletes – following de Coubertin's ideas – or process-oriented competitors (Tangen, Breivik 2001). Therefore, as A. Pac-Pomarnacki (1991) aptly notes: "An educational programme […] must reach their [sportsmen's] souls, touch the psyche and the mind, demonstrate the fundamental meaning of the fair play principle for the humanistic dimension of sport. If these deep layers are not reached […], the programme will remain a purely informational campaign […]". The same author postulates that anti-doping programmes be based on three mutually balanced and complementary elements: testing, penalisation (system of penalties) and education.

8.4. Therapeutic use exemption

A competitor using medications included in the list of prohibited agents due to medical indications must obtain a special permit in order to avoid a penalty for doping use. Both the IAAF and WMA can grant the so-called therapeutic use exemptions (TUE's) allowing the use of prohibited substances for therapeutic purposes. The exemptions are recognised by both organisations, provided that WADA and IAAF regulations are met.

Permits can be applied for using official forms: either standard or abbreviated (see the Annexe, also available at: *www.world-masters--athletics.org* – Anti-doping or *www.wada-ama.org* – Therapeutic Use Exemptions). The standard form concerns applications related to the use of drugs or methods included in the official list of prohibited substances. The abbreviated form is used in the case of applications for a permission to use inhalants, e.g. formoterol, salbutamol, salmeterol, terbutaline and glucocorticosteroids administered locally (in the form of injections, eye drops, ear or nose drops or by the inhalant route). In both cases, the following information needs to be supplied: basic personal data of the competitor, sports discipline, as well as qualifications, specialisation and

personal data of the medical practitioner, disease diagnosis, types of tests/examinations and medical details concerning the substance used – the commercial and generic names, single dose, route and frequency of administration and the expected treatment period. The medical practitioner certifies with his or her own signature the necessity to use the indicated substance(s) and the lack of any alternative method of effective treatment of any given disease, providing a relevant explanation. At the end of the procedure, the competitor submits a declaration in which he or she states that the personal data are genuine and consents for the medical information to be made available to a relevant IAAF committee. The application must be accompanied by a case record, results of tests and sometimes – in order to ensure information objectivity – independent medical opinions. If possible, the national team doctor of a given country should be notified of the application placement and should additionally confirm the necessity to use the prohibited substance(s) for therapeutic purposes. Any change in the treatment regime (dosage, route of administration, etc.) requires the placement of another application and obtaining a new permission. Veteran athletes send their application to the following address: Karri Wichmann, Ritarikatu 7, FIN-00170, Helsinki Finland, fax: +358-9-6213379, e-mail: karriw@netlife.fi.

Upon favourable consideration of the application, the competitor is granted an official permission for the use of specific substance(s) for medicinal purposes, authorised by the WMA ("Certificate of approval for therapeutic use", available at: *www.evaa.nu* – Anti- Doping). The athlete is obliged to hold a copy of the decision at all competitions and present it on request. This, however, does not mean that the competitor concerned is exempt from the standard rules of anti-doping control and obtains a "doping permission". The athlete is subject to doping testing as before, however if the illegal substance specified in the permission is identified in a testing sample, the athlete concerned is not usually penalized. On the other hand, the competitor can be subject to sanctions if the blood or urine levels of the substance concerned exceed the concentration calculated on the basis of dosage, frequency and route of administration specified in the permission. Consequently, athletes must follow medical orders very closely so as not to run the risk of suspension or disqualification.

Also, a proposal has been put forward to treat unconscious dopers differently, depending on the extent of their offence (Nickel 2005c). First--degree doping offences are cases in which a prohibited substance identified in the athlete's body is totally unrelated to the disease from which the competitor suffers. Such cases should be rigorously penalized – either with disqualification or a long-term suspension. Second-degree offences are cases of detection of a prohibited substance whose action

is directly related to the therapy of the objectively diagnosed illness from which the competitor suffers. The burden of proof is on the sportsman concerned with the help of independent experts. The competitor's fault in this case is that he or she failed to make an attempt to find alternative treatment methods, even though a given prohibited medication could have been replaced with another admissible drug. In such cases, the period of suspension can be reduced to 1-1.5 years. Finally, third-degree offences include cases of detecting a drug containing a prohibited substance that was necessary for treatment or relief of symptoms, while there was no other medical possibility of using another drug. The burden of proof is on the competitor concerned who is required to prove that he or she was eligible for a therapeutic use exemption (TUE), even though he or she had not applied for it. In such cases, a penalty is imposed not for doping, but for failure to abide by valid procedures. Therefore, the minimum period of suspension should be considered, e.g. three months.

8.5. Anti-doping declarations

One of the means of preventing illegal doping in veteran sport are voluntary anti-doping declarations. Such actions are implemented e.g. by the German master athletic federation, whose members undertake to abide by fair play principles and abstain from using prohibited substances and methods. It seems that the solution is recommendable also to "young" track and field activists and sportsmen. Athletic veterans thus have a chance of becoming pioneers of the campaign against doping, setting a good example to children and grandchildren. In this chapter you can find a sample declaration and, at the same time, a specific code of honour of veteran athletes, drawn up and proposed by Rüdiger Nickel, a German lawyer and sportsman specialising in anti--doping and his colleagues: Dieter Massin, Arno Hamaekers and Guido Müller.

Anti-Doping Declaration and Personal Pledge by Master Athletes ©

In recognition and acknowledgment

- of the importance of fair play rules as fundamental pillars within all sports as well as the necessity and observance of such rules by masters of both genders in their function as role models for young people, who are involved in sports activities,
- of suspension of those who ignore these principles, as with each performance manipulation the basic rules of organised sports as part of an accepted and precious human conduct will be undermined and endangered,
- of the importance of sports within our and for our society, and as a fundamental principle within organised sports and its importance for a credible functioning of the sport,
- of my responsibility for my own physical well-being and for acceptance only of medically unobjectionable treatments and medications,
- of respect towards my competitors and contestants in a competition that is performed under the observance of fair rules while striving for the realisation of ethically responsible results,
- of the fact that each medication burdened by doping whether intentionally or unintentionally consumed, results in the same illegal advantages for myself and disadvantages for my competitors and constitutes performance manipulation,
- of the fact that each doping instance is in fact deception, and that by illegal performance enhancement I do not only deceive my competitors but likewise myself,
- of the fact that with each illegal performance enhancement I discredit not only sports and athletics in general but specifically masters athletics,
- of the Anti-Doping-Rules and Regulations determined by IAAF, as well as of the Anti--Doping-Codes issued by WADA and NADA,

I declare and affirm herewith,

- to abstain from any illegal performance enhancement, specifically by way of doping,
- to support anything that prevents the use of unintended or extraneous doping medication,
- to do my share in actively supporting the struggle against doping,
- my undivided acceptance for unannounced doping test controls external of competitions ("training test controls").

I am aware of and I welcome the initiative that was taken by EVAA, the European association, and WMA, the World Masters Athletics, in conjunction with their commissioned national (NADA) and international (WADA) anti-doping agencies, to ensure that all fairly competing master athletes are supported and advised. This is a declaration at the initiative of EVAA and the Anti-Doping-Masters--Athletics-Advisory.

I agree with the publication of my name in a listing of those athletes who have likewise signed this declaration of anti-doping and personal pledge.

Date_____ Signature_____

Name_____ First Name_____

Club Affiliation & Country_____

Address_____City_____

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8.6. Anti-doping control

At competitions and trainings standard anti-doping tests performed by licensed laboratories are used. The World Masters Athletics organisation has its own Doping and Medical Committee made up of a chairman and six members with legal and medical experience. The Committee is responsible for anti-doping testing at world championships and acts according to the "Procedural Guidelines for Doping Control" laid down by IAAF – *www.iaaf.org* – Anti-Doping – Downloads – Anti-doping Rules and Regulations).

8.7. Gene doping

Thanks to the recent enormous progress in genetic engineering and medicine, the treatment of diseases and dysfunctions that are resistant to traditional therapeutic methods is becoming increasingly feasible. Numerous genes responsible for severe acquired or congenital disorders have been decoded and intensive experimental research is conducted. Some of the direct goals of gene therapy are to kill or weaken cancerous cells, to enable the body to produce anti-cancer drugs or replace defective genes with their healthy copies. On the technical side, gene therapy consists of the introduction of a laboratory--obtained synthetic gene into somatic cells or germinal cells of the body using one of two procedures: 1) through a direct placement of a gene into body cells (*in vivo* strategy) or 2) transfer of gene into cells cultured outside the body and their subsequent implantation (*ex vivo* strategy). Genes are transferred into cells using special carriers called vectors. Usually, these are retroviruses, adenoviruses, adeno-associated viruses and the herpex simplex virus. Along with them, regulatory elements – the so-called promoters, responsible for gene expression – are introduced into cells. Gene activity can be additionally controlled by means of administration of suitable substances (Unal M., Unal D.O. 2004; Potaczek 2005). Genetic material reaches relevant body cells and re-programmes them as required. Research is mainly conducted on experimental animals, however it yields many promising results. Genetic therapy is still linked to considerable uncertainty and numerous controversies, however it seems that it can actually benefit severely ill patients in the perspective of several or around a dozen years.

Not only medicine is now facing the "genetic revolution". It can also affect sport and the whole sphere of human physical activity. The human gene map for performance and health-related fitness phenotypes, initiated in 2000 and constantly updated, is becoming more complete. So far, 160 genes or genetic markers have been identified, including

sequences of genes associated with the level of physical activity or indicating sedentarism (Wolfarth et al. 2005). Obviously, it has already been known for many years that the genotype defines human physical and locomotor potential to a large extent, however the possibilities of a precise specification of responsible genes and tampering with the DNA-encoded information have emerged only recently.

Sports and medical circles are essentially convinced that genetic manipulations will become a new form of doping. The history of contemporary sport shows that a number of pharmacological doping agents were initially drugs used in medicine (Dzierżanowski, Wysoczański 1995). Typical examples include ephedrine (treatment of bronchial asthma, hay fever, allergies), morphine (analgesic), anabolic-androgenic steroids (used in protein deficiencies, i.e. hypoproteinemias), growth hormone (dwarfism), diuretics (diseases accompanied by water retention in the body), erythropoietin (anaemia), beta-adrenolytic drugs (hypertension, cardiac rhythm disturbances, ischaemic heart disease) (Rewerski, Pasierbski 1995).

In 2003 WADA (World Anti-Doping Agency) included gene doping in the list of prohibited methods, stating that "the non-therapeutic use of cells, genes, genetics elements, or of the modulation of gene expression, having the capacity to enhance athletic performance, is prohibited" (*The 2006 Prohibited List*, item M3). It is already known which particular genes arouse the greatest interest of dishonest sportsmen and their coaches. These include the genes coding for the IGF-1 hormone (insulin-like growth factor-1), myostatin, EPO (erythropoietin), VEGF (vascular endothelial growth factor), opioids (Potaczek 2005), as well as leptin.

The gene coding for IGF-1 is a great hope for patients suffering from congenital or age-related muscular dystrophy. IGF-1 controls the action of the growth hormone, affects the cartilage, stimulates the proliferation of cells and the synthesis of DNA, RNA, proteins and proteoglycans. In muscles, it stimulates the transport of amino acids and glucose and the synthesis of glycogen and protein, while in the fatty tissue it facilitates the oxidation of glucose and the synthesis of lipids. It is the main growth regulator of muscles, bones and cartilage (Tirapegui 1999). It delays or inhibits the process of muscle ageing resulting from age-related motor neurons (Payne et al. 2006). Since IGF-1 mediates in a number of cellular development processes, including proliferation, differentiation, growth and apoptosis, it plays a critical role in muscle regeneration following injuries and inflammations (Mourkioti, Rosenthal 2005, Musaro 2005). Its beneficial effect has been demonstrated in muscular atrophy in animals (Dalla et al. 2004). IGF-1 was injected into the muscles of experimental animals via a harmless virus. The effect of the injection was a 20-50% increase in muscular mass, a 15-30%

increase in muscle growth rate and almost a double increase in strength in comparison with control animals (Sweeney 2004). It was found that the gene coding for IGF-1 has a local effect, i.e. it functions only in the muscle into which it was injected (Zaratiegui 2002), however the effect is long-lasting. It follows that a genetic coding of additional production of IGF-1 by the body is an ideal type of doping for dishonest competitors of strength- and speed-oriented sport disciplines, e.g. sprint running, athletic jumping and throwing, since it ensures a substantial and lasting increase in muscle mass and strength after a single application. Another factor related to skeletal muscle mass growth is myostatin, displaying an inhibitory effect. The use of specific myostatin inhibitors or a lack of myostatin-coding gene causes excessive muscle growth in experimental animals (Potaczek 2005, Sweeney 2004).

Another gene in the “gene ranking list” is the gene coding for erythropoietin (EPO), a tissue hormone produced in kidneys and crucial to the process of erythropoiesis, i.e. production of red blood cells. EPO stimulates the production and maturation of erythrocytes in bone marrow. It is produced in greater quantities under the influence of hypoxia – e.g. at high altitudes above sea level, after profuse haemorrhages, in dyspnoea, etc. (Krzymowski 1989). Synthetic EPO was first produced in the 1980s. It is used in the treatment of anaemia caused by renal dysfunction and neoplastic diseases, AIDS, haematological diseases, in chemotherapy, in premature births and during surgical procedures in order to minimise the need for blood transfusions. The physiological role of erythropoietin is not only limited to erythropoiesis. EPO also participates in the process of formation of capillaries and endothelial cells, regulation of vascular resistance and even in neuroprotection (Chong 2002, Fisher 2003, quoted after Diamanti-Kandarakis et al. 2005). On account of its significant functions, EPO was the first haematopoietic growth factor subject to cloning – around 20 years ago. Soon afterwards, in 1987, EPO became the object of interest of European professional cyclists. Since then, erythropoietin has been used for doping by endurance sports competitors (Dzierżanowski, Wysoczański 1995). The substance was, naturally, entered by the Medical Commission of the International Olympic Committee (IOC) in the list of prohibited agents. The introduction of the erythropoietin-coding gene into the body produces a much more potent effect than injections of ready EPO. Animal tests demonstrated that in mice after ”genetic treatment”, the haematocrit level rose from 49 to 81% (!) and stayed on that level for a year, while the haematocrit value in monkeys grew from 40 to 70% and remained unchanged for 84 days (Svensson et al. 1997, quoted after Diamanti-Kandarakis et al. 2005).

Clinical trials on gene therapy of cardiovascular diseases, particularly coronary artery disease and peripheral vascular diseases in

elderly patients, have been conducted for a long time (Baumgartner, Isner 2000; Hedman, Ylä-Hertualla 2000; Masaki et al. 2001; Rasmussen H.S., Rasmussen C.S., Macko 2002). The active substance is usually VEGF (vascular endothelial growth factor) stimulating the local growth of new blood vessel networks (angiogenesis), a process of a potential significance in sport.

One of the main roles of leptin is the prevention of lipid accumulation in peripheral tissue. It also improves insulin sensitivity. Leptin deficiency or leptin resistance leads to obesity (Dyck 2005). As early as in the 1990s research was conducted into the genetic therapy of obesity and metabolic diseases. An injection of the leptin-coding gene into the hypothalamus of experimental animals results e.g. in the suppression of body mass growth and even the reduction of age-related and dietary obesity, loss of appetite and the consequent reduction in the energy value of consumed foods and increase in thermogenic energy expenditure (Chen et al. 1996; Dube et al. 2002; Lecklin et al. 2005; Kalra S.P., Kalra P.S. 2006). The process can be used in those sports in which the maintenance of a low body fat deposition or an overall low body mass is of key significance.

Also, new possibilities of pain relief using gene therapies regulating the production of endorphins in the body are emerging. They are particularly promising for the treatment of terminal diseases, but also in sport, an activity inherently related to injuries, overtraining, exhaustion and the consequent pain sensation (Potaczek 2005). Furthermore, genetic therapy of orthopaedic injuries is becoming increasingly real. Research was initiated as early as in the 1990s. Damaged tissues such as ligaments, tendons, articular cartilage, synovium or menisci regenerate poorly due to their reduced vascularisation. What is more, surgical intervention does not offer a good prognosis in the case of such injuries, either. Research has show that a local transfer of genes coding for relevant growth factors may improve prognosis in such cases (Evans, Mankin 1997; Gerich et al. 1996; Lamsam et al. 1997; Lattermann et al. 1998).

With the current state of medical knowledge, the use of any type of gene therapy in humans is linked to an extremely high risk of health deterioration or even death. The main problem is currently the lack of control over gene expression of synthetic genes and possible undesirable side-effects that are impossible to predict. Potential side--effects include, for example, mutations of vectors carrying therapeutic genes, causing cellular growth disorders, toxicity of produced substances due to gene overexpression or cell canceration. In the case of IGF-1, muscles developed as a result of its action could be disproportionately strong in relation to tendons or bones, thus increasing the risk of rupture or fracture, particularly in people suffering from

osteoporosis (Sweeney 2004). The introduction of the erythropoietin gene rapidly increases the erythrocyte count, thus increasing blood viscosity and provoking a rise in blood pressure. The production of EPO initiated in the body can turn out unstoppable, which can trigger thrombosis and, consequently, embolism, brain stroke or heart attack. On the other hand, the application of blood-diluting agents can bring other side-effects (Unal M., Unal D.O. 2004).

Unfortunately, even obvious health risks involved in gene therapy due to fact that research is still in its initial phase do not deter corrupt athletes from trying them. The problem was discussed in the press several years ago, when the first mammal was cloned (Powell 2001, *Gene doping*… 2001). The fears proved justified. In 2006 a German court in Magdeburg considered a case of distribution among coaches of a substance called Repoxygen which triggers the internal production of erythropoietin in the body. The main advantage of the drug is that the erythropoietin-coding gene is "switched on" in the case of oxygen deficiency and it is "switched off" when the oxygen level is sufficient. Repoxygen was first synthesised in 2002, however it was never implemented in production. Information concerning the use of Repoxygen was found in the e-mail correspondence of a German track and field coach who was sentenced for delivering anabolic steroids to female athletes, including his partner, a two-time European champion, disqualified for using clenbuterol (Owen 2006). IGF-1 is also – probably – available on the black market now. It is difficult to speculate to what extent the recent Winter Olympic Games in Torino 2006 were tainted by gene doping practices, however things are happening faster than sports and medicine experts thought, predicting that gene doping would appear during the Olympic Games in Beijing in 2008 or in London in 2012 at the earliest. It seems that sport has reached a turning point that will determine its future shape. Articles and expert discussions in everyday press, however, do not give rise to optimism (Bishop 2005; *Top experts*… 2005; Pincock 2005). Many experts realise that gene doping is already a fact and do not rule out fatal outcomes resulting from side effects. The end of sport in its current form is even proclaimed or a division into sport allowing doping and doping-free sport is proposed. There are also those claiming that a genetically based improvement of body performance is not at variance with the sporting spirit but – on the contrary – it is the very essence of sport (Skipper 2004).

Often we do not realise the great extent of benefits which gene doping can bring to competitors and the risk they are prepared to carry in order to achieve a record result. Many athletes will not shun being guinea pigs, which is confirmed by the correspondence reaching H. Lee Sweeney, an outstanding scholar specialising in gene therapy of muscular dystrophy (currently in the phase of animal testing). Nearly a

half of all letters come from coaches and athletes that are acutely interested in the immediate use of genetic methods. Cash offers are not uncommon (Brownlee 2004).

Both the scientific and everyday press indicate difficulties involved in the detection of gene doping (Diamanti-Kandarakis et al. 2005, *Scientists fear…* 2004). Genetic doping is undetectable with currently used anti-doping tests. A direct detection of gene doping using molecular methods, i.e. by the identification of a relevant synthetic gene or its vector, requires a sample of muscle or another tissue (biopsy), which may provoke justified protests of competitors. Furthermore, molecular tests are too expensive and time-consuming for the monitoring of a large number of sportsmen. New indirect methods are being developed, based on the so-called "*molecular passport*" containing data on the physiological limits of a given substance in a competitor. If the limits are exceeded, doping is alleged. Only then would a suspected athlete undergo direct pharmacological or molecular tests. Jacques Rogge, the President of the International Olympic Committee called upon scientists and organisations conducting research into doping to develop new tests within the shortest possible period and to adopt new legal regulations enabling the detection of gene doping (*Laws can halt…* 2005).

The use of gene doping in masters sport seems as real as in young athletes, perhaps even more likely, as genetic therapies are developed with elderly people in mind. Older sportsmen not only have to cope with the standard problem of keeping fit or improving performance, but also – to the same extent – with the ageing processes. Physical activity delays them to a considerable degree, nevertheless if an additional chance emerges to stop the involution process, many older athletes will be prepared to embrace it regardless of risks and costs. In the case of doping of veteran sportsmen, moral and technical problems are likely to appear and they will be even harder to resolve than in young athletes. Doping in whatever form is definitely reprehensible, but – on the other hand – how should be treated an elderly person, effectively treated with gene therapy, who then undertook sporting activity in the masters class? A great number of elderly people will undergo genetic treatment, just as they take various rejuvenating drugs now. Should such therapies be prohibited similarly to the use of medications included in the WADA list? After all, competitors have the same rights as the rest of the society, including the right to benefit from this form of treatment. Why should they – for the sake of compliance with sports regulations – choose a worse method of treating injuries or chronic illnesses or resign from a life-saving genetic hormone therapy? The problem is more significant than the choice between different cough syrups or eye drops. Should such cases fall under the therapeutic use exemption provision?

And if so, how is it possible to reliably determine – as in the case of pharmacological agents – the "concentration" of synthetic genes in the body? How is it possible to establish whether gene therapy only compensated defects caused by a disease or injury or additionally enhanced the competitor's physical efficiency above the physiological limits and thus gave him or her an unjustified advantage over opponents? Should all people subjected to any type of gene therapy be, on principle, excluded from any kind of sports rivalry? It is possible that new techniques that would allow a fast and cheap encoding of DNA sequences (Church 2006) will resolve these issues on the technical side, at least partially.

It is also possible that the problem of genetic doping in veterans sport will not be as significant. Physical activity in itself is a medication curing a number of ailments. For example, sudden age-related muscle loss is usually a result of malnutrition, vitamin D deficiency and reduced physical activity, while muscle regeneration ability does not decrease significantly with age (Grounds 2002). Physical activity in advanced age has a beneficial effect on cardio-respiratory fitness and the production of anabolic hormones (growth hormone, testosterone, DHEAS) and the above mentioned IGF-1 (Bonnefoy et al. 2002). Veteran sportsmen, exceptionally active and physically fit, will not – conceivably – for the most part feel the need of genetic enhancement of their performance or they will not like to become exposed to the risk of side-effects that would be more serious for the aged body than for stronger and more flexible body systems of young athletes. Definitely, ambition-conditioned motives of doping use will remain a key factor. Masters athletes will probably be forced to confront such dilemmas quite soon. In order to be able to face them, we should now start asking difficult questions and try to find satisfying answers to them.

9. Background to the physical activity of masters athletes

9.1. Athlete's experience

Studies conducted among German masters athletes indicate that the average age at which they begin their athletics training is 22 (23 for women and 21 for men). A significant percentage of people start athletics training relatively late in life, i.e. past the age of 30 – they account for around 20% of men and 34% of women. At the same time around 2/3 of the subjects had previously practiced another sports discipline, most frequently gymnastics, handball or football. Moreover, nearly 1/3 of the respondents stated that their spouse was an athlete and over half of those questioned said that their children were also involved in athletics training. Masters athletes have been training for an average of 28 years (women for 24, men for 30 years). The largest group (around 28%) comprises masters athletes who have been in training for 30-35 years. The second largest group, comprising 12% of all masters athletes, are those youngest in terms of their experience, who have been training for less than 5 years. Groups with 10-25 years' and 40-55 years' experience comprise from 5 to 9% of athletes, respectively. People who have been training for 60 and more years form the smallest group (2%). Over 40% of masters athletes, apart from training, also perform various functions in the sports community: sports activists, judges and referees, coaches and instructors, managers of clubs and sections (Conzelmann 1993; Maurer 2005a).

9.2. Education and material status

There seems to be enough evidence to claim that masters athletes form an "elite" social group in terms of their education and income. In Germany as many as 43% have a university degree, while the university education index for the whole population stands at 11% and for recreational athletes at 15%. Nearly 60% of German masters athletes, i.e. 10% more than the general population, have a net monthly income of over 3 thousand euros. The spending power for people over 50 in Germany is estimated at around 150 billion euros annually (Maurer

2005b). In turn, Canadian masters athletes in 1991 spent the average of around 1400 Canadian dollars annually on clothing, equipment and entrance fees, as well as travel to competition sites; at the same time the expenditure was higher for endurance sports athletes than recreational athletes (Shephard et al. 1995). Therefore it is not surprising that masters athletes are considered highly desirable customers for large competition organisers, where a few thousand masters athletes enter fees to the total amount of a few hundred thousand euros.

The data concerning education and material status of masters athletes, combined with their above-average physical activity, confirm the already demonstrated positive correlation between a higher socioeconomic status, social class or professional position and leisure time physical and sports activity in adult populations, regardless of geographical location (Cauley et al. 1991; Ford et al. 1991; Holme et al. 1981; Takao et al. 2003; Weinberg, Gould 2003, pp. 410-411).

9.3. Level and profile of physical activity

At the World Masters Athletics Championships in Puerto Rico in 2003 and the European Veterans Athletics Championships in Potsdam in 2002 a survey was conducted among 378 athletes, of whom 172 were women and 206 were men aged 40 to 59 (Zieliński, Kusy, Król-Zielińska 2005). To assess their physical activity, questions from Baecke questionnaire were used (Montoye et al. 1996). The questionnaire featured questions concerning physical activity at work, sports, as well as leisure time physical activity. The mean values of physical activity indexes are presented in table 9.1. The highest mean value of physical activity at work was noted among women aged 55-59 and amounted to 3.82. On the other hand, among men this index was the highest at the age of 45-49 and stood at 3.57. The highest index of sport activity in women was noted at the age of 40-44, while in men at the age of 45-49. Both groups had the highest index of leisure time activity between the ages of 40 and 44. The masters athletes surveyed had higher activity indexes than their non-exercising peers, as shown by studies of other authors (Beunen et al. 2004; Cuppett, Latin 2002). They even achieved higher values than younger people aged 20–32, whose work, sport and leisure activity indexes stood at the average of 2.9 / 2.4 / 3.1 in women and 2.6 / 2.8 / 2.8 in men (Baecke, Burema, Frijters 1982). This indicates a high level of physical activity of masters athletes.

Tab. 9.1. Mean values of physical activity indexes in track and field masters athletes by sex and age category. Data drawn from: *Zieliński, Kusy, Król-Zielińska 2005*

Age	WOMEN		MEN		Mann-Witney Test
	Mean	SEM	Mean	SEM	
Work activity					
40 - 44	3.49	0.05	3.51	0.07	0.360
45 - 49	3.50	0.09	3.57	0.06	0.804
50 - 54	3.38	0.11	3.38	0.06	0.581
55 - 59	3.82	0.09	3.30	0.07	0.000**
Sport activity					
40 - 44	3.48	0.06	3.34	0.09	0.521
45 - 49	2.98	0.08	3.47	0.11	0.000**
50 - 54	3.43	0.09	3.17	0.08	0.142
55 - 59	3.21	0.12	3.30	0.09	0.558
Leisure time activity					
40 - 44	3.18	0.13	3.12	0.10	0.211
45 - 49	2.85	0.08	2.92	0.11	0.337
50 - 54	3.14	0.09	2.91	0.10	0.105
55 - 59	3.15	0.07	3.05	0.09	0.933

*** – significant at level p<0.01*

The values of the work activity index calculated for masters athletes are usually higher than their sport activity index. This could result from the prevalence of professions requiring increased physical activity among masters athletes or the spontaneous performance of work duties in a more active way than non-exercising individuals. The leisure time activity index (e.g. walking, cycling, shopping) is the lowest among masters athletes, which can probably be attributed to the fact that they devote more time to strictly sporting activities. Only two statistically significant differences were noted between women and men. The first concerned physical activity at work in the 55-59 age group, while the other sport activity in the 45-49 age group. Y. Fogelman, B. Bloch and E. Kahan (2004) in their study of non-exercising individuals found a higher sport activity index in men and a low level or even lack of sport activity in women. The biggest challenge for masters athletes is to maintain the level of training that provides their bodies with the right stimuli to continue getting good results, without leading to injuries and overuse (Maharam et al. 1999). Masters runners move at a slower pace during their training and cover shorter distances per week than competitive runners, but statistically their pace and distance are comparable to those of the performance-matched control group of

teenage runners (Coggan et al. 1990). The typical masters athletes training lasts 6-10 hours per week, which is sufficient for maintaining their aerobic capacity (*Guidelines for graded exercise…* 1995). Endurance athletes aged 40-81 devote the total of 10 to 30 hours per week to training, competitions and sports-related travel. In turn, the long-distance runners in the same age group cover around 50-70 km weekly (Shephard et al. 1995).

Elite endurance runners, who, at the age of 25, covered the average distance of 125 km per week, following 22 years of training (at the age of 47) reduced that distance to around 71 km per week, but at the same frequency of training (6 times a week) and a similar pace (13.5 – 14 km per hour) (Trappe et al. 1996a).

There are noticeable preferences among masters athletes concerning the choice of the track and field event. The largest percentage of respondents listed sprint running as their favourite event (18%), while the least popular events include hurdles (5%) and long--distance runs (9%). The remaining groups of events – relay, middle--distance running, combined events, jumps, vaults and throws – are preferred by 12-15% of masters athletes. The decision to compete in their preferred event is related to age and gender. The oldest age groups show declining interest in middle and long-distance running, which are not practiced by women over 70 years of age, just as hurdles. As they age, both genders, but especially women, become more interested in combined events and throws. Men over 70 years of age still participate in all event groups (Maurer 2002, quoted after: *Senioren Leichtathletik* 2005, Nr. 8, s. 14).

Increased physical activity is not the only indicator of a healthy lifestyle typical of people practicing sports in adulthood and at an older age. A Canadian study of 756 competitors at Toronto Masters Games aged between 40 and 81 years found that almost all of them (91%) are interested in maintaining their fitness and good health. They also rate their quality of life significantly higher than their sedentary peers and the percentage of positive answers even rises with age (around 75%). Around 32% of athletes were former smokers, but 86% of them reported smoking withdrawal before they engaged in serious training and competing, thus the percentage of athletes who were still smoking when the study was conducted was only 2.9%.

The overwhelming majority (86%) fasten seatbelts while driving. On the whole such a lifestyle is beneficial for their health. Around 88% indicate that they sleep well or very well, which constitutes a very high percentage compared to people with a sedentary lifestyle. The fact that endurance competitive athletes demonstrated better indexes and health behaviour than recreational athletes engaging in social forms of sport is of great importance for health promotion. It seems that intense physical

activity combined with competition has a more positive impact on healthy lifestyle than recreational sports. It is a significant indicator for sports promotion professionals (Shephard et al. 1995).

9.4. Motives of undertaking physical activity

The most frequent motive of undertaking athletics training seems to be the “joy of sports”, declared by around 80% of masters athletes (in a study of German athletes). This is followed by two other significant motivating factors, such as “testing one’s physical fitness” and “establishing friendships” (around 60% each). Around one third of respondents values “self-confidence” that stems from athletics training, while a quarter of athletes enjoy “international meetings”. “Popularity, fame and better social status” are virtually negligible. The significance of the motives largely depends on the age and gender of masters athletes surveyed. The factors whose importance declines with age include “testing one’s physical fitness” (from 65 to 35%) and “self-confidence” (from 39 to 23%), while the one that grows in importance is “international meetings” (from 14 to 47%). However, the feeling of enjoyment and friendship are valued by all generations of masters athletes. A larger percentage of women (around 90%) than men point to the “joy of sports”. In turn, men are slightly more likely to join the masters athletes movement in order to test their physical fitness (Conzelmann 1993; Maurer 2005a). A study of 730 Australian masters swimmers and athletes (aged between 20 and 86) found that the importance of external motivation (such as social approval) rose significantly in the 60-90 age group. Internal motivation (ambition, the will to compete) remained relatively constant in all age groups, but there was an age-related decline in the declared significance of improving one’s skills and physical fitness. Besides, athletes were more driven by internal motivating factors than swimmers (Dodd 1991).

The factors motivating adult athletes differ from the motives of children and youth beginning their athletics career (table 9.2.). Young people declare maintaining physical fitness as their priority (79-88%, depending on the gender), followed by sporting success and fame (51-72%). Joy and fun (33-45%) and friendship (13-21%) are less important for young people than for masters athletes. Such motivating factors as the need for self-confidence and international meetings in that group are non-existent. The youngest athletes also driven by nice appearance (16-38%) and the wish to please their parents (6-8%) (Biernacki 1996).

Tab. 9.2. Differences in some motives of undertaking sport activity in masters versus young athletes aged 10-15 [percentage of answers]. Compiled on the basis of data drawn from: *Biernacki 1996; Maurer 2005a*

Masters athletes	Motive	*Young athletes*
73-85	Joy, fun	33-45
54-66	Friendship	13-21
35-83	Physical fitness	79-88
23-39	Self-confidence	–
14-47	International meetings	–
1-5	Success, fame	51-72
–	Nice appearance	16-38
–	To please parents	6-8

10. Veteran athletics competition in practice

Veteran track and field events basically follow the official regulations laid down by the IAAF. However, the needs of mature athletes, age-related factors and organisational requirements have prompted the necessity to modify the existing competition rules. An analogy can be drawn here to the track and field competition of children and teenagers, in which there is a division into different age categories, while the events, implements and regulations are adjusted to the physical capacity of competitors. The competition rules and the description of veteran track and field events outlined in this chapter comply with the guidelines included in the *World Masters Athletics Handbook* (2005) and the arrangements of the European Veterans Athletics Association (EVAA).

10.1. Age categories

Veteran athletes compete in age groups denominated according to 5-year intervals. Currently, the lower age limit laid down by the WMA and accepted by the IAAF is 35 years, both for women and men competing in World Master Championships and continental championships held under the aegis of these organisations. At the World Masters Games, a multi-sports event organised by the IMGA, the minimum age of participants is 30 years. The same age limit is also established by a number of athletics federations for national events. In both cases, some outstanding athletes at the age of thirty still actively participate in professional sport and commercial sports events. Both types of competition, however, are not conflicting on account of different goals and motivations driving competitors. Masters are exclusively motivated by their ambition and finance their hobby out of their own pockets, while professional track and field at the highest level is also heavily profit-oriented. Therefore, international top-level athletes have no reason to simultaneously compete in masters events that do not bring any money. On the other hand, “young veterans” do not achieve such good results as to be admitted for competition with professional athletes.

Masters events are held in 5-year age groups. Men’s categories are denoted with the capital letter M (for men or male), while women’s categories are denoted with the letter W (women) or F (female). The

symbol of any given category represents its lower age limit, e.g. M 65 denotes men aged between 65 and 69 years plus 364 days (that is up to the 70 years of age “without one day”).

Tab.10.1. Age categories in track and field masters competition according to *World Masters Athletics Handbook* (2005) and age categories valid during the European Veterans Athletics Championships Stadia EVACS 2006, held in Poznań 2006 (according to the *Invitation… 2005*)

Age [years]	Men	Women	Low and upper limits of the date of birth adopted for EVACS 2006
35-39	M35	W35	born from 20 July 1971 to 21 July 1966
40-44	M40	W40	born from 20 July 1966 to 21 July 1961
45-49	M45	W45	born from 20 July 1961 to 21 July 1956
50-54	M50	W50	born from 20 July 1956 to 21 July 1951
55-59	M55	W55	born from 20 July 1951 to 21 July 1946
60-64	M60	W60	born from 20 July 1946 to 21 July 1941
65-69	M65	W65	born from 20 July 1941 to 21 July 1936
70-74	M70	W70	born from 20 July 1936 to 21 July 1931
75-79	M75	W75	born from 20 July 1931 to 21 July 1926
80-84	M80	W80	born from 20 July 1926 to 21 July 1921
85-89	M85	W85	born from 20 July 1921 to 21 July 1916
90-94	M90	W90	born from 20 July 1916 to 21 July 1911
95-99	M95	W95	born from 20 July 1911 to 21 July 1906
100+	M100	W100	born on the 20 July 1906 and earlier

The inclusion in a given age category is based on the date of birth of a given competitor and the date of a concrete event that is used for the precise calculation of age. It is, therefore, perfectly normal that within one season a master can pass from a lower into a higher age category. In the case of events lasting several days, a master competes in the category indicated on the first day of the competition throughout the whole event (although in practice sometimes changes the age category during the event). Table 10.1. illustrates an example of determination of age categories for the purpose of the European Veterans Athletics Championships Stadia EVACS held in Poznań. The reference date is 20 July 2006, i.e. the date of commencement of the competition – the opening ceremony was held on 19 July and the final events were staged on 30 July.

It is acceptable for competitors from different age categories to compete together in one event or run series, provided that there are separate results and awards for different age groups following the end of

the event. The practice is particularly common in higher age categories in which smaller numbers of participants compete. For the same reason, the WMA permits women and men to compete together, a procedure not allowed under the IAAF regulations.

At masters championships in relay races a master can only compete for one age category. The category can be younger than the one to which the competitor is otherwise assigned. For example, an M60 category sprinter is entitled to compete in a relay race in which other runners represent the M55 category, with the whole team classified as M55. World records in relay races are noted in categories encompassing 10 years, i.e. 40-49, 50-59, etc.

In running events, race-walking and cross-country races there is an additional team classification. Each participant is then a member of a national (club) team within his or her 5-year or 10-year age category. The common practice is that the results of the best three competitors in each category are added. In order to supplement a team that lacks the required number of competitors, an athlete is allowed to participate in events in a younger age group on the condition that there are not enough competitors in the particular age category and the team competes in the same race as the older category athlete supplementing the team. No more than two extra competitors may join one team in this way.

10.2. Events

Veteran track and field sport offers an equally broad, or even broader, range of disciplines than standard professional athletics. There are no well-established athletic disciplines that are not pursued by mature athletes, while – on the other hand – there are many events that are passed over by young sportsmen. Below we are presenting a list of typical veteran events held during championship-level competitions (world championships, continental championships). Nearly all of them are held in all age categories (M/W 35-100+), with the exception of some hurdle and steeplechase variants and multi-discipline (combined) events. In those cases, in the list below we provide symbols of categories that apply to a given event, according to WMA/EVAA guidelines.

Stadia events:

Short runs: 100 m, 200 m, 400 m

Hurdle runs: 80 m (*M70-100, W40-100*), 100 m (*M50-M65, W35*), 110 m (*M35-45*), 300 m (*M60-100, W50-100*), 400 m (*M35-55, W35-45*)

Relay races: 4 x 100 m, 4 x 400 m
Middle distances: 800 m, 1,500 m
Long distances: 5 km, 10 km
Steeplechase: 2,000 m (*M60-100, W35-100*), 3,000 m (*M35-55*)
Jumping events: long jump, triple jump, high jump, pole-vault
Throwing events: shot put, javelin, discus, hammer, weight throw
Track walk: 5 km
Combined events:
female pentathlon: 100/80 m hurdles, high jump, shot put, long jump, 800 m
female heptathlon – day 1: 100/80 m hurdles, high jump, shot put, 200 m; day 2: long jump, javelin throw, 800 m
male pentathlon: long jump, javelin throw, 200 m, discus throw, 1,500 m
male decathlon – day 1: 100 m, long jump, shot put, high jump, 400 m; day 2: 110/100/80 m hurdles, discus throw, pole-vault, javelin throw, 1,500 m
throwing pentathlon: hammer throw, shot put, discus, javelin and weight throw.

Non-stadia events:
Marathon: the classic distance of 42,195 m, half-marathon and marathon-relay, ultramarathon (100 km)
Road races: 10 km, 100 km
Cross-country races: 8 km
Road walk: 10 km (*W35-100*), 20 km (*M35-100*), 30 km (*M35-100*), 50 km (*M+W*)
Cross-country relays: 5 x 4 km (M35-45), 3 x 4 km (M60+/W35+),
Mountain running on different distances (usually about 10 km).

Indoor events:
60 m, 60 m hurdles, 200 m, 400 m, 800 m, 4x200 m, 1,500 m, 3,000 m, 3,000 m walk, long jump, triple jump, high jump, pole--vault, shot put, weight throw, male pentathlon (60 m hurdles, long jump, shot put, high jump, 1,000 m), female pentathlon (60 m hurdles, high jump, shot put, long jump, 800 m). The schedule of the European Championships Indoor also includes 10 km road run, 5 km cross-country race and race walk – obviously held outdoors. At the Master Athletics Championships Indoor in Sindelfingen in 2004, a “winter throwing” programme was added for the first time, staged outdoors.

In addition to the above, masters also compete at local competitions in non-standard disciplines, including 1-mile race (1,609 m), one hour run, 4x800 m, 4x1,500 m, standing long jump, long-distance double jump from standing, triathlon (100 m, long jump, shot put).

It is also worthwhile to devote some time to discussing various throwing events enjoying a huge popularity with veteran athletes (though also practised by junior athletes). These throwing events include single competitions and combined events using non-standard implements, equipment and techniques. The competitions are held at both national and international levels and they became popular largely to the efforts of Erwin Kollmar (died in April 2003), a German enthusiast of non-typical athletic disciplines, the initiator of the LSW-Spezialsport movement (from the German abbreviation LSW – Laufen, Springen, Werfen – run, jump, throw). Incidentally, a trend is observed to return to the tradition of athletic events related to regional culture that have not become globally popular or have been forgotten. Some of them used to be held at the Olympic Games, which is now reflected in the organisation of the so-called "Retrolympics". Below we list a number of examples of such non-standard track and field disciplines together with short descriptions and the selection of implements, based on the *Senioren Leichtathletik* journal (2005) and taken from the official LSW-Spezialsport website (*www.lsw-spezialsport.de)*. In several cases, original German discipline names are provided due to their conciseness and the lack of corresponding recognised English equivalents.

– Long-distance tennis "service" (*Tennisballweitschlagen* in German) from the service position. Underhand or lateral strikes are not allowed. Typical tennis rackets and balls are used. The width of the sector is 40°.
– Hand grenade throw from the running start; with the technique, regulations and implements similar to javelin throw; grenade tossing with a side swing is not allowed (*M35-65 500 g, M70+/W35+ 250 g*).
– Sling-ball throw (German: *Schleuderballwerfen*, tossing a ball with a leather string attached) – the ball is thrown with one arm, there are no rules specifying the required run-up and the number of turns the thrower uses (*M35-55 1,5 kg; M60+/W35+ 1 kg*).
– Iron sling-ball throw (German: *Eisenschleuderwerfen*) – tossing an iron ball using one arm, with no rules specifying the required run-up and the number of turns the thrower uses; the maximum length of the implement is 54 cm, the run-up is 4 m wide and 12 m long; 60° throwing sector (*M35-45 2.75 kg, M50-65 2 kg, M70+/W35+ 1.5 kg*).
– Iron sling-ball throwing triathlon – three attempts using 1.5 kg, 2 kg and 2.75 kg iron balls. The best results are added.

Austro-Hungarian javelin tetrathlon: three throws with javelins of increasing weight and a hand grenade throw (*M35-50 600-700-800--500 g; M60-65 500-600-700-250 g; M75 400-500-600-250 g*).

– Discus throw – Ancient (Greek) style (*M35-45 5 kg, M50-55 3.75 kg, M60-65 3 kg, M70+/W35-45 2.5 kg, W55+ 2 kg*).
– Discorama: discus triathlon: three throws with discuses of increasing weight; discus is thrown from a standing position; distances achieved are added (*M35-45 1.5-1.75-2 kg; M50-65 1-1.5-1.75 kg; M70-75/W40-65 0.75-1-1.5 kg*).
– "Ingmand" Scottish hammer throw with 8 kg implements (*M55-65*).
– Weight throw. It was the event at the early Olympics – St. Louis 1904 and Antwerp 1920 (*M35+ 25.4 kg, 41 cm long; W35+ 12.5 kg, 50 cm long*).
– Weight throw with one arm; the weight is thrown using the discus--style spin technique within a throwing circle, the weight is 50 cm long (*M35-55 7.5 kg; M60-65/W40-45 5 kg; M70-80/W50-80 3 kg*).
– Weight triathlon with distance adding, with one or both hands, within a hammer throwing circle, with three attempts for each weight, the best results are added, weight lengths: 50 cm (up to 12.5 kg) and 41 cm (15.88 kg). (*M35-45 10-12.5-15.88 kg; M50-55 7.5-10--12.5 kg; M60-65 5-7.5-10 kg; M70+/W35+ 3-5-7.5 kg*).
– Shot put triathlon: using the glide technique, with a spin within the prescribed circle and with a run-up (*M35-45 7.26 kg; M50-55 6 kg; M70+/W35-45 4 kg; W50+ 3 kg*).
– Stone-put from a running start (*M35-45 15 kg, M50-55 10 kg, M60 7.5 kg, W35-40 5 kg*).
– Megastone put (German: *Ultrasteinstoß*); the stone must weigh more than 1/3 hundredweight (16.7 kg). The tradition goes back to 1805 when at the Traditional Costume and Alpine Herdsmen's Festival in Unspunnen/Interlaken (Switzerland) a throwing competition was held using a 184-pound (83.5 kg) boulder. When the original stone was lost, a replica weighing 167 pounds (75.8 kg) was made in 1907. This weigh is now traditionally used in Switzerland. At present, the weights used at championship-level competitions include 25 kg, 50 kg and 83.5 kg, while those used at local contests are12.5 kg, 25 kg and 50 kg.
– Megastone put duathlon (German: *Ultrastein-Duathlon*) (*12.5 kg and 25 kg for youths and women and 25 kg and 50 kg for men*).
– Stone put triathlon using stones with increasing weight; throw distances are added; the stone is put after a run-up with one or both arms; three attempts for each weight; the best results are added (*M35-55 7.5-10-15 kg, M60-65 5-7.5-10 kg, M70+/W35+ 3-5-7.5 kg*).
– Stone put octathlon, the rules are as above (*M50+/W35+ 3-5-7.5--10-12.5-15-20-25 kg*).

– Stone put decathlon, the rules are as above (*M35-45 5-7.5-10-12.5--15-20-25-30-40-50 kg*).
– LSW Strongest (Athletic) Man / Woman (LSW Heavy Weight Triathlon). Three events: 1) Ancient-style (Greek) discus throw (from a standing position with a 5 kg iron discus, 2) Olympic weight throw (25.4 kg/41 cm), 3) megastone put (50.0 kg).
– Shotorama: putting pentathlon using shots or stones of increasing weight; distances are added; the shot/stone is put from a standing position with an allowed jump after release; three attempts per each of the weights; the best results are added (*M35-45 5-6-7.26--10-15 kg; M50-65 4-5-6-7.26-10 kg; M70+/W35-45 3-4-5-6-7.26 kg; W50+ 2.5-3-4-5-6 kg*).
– Schockorama: throwing triathlon using shots with increasing weights; discus throwing technique; distances are added; three puts for each of the shots, the farthest tosses are added (*M35-45 3-4-5 kg; M50-65 2.5-3-4 kg; M70+/W35-45 2-2.5-3 kg; W50+ 1.5-2-2.5 kg*).
– Speerorama (German: "*Speer*" – javelin): ball tossing from a standing position using the javelin throw position (overhead); the balls have increasing weight; three attempts are allowed, the best results are added *(M35-45 2-2.5-3 kg; M50-65/W35-45 1.5-2-2.5 kg; 70+/W50+ 1-1.5-2 kg).*
– Athletic duathlon: a combination of Shotorama and Schockorama, held within one or two days.
– Athletic triathlon: a combination of Shotorama, Schockorama and Speerorama.
– LSW throwing decathlon (the so-called Kollmar Throwing Olympics). The exact sequence of events is not specified. The competition last one or two days and includes:
  1. shot put (*M35-45 7.26 kg; M50-55 6 kg; M60-65 5 kg; M70+/W35-45 4 kg; W50+ 3 kg*),
  2. discus (*M35-45 2 kg; M50-55 1.5 kg; M60+/W35+ 1 kg*),
  3. javelin (*M35-55 800 g; M60+/W35-45 600 g; W50+ 400 g*),
  4. hammer (*M35-45 7.26 kg; M50-55 6 kg; M60-65 5 kg; M70+/W35-45 4 kg; W50+ 3 kg*),
  5. stone (*M35-45 15 kg; M50-55 10 kg; M60-65/W35-45 7.5 kg; M70+/W50-55 5 kg; W60+ 3 kg*),
  6. sling-ball (*M35-55 1.5 kg; M60+/W35+ 1 kg*),
  7. shot put with discus technique, using one arm (*M35-45 4 kg; M50-65 3 kg; M70+/W35-45 2.5 kg; W50+ 3 kg*),
  8. weight – with one arm (*M35-55 7.5 kg; M60-65/W35-45 5 kg; M70+/W50+ 3 kg*),
  9. weight – with both arms (*M35-45 12.5 kg; M50-55 10 kg; M60--65/W35-45 7.5 kg; M70+/W50+ 5 kg*),
  10. grenade (*M35-65 500 g; M70+/W35+ 250 g*).

The list above is by no means exhaustive and it does not reflect the wealth of athletic throwing events. There are a number of regional varieties of throwing events using different implements, including various types of *lanzamiento de barra* (throwing a metal bar), traditionally practised in Spain and the Basque Country for centuries, even today. Elements of *lanzamiento de barra española* have even entered the javelin throw technique (Lipoński 2001, pp. 270-271). It is also fitting to mention the interesting activity of the German Association of Lawn Strength Sports and Tug-of-War (Deutscher Rasenkraftsport- und Tauzieh-Verband), which e.g. organises league competitions in hammer, weight and stone throwing, with a division into several weight categories *(www.drtv-sport.de*).

10.3. Specific features of sporting regulations

In addition to the differences related to age categories and types of events discussed above, classic masters' competitions are governed by modified regulations. The most important modifications are outlined below (according to the *World Masters Athletics Handbook,* 2005).

Running events

- At championship-level competitions, in running events longer than 1500 metres, competitors at the end of the field may be restricted to the outer lanes at any time within 5 minutes of the scheduled commencement time of the next track event. This procedure enables the next group of runners to commence their competition without delay.
- Master competitors required to use starting blocks or a crouch start or have both hands in contact with the track for the start of any race. Naturally, most masters use starting blocks and crouch start in short-distance races, however if a competitor thinks that such a start does not bring any benefits, he or she has the right to give it up, which usually happens in older age categories. The commands given by the starter are the same, i.e. "On your marks", "Set" and then shot. The master athletics movement does not accept the IAAF rule under which crouch start is obligatory for all short-distance races up to 400 m inclusive.
- In any race, master runners charged with a false start, as determined by the starter, are warned. Athletes who are charged with a second false start in the same race are disqualified. The rule also applies to the combined events. It thus follows that the veteran athletes' movement has not adopted the IAAF regulation under which after the first false start all competitors are warned,

while any athlete committing a second or next false start is disqualified, regardless of whether he or she committed the first false start or not. The IAAF has made the false start rule more rigorous largely due to the pressure of broadcasters wanting to ensure smooth broadcasting, which was often delayed by frequent false starts, often provoked deliberately in order to throw fellow competitors off balance. In the case of master competitions, however, the solution does not seem necessary, for mass-media interest is scarce, while master athletes greatly respect one another and do not commit deliberate false starts.

- In hurdle races, competitors must hurdle with a continuous motion, ensuring that both feet are off the ground for at least an instant. In other words, the take-off and flight phase over the hurdle must be visible. The rule is to prevent marching over hurdles instead of leaping over them. The situation is possible in older age categories where hurdles are rather low (the lowest hurdles are 68.8 cm high) in relation to the height of hurdlers.
- In steeplechase races, competitors may hurdle or vault the barriers or step on the top rail while in a continuous motion. The hands or the feet may touch only the top surface of the barrier. No other part of the body may touch any part of the barrier – barrier climbing is prohibited.

Jumps

- If a high-jump or pole-vault competition includes competitors classified in different age groups jumping or vaulting in the same competition pool and there is only one competitor left in a given age-group, the competitor concerned has the right to have the height of the bar raised according to the applicable IAAF rules, even though other competitors in other age-groups may still be jumping or vaulting. As well-known, competitors that are left alone in a competition (in a given category) can ask for the bar to be raised to any height. They are also allowed more rest time between successive attempts and for making the attempt.
- In high jump and pole vault, the competitor must take both feet off the ground during the vault. The take-off and flight phases are required in order to prevent athletes from “marching” onto the landing area.
- In high jump and pole vault, master competitors are allowed to touch the landing area before clearing the bar, provided that they do not use the landing area (mattress) to their advantage in clearing the bar.

Throwing events

- In hammer and weight throw it is required that the competitor uses both hands at all times when throwing.

Combined events

Combined events are essentially governed by the official IAAF regulations. Accordingly, only one attempt is allowed in running events and maximum three attempts in technical events with the exception of high jump and pole vault in which three consecutive unsuccessful attempts eliminate the competitor from further participation, etc. Regulations concerning breaks between different events, the starting sequence, running series lineup, competitor classification, identical results and withdrawal from participation are also respected.

One great difference in relation to the IAAF rules concerns the calculation of score for the results achieved in combined events. The actual performance in a given event is multiplied by the appropriate Age Factor, which gives the so-called Age Factored Performance. The Age Factored Performance is then read in the IAAF Combined Events Scoring Tables and the appropriate number of points is calculated. Age factors are thus used in order to find a "common denominator" for the actual scores, thanks to which one scoring table is sufficient and the performance level of men and women and age category is comparable.

Age factors are listed in a relevant appendix to WMA regulations (*World Masters Athletics… 2005; www.world-masters-athletics.org → Laws & Rules → Appendices).* The factors are specific for each gender, age group, type of combined event and parameters of implements used (weight, height).

Example 1:

The actual performance of an M50 man in the 100 m event is 13.12 s. The Age Factor for the event in the age category is 0.8917. The following formula is used:

Actual score x Age Factor = Age Factored Performance,

that is

13.12 s x 0.8917 = 11.699104 s.

After rounding up, this gives 11.70 s. According to the IAAF scoring tables, the competitor is awarded 711 points.

Example 2:

The actual performance of a W35 woman in the high jump is 1.47 m. The Age Factor (specific for age, gender and event type) in this case is 1.0408. The multiplication is performed as follows:

1.47 m x 1.0498 = 1.529976 m

After rounding down, this gives 1.52 m, which translates into 644 points.

The rounding rule is as follows: multiplication results in running events is rounded up to the higher one hundredth of a second and in throwing and jumping events – rounded down to the shorter centimetre, contrary to the mathematical rule. A similar rule applies to looking up Age Factored Performance in the scoring tables. If the scored performance is not listed in the tables, the rule is to take into account the closest lower score (i.e. longer time, shorter distance or lower height). The general principle behind these rules is not to give competitors artificial advantage and to ensure that the score read in the tables is not higher than the actual performance.

In the case of hand timing (exact to 0.1 s) in running events (from 400 metres down) which are a part of combined events, the times must be appropriately corrected before multiplying by the relevant Age Factor. Corrections recommended by the IAAF apply:

distances from 50 through 300 m	– 0.24 seconds are added to the hand time,
400 m	– 0.14 seconds are added to the hand time,
all distances above 400 m	– no correction is used.

The weight throw event is now included in the official IAAF Combined Events scoring tables and is scored just like other throwing events.

10.4. Equipment and implements

Due to considerable age differences and the resultant differences in performance of female and male competitors, the equipment and implements are precisely adjusted to the capabilities of different categories, based on many years' experience. This applies particularly to the specifications of hurdle and steeplechase races and the weight of throwing implements. Implements with modified parameters are used –

in older age categories the implements are the same as those used in children and youth categories – some implements, however, are specific for master athletics (*World Masters Athletics… 2005; www.world-masters-athletics.org → Laws & Rules → Appendices)*.

Generally, the distances of hurdle races and steeplechase races are shortened in successive age groups from 110 m to 80 m (hurdles) and from 3 km to 2 km (steeplechase). Also, hurdle/obstacle height is reduced (from 99.1 cm to 68.8 cm), the distance between hurdles is shortened (from 9.14 m to 7.00 m) and the weight of throwing implements is gradually reduced according to the age category. The most important parameters are listed in tables 10.2., 10.3. and 10.4.

In long jump and triple jump the distance between the take-off line and the landing area (sand pit) is established in such a manner as to ensure that the competitor lands safely. In the highest age categories, it is necessary to mark an additional "board" on the runway within the distance of several dozen centimetres (long jump) or 3-4 m (triple jump).

In pole vault, the lowest height of the bar should not be lower than the lowest height that can be placed on the supports of a given type and may not be lower than 1 m (the first height in the oldest age groups M85+ and W65+). In high jump, competitors can face a problem with the high mattress, since the lowest height should not be below the upper surface of the landing area. Therefore, in older age groups flat and safe mattresses are recommended – e.g. in the W85+ category high jump competitions usually begin with the bar at 65 cm.

In weight throw, an event usually held in a typical shot put circle, a protective enclosure is required. The dimensions, construction and material are not specified in sports regulations. Usually, the enclosure is made of strong netting made of steel wire or thin steel rods enclosing the circle up to the height of ca. 2 m. The weight itself is made of a metal head (ball), an inflexible link (a steel chain) and a triangular grip. The implement thus resembles a typical throwing hammer, however it is much shorter (up to 41 cm) and heavier (up to 15.88 kg).

Tab. 10.2. Distances and heights in hurdle runs

Age	Distance [m]	Height [cm]	First hurdle [m]	Between [m]	From last hurdle [m]
			MEN		
M35+40+45	110	99.1	13.72	9.14	14.02
	400	91.4	45.00	35.00	40.00
M50+55	100	91.4	13.00	8.50	10.50
	400	84.0	45.00	35.00	40.00
M60+65	100	84.0	16.00	8.00	12.00
	300	76.2	50.00	35.00	40.00
M70+75	80	76.2	12.00	7.00	19.00
	300	68.8	50.00	35.00	40.00
M80+	80	68.8	12.00	7.00	19.00
	300	68.8	50.00	35.00	40.00
			WOMEN		
W35	100	84.0	13.00	8.50	10.50
	400	76.2	45.00	35.00	40.00
W40+45	80	76.2	12.00	8.00	12.00
	400	76.2	45.00	35.00	40.00
W50+55	80	76.2	12.00	7.00	19.00
	300	76.2	50.00	35.00	40.00
W60+	80	68.8	12.00	7.00	19.00
	300	68.8	50.00	35.00	40.00

Tab. 10.3. Distances and heights in steeplechase runs

Age	Distance	Height	First obstacle	Between	From last obstacle
M35-55	3,000 m	91.4 cm	varies	79.00	62.20
M60+	2,000 m	76.2 cm	varies	79.00	62.20
W35-60	2,000 m	76.2 cm	varies	79.00	62.20

Tab. 10.4. Weights of throwing implements

Age	Shot [kg]	Discus [kg]	Hammer [kg]	Javelin [g]	Weight [kg]	[lbs]
M35-45	7.26	2.0	7.26	800	15.88	35
M50-55	6.0	1.5	6.0	700	11.34	25
M60-65	5.0	1.0	5.0	600	9.08	20
M70-75	4.0	1.0	4.0	500	7.26	16
M80+	4.0	1.0	4.0	400	5.45	12
W35	4.0	1.0	4.0	600	9.08	20
W40-45	4.0	1.0	4.0	600	9.08	20
W50-55	3.0	1.0	3.0	500	7.26	16
W60-75	3.0	1.0	3.0	400	5.45	12
W80+	3.0	0.75	3.0	400	5.45	12

Tab. 10.5. Medal standards for men valid during the European Veterans

EVENT	M 35	M 40	M 45	M 50	M 55	M 60
100	11.70	12.00	12.40	12.80	13.20	13.90
200	24.00	24.8	25.6	26.8	27.6	29.00
400	50.50	52.50	54.50	56.50	58.90	61.90
800	1:57.00	2:03.00	2:08.00	2:13.00	2:19.00	2:26.00
1,500	4:02.00	4:10.00	2:20.00	4:37.00	4:52.00	5:05.00
5,000	15:22.00	15:55.00	16:33.00	17:14.00	18:01.00	18:55.00
10,000	33:50.00	36:00.00	39:50.00	43:50.00	47:00.00	50:50.00
80 Hu						
100 Hu				17.50	18.50	19.70
110 Hu	16.00	17.50	18.60			
300 Hu						53.50
400 Hu	60.00	62.00	66.00	68.00	70.30	
2,000 St.						9:00.00
3,000 St.	10:31.00	11:10.00	12:30.00	13:45.00	15:00.00	
4x100	50.60	52.40	54.20	55.90	57.90	61.80
4x400	3.52	4.06	4.14	4.23	4.34	4.45
5,000 TW	26:00.00	27:00.00	28:10.00	29:20.00	30:30.00	32:20.00
20 km RW	x	x	x	x	x	x
Marathon			6 HOURS LIMIT			
High Jump	1.80	1.75	1.65	1.55	1.50	1.40
Pole Vault	4.30	4.00	3.70	3.40	3.00	2.80
Long Jump	6.44	6.02	5.60	5.26	5.00	4.60
Triple Jump	13.00	12.50	11.00	10.50	10.00	9.50
Shot Put	13.40	12.00	11.00	12.50	11.50	12.00
Discus	40.00	39.00	37.00	41.00	37.00	42.00
Hammer	45.00	42.00	40.00	43.00	36.00	40.00
Javelin	50.00	48.00	46.00	44.00	40.00	36.00
Pentathlon	2200	2600	2000	3000	2800	3000
Weight Pent.	2400	2200	2000	3300	3200	3500
Weight Throw	12.00	11.00	10.00	13.00	11.50	14.50
Decathlon	5000	5000	5000	5500	5000	5500

Athletics Championships EVACS 2006, held in Poznań

M 65	M 70	M 75	M 80	M 85	M 90	M 95+
14.90	16,00	17.20	18.40	20.00	22.90	26.00
31.00	33.50	36.00	39.4	42.80	47.20	55.00
64.90	68.00	74.20	80.60	86.60	97.80	114.00
2:34.00	2:45.00	2:57.00	3:14.00	3:40.00	4:25.00	5:30.00
5:30.00	5.56.00	6:30.00	7:07.00	8:24.00	10:36.00	13:50.00
20:00.00	22:60.00	25:10.00	28:30.00	34:00.00	41:00.00	48:00.00
54:00.00	57:30.00	61:00.00	65:00.00	71:00.00		
	16.15	17.80	23.60	27.00	31.00	
20.90						
58.00	64.00	72.00	80.00			
10:15.00	11:20.00	13:00.00	16:00.00	19:00.00	24:50.00	
65.80	70.00	75.10	81.50	88.80	96.00	
5.15	6.00	6.20	7.40	8.00		
33:50.00	35:50.00	38:10.00	41:10.00	46:00.00	51:00.00	56:00.00
x	x	x	x	x	x	x
ALL AGE GROUPS						
1.36	1.30	1.20	1.11	1.02	0.87	0.75
2.20	2.00	1.70	1.40	1.20		
4.30	4.00	3.50	2.80	2.40	2.20	2.00
8.50	8.00	7.40	6.00	5.00	4.60	4.00
11.00	10.80	9.00	7.50	6.00	5.00	4.00
39.00	35.00	30.00	20.50	17.50	12.00	8.00
38.00	33.00	25.00	20.00	16.00	12.00	7.50
34.00	28.00	24.00	20.00	15.00	12.00	10.00
2600	2100	2000	1800	1500	1200	
3400	4000	3500	3000	2500	2000	1500
13.50	12.00	10.00	11.00	9.00	7.00	5.50
5500	4500	4000	4000	3500		

Tab. 10.6. Medal standards for women valid during the European Veterans

Event	W 35	W 40	W 45	W 50	W 55	W 60
100	13.70	14.40	14.80	15.50	16.10	16.80
200	27.80	28.50	29.60	31.50	33.50	34.50
400	60.00	62.50	65.00	69.50	75.00	80.00
800	2:26.00	2:30.00	2:35.00	2:43.00	2:51.00	3:08.00
1,500	5:02.00	5:10.00	5:21.50	5:37.00	6:10.00	6:30.00
5,000	19:00.00	20:00.00	21:00.00	22:20.00	24:50.00	26:00.00
10,000	39:30.00	42:00.00	44:00.00	46:00.00	50:00.00	55:00.00
80 Hu		14.50	15.50	16.60	17.60	19.00
100 Hu	17.00					
300 Hu				57.00	62.00	66.00
400 Hu	72.00	76.00	82.00			
2,000 St.	8:45.00	9:45.00	10:23.00	11:30.00	12:50.00	13:50.00
4x100	57.80	60.50	62.50	64.90	67.50	70.50
4x400	4:38.00	4:49.00	5:01.00	5:15.00	5:31.00	5:49.00
5,000 TW	31:15.00	32:20.00	33:41.00	35:15.00	37:00.00	39:00.00
10 km RW	x	x	x	x	x	x
Marathon			6 HOURS LIMIT			
High Jump	1.65	1.50	1.45	1.35	1.30	1.20
Pole Vault	2.70	2.40	2.20	2.00	1.80	1.80
Long Jump	5.10	4.90	4.50	4.20	3.90	3.60
Triple Jump	10.00	9.45	8.50	8.00	7.00	6.00
Shot Put	10.80	10.30	9.50	9.50	9.00	8.50
Discus	33.40	30.90	26.00	24.00	20.50	18.10
Hammer	32.00	29.60	22.00	28.00	24.00	21.00
Javelin	29.00	27.00	24.00	24.00	21.00	19.00
Pentathlon	2800	30000	2800	2500	2500	2850
Weight Pent.	2800	3000	2800	3000	3000	3000
Weight Throw	10.00	9.00	8.50	9.50	9.00	10.00
Heptathlon	3300	3500	3000	3000	2700	3000

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W 65	W 70	W 75	W 80	W 85	W 90	W 95+
17.90	21.40	23.00	24.50	27.40	30.70	33.00
36.90	45.50	48.00	52.00	60.00	64.00	68.00
85.00	96.00	107.00	120.00	140.00	161.00	183.00
3:30.00	3:50.00	4:04.00	4:26.00	4:54.00	5:27.00	7:00.0
6:51.00	7:23.00	8:23.00	10:25.00	13:00.00	14:00.00	
29:00.00	32:00.00	35:00.00	39:00.00	44:50.00		
60:00.00	60:00.00	73:00.00	80:00.00	90:00.00		
22.00	25.00	28.00	31.50	35.00	42.00	
71.00	78.00	87.00	96.00	117.00		
16:00.00	19:00.00	24:00.00				
74.20	79.00	85.00	92.00	99.00		
6:12.00	6:39.00	7:13.00	8:00.00			
41:15.00	44:00.00	47:10.00	51:10.00	56:40.00	65:00.00	
x	x	x	x	x	x	x
ALL AGE GROUPS						
1.14	1.02	0.96	0.88	0.80	0.74	0.68
1.60	1.40	1.20				
3.10	2.90	2.20	2.00	1.70	1.40	1.10
5.50	5.20	4.00	3.50	3.00		
7.50	6.00	5.50	4.50	4.00	3.00	2.50
16.00	14.20	12.50	10.00	8.00	6.50	5.00
19.00	17.00	12.70	10.00	8.00	6.50	5.50
17.00	14.00	13.00	10.00	8.00	6.50	5.50
2200	2000	1800	1600	1400		
2700	3000	2700	2500	2000	1700	1400
9.00	9.00	8.00	7.00	6.00	5.00	4.00
3000	2500	2000	1700	1400		

10.5. Medal standards

In order to be eligible for participation in top-level competitions, young professional athletes are required to meet exacting minimum score requirements imposed by the IAAF and national athletics associations. Consequently, only an elite group of athletes compete at the Olympic Games, world championships or international track and field meetings. The veteran sport movement does not impose such demanding requirements for participation in track and field events, which – however – does not mean that the performance level of competitors is secondary to participation itself. A good incentive for self-improvement and performance enhancement are e.g. medal standards, also referred to as scoring standards, established for the majority of age categories and events. The standards are used at championship-level competitions in the case of a small number of participants in a given age group. If three or fewer competitors participate in a given event, all of them must achieve a score equal to or better than the medal standard. If a given competitor fails to meet the requirement, he or she will not be awarded a medal.

Medal standards are specified on the basis of data collected by representatives of veteran organisations, mostly the WMA, concerning performance levels in a given age group. Particular caution is required in the M90+ and W85+ categories and in the case of new events with few participants, in which the available data do not allow the specification of standards in a number of events. Tables 10.5. and 10.6. list medal standards used during the European Veterans Athletics Championships EVACS 2006 held in Poznań.

10.6. Organisation of events

Masters athletics events pose a considerable challenge in terms of organisation. The number of participants in national-level competitions reaches several hundred, while international-level events attract from several to more than a dozen thousand competitors. Based on our own experience in organising the European Veterans Athletics Championships in Poznań in 2006, below we outline the most essential issues involved in the correct preparation and organisation of competitions.

The right to the organisation of world athletic championships and continental athletic championships is granted by relevant organisations: World Masters Athletics or continental federations (e.g. EVAA). An approval of the national veteran association and the authorities of the city which is to host the championships is required. Furthermore, specific requirements related to sports venues and equipment and housing/meal

facilities must be met. Tourist attractiveness of the city is also of considerable importance. What also matters in the case of outdoor stadia events is the climate of a given region (moderate temperatures and stable sunny weather are desirable). Thanks to the growing popularity of masters track and field competitions, two to three cities bid for the organisation of top-level competitions every year. An additional incentive is undeniably the fact that such ventures contribute to the promotion of the host city and region and – if properly organised – they yield the organisers financial benefits. After the right to organise championships is granted to the successful bidder, a contract is signed between the organising committee and the world or continental association. The contract regulates the rights and obligations of both parties, technical and financial issues related to the event and the schedule of activities.

Two years before the planned championships (one year at the latest) a special *Entry Booklet* is published – an information brochure and, at the same time, the official document containing welcome greetings from the championships' organisers, information about the host city, dates of events, travelling guidelines, visa requirements, framework programme, participation conditions, basic rules and regulations, entry fees, entry form, accommodation facilities, tourist attractions and other necessary information. Copies of the Entry Booklet are sent to national veteran athletic associations and distributed at major veteran events. At the same time, an official and regularly updated website is launched and a campaign is started to recruit volunteers.

All women and men who are interested in participating in championships first send their applications to national affiliates of the WMA, EVVA or another continental association. Following the verification of personal data, national organisations send all the entry forms to the organiser within the specified period (usually 2-3 months before the scheduled event). A basic precondition for the participation in world and continental championships is the membership in the national masters athletics association. If no such association exists in a given country, competitors send their entry forms directly to the WMA or a continental federation. Competitors may participate in any number of events. Also, there are no minimum results requirements for entry.

Participants are gradually registered in the organiser's database and starting lists in different events and age categories are drawn up. After all entries have been collected, the *Competitors Handbook* is published, containing starting lists, a detailed timetable, precise regulations governing different events, location of sports venues and facilities, marathon and road walk routes, etc. Championship-level competitions usually last 12 days, of which actual sports events take

10 days (the first day is usually accreditation day and there is a day off halfway through the competition).

As for the organisation of the sports part of track and field masters competitions, particular attention should be paid to the aspects discussed below:

- On account of the large number of participants, veteran athletic competitions are held at a minimum of two venues. Special attention should be paid to provide the required number (at least a dozen or so) of throwing rings. Additional temporary portable platforms with circles and cages for shot putting and weight throwing are often used. They may be located outside the primary venue, in side fields.
- If sports venues are located at a considerable distance from one other, the organisers must ensure a free and smooth transport of competitors between different facilities. The requirement also applies to the transportation of athletes from their accommodation to competition venues and the way back.
- Both the framework and timetable must be drawn up in such a way as to enable athletes to participate in several events. It is common for master athletes to participate in a number of related events, e.g. short-distance races, throwing, jumping or long-distance races. The same events for one age group may not overlap.
- In order to protect competitors from all-day exposure to sunlight or rain, adequate shelter in the form of covered stadium stands and tent structures for the areas of event staging and warm-up. Also, benches or chairs must be provided for competitors on the stadium surface.
- The oldest age categories begin the competition in a given event on a given day in order not to keep e.g. 80- or 90-year-old and older athletes waiting for their turn and thus exhaust them unnecessarily. This applies in particular to long-distance races in older age groups that should be held in the morning when the air temperature is lower.
- In 10 km races held in the stadium a water station should be placed right next to the running track. The oldest or physically the weakest competitors tend to cover the distance during 2-2.5 hours, which corresponds to the duration of marathon in young athletes. Furthermore, a typical feature of long-distance races and road walking events contested on the track, particularly in older age groups, are large differences in performance. Consequently, some of the athletes running more slowly (or marching) are repeatedly doubled, which is why judges are required to pilot competitors individually, showing each of them the number of laps left until the end of the race.

- Particular emphasis should be placed on providing adequate medical assistance. Medical help should also be available on days off and in side fields in which a number of veterans train or do their warm-up.
- Veteran competitions also involve the institution of the so-called safety judges. They have the right to exclude a competitor from the event if he or she endangers his or her own health or that of fellow competitors, unduly delays the progress of the event or lacks appropriate technical skills necessary for safe participation in the competition.
- Starting numbers – the first two digits represent the age category and the remaining three digits a consecutive number (e.g. 80132 denotes a competitor listed 132nd in the category of athletes 80 years or older). The colours of men's and women's starting numbers are different.
- A large number of volunteers are to be recruited for the competition (usually several hundred people). The tasks of volunteers include helping judges in their work, giving information (knowledge of foreign languages recommended) and performing maintenance activities.
- Due to safety reasons, the competition venues are exclusively accessible to competitors participating in a given event, judges, technical personnel, accredited journalists and medical assistance staff. The only entry pass is the ID card issued by the organisers. All other persons must remain in the stadium seats.
- Award presentation ceremonies should follow the established schedule. Representatives of only one age category are awarded medals at a given hour at an appropriate awards stand in the main stadium. Winners are awarded medals and diplomas to the sound of fanfares. Other athletes may ask for the print-out of a diploma confirming their place and score in a given event at an indicated location.
- Marathon and relay races, as well as several technical events in selected categories are held on the last day of the competitions so that the stadium is not completely empty waiting for the marathon finish. Team classification is used for the marathon and road walk based on the fastest three cumulative times in a given age group.
- Organisers are required to keep a regularly updated information service. The results are to be posted daily on the championships website, on special information boards and made available to managers of national teams.
- World masters records and continental records achieved at championship-level competitions are recognised automatically on the basis of the final event announcement sent to the statistics

centre, so that there is no need to fill in special application forms. The rule does not apply to national records and competitions, though.
- Anti-doping tests are conducted at veteran athletic competitions. The issue is discussed in detail in a separate chapter.

Among issues not directly related to sport, the key aspects include:
- Good accommodation and meals offer. Unreasonable prices and other inconveniences discourage potential competitors from participating, as they must pay for their stay and entry fees out of their own pocket.
- Accompanying events (trips, tours, sightseeing attractions) and good access to recreation and leisure facilities (swimming pool, leisure centre, biological rejuvenation facilities).
- Free admission to sports facilities and transportation service for accompanying persons (most veteran athletes come to competitions with their families).
- Preparation of souvenirs/memorabilia featuring the logo of the event (T-shirts, medals, commemorative caps, stamps, postcards, mugs, umbrellas, etc).
- Photographic service – souvenir photographs taken by accredited representatives of photographic companies, available for a fee in a special stand.
- Free Internet access for competitors so that they are able to follow the results of different events and contact their families in their home country.

10.7. Organisers of masters athletics competitions and the *fair play* principle

Fairness in sport is not only an internal matter of competing athletes. The rules of fair play also apply to the organisers of veteran competitions. Unfortunately, they have not – so far – been elaborated into any code of conduct, however certain sore points can be identified that have already become subject to criticism (Noffke 2005).

As we have already mentioned, master championships are huge sporting events. It is therefore clear that they cannot be prepared and conducted without an appropriately large budget. It is no secret – and there is nothing wrong in that masters championships yield financial profits. Money is partially acquired from sponsors and official authorities interested in the promotion of a given city or region, but also from veteran athletes themselves who pay their entry fees (for each event

separately), book hotel accommodation, pay for their meals during the competition, buy souvenirs and memorabilia, photographs and films documenting the competition, take part in tourist events offered by the hosts, etc. It needs to be stressed that they are not usually sponsored and typically they are sport enthusiasts spending their savings on their sports hobby combined with travelling around the world. A major risk for the veteran sport movement is the fact that organisers tend to regard veteran championships as a proverbial gold mine, an excellent opportunity to earn easy money quickly. The prices of hotel accommodation are frequently increased for the period of the competition, sometimes by more than 100%. Restaurant owners also hike up their prices. A number of hotels even charge some of their fees half a year ahead of the event. Very often local organisers ally themselves with hoteliers. In addition to artificially inflated prices, hotel managers sometimes impose the requirement to book rooms for a minimum period, e.g. 6 days, which is hard to understand for marathon runners that arrive one day before their event. Another contentious issue is the fee for the transport of family members accompanying master athletes to the competition, with free transport for competitors according to routinely accepted contracts. There are also other graver problems, e.g. members of masters organisation management abusing their positions. There are suspicions that some of them combine their own business with the competitions, first deciding on their date and venue and then directly booking hotels as owners of travel agencies (Noffke 2005).

It is thus clear that the main focus of attention for people involved in the organisation of masters competitions is not sport but their own benefits – to the disadvantage of competitors but also to the detriment of the whole veteran movement, since there is a real threat of some mature athletes resigning from participation in competitions. Perhaps the absence of numerous athletes from championships is the only means of making the organisers acutely aware of the fact that they incur greater losses by inflating prices than setting them at a reasonable level. It seems a sensible idea to monitor the conduct of organisers regularly and to bring to light the inside business of masters organisations management.

In conclusion, it must be stressed very strongly that the guiding principle for organisers of masters competition should be the respect for all competitors on account of their extensive life and sporting experience, remarkable vitality and activity, openness to others and great enjoyment of life. Veteran sportsmen are sporting role models for everyone.

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Photo: Karl-Heinz Flucke

One of the oldest participants of the World Championships in San Sebastian, Rosario Iglesias y Rocha of Mexico, category W90.

Photo: Karl-Heinz Flucke

Janina Rosińska of Poland after 10 km run during the World Championships in San Sebastian 2005.

Photo: Karl-Heinz Flucke

Polish Championships, Poznań 1997. The founder and first president of the Polish Masters Athletics Association, Gabriel Mańkowski (right) with one of the oldest Polish athletes, Kaziemierz Spychała, then 77.

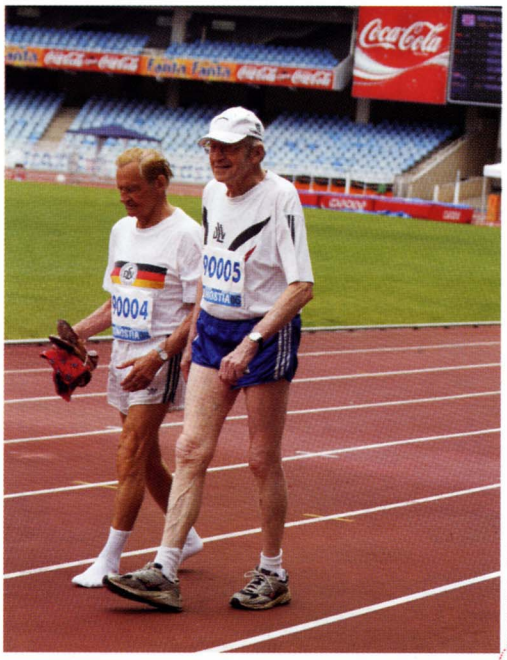

Photo: Karl-Heinz Flucke

Friends from the track: the winner of the 100 m final in the M90 category,Friedrich Mahlo (left) and Albert Olbrechts, World Championships, San Sebastian 2005.

Photo: Karl-Heinz Flucke

A Dutch multi-medallist and the winner of the IAAF Best Master of the Year 2005 - Rietje Dijkman.

Photo: Karl-Heinz Flucke

Long distance running after 85?
Why not? Regards from Efrain Wachs.

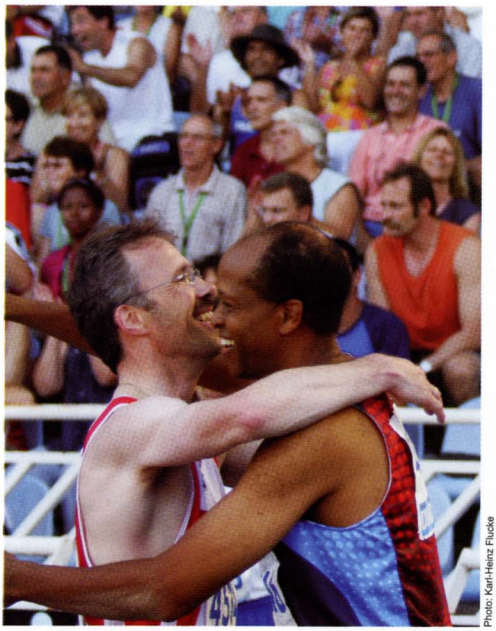

Photo: Karl-Heinz Flucke

The famous triple jumper Willi Banks (right) just after
his debut as a veteran, congratulates Wolfgang Knabe
on his surprising win. World Championships,San Sebastian 2005.

Photo: Karl-Heinz Flucke

A blind Swedish walker, Marie-Louise Wahlberg,
with her guide. Masters athletics is a sport for everyone.