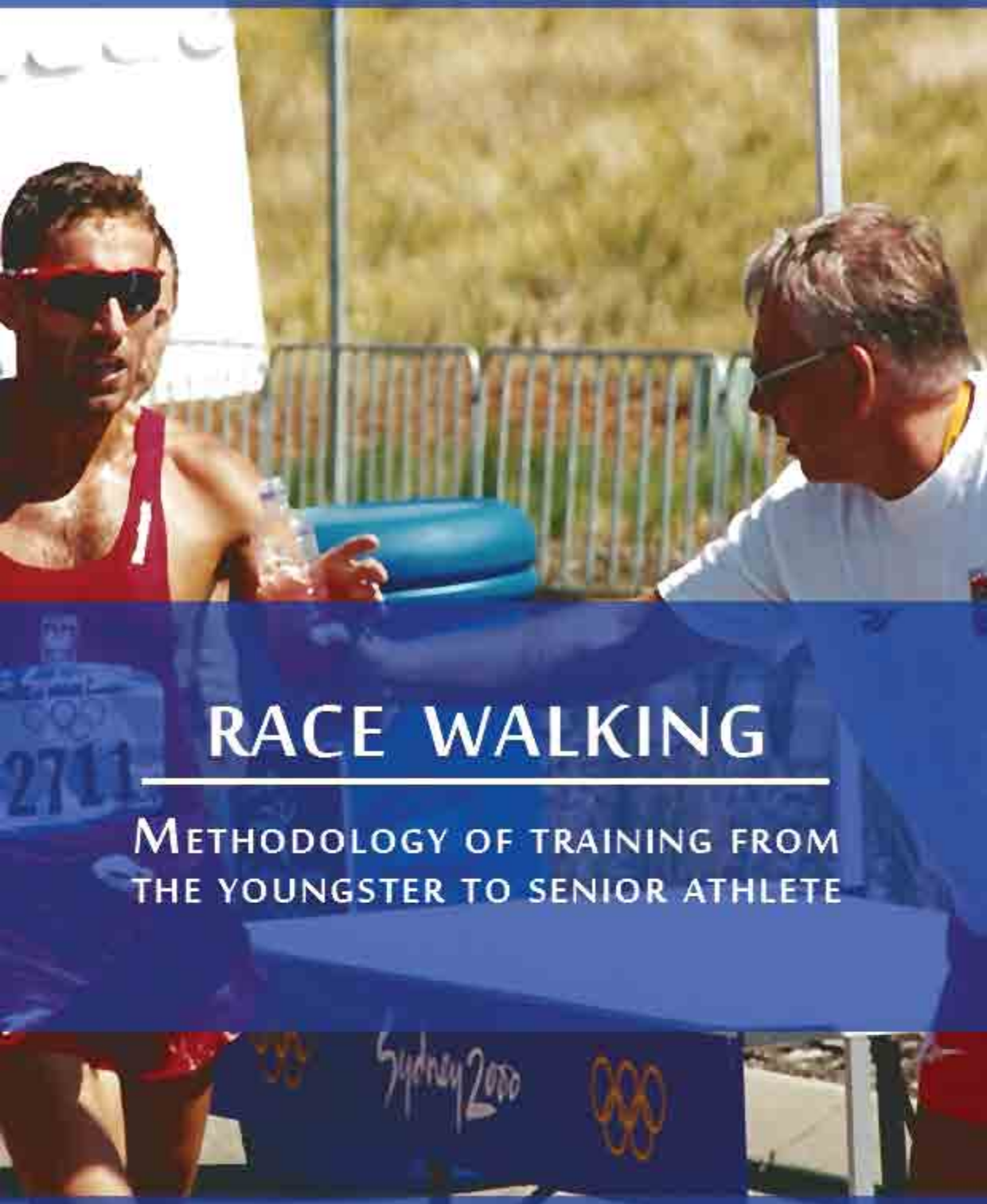
WORLD OF RACE WALKING



RACE WALKING

METHODOLOGY OF TRAINING FROM THE YOUNGSTER TO SENIOR ATHLETE

KRZYSZTOF KISIEL

World of Race Walking

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Methodology of training from the youngster to senior athlete

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Introduction

Introduction

Race walking is one of many competition of the Olympic disciplines of athletics. It made its debut on the Olympic stage in 1908 at the Olympic Games in London. It contributed to the dynamic growth of that competition in the world and gain more and more popularity among the supporters of athletics, as well as in contemporary media. Currently race walking is played at the Olympics in three events, the ladies compete on the distance 20 km, while the gentlemen at 20 km and 50 km. Competition race walking is carried out on the championship of all continents and the world in all age categories from junior to veteran. In 2016, first Europe and World Team Championships are played in both category junior and senior. However, before the athlete can participate in these events, he has to go through long-term training cycle. Training is a long-term, organized process involving several stages, in a strict manner associated with age and sportlevel of athlete. The athletes are aware of the impact on the unit, which is designed to improve the physical and mental capabilities, in order to achieve mastery of this discipline. In practice, it is a constant search for the appropriate balance between work and rest and training between the various types of training units. The selection of these proportions depends on the experience of training an athlete, personal attributes, and development of his sports level.

In athletics and especially in endurance events which include race walking, is very important to the planned long-term job training. Only in this way it is possible to achieve the final result, which is to obtain championship. Training of race walker is a long process, the beginning of which coincides with the period of childhood, and the end at adulthood.Modern sports training in order to cope posed his goals, it must be a process planned and well organized. The need for streamlining and improving its effectiveness is forcing the coach to look for a new solutions in the field of theory and practice of mind training. The athlete and coach, who decide to start to train a race walk, are in front of big challenge. They must realize that this athletics competition which is race walking is the only competition in all athletics, which technical performance is evaluated by the judges. Therefore, before race walker start his sportsmanship, he must be convinced that he is well prepared by the coach on both the physical and the technical levels.

In the literature on athletics, there is no publication devoted to race walking from conducting the recruitment to this difficult competition to achieve chempionship. This gap is filled by this publication. Author longtime coach of the Olympic team in the race walking in the Polish Athletics Federation presented their findings from the work as a coach at all stages of training walkers, that passed as a trainer. From working as a school teacher to coach Olympic champion. Starting with the presentation of the characteristics of the competition, by providing training means used in the training process to present training methods at different stages of athletes development. It also presents many aspects of recruitment to engage in this competition, paying special attention to the improvement of race walking techniques. Race walker should be aware that this is the only athletics competition which is judged by the judges in terms of techniques. That's why it has to be perfect. Large part of the book is devoted to issues related to the control of the training process, high altitude training or renewal of both biological and pharmacological. Author pays particular attention to the work the coach and athlete was the idea of "progressive" training from the youngster to the full development of sports in adulthood. You should calmly and deliberately seek to end; haste can only harm.

Chapter I
Characteristics of race walking

The statute of International Association of Athletic Federations (IAAF) and regulations of Polish Athletic Association (PZLA) state a definition of race walking as follows:

...Race Walking is a progression of steps so taken that the walker makes contact with the ground, so that no visible (to the human eye) loss of contact occurs. The advancing leg shall be straightened (i.e. not bent at the knee) from the moment of first contact with the ground until the vertical upright position...[42]

The mentioned definition of race walking technique was decided on during 42'th IAAF Congress in Seville (Spain) in 1999.

Movement techniques in race walking are rigorously adjusted to the regulations. The athlete walks on so called "straight legs", i.e. the lower limb during the front-support period maintains a full extension in the knee-joint. When exposed to that kind of work, the knee-joint and its limb extension muscles are not used as absorbers and do not take part in the bouncing off the ground procedure. Walker deadens the walk by lowering the centre of gravity in the hip-joint. The race walking is characterized by maintaining a constant contact with the ground, alternately in a uni- and di-supporting phase. The rhythm of strides for professional walkers can reach up to 200 strides per minute.[14]

When analysing the physiques of athletes, it can be concluded that the world-class racewalkers present a mezomorfic type with well developed musculature and medium slenderness[13]. Women in this athletic competition fall into the mezoectomorfic category, with developed musculature and slender figure. Boys and girls in the junior age who specialise in racewalking, are characterised by the amount of body fat lower than the average for teenage population as well as higher vital capacity and well developed muscle structure[13,14].

An essential feature of competing in this discipline is a high variety of results obtained in individual events. The main cause for this is mostly changeable weather conditions and unequal scale of difficulty of configuration for paths being used for the competition[43].Endurance exertion is realized mostly in aerobic and aerobic - anaerobic transition zones. It is vital to remember that the competitions take place on paths with varying cross-section, limited to going multiple times through the same circuit, which results in constant changes in exertion intensity. This changeability causes a variability in energetic transitions, e.g. during approaches the anaerobic processes intensify. The combination of specific walking technique and need to develop a maximal speed (in given moment) results in compensative movements and static type muscle tensions, which increase the energetic demand during exertion and require additional provision for the athlete to continue the work[45,46,48]. Because of that, the training routs are selected in such a way that during the exercises athletes are able to learn how to control and regulate walk pace and so not to get into excessive oxygen debt, increase the concentration of lactic acid in muscles and create acid-alkali imbalance[25].

The race walking competition is present in programs of such events as: The Olympic Games, The World Championships, continental championships and county championships. The following distances are available: women 20 km, men 20 km and 50 km.

On those distances world, continental and country records are noted as well as records for individual sports events. Additionally, walks on unusual distances are often organized, e.g. 5 km, 10 km, 15 km, 25 km, 30 km, 35 km. There are also one- and two-hour long race walking events being organized [42]. In the athletic indoor events the race walking is limited to shorter distances, respectively 3 km for women and 5 km for man, but they are not included in the World Indoor Championships in Athletics or European Indoor Championships.

Such kind of variety allows for a diversity in sports season and a proper realization of the training process in preparation for main start.

Paulina Buziak, women 20 km. Olympic Games London 2014.

Chapter II
RULES, FORMS AND TRAINING MEASURES

2.1. BASIC TERMS

The sports training consists of many interdependent factors. Such correlations exist on every level of competitor's development, thus it is necessary to constantly seek theoretical clarifications and explanations, as well as practical solutions possible to implement for a particular athlete. It is compulsory to abide by the rules, i.e. standards of conduct specifying particular means for putting hypothetical goals into practice. It provides a starting point for so much desired effectiveness of long-term training process.

Behind every kind of training stands physical, mental and intellectual effort. Specific forms, means and techniques need to be presented in order to ensure methodical aspect of the training [22].

The term of teaching (training) form defines an organization side of a training unit, in which the process of learning and function formation is being realized. While preparing exercises it is necessary to plan and think about, for example, the factors of time and space. Means of training consist basically of physical exercises, but they can also encompass elements of natural and social environment - various factors conductive and supporting for the process of rest after the training, along with material objects used by the athlete in the process of training, including devices, facilities and equipment. By the training method we describe a specific course of work between a coach and the athlete in terms of mastering the required knowledge base, dexterity and ability. It characterizes means of planning the schedule and intensity of exercises, along with utilizing its parameters functions (intensity and duration, number of repetitions, rest time, etc.) to ensure a development of dispositions of particular kind.

Exercises, methods and form are always closely correlated in practice. Relations between them have a great influence on the direction, speed and extent of the changes body system functions, together with the acquisition of new abilities [22].

2.2. RULES OF TEACHING IN SPORTS TRAINING

2.2.1 SPECIFIC TRAINING RULES

specialization rule – it determines the training process should be focused on maintaining high achievements in given specialization [22,38,46],

- *constant increase in workload rule* – postulates systematic growth in training intensity as a basic factor for increasing the state of fitness,
- *continuity rule* – is based on the correctness of the development of adaptation process. The constant usage of varied incentives results in development of desired adaptation changes.
- *periodicity rule* – it points out the necessity of process periodization. The rule is based on premises describing the phenomenon of phase development of sports

form. It requires the training process to be organized in specific cycles, occurring rhythmically in time.
- rule of variable (sinuous) character of workload – results from planned training cycle periodization. It aims to rationally stimulate the development of the form through appropriate load modeling and defining proper relations between its main components, i.e. the volume and intensity,
- unity of general and special preparation rule - involves the provision of an adequate type for measures of preparation at all levels of training,
- immediate information rule – involves rapid transmission of verbal, acoustic and visual information about the execution of movement, along with the state of the body of the exerciser, addressed to both coach and player.

2.2.2. Didactic rules used in training

- awareness and activeness rule – is expressed mostly by appropriately directing the player's activity to fulfill aims and objectives of training; motor activity and associated with it intellectual activity are therefore fundamental, especially those embodying the understanding of the components of tasks to perform,
- perception rule – postulates a full cooperation between the first and second signal system, the binding of words and their combinations with reality perceived in practice, as well as taking effective actions,
- regularity rule – means maintaining a planned and logical in the system of training,
- accessibility rule – points out the need to adjust the objectives, measures, method forms and workloads to the level of mental and physical development of athletes,
- durability rule – involves using such kind of methods, means, forms and workloads which will result in solidification, systematization, and deepening of athletes knowledge and skills as well as in improving efficiency,
- individualization rule – is expressed through the organization of work based on the best possible knowledge about individual walkers.

2.3. Forms of teaching in sports training

Among the forms employed in sports training the following can be distinguished:
- strict form – the leading role belongs to the coach, who determines the technical means to perform the task, its pace, direction, number of repetitions, etc. The exercisers have to precisely follow his commands,
- task form – leaves a lot of room for initiative competitor. Coach defines the purpose of an action and the athlete chooses the way of its implementation,
- game form – very attractive for the exerciser, usually has a lot of variants. Should be applied usually in the early stages of training, when the purpose is to familiarize oneself with the general structure of a particular movement.

2.4. Means of training

The effects of training depend largely on means of training used in the training process [22,38,46]. An universal measure is the classification of exercises using the methodo-

logical criterion, i.e. according to the degree of structural and psychofunctional similarity to the initial effort. Therefore, in each competition general development, directed and specific exercises can be distinguished. The following subchapter contains a list of training measures used in a year-round training of a racewalker [22].

2.4.1. Means of general development influence

- warm-up consisting of exercises meant to prepare the organism for proper training,
- general dexterity exercises,
- strength exercises under own weight,
- exercises with medicine ball,
- strength exercises with weight and exercises on the "Atlas" type devices,
- swimming,
- sport games (basketball, football - with the medicine ball),
- cross country skiing,
- canoeing.

2.4.2. Means of directed influence

- continuous run,
- continuous walk, (in I, II range of intensity)
- games in walk (destination, azimuth, circular),
- walk on distances of different length with changeable intensity,
- walk in a terrain with varied configuration (mostly uphill)
- exercises perfecting the walking technique.

2.4.3. Means of special influence

- general endurance in racewalking with different intensities,
- games in racewalking (in a loop, with different terrain configurations),
- pace endurance,
- special endurance - short, main, long,
- pace interval endurance,
- exercises improving speed,
- technical and rhythm exercises,
- special walk strength (uphill walking),
- tests in racewalking:
  - taking part in indoor competitions – technique test,
  - up to 10 km test – measures the special racewalking endurance,
  - over 25-40 km test – measures general endurance,
- taking part in actual competitions.

2.4.4 Means of biological regeneration

- physical means – massage, sauna, water treatments (e.g. salt baths),
- physiotherapeutical means – ultrasounds, radiation,
- healthy lifestyle, including training hygiene,

- cryotherapy,
- balanced diet.

2.4.5. Psychological means of regeneration

- focus - relaxation exercises,
- special psychotherapeutic training, e.g. model of autogenous exercises.

2.5. Training methods

The division of training methods used in the development of exercise capacity is related to the nature of dispensed loads [22,38,47].

2.5.1. Continuous methods

The essential feature of continuous methods is the lack of rest during workout. Training is characterized by a substantial amount of work, implemented mostly in the conditions of oxygen balance. The structure of this kind of methods is significantly influenced by two elements - volume and intensity of training.

- continuous method with constant intensity, is characterized by long periods of workout with a constant, even intensity. It ought to be adjusted to the lactate threshold of an athlete. From the psychological and biochemical point of view, long-lasting effort can involve considerable energy losses. At some times, this forces the athlete to use up all their reserves. The continuous method of constant intensity is recommended mostly for the formation of cardiovascular and respiratory system efficiency. It increases the resistance to fatigue, loss of body fluids and temperature changes. Moreover, it conduces to a better workout economy.
- continuous method with varied intensity, is characterized by a continuous effort, during which the intensity undergoes some specific changes:
  1. planned changeable intensity, in which the duration, intensity and the number of acceleration phases are dependent on the stated tasks and aims of the training, along with athlete's advancement,
  2. unplanned changeable intensity, which depends on various external factors, e.g. terrain type.

The continuous method with variable intensity is usually used for the purpose of endurance and strength endurance formation. Generally speaking, continuous methods (constant and variable) increase mostly the aerobic fitness.

2.5.2. Intermittent methods

The essence of intermittent methods lies in planned, repetitive changes of load and rest phases, modeling the effort [22,38,46]. We distinguish the following:

- repetition method, in which we operate with three elements: workout time, number of repetitions, duration and nature of the rest breaks. After each exercise ensues a break, leading to a complete rest before starting the next exercise. The number of repetitions given is usually pretty low. The intensity of workout results in high oxygen debt and determines the character of breaks. The nature of wor-

kout conduces maximum strength, power, speed, speed endurance and special endurance,

- interval method, is characterized by scheduled phases of workload and incomplete rest. The intensity and duration of successive efforts, as well as the length of the breaks, are tightly scheduled according to the principle, that each consecutive effort is performed on top of previous, incomplete rest. In the interval method consists of two main types, with differences resulting mainly from work intensity, and consequently, the time intervals and number of repetitions:
  1. extensive interval method, with workout of moderate and average intensity, short rest breaks and high number of repetitions. Is used in creation of aerobic endurance,
  2. intensive interval method, based on high intensity efforts, respectively longer break time and a lower number of repetitions. It is a way to cultivate the anaerobic endurance, characteristic for pace endurance.

2.5.3. Control and start methods

An integral part of the training process consist of tests and taking part in actual competitions [22]. On the one hand, they provide information about the level of player attributes and skills, on the other hand are a comprehensive training stimulus aimed to fully prepare the athlete for major competitions.

Competing and control methods have therefore the purpose of effective rebuilding the level to preparedness developed by basic training methods into high competitive efficiency.

2.5.4 Methods for teaching sport abilities

While implementing the sport abilities teaching program we use the following [3,18,22]:

- verbal methods,
- perception methods,
- ideomotor methods (mentally - imaginative),
- practical action method,
- complex training,
- integrated training.

2.6. Classification and characteristics of racewalkers training means

Using the available literature and significant amount of practical experience, the author presents an attempt to classify and describe the training measures used in race walking [15,22,38,45,47].

2.6.1 General racewalking endurance in the first intensity range (OWCH1)

General racewalking endurance within a first range of intensity is a measure specialized in shaping the long-term aerobic endurance at 70% - 75% max HR level, with walking speed in range of 4.30 - 5.05 min / km. It is dependent on the sports level. The level of 70%

-75% HR generally corresponds to regenerative workouts, performed a few days before a competition, as well as two to three training sessions after a competition.

A higher HR value characterizes training units of large volume, whose aim is to develop long-term endurance (16 - 40 km) and general motoric preparation of movement apparatus for other, more intense training measures.

OWCH1 is included in every warm-up prior to the race endurance of second range (OWCH2) or a special endurance (WS). Immediately after training, OWCH can be used as a form of active regeneration, and thus contributes to gradual reduction of intensity in the training unit.

2.6.2. General racewalking endurance in second intensity range (OWCH2)

The second intensity range causes the training to be realized at the HR level of 160 - 180 beats/min and velocity in range of 4.30 - 4.40 min/km.

OWCH2 is intended to shape the long-term strength and, regarding its basic purpose, should take a form similar to the competing model. Considering the performed workout in terms of energy management, in this type of endurance the energy sources should be assigned to the area of mixed energy sources with predominantly aerobic processes. OWCH2 makes up the main part of the training unit and is preceded by a warm-up in form of OWCH1 and other exercises.

While racewalking a distance in OWCH2 it is not advisable to interrupt the training under any pretext and resuming it later, because it may cause a loss of its specificity of continuousness, occurring in the competing model. OWCH2 is not only a part of continuous racewalk form, which for champion racewalkers can reach up to 30 km, but also is a part of the fartlek, i.e. alternate occurrences of OWCH1 and OWCH2. It is included as a part of a warm up (1 to 2 km) before special endurance training (WS).

2.6.3. Special endurance (WS)

While OWCH2 meets the requirements of a competition due to its continuous form and relatively high intensity, working on the special endurance is adjusted to the considered competition distance, taking into account the average speed on that kind of distance and duration of covering it. It can appear in three forms:

1. short-time special endurance,
2. medium-time special endurance,
3. long-time special endurance,

The rule of adjusting special endurance to competition pace applies here:

- short WS – in pace supermaximal to competition pace,
- main WS – in pace maximal to competition pace,
- long WS – in pace submaximal to competition pace.

Very often one training unit actually consists of two types of special endurance, e.g. short WS + main WS, or long WS + main WS. Entering short WS or long WS composition from main WS allows the athlete to adapt more easily to a competition speed model.

The mutual influence of the above-mentioned types of special endurance is crucial. And so, practicing short WS and main WS together, allows the athlete to gradually develop speed endurance. The of training main WS and long WS, on the other hand, causes a gradual increase of time endurance. As a result, despite growing weariness, the racewalker is able to continue the performance at least on the average level of his or her speed, calculated based on their life record. In addition to distance and speed of its covering, a very important factor in training the

athlete is the rest break. It should be arranged between each repetition, in order to provide regeneration for the body. Such breaks range from two to six minutes, depending on the individual athlete and his or her adaptability, as well as the stated goal to achieve before next training unit.

2.6.4. Relative speed (SWZ)

Relative speed (SWZ) is a specialized training measure, which aims to shape speed abilities of the walker. Relative speed training allows not only to shape these capabilities but also allows both to master the tactical ability to respond to opponents attack and to accelerate over a distance with a simultaneous breakaway from the group, etc.

The relative speed occurs in the following forms:

- acceleration on intervals of 30 – 100 m distance, during OWCH1 and OWCH2
- regular interval e.g. SWZ/ OWCH1 on intervals of 100/100 m on e.g. 2 km distance,
- immediately after OWCH1 or OWCH2 in means of e.g. 10 repetitions of 100 m intervals with extremely short rest breaks (15 sec.-20 sec.)
- repetition or interval pyramid e.g. 100m + 200m + 300m + 200m + 100p with rest breaks between 100m OWCH1 intervals or 1min.

The relative speed intervals do not exceed 95% of the maximum speed ability of an athlete.

2.6.5. Maximal speed (Smax)

Maximal speed (Smax) takes the form of a small amount of repetitions separated by relatively long rest intervals (2-3 min). Its training is preceded by only a walk-gymnastic warm-up and technical exercises. The player develops 100% speed depending on the speed which he or she is currently able to achieve and remains at the same time in accordance with the technical rules of the competition. In order to break the speed barrier the athlete uses a slight terrain drop or wind at their back. Due to their nature, the volume of this measure is small in annual training cycle.

2.6.6. Technique, rhythm

To work on a technique, in addition to individualized correction of errors during the time of covering a distance, athlete can use a set of exercises aimed at developing coordination and sense of steps rhythm (frequency). The technique and rhythm can make an integral part of the warm-up, as well as being a major (usually occurring along with Smax and SWZ) accent in training. To effectively work on the technique and to detect and assess the mistakes and progress made, a frequent use of video cameras is advisable. The most accurate up-to-date device for analyzing racewalking technique is the Vicon system.

2.6.7. Walking strength

Racewalking strength training is integrated with OWCH1, OWCH2 and SWZ, because of the very frequent searching for training routes with varying terrain configuration. By using deliberate acceleration during OWCH1 and OWCH2 on some uphill terrain sections can result in an increase of special strength, without introduction of any additional training units.

2.6.8. Competition losses

Taking part in a competition, along with competitive sports, can serve as a form of tactical and physical training. Depending on the tasks faced by the player, it can lead to shaping of speed and speed endurance on short distances (5 km), thus functioning as a phase of preparation for competitions with 20 km and 50 km distance. On the other hand, competing on distances of 30 km and 35 km is an excellent form of preparation of special endurance for the 50 km distance. Taking part in competitions, while used as an incentive, can make a factor that should not be underestimated in a monotonous racewalker training.

2.6.9. General running endurance in the first range (OBW1)

In the racewalker training, the general running endurance in the first range (OBW1) is defined as one of the directed measures. It is usually used as a basic training mean for maintaining overall endurance and muscle fitness, especially in transition periods. In the initial phase of preparation period it is used in the form of mountain hikes.

The HR level characteristic for (OBW1) is 120 - 150 beats / min, with running speed in the range of 4.10 - 5.00 min / km. An interesting phenomenon is that the walker running performance decreases with the increase of his or her competition preparation. During the preparation and competition time (OBW1) should be used in volume of 1-2 km per one training unit.

General running endurance in the first range (OBW1) is an integral part of a warm-up, but can also serve as a relaxation supplementary training, which is usually scheduled as a second training unit during the same day.

2.6.10. General fitness (SPR)

General development exercises do not affect the level of achieved specialized abilities, instead they are characterized by a low correlation with the performance results. They create the main potential motor for overall mental toughness. In a racewalker training the overall strength, stretching and compensation exercises can be mentioned.

In this type of sports training, there are three ways of gaining overall strength, which falls into the category of measures having an overall impact on the athlete.

- strength endurance – exercises performed on training devices of type “Atlas” in the form of circuit exercises, which influence all the muscle groups through a workload of 50% of one maximal repetition with a maximum frequency of repetitions,
- compensating exercises – their aim is to build and maintain a proper security of the spine, shoulder girdle and hip muscular corset,
- stretching exercises and all kinds of team sports games that affect the overall physical fitness.

Chapter III

Recruitment and selection in race walking

Athletics - the queen of all sports - consists of many competitions, one of them being racewalking. It is regarded as an integral part of Olympic sports, with racewalkers making successful performances at the Olympic Games, World Championships, European Championships, and thus, gaining popularity among children and teenagers.

When preparing a long-term program for young racewalker's sports training, it is important to remember that the training schedule and means should be selected and realized in such a way, that participants can take joy from the training and, in the same time, it will allow them to obtain the best possible sports result. Also, a crucial issue is to properly select racewalkers meant for practicing this athletics discipline. Deliberative initial selection will allow athletes to start and cultivate an accurate racewalking training process.

The coach, who plans to conduct a training for this kind of athletic competition, has to come up with a kind of recruitment procedure, which will allow him or her to select, from given candidates, those who are most talented and promising for achieving a high level of sports performance [2,3,5,19,22]. It is also advisable to maintain a fair amount of organization and advertising campaigns, promoting racewalking in the environment from which the possible candidates for future training will be recruited [22,23]. Also, direct contact between coaches and physical education teachers plays an important role in proper selection of candidates, along with general fitness and special fitness test results analysis. Sports results obtained by students in school and interschool events are also quite significant. Watching local mass events gives really good results, because most promising individuals can be spotted and encouraged to participate in organized sports training. An effective course of action is to put an information about possible sports training recruitment in local media, stating the required age, desired physical condition and psychomotor abilities.

Race walking, because of its specificity, is the only athletic competition, which is evaluated visually by the judges. This fact has a huge impact on the process of training, resulting in coaches paying attention not only to the excellent physical preparation of the athlete, but also, striving for technical excellence of their motion. All the factors have a huge influence on the conduction of such "enrollment" to the athletic "infantry" [3,24,32,44].

While encouraging children and youth to practice sports such as racewalking, similarly as in other athletic disciplines, strength disciplines in particular, we draw their attention to [1,2]:

- the need for outdoor activities,
- natural demand for long exercises,
- desire for sports rivalry,
- interest in competitive sport.

While carrying out a recruitment one should pay attention to:

- overall fitness,
- movement coordination,
- passion for running or marching on long distances,
- the overall performance of the organism,

- interest in athletics and racewalking,
- knowledge about racewalking in the environment where the recruitment is carried out,
- knowledge of basic road traffic regulations.

It is desirable to recognize the psychological predispositions of candidates, including for example:

- Ability to comply with the coach and to accept their instructions,
- a strong motivation to play sports and to submit all other interests to this purpose,
- the ability to work on self-control and self-esteem skills,
- confidence and faith in your sports abilities.

It is also important to draw attention to the undesirable qualities of future athletes, such as:

- variability of interests and a little perseverance at work,
- inadequate emotional reactions to the situation,
- serious anxiety, tendency to have a depression and self-deception, susceptibility to injuries, aggression, difficulty in establishing contacts in the group, not being accepted by the group, not recognizing the authority of the coach.

While creating activities for children one should pay special attention to overall development, cultivation of coordination and flexibility, development of speed, aerobic endurance, and, in later phase of training, speed-strength features. In order to increase the attractiveness of classes many forms of competition should be introduced, including sports games [1,2,5,14,15]. The process of child's sports training cannot, in any case, be equal to adult's training schema or introduce young athletes to a premature serious training in the sports discipline. Nowadays, professional approach clearly indicate the need to adapt the methods and means of training for mental and physical conditions of child's development. It is advisable to take advantage child's development periods which are particularly advantageous to the formation of specific features and functions, i.e. so-called 'critical periods' (periods of optimal response to the stimulus, that is training) and sensitive periods (periods prone to training stimuli) [44].

From the very start of training racewalking with young adepts the coach should teach them a proper technique for this athletic competition. The trainer has to familiarize them with the regulations of sports events as well as rules of proper racewalking technique. In order to ensure the most overall racewalker training one has to engage him or her in other athletics disciplines as well. It may happen that a coach has encountered a great athletic talent, but not actually in racewalking. A dynamic and properly conducted training process should aim to select subjects (competitors) with optimal morphological, psychological and fitness conditions, which will allow them to a achieve in the future a high performance results in sport. This selection of two main action types, i.e. in a natural and directed way:

Natural selection involves a gradual development of the interests and aptitudes of athletes during the training process. Cancellation of participation in training is natural, and this decision stems from options available for athletes.

Directed selection seeks to qualify for the training process the individuals endowed with specific racewalking characteristics, measured by tests and the development in athletic performance.

Pre-selection is related to the systematic observation of children during mandatory physical education classes and extracurricular activities. It has to, in this case, be supported by measurements of motor efficiency and some indicators of how the body is build. Information gathered by this means of assessment allows to qualify the students for sports training in athletics. Also, some people who begin practicing this sports discipline will gain the desire to, later in the life, practice another sport. Under no circumstances should one discourage young people to have fun in practicing any sports.

The proper selection is carried out during the whole period of basic training. It aims to select the most talented individuals in terms of fitness and biological and psychological predisposition to the various athletics disciplines, one of them being racewalking. It is conducted by pedagogical observation tests. At this stage, coach chooses the actual racewalkers. Candidates selected in this way are directed to further directed training, which consists of:

- special selection – intended to identify athletes to practice this discipline by combining their natural predisposition and the specificity of racewalking. It should reveal the talent of athletes in the perspective of sports mastery in athletic at all stages of training. It creates a basis for one to guide the young athletes to a specialized training,
- selection of high performance – includes athletes already practicing racewalking, focused on this competition based on psychological predispositions, morphology and achieved results, as well as approach to the training. It allows for selecting those athletes, who have the chance to achieve sports mastery in the future.

In order to conduct a proper selection of young people already involved in racewalking, one has to perform certain tests on the athletes, which allow to specify the level of overall fitness, training and technical training of racewalkers [1,2,14,43,44].

Youngsters' sport camp, Kobyla Góra, Poland.

3.1. Youth category

Tests for assessing the overall preparedness:

- running on 600 m (girls) and 1.000 m (boys) distance,
- 12 – minutes test (Cooper's test),
- 3 kg medical ball throw (from behind),
- run with a front flip,
- shuttle run 4x10 m,
- forward body bend,
- sits from lying in 30 sec.

Tests for assessing preparation for racewalking training:

- taking part in racewalking competitions: 1 km or 3 km distance – girls, and 1 km, 3 km or 5 km distance – boys,
- sports results in endurance competitions in sports events.

Youngsters' sport camp, Kobyla Góra, Poland.

3.2. Junior category

Tests for assessing the overall preparedness:

- forward body bend from lying on one's back,
- sits from lying in 30 sec.
- 12 – minutes test (Cooper's test),
- 3 kg medical ball throw (from behind),
- envelope run,
- pull-ups,
- bending and unbending of the body while lying face up on a bench (back muscles).

Tests for assessing the level of training:

- Conconi's test,
- racewalking mental toughness test (long-distance),
- long-distance direction walk,
- azimuth walk,
- long-distance loop walk,
- sports results in sports competitions.

Tests for assessing the racewalking technique:

- line walk – 30 m,
- line walk – with hands entwined behind one's back,
- line walk – 30 m with a blindfold,
- slalom walk on 100 m distance,
- walk with maximal speed on 100 m distance,
- athlete's yearly technique assessment given by a coach.

All test results should be documented by the trainer. They will be useful in planning more detailed training schedules for athletes at different levels of their sports careers.

Chapter IV
Racewalking technique

Walking is one of the most primary forms of sports activities and generally is being mastered in early childhood. It is a part of human daily life, being a basic method of transportation without using any particular means of transport.

Nowadays, racewalking is also a popular form of reparative sports and extreme sports. Just 10 km long walking distance allows one to lose 1 kg of bodyweight. Liptak characterizes racewalking as a cyclic competition of an endurance type [35]. It is an only Athletics competition being supervised by a team of judges, who evaluate the technique of performing the walk and accordance with existing rules - the overall correctness has an impact over the final score [43]. The evolution on racewalking techniques was faced with constant changes caused mainly by sports development and changeable ruses being applied by the judges. In today's racewalking the technique is adapted strictly to the athletics regulations being in force in sports competitions. According to those regulations, a walker is to maintain a constant connection with the ground. Nonetheless, while walking with a high speed in the double-support phase, an unnoticeable for a human eye break of this contact is being registered. This kind of lack of contact with the ground can go unnoticed by the walker. The rules in force state that the loss of contact with the ground takes place only when it can be seen by the judge without any additional equipment [43].

The main difference between racewalking and normal walking lies is keeping the advancing leg straight. The hip moves toward the advancing leg, head and torso maintain a vertical position and hands move in a way similar to a long-distance run. Racewalkers can reach a mean step length of 105 - 130 cm and frequency of 180 - 200 steps per minute [14,47].

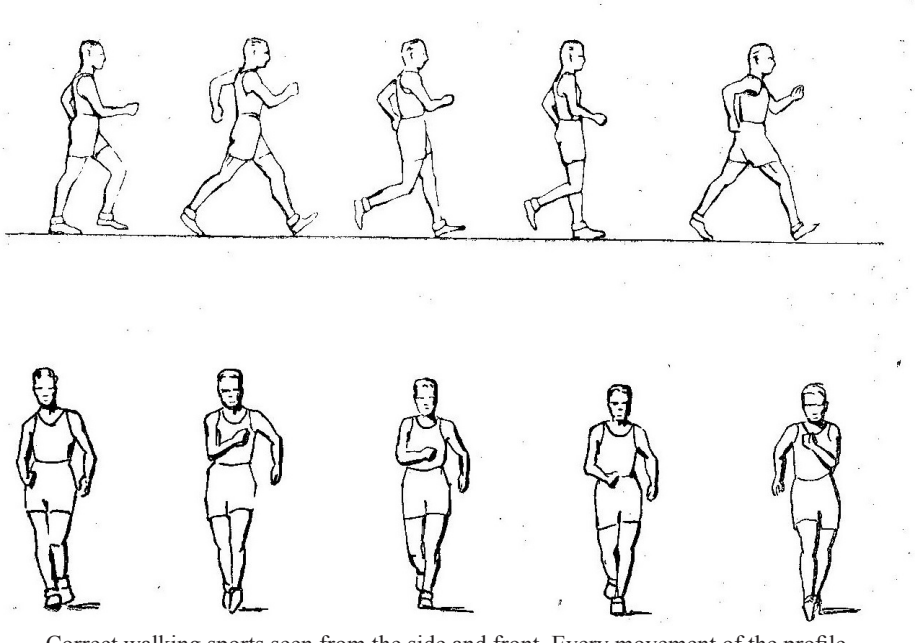
During the 42nd IAAF Congress in Seville (Spain) in 1999, the following racewalking technique was defined: "Racewalking is a progression of steps so taken that the walker makes contact with the ground, so that no visible (for the human eye) loss of contact occurs. The advancing leg shall be straightened (i.e. not bend at the knee) from the moment of first contact with the ground until the vertical upright position" [42]. The most important aspect is of course to determine the difference between actual racewalking and running [14]. For disregarding the mentioned rules the competitor at first receives a warning and then, if the situation happens again, he or she receives an disqualification vote. Three of those kind of votes given by three different judges assessing the competitor's movement technique results in his or her disqualification.

The decisions made by the judges about this issue are strictly defined in the sport rules. Still, it is common for the decisions to be based on subjective interpretation of those rules and to be widely discussed in the racewalking environment and beyond, rising both justified and unjustified doubts. Thus, the performance rules in racewalking are not as unambiguously and strictly defined as in other Athletics competitions. Yet, the main rule that "the advancing leg shall be straightened (i.e. not bend at the knee) from the moment of first contact with the ground until the vertical upright position" holds every time. It is a basic definition of race walking.

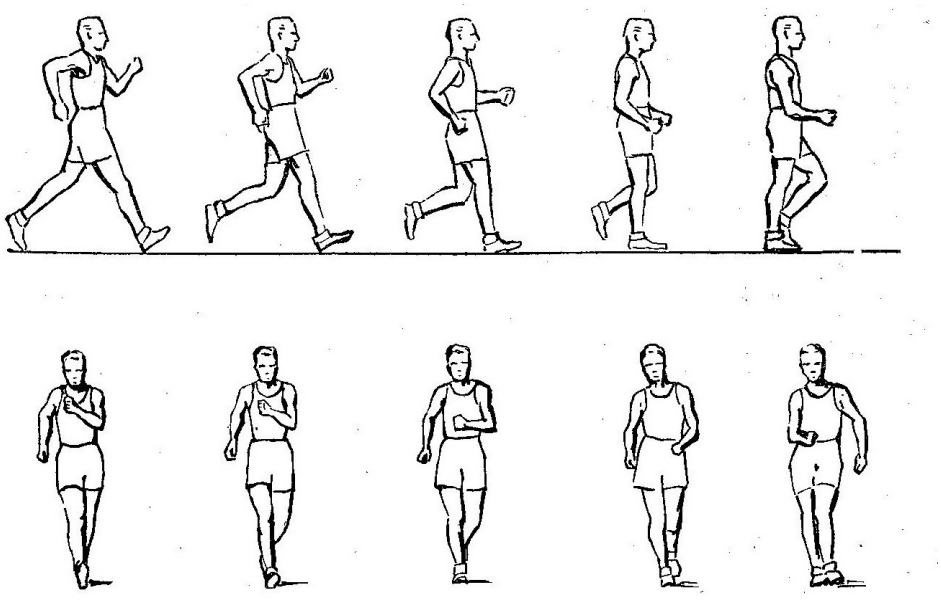
During the race walking the torso movement takes place on every plane. On the vertical plane, the centre of gravity successively moves up and down about averagely 2,5 - 3,5 cm (the better the walker's technique, the smaller the deviation). In the front - back plane, the torso successively leans forward and backward, simultaneously with placing the foot and bouncing from the ground [10,11]. The deviation of gravity centre in horizontal plane is dependent on a distance between feet and on the way of placing them on the ground.

We talk about a proper technique when [10,11,33,35]:

- The front leg straightened in the knee joint,
- the bouncing leg (the back one) is bend in the knee joint,
- the foot of the front leg is connected with the ground at about 40 - 45 degrees angle,
- the foot of the back leg is connected with the ground at about 50 - 60 degrees angle,
- the torso is leaning forward at about 20 degrees angle,
- arms are bend in the elbow joint at a 90 degrees angle, hands slightly closed.



Correct walking sports seen from the side and front. Every movement of the profile corresponds to the same movement of the front view.

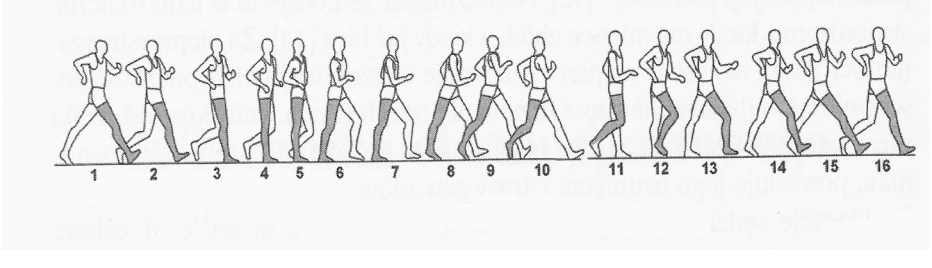


Correct walking sports seen from the side and front. Every movement of the profile corresponds to the same movement of the front view. (cont.).

The muscle power is the basic force having an impact on a walker's movement. The magnitude and direction of this force is changeable depending on the walking phase.

The racewalking speed is approximately two times higher than the normal walking speed (locomotive speed), i.e. about 12 -15 km/h. In the landing phase the speed decreases and, conversely, increases in the bounce phase. The second mentioned phase is noticably longer than the landing phase.

The picture presented below depicts a diagram of racewalking technique [5]



A racewalker's double-step is a basic feature of racewalking. One double-step encompasses two single-support and two double-support phases. Thus, the racewalking double -step consists of:

- single-support placement of the leg (e.g. right one, diagram, case 1),
- the step phase (2)
- the vertical phase (3,4,5)

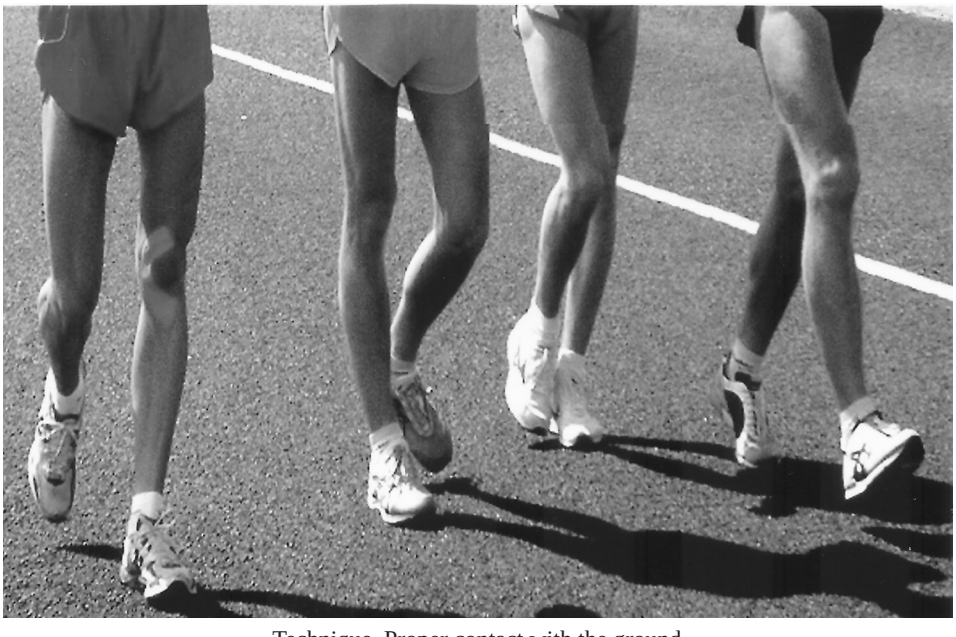
- the bounce phase (6,7,8)
- the double-support phase (9,10)
- single-support placement of the leg (e.g. left one, diagram, case 10),
- step phase (11),
- vertical phase (12),
- bounce phase (13,14),
- double-support phase (15,16).

The landing phase involves movements starting from the heel touching the ground till the vertical phase.

The vertical phase is the position in which the contestant is between the landing and the active bounce.

The double-support phase is a phase in which both legs are connected with the ground, i.e. the bouncing leg touches the ground with toes and the advancing leg is placed on the heel.

Each competitor who practices racewalking has to, with a help o a coach, work out his or her own optimal model of selecting the length and frequency of steps. The model will help the walker to obey the rules by preventing a transformation of the racewalking into a run and will help him or her to achieve a best sports result. The act of finding the optimal model is an individual issue between the trainee and the coach.



Technique. Proper contact with the ground.

Chapter V

RACEWALKING TECHNIQUE TEACHING METHODOLOGY

The competitor has to keep learning and improving his or her walking technique during whole sports career. Negligence in this regard may lead to serious consequences including disqualification from a competition. Walker, simultaneously to a properly conducted specialized training, should strive to develop coordination skills, which would help him or her to train and improve the racewalking technique.

When learning the basic of racewalking one should pay attention to the fact that this competition is derived from marching and natural walking and, therefore, the technique and movement style has to be natural. [19] Flawless technique is a main factor in the effectiveness of racewalking, and its imperfect mastering can lead, as already mentioned, to disqualification. In the best case it can lead to a low-economics moves during the competition and, by increased energy expenditure, negatively affect the sports results.

A basic condition for mastering the standard and cost-effective techniques of high speed movement is a high mobility of the pelvis as well as strong muscles of the torso and upper and lower limbs. An important factor in learning the racewalking techniques is a so-called physical intelligence. It is defined as an aptitude for learning new moves, for example practicing other athletics sports besides racewalking. This way the coach can enhance the motility of a young person and at the same time encourage him or her to practice racewalking. The appropriate time to begin teaching the proper technique for racewalking sports is the age of 10 - 13 years. It is the golden age for mobility, the most favorable for learning the highest control of one's motor habits [17,19,21,24,25].

We realize the training on 50 - 200 m distances, never using the maximum speed. It is recommended for the training to encompass exercises alternately with both shortened and elongated step .

With racewalking beginners, teaching the techniques should be carried out before the main part of the training unit, when the walker is not tired yet. The walker's movement should not only be natural but also easy. The physical load during training the techniques corresponds to 50-70% of maximum heart rate frequency. The next stage of learning the techniques should be carried out on short distances with the intensity of 90-100% of the maximum heart rate frequency. The length of distance sections and speed on them is determined by the coach, whose role is very important at this stage. The maximum speed is determined by the so-called technical movement correctness. If a player is not able to maintain the proper technique it means that he or she walks too fast.

Walking speed can be increased through an increase in the frequency or stride length. A suitable length of the step depends on the walkers height, on the length of his lower limbs in particular. Step length is a decisive factor for the correct walking technique. It provides an increase in the frequency of steps, thereby affecting the walking speed. From the beginning of training, one should make sure that the step is performed correctly.

At the first contact with the ground attention should be given to a very important technical element - the advancing leg needs to be straightened at the knee [21.33]. It is important for the competitor to learn how to properly conduct the foot, because both walking in a too wide manner and twisting one's feet is inefficient and leads to additional rotations.

Another important element is the arm work. The movement is performed forward-backward, while the arm placed in front of the body is directed slightly inward. The bend angle in the elbow joint is kept at 90% and does not change during the arm movement.

While teaching a proper way of arm movement I suggest using some items such as towels or sticks. For example, we place a long towel on one's neck. The walker holds the ends of the towel with his hands and performs the walk in such a manner that he or she does not change the arm bend angle (one should not lower the hands below the waist line or bend the arms excessively). When learning a proper racewalking technique, one should pay attention to his or her breathing manner. The breathing should be natural.

The most important part of mastering the walking technique is learning the so-called walkers alphabet (exercises performed on the distance up to 50 m) which are [19,21,25,32]:

- walking with an extended step - with one's hands in front, in the back, crossed on one's back, in the air, with circling one's arms backward, with extended arms; a lot of attention is given to straighten knees, putting the foot on the heel, twisting hips simultaneously with the stride of the lower limb,
- walking with a shorter step, putting feet on the heel, hands up,
- imitating a walk while standing in place, in a way that the leg does not detach from the ground and feet are placed in parallel; the essence of this exercise is to transfer weight from one leg to the other while the toes are not detached from the ground and the hands work in the same manner as when walking,
- walking with a pronounced (up to a maximal) hip twist; the movement should not performed to the side;
- walking with a pronounced hand movement,
- gradation of the walking sections from low to high or maximum speed, with a pronounced hand movement and a high frequency of steps,
- walking with a shortened step, with an emphasis on the straightening knees starting from the first contact with the ground up to the vertical phase,
- walking on a line,
- slalom walking.

After mastering techniques of stadium racewalking, we can begin a walking training with varying intensity - from low to high (maximum). Trainings take place in the field - (park, forest), on the road - where we select the appropriate configuration of the terrain, depending on the already mastered technical skills of a walker. One should take into account the overall preparation of the competitor. The coach has to control, especially when training athletics beginners, the technique of walking. It should be observed it from the side, front and back, so that the coach can notice all the shortcomings simultaneously.

The most common errors in racewalking technique and their causes, as well as the proposed means for their correction are presented in the table below [9,19,21,25,33,35].

Table. 6.1. Errors in walking technique and their correction.

Most common errors	Cause	Error correction
Rotary movement of the shoulder girdle	Lack of rectilinear shoulder work Bad habits	Training (imitation) of a proper shoulder work in racewalking; Paying attention to a proper technique
Head and torso tilted in different planes	Weak torso muscles; Too high walking speed comparing to the technical abilities; Bad habits	Maintaining a straight torso (eyes straight ahead) in a slow walking by flexing the back/lumbar muscles; Reduction of walking speed; Paying attention to a proper technique; Learning to maintain a straightened body, while simultaneously strengthening the core muscles
No relaxation and side pelvic tilt	Too little mobility in the pelvic girdle; Too high walking speed	Training (imitation) of a proper waling technique in front of a mirror; Hip joint stretching exercises
Placing of (walking on) the entire surface of the foot	Too high walking speed; Weak leg muscles; No hip descent (lowering of the centre of gravity)	Exercising a proper technique for walking at a slow pace; Rolling the foot after placing it on the heel with a proper descent on hip; Extension of a step length
Placing feet beyond the line defining the direction of movement (regurgitation of the feet)	Poor race walking technique	While practicing technique, placing the feet in a wider manner (in the direction of walk); Change of the walking technique
Bouncing from the inner foot edge (skate walking)	Poor race walking technique	The technique correcting exercises of placing the legs (in the direction of walking)
Excessive arm bending	Poor race walking technique	Paying attention to keeping the arms low in the transition to the rear swing
Straightened knee joint	Bend in ankle joint	Learning to put the foot on the heel, with a straight knee
Illiquid movement caused by a hard landing on the whole foot (no amortization); Wrapping with heels Zawijanie piętami ?	Poor race walking technique ; Wrong feet placement	Paying attention to landing on the heel, with a pronounced placing of the heel in the direction of the calf.
Short step	Toddling	Increase the mobility of joints, reduce the frequency in effort to lengthen the step
Back and front torso tilt		Learning to keep a straight torso with simultaneous strengthening of core muscles
Illiquid hands movement, straightening the hands behind the torso, elbows held away from the body, lowering the hands below the waist line.		Training (imitation) of a proper waling technique in front of a mirror; Training of independent hand work;

Front and side head tilt		Learning to keep a straight torso with emphasis on keeping the head straight
Opened, lowered hands		Walking while holding small objects in hands
Excessive torso movement		Strengthen the core muscles
No contact with the ground. Breaking the rule of constant connection with the ground.	Too high walking speed; Excessive shoulder lifting; Too extensive arm work; Too early break of contact between the rear foot and the ground.	Technical exercises in slow walk; Longer contact of the rear leg with the ground; Exercises for the sole of the foot

All observed errors should be removed gradually, because some of them may be caused by individual anatomical features of the walker; anatomical conditioning may result in pain in the joints and muscles. Race walking is derived from a natural form of human locomotion, but also has its own characteristics, for which the body is not immediately prepared. It can appropriately adapt to this athletic competition only through systematic training. However, from the point of view of long-term sports training, racewalking is less traumatic to the human locomotor system than racing. Please note that there is no actual flight phase in racewalking, and thus there is no impact of hitting the ground, which in case of runners, is a common cause for intra-articular cartilage, knee or ankle joint injuries.

Athletes on the route. Example of correct operation of the arms, keeping the torso straight and proper step length.

Chapter VI
Youngster Training

The main goal of a training, playing and training to be precise, at the age of 14 - 15, is the general interest in Athletics. In the first place we conduct an overall training, which aims to develop the organism, embed healthy lifestyle habits and strengthen the interest in Athletics, racewalking in particular. Simultaneously we teach youngsters about competitiveness by encouraging taking part in sports competitions on school and local level. It is advisable to participate in various athletics disciplines [15,31,44].

The main objectives of sports training in this age group are:

- Promoting the overall development of young athlete's body,
- Improving the techniques of athletics disciplines that were already partially mastered,
- Teaching about different athletics disciplines,
- Improving general development exercises (e.g. with hurdles).

When constructing an annual training program we must take into account the specificity of sports competition schedule, which is connected with the organization of the school year.

The main sports event of the youngster category in Poland is the "Janusz Kusociński Small Memorial" which is actually equivalent with Polish championships. It always takes place at the end of September and is preceded by a macro-regional competitions. Therefore, an annual training plan should be constructed in a way that the peak in the person's condition will have place in that month [24,34].

I propose an adaptation of the plan to the school year schedule in a following partition of training sessions. It includes school cross-country running competitions carried out in spring (March) and autumn (October) as well as different school-level competitions organized in April and May [20,24].

Preparatory period:	December 1st – April 15th
• introductory mesocycle	December 1st – January 31st,
• winter training camp mesocycle	February 1st – February 14th,
• specialist mesocycle	February 15th – April 15th.
Competition period	April 16th – October 30th
• first competition mesocycle	April 16th – June 20th,
• summer break	June 21st – July 31st,
• summer training camp mesocycle	August 1st – August 15th,
• specialist mesocycle	August 16th – August 31th.
• second competition mesocycle	September 1st – October 31st.
Transitional period	November 1st – November 30th.

Youngster's training.

6.1. Preparatory period

In the introductory mesocycle (December 1st - January 31st) the training sessions should be performed 3-4 times a week. The average time of one training unit should not exceed 90 minutes. The main goal of workout is developing the aerobic endurance, both in running and racewalking. One training unit per week should be dedicated to developing overall fitness (strength and movement coordination). One should remember to include fitness training in every training unit.

During each session, about 10 - 15 minutes should be dedicated to improvement of a proper racewalking technique [44]. The Table 2 presented below contains a training plan for the introductory mesocycle.

Table 2. Youngster's training schedule - introductory mesocycle.

Weekday	Training means	Exercises durtion (min.)
Monday (gym)	• basketball, • shaping exercises, • circuit training in form of a game, • flexibility exercises, • racewalking techniques, • sports games,	10 10 10 10 15 15
Wednesday (outdoors)	Playing while walking: • jog trot with exercises, • technique, • continuous walk, • stretching exercises, • rhythm exercises e.g. 5 x 60 m, • continuous walk, • jog trot,	10 10 15 10 5 25 5
Thursday (outdoors)	• terrain jog trot, • continuous walk, • technique, • rhythm exercises e.g. 10 x 100m, • continuous walk, • continuous walk with rhythm changes, • jog trot,	10 15 15 10 10 20 5
Saturday (outdoors)	• jog trot, • stretching exercises, • technique , • continuous walk up to 5 km, • sports games,	10 10 15 35 20

During winter break, organizing a winter camp is advisable. Such camps will be further discussed in the next chapter.

Specialist mesocycle takes place between February 15th and April 15th. It begins after the winter camp and after the start of second school semester. From the school practice we can derive that highly fit youngsters often take part in sports competitions organized on school level. For youngsters practicing racewalking, the school competitions often encompass cross-country running. Because of this I propose to include following training cycles in discussed mesocycle:

- specialist training cycle February 16–28th and April 1–15th,
- cross-country running competition period March 1–31st.

Similarly to the previous mesocycle, one should place a lot of attention to the endurance workout, especially racewalking endurance.

Each training unit should improve the walking technique, and during continuous walks we pay special attention to its correctness. Please note that athletes in general, not only in youngster categories, like to compete between themselves during trainings. Such unplanned races can disrupt normal racewalking and create irreversible errors in the proper technique. Therefore, when noticing such behavior, we should strictly ban those kinds of harmful actions.

During the contest preparations we should include strict forms of speed endurance training in racewalking sessions. A proposition of a schedule for specialist mesocycle is presented in Table 3.

Table 3. Training schedule in specialist mesocycle.

Weekday	Training means	Exercises duration (min.)
Monday (stadium)	- continuous walk, - shaping exercises + technique - rhythms, e.g. 10 x 100m, - improving other athletics competitions, - sports games	15 20 10 30 15
Wednesday (terrain)	- continuous walk, - technique + rhythm 100/100 m, - continuous walk with changeable rhythm, - stretching exercises	15 15 40 15
Thursday (terrain)	- continuous walk, - shaping exercises + technique - rhythms, e.g. 5 x 50m, - pace endurance - 5x 400m, or 4x600m - continuous walk,	15 15 10 30 10
Saturday (terrain)	- continuous walk, - shaping exercises + technique - running game - stretching exercises	15 15 40 10

6.2. Competition period

The competition period in youngster category is quite long and takes place between April 16th and October 31st, including the autumn cross-country running cycle.

I encourage even further cycle division:

- first racewalking competition mesocycle — April 16th – June 20th
- summer break — June 21st – July 31st
- training camp period — August 1 – 15th
- specialist training period — August 16 - 30th
- second racewalking competition mesocycle — August31st–September 30th
- cross-country running competitions mesocycle — October 1–31st

In the competition period, because of the high intensity of training resulting from taking part in actual competitions, the organism requires a lot of time to regenerate. It is advisable to schedule training units three times a week and counting a start in a sports event as a forth one. If there are no sports events in a given week, athlete is free from training [20, 24].

A proposition of training schedule in competition period is given in Table 4.

Table 7.4. Training schedule in competition period.

Weekday	Training means	Exercises duration (min.)
Saturday or Sunday	- start	
Monday (terrain - road)	- trot	5
	- stretching exercises,	10
	- continuous walk,	20
	- technique,	10
	- rhythm exercises, e.g. 8 x 50 m,	10
	- sports games	15
Wednesday (stadium)	- continuous walk,	20
	- technique and rhythms	15
	- 8 x 400 m breaks 200m	25
	- continuous walk	10
Thursday (terrain - road)	- playing while racewalking	60

6.3. Training camps

The main goal of training camps is to conduct intensive workout session, but also to provide some physical and mental relaxation for the athletes. This kind of organized activities allow coaches to carefully monitor their trainees, which can help them to determinate the true mindset of the athletes, especially regarding sports. This kind of camps are good for the walkers who already had some successful starts in racewalking events, but can also be fruitful for competitors who can, in our assessment, be successful in the future. It is important to remember that training camps should be a kind of reward for walker's training effort and should not be treated as an unpleasant obligation [24,44].

During one camp, which lasts about 10–14 days, we can schedule trainings way longer than normal ones, but it is important to remember that the load intensity should not be higher than during normal session. On the other hand, the number of exercises and general workout can be considerably higher. Realistically, we usually organize two training camps for youngsters - one during summer holidays and one during winter break. An example of a training schedule of a winter training camp is presented in the Table 5 below.

Table 5. Exemplary training schedule of a winter training camp

No.	Camp day	Ist training	IInd training
1.	Monday	arrival	stroll, gymnastics, sports games
2.	Tuesday	continuous walk	sports games
3.	Wednesday	terrain fartlek	continuous walk
4.	Thursday	terrain trip - 2h.	continuous walk
5.	Friday	continuous walk	continuous walk, sports games
6.	Saturday	terrain fartlek	continuous walk
7.	Sunday	terrain trip - 3h.	continuous walk
8.	Monday	target walk	continuous walk, sports games
9	Tuesday	terrain fartlek	continuous walk
10.	Wednesday	terrain trip - 3h.	continuous walk
11.	Thursday	target walk	continuous walk, sports games
12.	Friday	continuous walk –„friendhip march”	departure

In general, during the whole 12-day winter training camp, our young walker or athlete should cover the distance of 100 up to 150 km, despite the weather. The trips should be organized in such ways that they lead to a particular goal destination and are mostly done while running. At the halfway point (final destination) athletes need to rest, drink some tea and go back to the “base.” When outdoors, coaches should always use the rule of “catching up to with the weakest “, but only until reaching the halfway point (destination). After the break coaches should encourage a faster pace, which can be allowed because all athletes already know the route [24]. This way the every trip will be an adventure and in the later years of their sports career, walkers will be eager to return to the routes they already know, e.g. in the Giant Mountains (Poland).

The walking routes should be chosen depending on their diversified terrain configuration, preferably in a loop. Target racewalking (with a set destination) is also advisable, because of its ability to highly improve competitors mental strength to cover a long and monotonous marching distance.

Summer training camp has a little different overall character than the winter one. It can be treated as an summer holidays extension while actually re-starting extreme sports practice. After the first part of the season, which at this point of the year is already over, the main goal of the training is to recreate the sports fitness and preparing the athlete to the most important Polish racewalking event of the year, that is “Janusz Kusociński Small Memorial”. Personally I recommend to make this camp little longer, say 14 days. It is

quite important to keep in mind that young people that come to this camp are already selected based on their sport abilities and in some way already prepared to train sports.

If there exist a possibility to include kayaking in summer training camp, coaches should take the opportunity to introduce it into training schedule. Not only are those kind of activities fun for the participants, they also influence the strength development in a natural way. It also allows for the young people to learn some discipline, because kayaking forces them to work together in order to row [14, 24, 44]. An example of a summer training camp schedule is presented in the Table 6 below.

Table 6. Exemplary training schedule of a summer training camp.

No.	Camp day	Ist training	IInd training
1.	Monday	(arrival)	stroll, gymnastics, swimming
2.	Tuesday	continuous walk	technique, fitness
3.	Wednesday	terrain fartlek	sports games
4.	Thursday	forest terrain walk	stroll, fitness, kayaking
5.	Friday	target walk – teams	kayaking
6.	Saturday	continuous walk with chang able rhythm	terrain games
7.	Sunday	sports games: basketball, voleyball	stroll, gymnastics, kayaking
8.	Monday	continuous walk with chang able rhythm	terrain games
9	Tuesday	azimuth walk in a known foest terrain	technique, gymnastics, swi ming
10.	Wednesday	playing while walking (i cluding 6x 600m) or 10 x 400 m, breaks - 400m	stroll, technique, kayaking
11.	Thursday	continuous walk with chang able rhythm	technique, gymnastics, swi ming
12.	Friday	target walk - in pairs	technique, swimming; sports games
13.	Saturday	test on 5 km distance	terrain games
14.	Sunday	continuous walk – „friendship march”	departure

After an easy introduction we start to work on recreating the general endurance. We do this in means of outdoor trips and continuous walks of various forms. Then we gradually introduce the speed workout by including rhythm sections into the training session.

One should constantly remember about improving the walking technique. I propose to conduct those kind of exercises during the complementary training in the afternoon. Still,

it does not allow the coaches not to pay attention to the proper technique during the rest of training sessions.

Table 7 presents notes from a training diary written by a coach, which describes a summer training camp for voivodeship youngster's racewalking team of Wielkopolska region. It took place in Szklarska Poręba, in August 2008. After the camp, the athletes took part in an event called „O Puchar Obrońców Poczty Polskiej w Gdańsku". After analysing all the results one can conclude that competitors in the second part of the competition season were well prepared. They achieved life records or performed at a level very close to their life record. In the main season event, one of them was a medallist of „J. Kusociński Small Memorial".

Table 7 Training realization of a training camp in Szklarska Poręba, Poland.

Camp Day	Ist training	IInd training	Total km
1.	(arrival)	$OWCH_1$-4, technique, SPR	5
2	$OWCH_1$-5	$OWCH_1$-2, technique, SPR	8
3.	trip – 4 h.	games - basketball	12
4.	$OWCH_1$- 6	trip to a museum	6
5.	$OWCH_1$-6 (target)	games - basketball	6
6.	trip – 4 godz	games - basketball	12
7.	stroll	$OWCH_1$-4 + TECHNIQUE	4
8.	$OWCH_1$-6 + SW-5x100 breaks-200 m	sports games	7,5
9.	azimuth walk	technique, gimnastics	10
10.	$OWCH_1$-2+$OWCH_2$-1+WT 5x400m breaks 400m	stroll	8
11.	$OWCH_1$-6	$OWCH_1$-2,technique, gimnstics	9
12.	$OWCH_1$-6	technique	6
13.	$OWCH_1$-2+$OWCH_2$-2+S -10x200m breaks-200m	sports games	8
14.	$OWCH_1$-10 „friendship march"	departure	10

As shown in Table 7, during the training camp simple means of training were used, and they brought the desired effect. One should keep in mind that young people are interested not only in sports training, but are also looking for other attractive activities and is receptive to the knowledge about things of their interest. When coaching a youngster's camp I advise to carry out three following talks [24]:

- about the purpose of the camp and its rules, behavior during training, safety on training routes, traffic laws, and interpretation of regulations regarding racewalking sports
- presenting profiles of outstanding athletes and sports competitions (for this purpose we use audio-visual media).

- making a contest in knowledge about athletics competitions.

Organizing and conducting a kind of fun "initiation rites" is also highly recommended, during which the athlete becomes a "fully-fledged" walker. It allows us, the coaches, to evaluate the behavior of our youngsters, their creativity, ability to deal with a situation and defending their own opinion.

6.4. Transition period

The transition period begins after the competition period and takes place in the months of October and November. It is advisable to remember that in the months of September and early October, at this age category, there is a high intensity of club and school competitions, which heavily deplete the young body. Therefore, during this season, one should pay close attention to the athletes medical examinations, and check if they have healed all injuries and contusions.

Training sessions are characterized by a decrease in the volume and intensity of training workload. Exercises are conducted 2-3 times a week, while practicing some complementary sports at the same time. I would recommend performing some course-acrobatic gymnastics with the young athletes, some sports games, and swimming. It is important to pay close attention to the comprehensive development of the body, embedding healthy lifestyle habits and cultivating an interest in sports, including athletics.

Generally, after the end of the season in the youngster category, the athlete is being put in a higher one - junior - which is connected with higher training loads [24,25,44].

Chapter VII

Junior Traning

A coach should adopt the principle that, during the whole junior period in sports training, our main goal is to improve the athlete's abilities, with special emphasis on perfecting the racewalking technique. Racewalkers take part in competitions with 3 and 10 km distances. Only in the later training period (especially in the last year of junior training), high endurance competitors are allowed to enter a 20 km racewalking events. Polish Junior Championships are held on the mentioned 20 km distance.

From the beginning of sportsman's career it is advisable for the junior to train daily or 6 times a week, including competitions. Junior training starts to resemble more professional adult training. This rule allows to introduce a quite low training workload while summarized workloads in the whole micro- and mesocycle will be sufficient for satisfactory performance. This way, a well guided walker will be able to improve his or her life records during the competition period.

In order to make the junior training more systematic, I propose the following training year schedule. (9,20,31)

1. Preparatory period:	November 15th – April 15th
• introductory mesocycle	November 15th – January 31st,
• winter training camp mesocycle	February 1st – February 14th,
• specialist mesocycle	February 15th – April 15th.
2. Competition period	April 16th – October 7th
• first competition mesocycle	April 16th – July 25th,
• summer training camp mesocycle	July 26th – August 25th,
• second competition mesocycle	August 26th – October 7th.
3. Transitional period	October 8th – November 14th.

The training year schedule given above takes into consideration the most important aspect of junior's personal life, that is school education.

Training of young walkers.

7.1. Preparatory period

7.1.1. Introductory mesocycle (15th November – 31st January)

The purpose of introductory mesocycle is to achieve high general endurance in racewalking and to improve the mobility and fitness. Sessions begin around November 15th and have a light, not to intense, character. Coaches should pay special attention to athlete's systematical attendance.

In the first 2 - 3 microcycles of introductory mesocycle I suggest to include running trainings twice a week. The purpose of this kind of training means is not only to increase the general endurance, but it is also an important mental factor, especially after a long break in the systematic training. It can shorten the time needed to resume normal trainings.

In the preparatory period, it is essential to properly select the place of training sessions. A good coach should plan the activities in advance, so that race walker can train on different walking surfaces - in the forest, on the road, on bike paths.

An example of a weekly microcycle of an introductory mesocycle (2 - 3 first weeks) is presented in the Table 8.

Table 8. Weekly microcycle of an introductory mesocycle - initial stage.

Weekday	Workout focus	Basic means of training	Training place	Distance km
Monday	general endurance, fitness	running - light jog, general fitness exercises	forest, park, gym	6
Tuesday	general endurance	continuous walk	road	8
Wednesday	general endurance	running - light jog	forest, park	8
Thursday	fitness	general fitness with strength exercises	gym	
Friday	general endurance	continuous walk	road	8
Saturday	general endurance	walking games	road	10-12

After finishing the initial period I propose to resign from systematic running in favour of typical racewalking. During the whole training we give special attention to a proper racewalking technique. If there exist a possibility of indoor training, it is advisable to introduce speed and rhythm training elements. The training takes place 6 times a week. An exemplary weekly microcycle of an introductory mesocycle is given in the Table 9.

Table 9. Weekly microcycle of an introductory mesocycle.

Weekday	Workout focus	Basic means of training	Training place	Distance km
Monday	general endurance, fitness	continuous walk, general fitness exercises	road, gym	8
Tuesday	general endurance	continuous walk	road	12
Wednesday	general endurance	continuous walk	forest, park	10
Thursday	fitness	general fitness with strength exercises	road	
Friday	general endurance	continuous walk	road	12
Saturday	general endurance	Walking games	road	16

As we can see above, the weekly training distance to cover has greatly increased, yet the sessions have still a light character.

Among the training means used in this mesocycle we can list [18,25]:

- **continuous walk (OWCH 1)**

A continuous walk with a constant intensity is characterized by a long-term exertion, with unchanging intensity level in terms of functional balance. This allows for the formation of racewalking endurance by implementing the constancy method.

The constancy method training consists of two stages: in the first one we increase the workout time without changing the intensity; in the second one we shorten the walking time with simultaneous increase in the intensity. We use this kind of training in order to develop the racewalking endurance.

- **walking games [18,22]**

The walking games in racewalking preparatory period can be included in the training of athletes with a high efficiency of cardio - vascular and respiratory systems. This kind of games are a characteristic form of special or general endurance training (depending on the speed of covered distance intervals). They consist of four parts: warm-up, rhythm workout, pace workout and wrap-up. [45]

Part I (20 –30 minutes) – a warm-up, considered as an introduction to main training. We adopt the rule of performing all the exercises while walking, in order to improve the locomotor system. The training consist of 3 - 5 minutes of running, continuous walking, shaping exercises, stretching exercises and coordination and technical exercises.

Part II (20 – 25 minutes) – rhythm and speed workout. The exercises are perform with a quick rhythm but not with maximal intensity. The amount of exercises is dictated by the athlete's overall state of being. This part consists of rhythm waling on 200 - 300 m intervals (repeated 4 - 6 times), and accelerations with changeable intensity on 100 - 120 m intervals (repeated 4 - 6 times).

Part III (15 – 35 minutes) – pace workout - it is a basic characteristics of racewalking competitors. An athlete repeatedly alternates between pace walking and normal distance intervals. After each pace walking interval it is advisable to introduce a light racewalking interval which continues until the reduction of athlete's heart rate down to 140 - 120 beats per minute. One can use for example pace walks repeated from 3 to 5 times and lasting about 10 minutes (usually athlete covers about 2 km).

After the pace walking interval the athlete souls switch to a continuous walk, which will last until walker's heart rate slows down to 140 – 120 beats per minutes.

Part IV (20 – 25 minutes) – the wrap-up should be realized as an active rest. Athlete should perform a continuous walk, relaxation exercises, jog and march.

- **running - light jog (OWB1)**

Light jog is considered as running freely on any terrain with a speed allowing to cover about 1 km distance in 5 minutes. We avoid making any rest breaks. This kind of workout is made in the state of functional balance. We do not introduce any warm-up.

The term "running" is understood as a more intensive form of constant jog in different terrain, with a speed allowing to cover about 1 km in around 4 min 20 sec., i.e. 75-80% HR max. During one training unit racewalker runs a distance of about 10 - 12 km.

- **general fitness exercises (SPR)**

During the gym training, the coach should take special care of an overall fitness training [44]. Apart from that, one should take into account the exercises focused on strength, which the walker develops by performing resistance exercises and exercises with small loads. These kind of activities improve overall strength and should engage all torso muscles with emphasis on the upper limbs. Also, one should consider special strength exercises related to the lower limbs. It is advisable to use various exercises to strengthen different muscle groups in different isolated positions.

An athlete should not develop too much speed and jumping ability, because it can disrupt the racewalking technique.

- **indoor competitions**

During the introductory mesocycle period, Polish Junior Indoor Championships are held over a distance of 5000 m. From the training point of view, participating in them can be beneficial. It is a kind of interlude in the monotonous workout of both athlete and the coach.

It allows for the coach to gain a deeper knowledge about the trainee's current disposition against other competitors. Taking part in Junior Indoor Championships can be also used to evaluate the athlete's technique by an independent committee of judges. All this allows us to introduce amendments to the training plan, which we will implement in the next mesocycle.

To compete in indoor events, one does not have to be specially prepared. An athlete can take part in them after just some initial preparation, e.g. through rhythm and short pace exercises done 1-2 times. Below we can see the plan of preparations for the Polish Indoor Championship walker of first sport class.

14.01	OWCH1-12 (including 10 x 50m)
15.01	OWCH1-8
16.01	SPR– 45 min
17.01	OWCH1-8 (including 5 x 100 m – rhythm)
18.01	OWCH1- 6
19.01	OWCH1-2 +OWCH2 – 2 + WT-600+400+1000+600+400
20.01	OWCH1-4 + SPR – 45 min
21.01	OWCH1-8
22.01	OWCH1-2 +OWCH2 –2 +WT 200+400+200+400+1000
23.01	OWCH1-8 (including 5 x 50 m - rhythm)
24.01	OWCH1- 4 + SW /OWCH1-10 x 50m/100m
25.01	warm-up (OWCH1-3) + 5 x 100m/100m
26.01	SPAŁA - Polish Junior Indoor Championship – 4th place, life record - 21:55;34

7.1.2. Winter training camp mesocycle (1st –14th February)

During the winter break athletes should go on a training sports camp. The coach can devote this time to an intensive training. While on camp we can train in full visibility of daylight, which is important for the safety of the athletes, especially in the rapidly fading winter light.

Ideally, it should take place after the Polish Junior Indoor Championship, in which the athlete supposedly participated. Winter sports camp is a very important part of the yearly training. I encourage to organize the camps not longer than 12 days, so that young athletes could return home before the end of the winter break and have some rest before going to school. During the 12 - day camp, the main stress of the training should be placed on developing the general strength and improving racewalking techniques (trainings twice a day). An example of a weekly microcycle for a training camp of a younger junior with 10 km competition distance and personal record of 45:30 is presented in Table 10.

Table 10. Winter training camp plan

Weekday	Main training aspect	Basic means of training	Distance km.
Monday		continuous walk – I range	8
Tuesday	general endurance	continuous walk – I range	10
	general endurance, fitness	continuous walk – I range	6
Wednesday	general endurance	continuous walk – I range	12
	general endurance	continuous walk – I range	4
		technique	2
Thursday	general endurance	continuous walk – I range	14
	general endurance	continuous walk – I range	4
Friday	general endurance	continuous walk – I range	10
	general endurance	continuous walk – I range	4
Saturday	general endurance	continuous walk – I range	12
	general endurance	continuous walk – I range	6
Sunday	general endurance	continuous walk – I range	20
Monday	general endurance	continuous walk – I range	8
	general endurance, fitness	continuous walk – I range	4
Tuesday	general endurance	continuous walk – I range	8
		continuous walk – I range	6
Wednesday	general endurance	continuous walk – I range	8
Thursday	general endurance	continuous walk – I range	16
	fitness	general fitness exercises	
Friday	general endurance	test	10

During the preparatory period, a junior has to walk long distances, because of the main goal being taking part in the Polish Junior Championships on a 20 km distance.

At the end of the camp I propose to carry out a test in the form of task, e.g.: target walk or azimuth walk.

Training means used during the winter camps are the same as in the introductory mesocycle. Having the opportunity to train in good conditions (natural light) we can devote more time to technical exercises, as compared to our base location.

- **technique exercises**

It is a one of the most important training means in racewalking. When on winter training camp, we spend a lot of time practicing the technique. It is a principle that the better the technique, the lower the energy cost of movement, and also fewer judge's warnings for the competitor, which can affect the performance results.

Technical exercises should be interspersed with rhythm exercises on 100 m intervals. During the rhythm walking one should draw attention to the accuracy and proper racewalking technique. Technical exercises and rhythms should be performed individually by the athletes, for the coach to have the opportunity to carefully evaluate each person. It is also a good idea to film the training sessions and competition events, so that the walkers can see their technique for themselves.

- **theoretical exercises**

At the junior training camp, some lectures should be applied in training. We should share with young athletes some of our relevant experiences in sports. It is advisable to present fragments of different competitions with audiovisual equipment, and racewalking and traffic regulations in force.

7.1.3 Specialist mesocycle (15th February – 15th April)

After returning from the winter training camp which should have resulted in creating a suitable base for main training, we begin the specialist mesocycle. It should last until the first competitions, which usually begin in mid-April and last for approximately 8 - 9 weeks.

The main goal of this mesocycle is to work on the pace endurance. We should continue to maintain a high level of endurance in race walking and general fitness, but also spend a lot of time improving the technique. We introduce tests as a novelty. Based on them we can evaluate the optimal speed for the walkers to perform pace walks.

An example of a weekly microcycle on a specialist mesocycle is presented in Table 11.

Table 11. Weekly microcycle of a specialist mesocycle

Weekday	Workout focus	Basic means of training	Distance km.
Monday	general endurance, fitness	continuous walk – I range	6
Tuesday	special endurance	changeable walk	8
Wednesday	general endurance, speed	continuous walk – I range, rhythms	6
Thursday	general endurance	continuous walk – I range	12
Friday	special endurance	changeable walk	
Saturday	general endurance	continuous walk – I range	10
Sunday	special endurance	pace walking test	8

Below I present a training schedule realization for a junior member of national team on a camp which took place 2-16.03.2006 in Tunisia. The young athlete went to the training camp with national senior team.

2.03	OWCH1-10
3.03	Żołądź's Test
	OWCH1-6+SPR(STRENGTH)
4.03	OWCH1-8+SW/OWCH1-5x200/200
	OWCH1-4+TECH/OWCH1-100/100X10
5.03	OWCH1-12
6.03	OWCH1-8 +WT-100+200+300+200+100
7.03	OWCH1-20
8.03	OWCH1-10
	OWCH1-6+SPR (STRENGTH)
9.03	WOLNE
10.03	OWCH1-3+ OWCH2/OWCH1–(1/1) x 6
	OWCH1–6+SPR
11.03	OWCH1-12
12.03	OWCH1-12+SW(100/100) x 5
	OWCH1–4+ TECH/OWCH1-100/100x10
13.03	OWCH1-3+OWCH2/OWCH1 – (1/1) x7
14.03	OWCN1-12
15.03	OWCH1-8+SW-2 x (100+200+300+200+100)
	OWCH1-6
16.03	OWCH1-12

The athlete in this mesocycle should train seven times a week. In case of training sessions 6 times a week, I would recommend skip Thursday in the training plan. The training measures used in the specialist mesocycle are the same as in the introductory mesocycle. There are two new measures: changeable and pace walks [22,23,25].

- **changeable walk**

A changeable walk is a great means to develop athlete's special endurance. It is a walk in I and II range. The competitor, after introducing the training, depending on his or her performance level, can walk in I range 2 or 4 km with immediately ensuing II range walk. After covering the intended distance in II range, the cycle repeats itself. Junior can implement following variants:

II range walk (OWCH 2)	I range	(OWCH 1) – 1/1	repeated 8 times,
(OWCH 2)		(OWCH 1) – 0,5/1	repeated 8 times,
(OWCH 2)		(OWCH 1) – 2/1	repeated 3 times,
(OWCH 2)		(OWCH 1) – 3/1	repeated 2 times.

- **pace walking (WS)**

The athlete begins the training of special (pace) endurance with warm-up, which includes: jog for about 0.5 km, 2 km I range walk, 2 km II range walk immediately after and stretching exercises (about 10 min), after which athlete performs exercises perfecting the technique interwoven with rhythm intervals on 100 m distance.

Pace walks are best exercised on a treadmill or on the same training route (we have the opportunity to compare the results). It is recommended for participants to exercise individually. It is required for the coach to, in addition to measuring the time, carefully observe the racewalking technique and react to any spotted errors. It is advisable to film walking athletes, as it is perfect way to show them any imperfections in their walking technique.Only a diligent training based on mutual trust between the coach and the athlete can bring a success in sports competitions.

The young contestants perform the most pace walks at the distances from 400 m to 2 km and cover them, depending on the length, 10 to 3 times. The pace is slower on longer distances and faster on shorter ones, especially when the athlete is preparing for 3 km and 5 km distances. One should avoid introducing too fast pace intervals in the initial period of mesocycle. The starting point for scheduling pace walks are test results. Based on that and with the help of lactate measurement and Sport-tester, one can very accurately determine the walking speed and heart rate in different walking ranges.

Example: A competitor in 3 km control racewalking distance received the result of 13: 30.03 minutes. The average speed of 1 km was 4:31 minutes, and of 100 m was 27 seconds. Thus, during one pace workout, the athlete can cover:

6 x 400 m in – 1:48 min (4 x 27 sec)
or 6 x 500 m in – 2:15 min (5 x 27 sec)
or 4 x 1000 m in – 4:30 min (10 x 27 sec)

It is advisable for the rest breaks in pace trainings to have the form of slow march. Each break should last about 2 – 4 minutes. If we are working with a more experienced athlete, the breaks can be performed in I range walk. In the example above, in case of 6 x 400 m, the competitor covers 400 m with given speed and then 600 m distance in I range walk.

7.2. Competition period

The main purpose of the competition period is to utilize the training experience gained during the whole previous period. The main goal is to achieve the best results, especially on the most important sports events.

In the competition period, while taking part in any competition, the organism is exposed to excessive energy loses. Thus, it is crucial to decrease the training workload. Because of this, coaches should plan future competitions in such a way, that taking part in them would maintain or develop particular player's motor skills. In order to shape the endurance for example, it may be a good idea to introduce the player to competitions on a longer distance (10 or 15 km). It may be considered as a preparation for the main distance at the end of the season (Polish Championships on 20 km distance). The speed endurance, on the other hand, is practised on shorter distances, say 3 or 5 km.

The competition period lasts about 5 months (from mid-April to the end of September). Many events take place in May and June, some of them, like Polish Junior Championships and Youth Olympics for younger juniors, are organized in July on the 10 km distance. The best athletes have also the opportunity to take part in World or European Championships, which usually take place during summer holidays.

In the second part of the season, that is at the end of August and in September, some very attractive racewalking events are organized, including Polish Junior Championships on 20 km distance. Because of this it is logical to take into account two competition mesocycles in the training schedule, as well as the summer training camp.

Juniors' competition in Walbrzych, Poland.

7.2.1. First competition mesocycle (16th April - 25th July)

In the competition mesocycle we introduce the speed elements to the weekly training schedule. Most competitions take place on Saturday or Sunday, and I recommend introducing warm-ups the day before each event.

An ex ample of a weekly microcycle of a competition mesocycle is presented In the table below.

Table 12. Weekly microcycle in competition mesocycle

Weekday	Workout focus	Basic means of training	Distance km.
Monday	general endurance, fitness	continuous walk - I range general fitness exercises	6
Tuesday	special endurance	pace work	8
Wednesday	general endurance	continuous walk - I range	10
Thursday	special endurance	continuous walk - I range + speed	8
Friday	general endurance	continuous walk - I range	4
Saturday	special endurance	competitions	10

We can distinguish a new means of training in the competition mesocycle, that is actually taking part in a competition. The other means introduced in previous mesocycles, i.e. pace walks, speed and general fitness change their character [14,20,25,33].

- **taking part in sports competitions**

Depending on the current predispositions and training requirements, the junior walker competes at distances of 3 km up to 10 km. For educational purposes, he or she may try his or her hand at a distance of 15 km. Before the competition the athlete makes a proper warm-up in order to be well prepared and achieve the best results. Both the coach and the athlete should work together to determine the tactics and walking speed for covering particular routes or laps. The mid-time results given by the coach will be of real help to the walker in order to cover the whole distance in an optimal way. One should remind the competitor that at the beginning of the race, when they still have a lot of energy, they should pay more attention to the technical aspect of their walking style, which will also be monitored and evaluated by the judges.

- **pace walking**

The pace intervals are covered by the walker with the speed calculated based on results achieved on various sports events. Depending on the situation, the training workload can be of different type. It can take the form of equal intervals, e.g. 10 x 400 m (while walking with constant speed) or 4 x (400 m + 600 m + 1000 m), or even of mixed type e.g. (200 m + 400 m + 600 m + 1000 m + 600 m +400 m + 200 m) x 2 with 400 m walking breaks between each interval and 1000 m walking breaks between each series.

We can also use different combinations of pace intervals, depending on particular athlete and his or her training needs.

- **speed**

The best training means of developing speed in race walking is a small walking game (MZWCH), which differs from the normal walking game (DZWCH) by not including the III part of the game - the pace workout. Moreover, in the second part there are intervals of 100 - 300 m, which walker has to cover with a given speed. The mentioned speed, however, has to be adequate to the already acquired technical skills of the athlete. Exceeding this barrier will bring more harm than benefit from the training classes.

- **general fitness exercises (SPR)**

During every session, the trainee should dedicate about 10 to 15 minutes to a stretching exercises, performed in a rather free and light form. In is also advisable to introduce, one a week, some kind of a game which requires medicine balls. This will allow for the athletes to maintain their level of strength.

7.2.2. Summer training camp mesocycle (26th July – 25th August)

In this mesocycle, every athlete who trains regularly and shows good results should participate in summer sports camps. It is recommended to organize two training camps: the first one lasting 8 - 10 days in July, having an accumulating character, and second one in August, during which walkers will be able to develop, or at least to form, a special strength. In August, after returning home, players should continue the trainings and competitions. It is recommended that the summer camps, as similar to the winter ones, should last about 12 days [18].

An example of a training workout on a summer training camp in August is presented in the Table 13 below.

Table 13. Summer training camp training schedule

Weekday	Morning training	Afternoon training	Distance km
Monday	arrival	$OWCH_1$ - 8	8
Tuesday	$OWCH_1$ -12	$OWCH_1$ – 4+ SPR	16
Wednesday	$OWCH_1$–2+$OWCH_2$/ $OWCH_1$-1/1x6	$OWCH_1$ - 6	20
Thursday	$OWCH_1$ - 12	$OWCH_1$ –6+ WT/$OWCH_1$-5x200/200m	20
Friday	$OWCH_1$ –15/including SW 10x50m/	$OWCH_1$ -6	21
Saturday	$OWCH_1$ - 10	$OWCH_1$–4 + WT/$OWCH_1$-5x200/200m	16
Sunday	$OWCH_1$ – 15 + $OWCH_2$-7	break	22
Monday	$OWCH_1$ - 10	$OWCH_1$ – 4 + SPR	14
Tuesday	$OWCH_1$ –12+SW 5 x200m	$OWCH_1$ – 6+SPR	20
Wednesday	$OWCH_1$-2+$OWCH_2$-2+ WT8x1000	$OWCH_1$ – 6	20
Thursday	$OWCH_1$ -12	$OWCH_1$–6+TECH/$OWCH_1$-100/100x10	20
Friday	$OWCH_1$ - 10	departure	10

The presented training plan is an actual training diary of a junior national team member. The person, after training in the summer camp, took part in a 20 km distance event and achieved the result of 1: 30.40 h. The obtained result and success in the sports season allowed him to qualify for the national team, which was preparing for the European Youth Championships that were to take place the following year.

7.2.3. Second competition mesocycle (26th August – 7th October)

Usually, the second competition mesocycle begins in Poland with the "Zawody o Puchar Obrońców Poczty Polskiej w Gdańsku" competition, which traditionally take place on Saturday preceding the Second World War outbreak anniversary. There are a few more racewalking competitions organized in September, e.g."Złote Buty J. Kilinskiego" and juniors league.

At the end of the season, Polish Junior Championship are carried out at a distance of 20 km. Participating in them allows the player to become familiar with the requirements connected with covering that kind of distance, which is a main route length of the senior category. The main benefits of taking part in a long distance event is the knowledge about required skills and, in particular, about the proper distribution of strength during the whole event. Because of this, it is easier for athletes to adapt, when

changing the age category to the senior one. One should keep in mind that in the first 3 years of being in senior category, the athlete keeps the right to take part in junior events such as the Polish or European Youth Championships.

The training schedule in this mesocycle is similar to the introductory one. Below I present a record of an walker's training plan (first sports class athlete), whose competition target in the second half of the 2006 season was to start in Polish Junior Championships at a 20 km distance, on 16 September. The plan depicts the last 7 weeks of training before the actual event.

28.07	OWCH1-10
29.07	OWCH1-12 +SW-5 x 50 m
30.07	OWCH1-8
31.07	OWCH1-12 +SW-5 x 50 m
1.08	OWCH1-4 + OWCH2-6
2.08	OWCH1-10
3.08	OWCH1-16
4.08	OWCH1-8 +SW–5 x 200 m
5.08	OWCH1-12
6.08	break
7.08	OWCH1-10
8.08	OWCH1-5 + OWCH2-10
9.08	OWCH1-8
10.08	OWCH1-12 + SW–2 x (100+200+300+300+200+100), breaks –100 m i 400 m
11.08	OWCH1-20
12.08	OLSZTYN training camp
	OWCH1-8
13.08	OWCH1-10
	OWCH1-4 +SPR
14.08	OWCH1-15
15.08	OWCH1-2+(OWCH2/OWCH1-1/0,5) x 10
	OWCH1–4+SPR
16.08	OWCH1-10
17.08	OWCH1-15
	OWCH1-4+SW-(200/100) x 5
18.08	OWCH1-2+OWCH2-2+WT 15 x 400m, breaks 200 m
	OWCH1-5
19.08	OWCH1-8
20.08	OWCH1-20
21.08	OWCH1-8
22.08	OWCH1-10
23.08	OWCH1-2+ OWCH2–2+WT-(600/400) x 8
24.08	OWCH1-6+SW
25.08	warm-up - end of the camp
26.08	Competition – Gdańsk – Puchar Obrońców Poczty Polskiej – 20 km–1:30;39

27.08	break
28.08	OWCH1-8
29.08	OWCH1-10
30.08	OWCH1-2+OWCH2-2+WT/OWCH1-(500/500) x 5
31.08	OWCH1-4+SW-5 x100m, breaks 100m
1.09	warm-up
2.09	Senior League Competition Wrocław – 5.000 m - 20:56.09
3.09	OWCH1-6
4.09	OWCH1-8+SW-5 x 100m
5.09	OWCH1-15
6.09	OWCH1-2+OWCH2-2+WT/OWCH1-(600/400) x 6
7.09	OWCH1-8
8.09	OWCH1-4+SW-5x100m, breaks 100m
9.09	warm-up
10.09	Competition - Złote Buty J. Kilińskiego –Warsaw –10.000 m– 43:17;07
11.09	OWCH1-6
12.09	OWCH1-10 (including SW-5 x 200m)
13.09	OWCH1-8+SW-3 x 200m, breaks 100m
14.09	OWCH1-4+SW-5 x 100m, breaks 100m
15.09	warm-up
16.09	Competition - Polish Junior Championships – Huta Krzeszowska - 20 km – 1;33,48

As we can see, in this period the athlete competed quite many times. During three weeks he took part in a racewalking competition exactly four times, including two 20 km distance events, and two treadmill competitions (5,000 and 10.000 m). He maintained a high performance during each event.

Presented sports level of competitions suggests, that the training plan implemented by the coach was properly chosen for the walker, and he realized it carefully and diligently. A close cooperation of the coach and the athlete is the key to success. After the Polish Championships in Huta Krzeszowska over a distance of 20 km, which the walker had actually won, he took part in Ivano - Frankivsk (Ukraine) racewalking event on September 30, where he achieved a result of 43:43 minutes at a 10 km distance.

7.3. Transition period

The aim of the training sessions during the transition period is to rest in an active way. Yet, it is crucial to maintain the athlete's general fitness in order to begin the following training year cycle on a higher level than the previous one.

Therefore, the transition period should be well utilized. The intensity of training workload decreases down to 2 units a week [18,25]. Young walkers are recommended to use the time to practice other sports, for example basketball, swimming or hiking.

I believe that participation in hiking tours is very beneficial for the athletes, because they not only maintain and exercise their motor skills, but also learn about interesting routes, which in the future can be used in the training process.

One of the important skills developed during such kind of hiking tours is the ability to walk in a marching group, adjust the pace to the group leader, and to establish some social contacts. All this affects the psychological development of a competitor and allows him or her to overcome the monotony of training routes.

By ensuring the correct structure of the transitional period, the walker can not only rebuild the strength and prepare for the workload in the ensuing introductory period, but also can achieve a higher level of preparation compared to the same period in the previous macrocycle.

The transitional period should also be used to recover from any injury and to perform a complex medical examination.

Chapter VIII
Senior Traning

The most important features required for achieving world-class results are patience and perseverance. If the athlete chooses unrealistic goals, makes up for skipped training days, does not listen to his or her body or coach's advice, then the development of his or her sports level will get really slow or, even worse, the walker will get discouraged. Thus, it is important for the competitor to listen to his or her body and not forget about the ambitions, train regularly, and to plan the process of reaching the world-class results for several years [30].

In order to systematize the workload of the advanced athletes I suggest the following division of the training year [20].

1. Preparatory period:	November 15th – April 15th
• introductory mesocycle	November 15th – December 31st,
• main mesocycle	January 1st – February 14th,
• specialist mesocycle	February 15th – March 31st,
• pre-competition mesocycle	April 1st – 15th April.
2. Competition period	April 16th – October 7th
• first competition mesocycle	April 16th – July 15th,
• regeneration mesocycle	July 16th – August 31th,
• second competition mesocycle	September 1st – October 7th.
3. Transitional period	October 8th – November 14th.

When preparing a yearly training plan one has to take into account several aspects:

- the date of first competition of the new season,
- the level of the main season event,
- the list of events in which the walker will compete,
- current year's goals,
- presonal life priorities.

The division of training year into different mesocycles can change during the year. This applies to the preparatory period in particular and can be caused by an early start of a competition season.

World Championship, Sevilla 1999, from left Magdziarczyk, Lipiec, Korzeniowski .

8.1. Preperatory period

The main goal of this period is to prepare the athletes in such a way that they will achieve the best results during the competition period. It is useful for building physical condition, acquiring new skills, and for technical and tactical improvement of motor habits, which are the basis of sports performance. We use this period to gradually increase the training workload up to the maximum. The training is aimed at fitness and technical preparation. During the preparatory period we should not avoid the confrontation and sports competitiveness, by taking part in indoor events or even treadmill competitions.

During the preparatory period we introduce the following mesocycles:

8.1.1. Introductory mesocycle

The introductory mesocycle begins the preparatory period and is characterized by gradual increase of the intensity of training, which is realized mainly by an increase in the workload up to 70-90% of the maximal training load. The main content of the training session is working on aerobic endurance. We use a wide range of general fitness and technique exercises.

Below I present an example of a training schedule for an athlete specialized in 50 km distance. The plan encompasses first three weekly cycles of an introductory mesocycle. Systematic preparations for the new season began mid-November.

14.11 OWCH1-8+SPR-gimnastics
15.11 OWCH1-8
16.11 OWCH1-10
17.11 OWCH1-8+SPR-strength
18.11 OWCH1- 10
19.11 OWCH1-10+SW-100+200+300+200+100
20.11 wolne
21.11 OWCH1-10+SPR-gimnstics
22.11 OWCH1-10
23.11 OWCH1-8-10
24.11 OWCH1-10+SPR-strength
25.11 OWCH1-8-(including SW-5 x100)
26.11 OWCH1 -12+SW-100+200+300+200+100
27.11 break
28.11 OWCH1-14+SPR-gimnastics
29.11 OWCH1-8
30.11 OWCH1-10-(including-SW-5 x100)
1.12 Żołądź's Test
2.12 OWCH1-8
3.12 OWCH1-6+OWCH2-6
4.12 break

After the introductory cycle, the walker went to the first scheduled training camp of the national team, which was held at the Central Sports Centre in Cetniewo on 5th - 16th December 2005. A stay in this resort guaranteed the full implementation of the training

plan and offered a biological regeneration. Table 14 shows a record of a training diary for the training camp in Cetniewo.

Table 14. Training plan realization for a December training camp in Cetniewo.

Date	I training	II training	Distance km
5.12		$OWCH_1$-10	10
6.12	$OWCH_1$-15	$OWCH_1$-6 +SPR	21
7.12	$OWCH_1$-12	$OWCH_1$-6 +SPR/STRENGTH/	18
8.12	$OWCH_1$-20/ including SW 5X100M/	$OWCH_1$-6 +SPR	20
9.12	$OWCH_1$-10	$OWCH_1$-6 +SPR/STRENGTH	16
10.12	$OWCH_1$-12	$OWCH_1$-6 +SPR	20
11.12	$OWCH_1$-15 +$OWCH_2$-5	$OWCH_1$-6 +SPR/STRENGTH	26
12.12	$OWCH_1$-12	$OWCH_1$-6 +SPR	20
13.12	$OWCH_1$-15/ including SW5X100M/	$OWCH_1$-6 +SPR/STRENGTH	23
14.12	$OWCH_1$-12	$OWCH_1$-6 +SPR	20
15.12	$OWCH_1$-25	regeneration	25
16.12	$OWCH_1$-10		10

Performed training was very extensive and had the character of I intensity range. The sessions were devoted to the development of aerobic endurance and improvement of general fitness.

In free periods between the camps the competitor should continue the training in club environment. During the holiday period one should take into account the traditions favored by the player. Therefore, the nature of the training work can undergo minor modifications. We focus on improving aerobic endurance through long but easy walks.

An exemplary training in described period:

17.12 OWCH1-12
18.12 OWCH1-6+medical examination
19.12 OWCH1-15
20.12 OWCH1-12-(including rhythm-10 x 100m)
21.12 OWCH1-10+OWCH2-5
22.12 OWCH1-10-(including rhythm-10 x 100m)
23.12 OWCH1-25
24.12 OWCH1-10
25.12 break
26.12 OWCH1-10-(including rhythm-10 x 100m)
27.12 OWCH1-12-(starting from 9th km, each following kilometer covered with a higher speed,gaining 5 sec)
28.12 OWCH1-10+OWCH2-5

29.12 OWCH1-10
30.12 OWCH1-30
31.12 OWCH1-10

This training ended the introductory mesocycle. After it, we continued to the next training stage, that is to the main mesocycle.

8.1.2. Main mesocycle

Main mesocycle comes after the introductory one. I suggest to begin it with the start of a new year, after the festive period. One should keep in mind that we are dealing with adults, who usually have a stable private life and are more involved in family life during the holiday season.

The volume of workload reaches the 100% of its planned size and the intensity is not substantially altered. There is a gradual increase in the number of specialized fitness exercises and technical exercises. Main mesocycle lasts about 6 -7 weeks.

Below we present a training plan record of a 2 week microcycle for a walker preparing for a 20 km distance competition:

8.01 OWCH1-20
9.01 OWCH1 -10+SPR
10.01 OWCH1 -12+SW-(100+200+300+200+100) x 2
11.01 OWCH1-15-(including-SW-5 x 100m)
12.01 OWCH1-15+OWCH2-5
13.01 OWCH1-10+SPR
14.01 OWCH1-12+SW-(100+200+300+200+100) x 2
15.01 OWCH1-25 - (evaluated)
16.01 OWCH1-10+SPR
17.01 OWCH1-12+SW-(100 +200+300+200+100) x 2
18.01 OWCH1-15+OWCH2-5
19.01 OWCH1-15+SPR
20.01 OWCH1-15-(starting from 9th km, each following kilometer covered with a higher speed, gaining 5 seconds, e.g. - 9th km in 5 minutes; 10th km in 4.55 minutes and so on)
21.01 OWCH1-12+SW-(100 +200+ 300+200+100) x 2
22.01 OWCH1-15-(including-SW-5 x100m+OWCH2-10
23.01 OWCH1-10+SPR

When creating a training plan, one should remember about the regeneration microcycles, that are used after 2-3 weeks of intensive training.

As part of the rest from the hard training work, as well as to verify the correctness of the training, I suggest to, at the end of the main mesocycle, use microcycle with a reduced workload volume. It should include one pace endurance training and a start in the Polish Indoor Championships.

An example of a weekly microcycle before a competition has a following form:

11.02 OWCH1-20 (including-SW-10 x 100 m)
12.02 OWCH1-12
13.02 OWCH1-2 +OWCH2 -2+WT-(600/400 m) x 7

14.02 OWCH1-10
15.02 OWCH1-6+SW-100+200+300+200+100m
16.02 OWCH1-4+SW-5 x 150 m
17.02 Competition – Polish Indoor Championships – 5.000 m

After competing in the indoor events we go back to the normal training sessions.

The Polish Indoor Championships close the main mesocycle. Next is the specialist mesocycle.

8.1.3. Specialist mesocycle

Specialist mesocycle is characterized by a decrease in the volume of workload down to 80-90% of maximum volume and an increase in the intensity. There is still an increase in the amount of specialist and technical exercises.

From a long time Polish national team walkers are able to train in that mesocycle in very good weather conditions, namely in Tunisia. Staying there allows them to train longer in a competition uniform, which positively affects the work on the technique of walking, as well as makes it easier to adjust the speed of walking to the current state of fitness.

Table 15 presents the record of an athlete's training workout on a camp in Tunisia, which took place in 3.03 – 17.03.2006.

Date	I training	II training
3.03	$OWCH_1$-10	
4.03	Żołądź›s Test	$OWCH_1$-8
5.03	$OWCH_1$-15	$OWCH_1$-4+SW x 2 piramyds
6.03	$OWCH_1$-35	$OWCH_1$-4+regeneration
7.03	$OWCH_1$-10	break
8.03	$OWCH_1$ –15	$OWCH_1$-8
9.03	$OWCH_1$-3+$OWCH_2$/$OWCH_1$ – (1/1)-x12 in 4:35	$OWCH_1$-6
10.03	$OWCH_1$-10	WOLNE
11.03	$OWCH_1$-12	$OWCH_1$-6+ RHYTHMS (10x200) breaks-100
12.03	$OWCH_1$-20+$OWCH_2$ -10	$OWCH_1$-6
13.03	$OWCN_1$-10	$OWCH_1$-8+regeneration
14.03	$OWCH_1$-15	break
15.03	$OWCH_1$-12+SW-(100+200+300+200+100) X2	$OWCH_1$-8
16.03	$OWCH_1$-2+$OWCH_2$/$OWCH_1$-(2/1) x 8	$OWCH_1$-6+regeneration
17.03	$OWCH_1$-10	

After returning from the camp we continued to the next training period, that is pre-competition mesocycle.

8.1.4. Pre-competition mesocycle

Pre-competition mesocycle takes place at the end of the preparatory period. The volume of work is further reduced down to 70-80%, while the intensity is steadily increasing, reaching the maximum expected value at the end of this mesocycle. The exercises have a specialist character, and the walker take part in a control competition.

Table 16 shows a record of a walker's training diary before the first major event of the season, that is, the World Cup.

Table 16. Training in pre-competition mesocycle.

Date	I training	II training
1.05	Żołądź›s test	$OWCH_1$-10
2.05	$OWCH_1$-2+$OWCH_2$/$OWCH_1$-(1/0,5) x 10	$OWCH_1$-6 + REGENERATION
3.05	$OWCH_1$-10	$OWCH_1$-6+SPR
4.05	$OWCH_1$-12	$OWCH_1$-4
5.05	$OWCH_1$-2+$OWCH_2$-2 +WT-(10x1000),breaks-400m	$OWCH_1$-6 + REGENERATION
6.05	$OWCH_1$-10	$OWCH_1$-4
7.05	$OWCH_1$-12	$OWCH_1$-SW-(6x200)x2,p-100m
8.05	$OWCH_1$-2+$OWCH_2$-2+WT (600/400) x 10	$OWCH_1$-6 + REGENERATION
9.05	$OWCH_1$-10	$OWCH_1$-4
10.05	$OWCH_1$-8+SW-(100+200+300+200+100)x2	break
11.05	$OWCH_1$-1+$OWCH_2$-2+WT-(400/200/200/400)x7	departure
12.05	Warm-up	
13.05	COMPETITION	

Training in the mountains, South Africa, from left Sudoł, Kuciński, Magdziarczyk.

8.2. Competition period

During this period, the coach should create the best conditions for the walker to achieve the highest results in sports competitions. Smaller training loads are used (with reduced volume and intensity) in comparison to the preparatory period. Training is aimed at maintaining the achieved physical features and improved motor skills, habits and abilities that will help the athlete to be well prepared for a competition. The intensity of a training is similar to the competition walk intensity. A lot of attention should be given to the tactical and mental preparation [46].

During this period, athletes should achieve and maintain a high disposition. Training sessions are very specialized and take into account the preparation for the following competitions starts. The length of the intervals between events depend on each athlete's physical preparation.

The racewalking competition period in is very long and can last from five to seven months. Therefore, in this period we can distinguish two starting mesocycles separated by a regeneration mesocycle.

8.2.1. First competition mesocycle

First competition mesocyce includes control and training events, which are preparing the athlete for the main competition in the first half of the season. The intensity of the workout is placed at a quite high level, the volume, on the other hand, is smaller as

compared to the previous period and depends on the number of planned competitions. The length of the first competition mesocycle ranges from 4 to 6 weeks.

8.2.2. Regeneration mesocycle

Regeneration mesocycle takes place during the competition period, but only if it lasts long enough, that is between 3 or 4 months. There are two types of these inter-mesocycles: regeneratively - preparatory and regeneratively - supportive.

Below I present different variants of a preparation plan for an athlete's main event, carried out in competition period. The described walker, whose personal best over a distance of 20 km is 1: 27; 07, was preparing for the Polish Championships on 20 km distance, organized in Rumia on 12.06.2005.

The presented plan includes the last two weekly microcycles before the main competition of the domestic season. It began with a test on a 5 km distance, repeated twice with a 20 min break.

28.05	Test on a 2 x 5 km distance
29.05	Warm-up
30.05	OWCH1-12
31.05	OWCH1-18
1.06	OWCH1-8+SW-100+200+300+200+100
2.06	OWCH1-2+OWCH2–2+WT-2000 x 5 e.g.–400 m
3.06	OWCH1-12
4.06	OWCH1-14
5.06	OWCH1-8+SW-100+200+300+200+100
6.06	OWCH1-2+OWCH2/OWCH1–(1/1) x 8
7.06	OWCH1-10+SW-100+200+300+200+100
8.06	OWCH1-2+OWCH2–2+WT-(600/400) x 6
9.06	OWCH1-12
10.06	OWCH1-8+SW-100+200+300+200+100
11.06	warm-up
12.06	Polish Senior Championships – 20 km - 9th place 1:28;24

The place won and achieved time allowed the walker to take part in the European Youth Championships, which were organized in Erfurt in July 2005.

The training plan for the walker, intended to prepare him for these Championships, is presented below.

21.06	OWCH1–10+SPR
22.06	OWCH1–12-(including-SW-5 x 100)
23.06	OWCH1–10–OWCH2–4
24.06	OWCH1–12+SPR+TECH
25.06	OWCH1–20-(including-SW-5 x 100)
26.06	OWCH1–10+SPR-strength
27.06	OWCH1–12+SW-(100+200+300+200+100) x 2, e.g.-100 m, 400m b tween series
28.06	OWCH1–10+OWCH2–5
29.06	OWCH1–2+OWCH2/OWCH1–(1 /1) x 10

	OWCH1–4+SPR-strength
30.06	OWCH1-12
	1.07 Spała training camp
	OWCH1–10
2.07	OWCH1–2+OWCH2/OWCH1–(2/1) x 8
	OWCH1–4+regeneration
3.07	OWCH1–12
4.07	OWCH1–10
	OWCH1–6+SPR-strength
5.07	OWCH1–10+SW-(100+200+300+200+100) x 2
	OWCH1–4+TECH
6.07	OWCH1–1+OWCH2–2+WT-(3+2+1) x 2, breaks - 400m
	OWCH1–6+SPR-strength
7.07	OWCH1–15
8.07	OWCH1–12
	OWCH1–4+SW-(100+200+300+200+100) x 2
9.07	OWCH1–2+OWCH 2–2 +WT-8 x 1000
	OWCH1–6+regeneration
10.07	OWCH1–12 end of the camp; arriving in Poznan
11.07	OWCH1–8+SW-(100+200) x 2
	departure for European Youth Championships,
12.07	OWCH1–2+OWCH2 –2+SW/OWCH1–(600/400) x 8
13.07	OWCH1 –8+TECH
14.07	OWCH1 –6+SW-(500/2000) x 3
15.07	WARM-UP
16.07	European Youth Championships - 20 km- 4th place (1:25;01),-12th place (1:31;44)

The next presented training plan concerns an athlete representing Poland in a World Cup, and was aimed to prepare him to the Polish Championships in 2006.

27.06	OWCH1–15
	OWCH1-4+SW-(50/TECH100) x 10
28.06	OWCH1–18
	break
29.06	OWCH1–10
	OWCH1-5+SPR-strength
30.06	OWCH1–20
	OWCH1-4+SW-(100/TECH100) x 10
1.07	TRIP
2.07	OWCH1–10+SW-5x 100M
	OWCH1-4+SPR-strength
3.07	OWCH1–10+OWCH2-10
	OWCH1-4+SPR
4.07	OWCH1–10
	OWCH1-6
5.07	OWCH1-10+2 x pyramid

	OWCH1-6+SPR-strength
6.07	OWCH1-2+OWCH2/OWCH1-(2/0,5) x 6
7.07	OWCH1-10
	OWCH1-4+SW-(100/TECH100) x 10
8.07	warm-up
9.07	OWCH1-22-(with a higher speed, starting from the 16th kilometer, gaining 5 sec each km)
	OWCH1-4
10.07	OWCH1–10
	OWCH1-4+SPR
11.07	OWCH1-10+ 2 x pyramid
12.07	OWCH1-2+OWCH2-2+WT-12 x 1000m, breaks – 400m
	OWCH1-6
13.07	OWCH1-12
14.07	OWCH1-10
15.07	OWCH1-2+OWCH2-2+WT-15 x 400m, breaks after 400 m
	OWCH1-6
16.07	OWCH1-12
17.07	OWCH1-10
18.07	OWCH1-2+OWCH2 -2+WT-(400/200/200/400) x 8
19.07	OWCH1-10
20.07	OWCH1–8-10
21.07	warm-up
22.07	Polish Senior Championships on 20 km distance.

An example of a training solution for an athlete preparing for Polish Championships on 50 km distance (author: K. Kisiel).

The training plan starts with competing in "O Puchar Obrońców Poczty Polskiej w Gdańsku" sports event. The result (1;28;10) achieved on 20 km distance was a new personal record for the athlete.

27.08	Competition–20 km – 1;28;10
28.08	break
29.08	OWCH1-8+SPR
30.08	OWCH1-8
31.08	OWCH1-10
1.09	OWCH1-15-(including rhythm-SW-10 x100m)
2.09	OWCH1-20 (starting from 15th km , each following km faster, gaining 5 sec)
3.09	OWCH1-12+SW-(100+200+300+200+10) x 2, breaks 100m and 400m
4.09	OWCH1-5+OWCH2–10+WT–10 (with competition speed)
5.09	OWCH1-12
6.09	OWCH1-15+SW-(100+200+300+200+100) x 2, breaks 100m and 400m
7.09	OWCH1-20+OWCH2-10
8.09	OWCH1-15
9.09	OWCH1-12+ SW–100 +200+300+200+1000 x 2, breaks 100m and 400 m
10.09	OWCH1-2+(OWCH2/OWCH1–(1/1) x 10

11.09 OWCH1-12
12.09 OWCH1-2+OWCH2-2+WT–10–12 x 1000 m, breaks 400 m
13.09 OWCH1-12
14.09 OWCH1-10+SW-5 x 200
15.09 OWCH1-35
16.09 OWCH1-10
17.09 OWCH1-12
18.09 OWCH1-2+OWCH2–2+WT/ OWCH1-(4/1)–x 5
19.09 OWCH1-12
20.09 OWCH1-2+OWCH2-2+WT-(600/400)x 10
21.09 OWCH1-15+SW–5 x 200m
22.09 OWCH1-20+OWCH2-10
23.09 OWCH1-12
24.09 OWCH1-15
25.09 OWCH1-5+OWCH2–5+WT–5 (with competition speed)
26.09 OWCH1-12
27.09 break
28.09 OWCH1-5+OWCH2/OWCH1–(1/1) x 3
29.09 OWCH1-10
30.09 OWCH1-8+SW-5 x 200 m
1.10 arrival at the competition - warm-up
2.10 Polish Championships on 50 km distance, 2nd place – 4:05;10

In order to compare the training schedules, I present a training plan for an athlete preparing under the guidance of coach W. Mirka, who was the author of the presented plan.

The preparation to main event also began with taking part in „O Puchar Obrońców Poczty Polskiej w Gdańsku" competition.

28.08 Competition – 20 km – 1;25;08
1.09 OWCH1–10
2.09 warm-up
3.09 Competition - 5 km-20.28.42
4.09 OWCH1-8 Żołądź's Test

In the Table 17 below, we present test results and comments by Mirek, describing the predispositions of described athlete.

Table 17. Żołądź's Test made on 5th September 2005

	I effort	II effort	III effort	IV effort	V effort
HR [sk/min]	141	150	160	171	182
Distance [m]	1075	1145	1230	1325	1450
LA [mmol/l]	1,66	1,73	2,39	3,28	7,08
t_{km} [min/km]	5:34	5:14	4:52	4:29	4:08

The current threshold heart rate is 150 contractions/min and is a limit between the aerobic endurance and mixed training. The threshold speed (LT) amounted to 5'14 "1 km. Considering the distance (50 km), to which the athlete is preparing, one can say that the work that he has done during the previous trainings had not increased his aerobic (special) predispositions. Also, the threshold speed is low, which does not guarantee a good result. One can expect that the walker will be prepared to achieve approx. 4.15-4.20 on 50 km.

6.09 OWCH1-10
7.09 OWCH1-30
8.09 OWCH1-10
9.09 OWCH1-12+ SW-(100+200+300+200+100) x 2, break-400m
10.09 OWCH2-2+WT-7 x 3 km, break-1km
11.09 OWCH1-12
12.09 OWCH1-12+SW-(100+200+300+200+100) x 2, break-400m
13.09 OWCH1-25
14.09 OWCH1-10
15.09 OWCH1-10
16.09 warm-up
17.09 OWCH2-2+WT-7 x 3 km, break-1km
18.09 OWCH1-10
19.09 OWCH1-10
20.09 OWCH1-10
21.09 OWCH1-35
22.09 OWCH1-10
23.09 OWCH1-12
24.09 OWCH1- 4+OWCH2–12 x (1000/400)
25.09 OWCH1-10
26.09 OWCH -12
27.09 OWCH1-10+SW-(100+200+300+200+100) x 2, break-400m
28.09 OWCH1-2+OWCH2-2+WT-6 x 400/400
29.09 Żołądź's Test
OWCH1-10 km

After this kind of work, intended to increase the threshold speed, four days before the start the Żołądź Test was carried out again. Achieved results are presented in the table 18.

Table 18. Żołądź's Test made on 29th September 2005

	I effort	II effort	III effort	IV effort	V effort
HR [sk/min]	141	151	**160**	171	181
Distance [m]	1095	1140	**1210**	1310	1420
LA [mmol/l]	0,652	0,756	**0.873**	1.67	3.66
t_{km} [min/km]	5:28	5:15	**4:57**	4:34	4:13

The threshold heart rate is 160 contractions/min. The speed threshold (LT) increased compared to the previous survey of 17 sec per 1 km and amounted to 4'57 "1 km. Based on the results of the test, one can assume that the walker's workout was focused on the threshold level, which resulted in improved speed parameters. In this case, one can assume that the athlete will soon cover the distance at an average threshold speed of (4 '57 ") and with average heart rate threshold of about 160 contraction/min.

Comparing the two tests, it is good to draw attention to the importance of the intensity of training suggested to the competitor. If the training intensity exceeds the current capacities of the athlete, one cannot expect to improve the threshold parameters any further.

30.09	OWCH1- 8
1.10	arrival at the competition - warm-up
2.10	Polish Championships on a 50 km distance, 3rd place – 4:08;12

8.3. Transition period

During the transition period, the athlete should devote his or her time for body regeneration and renewal after the season and to maintain an appropriate disposition for incoming training.

The transition period is a necessary consequence of the period of an intense and often very stressful competitions. It creates conditions for active recreation, wellness, and prevents the negative consequences of the applied training loads and sports events. If it is possible, it is recommended to go to a sanatorium for a propert renewal and healing of minor injuries.

In order to improve psychological well-being, it is advisable to travel to countries with warm climates (Turkey, Tunisia, Egypt), where you can enjoy swimming and sunbathing.

Most of the training is this period consist of active recreation and fitness. Only small training loads are used [8,46,48].

I recommend three variants of this training period:

1. A full passive recreation combined with lack of exercise lasting 4 to 6 weeks,
2. Active recreation in form of alternative sports and exercises - 4 to 8 weeks,
3. The use of training means characteristic for the first weeks of the preparatory period, which means, in practice, that we resign from the transitional period.

The time off from intense training sessions should be used by the athlete to regulate his or her private and professional life.

This will allow the walker to rest psychically by tending to other matters than sport.

Chapter IX
Direct competing preparation (BPS)

In today's racewalking training, it is crucial to specially prepare the athletes for the most important competitions of the given season, that is so called "target events". The events may take a form of Polish, European or World Championships, for example. This highly specific training phase (a part of the competition period, to be precise), is called Direct Competing Preparation (BPS). It can be divided into three main phases [46]:

- regeneration phase – its purpose is to restore the physical and mental preparation of an athlete after previous competitions. In the trainings, versatile workloads with low and medium intensity generally prevail. The best walkers in this period leave for high-mountain training camps.
- intensification phase – its main goal is to prepare the athlete for incoming competitions. The duration of training sessions decreases in comparison to the regeneration phase. Intensity, on the other hand, increases, which results in an increase in effort workload in following microcycles. In the intensification phase we use workloads similar to a competition workload.
- supercompensation phase – in this phase the competitor is to achieve the highest competing form in the season. The training units are characterised by a high intensity. The last BPS phase can undergo various modifications, depending on the location in which the main season event is being held. When planning this phase, one has to remember about such factors as: the travel time, time zone changes, acclimatization, adaptation to the local food. The phase lasts from 7 to 10 days.

The factor defining the start of the Direct Competing Preparation is the time between the last prestigious competition and main season event. Generally, the period lasts about 5-8 weeks. Often, the last prestigious competition takes the form of Polish Championships.

The first few days (4-5) after the National Championships are spent on active rest and mental renewal. After this microcycle, the main mesocycle is usually scheduled, which lasts 3-4 weeks. We can divide it into two parts: the comprehensive preparation and special preparation. In the first part of the main mesocycle training is intended to rebuild the disposition and has workloads similar to those in the first part of the preparatory period (sub-period of the comprehensive preparation). The second part of the mesocycle corresponds to the specialist preparation sub-period during the preparatory period.

After the main mesocycle a pre-competition mesocycle is planned, whose main tasks are: physical regeneration after the workload of previous mezocykle, mental preparation for the competition, adaptation of the body to the hours of the competition (thus, it is advisable to train in such hours) [38,45,46].

To achieve positive results in a competition we introduce during the Direct Competing Preparation to the main event of the season, a period of mountain training. It is important to appropriately choose the time between the end of the mountain training and the date of the main event. This period should provide not only the acclimatization, but also create conditions for a formation of a new level of functional and structural body features, resulting from adaptation to training in the mountains [6,8,27,28].

While for the re-acclimatizaction it is usually enough to last a few days (4-6), for shaping of a new level energy systems adaptation and organic links with other preparation features and the most important technique and tactics components, the required time is much longer. The success can be expected only in case of the time between the end of the mountain training and the main event being not less than 16-18 days, and no longer than 30-40 days. The most common practice is introducing a 20-25 days interval between the last day of training in the mountains and the main competition [5,6,8,26,46].

Please note that the mentioned time depends on many factors, with the main ones being: the specificity of the discipline, the length of mountain training and individual characteristics of the athletes. The longer the mountain training, the longer the re-acclimatization period and the time needed to form a new, higher level of preparedness [26].

Also, the content of the training after the mountain training period is also very important. During the re-acclimatization we carry out a comprehensive training with small loads of various types, with significant volume of a low intense aerobic workout of a regenerational character and a variety of renewal treatments. After this period we emphasize the comprehensive use of a variety of specialist exercises, closely associated with the structure and content of competitions [27].

Table 19 shows the organization of the Direct Competing Preparation in the Olympic four-year cycle in 1997-2000, i.e. before the Olympic Games held in Sydney.

Table 19. The direct competing preparation organization table.

Year	Date and location of Polish Senior Championships	Date of highmountain training camp	Date of domestic stay	Date of competition location stay (adaptation)	Date of the main event	BPS duration
1997	20.06 Bydgoszcz	21.06-12.07	13 - 22.07	23.07-31.07	07.08	48
1998	27.06 Wrocław	29.06-24.07	25.07-07.08	08.08-19.08	21.08	54
1999	02.07 Kraków	04.07-30.07	31.07-13.08	14.08-23.08	25.08	53
2000	05.08 Kraków	07.08-01.09		02-20.09 Australia	22.09 29.09	54

The table presents data about:

- the date of competing in Polish Championships, which is the date of BPS organization start,
- dates of high-mountain training camps,
- dates of domestic trainings,
- a time period devoted to adaptation to the event location,
- date of the main event,
- the number of BPS days required for preparing the athlete to take part on high level competition.

In the 2000 year, the racewalking Olympic team did not return to the country from the high-mountain training camp, which took place Johannesburg / RPA /, but went directly

to Australia for an adaptive training camp in Brisbane. More detailed data on the Direct Competing Preparation will be presented later in this chapter.

When analyzing the data in Table 20 we get a number of additional information concerning the organization of the Direct Competing Preparation during the Olympic cycle of 1977-2000.

- BPD organisation date,
- BPS duration,
- High-mountain training camp duration,
- Event country adaptation time,
- Event location adaptation time.

Table 20. The time division of Direct Competing Preparation.

Year	BPS date	BPS duration	High-mountain training camp	Adaptation in Poland	Adaptation in event location
1997	21.06-07.08	48	22	10	16
1998	29.06-21.08	54	26	14	14
1999	04.07-25.08	52	26	14	12
2000	07.08-29.09	47	26	-	21 28

Table 20 shows the division of the Direct Competing Preparation into phases. As you can see, regeneration phase in 1997 consisted of 22 days, but after the end of the season and after the training plan analysis, it was described as too short and extended to 26 days in the following years.

Intensification phase ranged from 15 to 17 days and is generally associated with the travel time required to return from the camp to the home country, as well as with the time required to travel to the competition location.

Supercompensation phase lasted 10 days through the whole four-year training cycle and, as one can see, its duration brought the desired sports results.

Table 21. BPS phase division.

Year	BPS date	Date of the regeneration phase (number of days)	Date of the intensification phase (number of days)	Date of the supercompensation phase (number of days)
1997	21.06-07.08	21.06-12.07 (22)	13.07-27.07 (16)	28.07-07.09 (10)
1998	29.06-21.08	29.06-24.07 (26)	25.07-10.08 (17)	11.08-21.08 (10)
1999	04.07-25.08	04.07-30.07 (26)	31.07-14.08 (15)	15.08-25.08 (10)
2000	07.08-29.09	07.08-01.09 (26)	02.09-18.09 (17)	19.09-29.09 (10)

In the Table 22 we can see data concerning the event rank, its date and location, the Polish National Team representatives and their results in a 4-year Olympic cycle.

Table 22 Sports events and results achieved by Polish representatives.

Year	Event rank	Achieved results			
		Surname	result	distance	place
1997	World Championships Athens 02.08-10.08	Korzeniowski R.	3:44, 46	50 km	I
		Lipiec Tomasz	3:50, 14	50 km	V
		Muller Jacek	1:24, 47	20 km	XV
		Muller Jacek	-	50 km	DNF
1998	European Championships Budapest 18.08-23.08	Korzeniowski R.	3:43, 51	50 km	I
		Lipiec Tomasz	3:48, 05	50 km	V
		Radke Katarzyna	43:09	10 km	VI
		Stosik Stanisław	-	50 km	DNF
1999	World Championships Seville 20.08 –29.08	Radke Katarzyna	1:31;34	20 km	V
		Magdziarczyk R.	4:05, 10	50 km	XIX
		Lipiec Tomasz	-	50 km	DNF
		Korzeniowski R	-	50 km	DNF
2000	Olympic Games Sydney 20.08-1.09	Korzeniowski R.	1:18, 59	20 km	I
		Korzeniowski R.	3:42, 22	50km	I
		Magdziarczyk R	3:48, 17	50 km	VIII
		Lipiec Tomasz	-	50 km	DNF
		Radke Katarzyna	-	20 km	DNF

The achieved results and the stable level of performance in the most important sports events in a 4 - year cycle indicate a proper training policy. Also, applied adjustments confirm the old saying that only orderly and systematically analyzed training and application of minor amendments can determine the ultimate success.

Training before the start. Paris World Championship in 2003, from left Kisiel, Kuciński.

In light of the data analysis of the material collected in a long-term training work and available literature, I can give the following observations concerning the Direct Competing Preparation for the racewalking main events:

- If the sports training calendar allows it, before the start of a Direct Competing Preparation, the athlete should go on a training camp in a medium-height mountain region,
- Before the start of the Direct Competing Preparation the athlete should take part in a competition (e.g. Polish Championships), to check their preparation level for a major season event,
- Before going on a high mountain training camp, an athlete should first go to a medium-height mountain training camp (e.g. Szczyrskie Pleso 1350m asl), [9]
- It is advisable to send the athlete to a high-mountain training camp organized in a place already known to the athlete, preferably located at most 2000m asl.,
- The high-mountain training camp should last form 22 up to 28 days,
- After returning from the camp we continue to train two times a day,
- 10 days before the main event we perform the last disposition test,
- The event adaptation period should last about 8 - 10 days and should be spent closest to the event location,
- If the high-mountain training camp takes place in BPS and is organized on a 2500 m asl, then the adaptation period should be extended to 10 days and the camp should last about 30-32 days,
- The period between the return from that kind of camp and the main event should be extended about 4 to 6 days because of the disturbances in racewalking technique coordination.

Chapter X

High-mountain racewalking training

High-mountain racewalking training camps have become, in recent years, an indispensable element of the preparatory process of an athlete willing to take part in major sports events. The problem of training in the conditions of reduced oxygen in the atmosphere became important in sports training since the Olympics held in Mexico in 1968.

From that point 40 years have passed, and the current disputes between theorists and practitioners are no longer focused on the possible benefits of high-altitude training, but on finding its optimal training form and a correlation with the physiological processes athlete's body.

I have been attending high mountain camps for many years, located at altitudes of 1000 m above sea level and up to even 3000 m npm. Research published in the literature [6,8], own observations and experience gained there has shown, that training in the mountains should take the main place in the system of hypoxic training in race walking. In this chapter, I wish to present my observations and comments on high-mountain racewalking training.

There are many sports centers located at the aforementioned altitude all around the world, where one can realize the high altitude racewalking training. There are centers in Strbske Pleso (Slovakia) - 1350 m., Belmeken (Bulgaria) - 2000 m., Johannesburg (South Africa) - 1850 m., Toluca (Mexico) - 2700 m above sea level, Alamosa (USA) - 2500 m above sea level. These centers are intentionally listed in this way, because, as already mentioned, training in racewalking has a certain specificity. Training units take place not only on a stadium or in the gym, but mainly in the field, on roads or bicycle lanes. They must be chosen in the way that their profile is similar to the competition route, of the competition to which the athlete is preparing to [5,6,14,26,40].

Selecting the optimal altitude for training in the mountains it is conditioned by the specific nature of the sport. With racewalking being a technical - coordination discipline, it is the best to use racewalking sports centers situated at an altitude of 1300 m - 2000 m above sea level. The selection of such a height allows for the use hypoxia in order to increase the level of sports disposition. Here I present the conditions required to be taken into consideration before going on high altitude training camp [5,6,8,26,40]:

- camp participant's age,
- good health of the competitors - one should avoid any inflammations, e.g. of teeth, and all injuries should be healed,
- emotional state of the athletes going on the camp,
- sports level of the athletes leaving for high-mountain region,
- rank of the event that the athletes will compete in after returning from the camp,
- current training disposition of walkers willing to go,
- "mountain experience" of the athletes taking part in the camp,
- the possibility of choosing different training routes in order to avoid mental exhaustion,
- duration of the camp,
- means of diversifying the training activities,
- possibilities of organizing activities other than sports ones, e.g. sightseeing,
- expected adaptation time.

10.1 Adaptation.

The time of adapting to high-mountain conditions depends on various factors, some of them being:

- altitude on which the training camp facilities are placed,
- age and sports level of participants,
- training discipline,
- physical predispositions for staying in high-mountain region,
- psychical preparation for a hypoxic training,
- previous high-mountain training camps training experience.

Acclimation period can last from 3 up to 5 days in e.g. Strbske Pleso, 5 to 7 days in Font Romeu, Johannesburg and even up to 10 or 12 days in centers such as Los Alamos and Toluca.

Such significant duration differences are a result of many factors. These include mainly the altitude of the center placement and athlete's experience in high-altitude training. All those who regularly go and train in the mountains have a greater ability to adapt (about 1,5-2 times faster) than the walkers doing high-mountain training for the first time [5,6,8.26.33.40]. Adaptation time, therefore, depends to a great extent on age, seniority and sports level of the athlete. Young people, especially those who visit a high mountain region for the first time, can find the adaptation period of the stay harder and slower.

Shorter distance racewalkers can have far more problems with adapting to high-mountain training than long distance ones. High level of sports predisposition, on the other hand, can result in a faster and easier adaptation.

It is also important to remember that if an athlete goes on a high-altitude training camp being fully aware of its purpose and with positive attitude towards hard work that will await him, their time required to adapt to the stay will be much shorter. Also, we cannot forget about the significant impact of previous high-altitude training experience.

When going for the first time on a camp at a height of 1800 m above sea level, it is advisable to complete a training camp at a lower altitude, e.g. in Štrbské Pleso, at an altitude of 1350 m. It will allow for the body to adapt to a training workout and the stay in high mountains. As already mentioned, each subsequent trip in the high mountains reduces the time needed to adapt and make the adaptation more easy.

A phenomenon often associated with adaptation which hinders or even prevents the normal training is mountain sickness. It manifests itself gradually or rapidly in people not adapted to the conditions of hypoxia.

The most common symptoms of high altitude illness include:

- headaches,
- insomnia,
- lack of appetite,
- nausea,
- vomiting,
- cough,
- dizziness,
- laboured breathing during exercises and rest,
- reduced urination,

- tiredness,
- coordination disorders.

These symptoms may occur in case of not respecting the gradual process of adaptation. Other reasons may be: achieving a too great alititude in a too short time, over-stimulation of hormones in order to compensate the reduced ability to exercise, too intense workout performed before the training camp, and poor resistance to hypoxia. One of the many measures to overcome this symptoms, yet quite effective, is administrating aspirin in the amount of 1g. daily.

In case of any of mentioned symptoms of mountain sickness one should

reduce the training workload, or even stop the training in general. If the symptoms of mountain sickness persist, the athlete should be taken to a lower altitude and he or she should consult their doctor.

For these reasons, in practical coaching, to avoid perturbations associated with acclimatization and before going to any training camp centers located at an altitude of more than 1,850 meters above sea level, some transitional camps should be organized at an altitude between 1000m and 1300m above sea level.

The period of staying in the mountains can be divided into following phases [6,8,26]:

- initial adaptation - lasts 6 – 8 days,
- progressive functional adaptation - 12 – 14 days,
- full functional adaptation up to 6 days.

10.2. High-mountain training camp

The exists a direct connection between the high-mountain training and the yearly training plan, which highly influences the content of the high-mountain training [8,14,26,35]. If we are organizing the camp in the initial preparatory period then the training is characterized by:

- high velocity of comprehensive workout,
- high number of long exercises made in the aerobic zone with low lactate level (not higher than 3 – 3,5 mmol/l),
- low intensity continuous walks.

In case of the camp taking place during the Direct Competing Preparation period (BPS), the general characteristics of the training workout change drastically, that is:

- the intensity of continuous walks increases,
- the intensity of changeable walks increases,
- the velocity of training workout decreases,
- the velocity of general fitness training workout decreases (e.g. hurdles)
- the lactate level increases in special cases (8 mmmol/l and more).

In both cases the camp lasts about 23 - 25 days, which are divided in the following way:

- initial adaptation period – up to 6 days,
- progressive functional adaptation period – up to 13 days,
- full adaptation period – up to 6 days.

Here I oresent an implementation of the training objectives in the Direct Competing Preparation of an athlete preparing to compete in 50 km racewalking distance at the Olympic Games in Sydney. Training began with a mountain camp in Strbske Pleso (Slovakia) at an altitude of 1350 m. on 21.07-3.08.2000. Walker's task was to prepare his organism for the next high-mountain training camp being held at 1850 m above sea level. The stay in Strbske Pleso allowed for an easier adaptation to the next training camp.

At the end of the camp, the athlete competed in the Polish Senior Championships on a 20 km distance, which was held in Krakow on 5th August 2000. It allowed to determine the current sports disposition and the degree of preparation to take part in the most important event in the walker's sports career. The actual competition demonstrated a good preparation in terms of strength, but also some shortcomings associated with maintaining proper walking speed over the distance.

From 8th August 2000, the athlete attended a 25-day training camp in Johannesburg (South Africa) at 1850 m., which lasted until 1st September 2000, when the athlete went directly to Australia for the Olympics. The stay in Johannesburg was divided as follows:

8.08 – 13.08 initial adaptation period,
14.08 – 27.08 progressive adaptation period,
28.08 – 1.09 full adaptation period,

Tables 22 - 24 present training means used in each adaptation period during the high-mountain training camp in Johannesburg.

Table 22. Training means used in the initial adaptation period.

Training means	Distance (km) Duration (min)	Percentage of the whole training workout(%)		Training intensity in relation to the sea level (%)
		Of the total distance:	Of the total duration:	
WB_1	4	4,44	3,13	95
$OWCH_1$	80	88,88	62,5	93
Rhythm	4	4,44	3,13	95
SW	2	2,22	1,56	95
SPR	135		21,09	100
Strength	55		8,59	100

Table 23. Training means used in the progressive adaptation period.

Training means	Distance (km) Duration (min)	Percentage of the whole training workout(%)		Training intensity in relation to the sea level (%)
		Of the total distance:	Of the total duration:	
OWB_1	12	3,37	2,82	100
$OWCH_1$	250	70,22	58,82	95
$OWCH_2$	51	14,32	12,00	98
$WS_{DŁ}$	21	5,90	4,94	96
$WS_{GŁ}$	11	3,09	2,59	96 – 98
Rhythm	6	1,69	1,41	100
SW	5	1,40	1,18	105
SPR	275		12.94	100
Strngth	70		3,29	100

Table 24 Training means used in the full adaptation period.

Training means	Distance (km) Duration (min)	Percentage of the whole training workout(%)		Training intensity in relation to the sea level (%)
		Of the total distance:	Of the total duration:	
OWB_1	5	4,55	3,50	100
$OWCH_1$	60	54,55	41,96	100
$OWCH_2$	40	36,36	27,97	100
Rhythm	3	2,73	2,10	105
SW	2	1,81	1,40	100
SPR	165		23,08	100

Legend:

OWB1 running endurance, I range,
OWCH1 walking endurance, I range,
OWCH2 walking endurance, II range,
WS gł main special endurance,
WS dł long special endurance,

Rhythm, technique,
SW relative speed,
SPR general fitness,
Strength general strength.

In order to maintain a balance between targeted and comprehensive measures (Strength, SPR) we assume that 1 km of running or walking is equal to 5min of the time spent on the development of strength and general fitness. In the initial adaptation period g the main training means is walking in the first intensity range. It amounts to 93% of the speed at which we train in the lowlands.

The use of OWCH1 as a means of training is the best way to adapt the musculoskeletal, cardiovascular and respiratory systems to the training work in the mountains.

In the second period of adaptation training this measure remains as the leading one. The second most important introduced measure is OWCH2, whose percentage in the training process amounts to 14.32% of the walking distance in the whole training. The training in this intensity is performed in a continuous and repetitive form, as well as WSGŁ, and WSDL (with the same intensity as OWCH2).

One should note that the SW speed increases to 105% of the speed achieved in the lowlands. Reduced air resistance in the mountains can "break the speed barrier."

Analyzing the training in the third period of the stay in the mountains, we can note that training can be conducted with the same intensity as in the lowlands. In this period, all means of training achieved 100% of their intensity and we also achieved a significant increase in speed and an easier regeneration between training units.

While taking part in a high-mountain training camp in Johannesburg we managed to fulfill all the training goals, which resulted in a good disposition for the Olympic Games in Sydney.

10. 3. Re-acclimatization

In order to achieve positive results in sports events after the high-mountain training, we must precisely determine the time between its end and the date of the main event. This period must ensure a proper re-acclimatization and also create right conditions for the adaptation of the body to the new training tasks. Please note that this period depends on many factors, such as:

- discipline specifics,
- high-mountain camp organization cycle,
- individual characteristics of an athlete,
- type of training introduced during a high-mountain stay,
- duration of high-mountain stay.

The last mentioned factor has a decisive impact on the length of the acclimatization and level of sports preparation for the lowland competition - the relation is a directly proportional. For racewalking who regularly use hypoxic training and stay in the mountains for about 23 - 26 days, the time of acclimatization is 5 -6 days, while for beginners it can last between 8 - 9 days.

Re-acclimatization is directly related to a proper selection of the date of competition, in which the athlete will take part after returning from the high-mountain camp. I believe that the best results can be achieved on the 5th day immediately after the camp, and when the time between returning from the mountains and the event is not less than 16 - 18 days and no longer than 35 - 40 days.

10.4. High-mountain training control

The training supervision during training camps is based on the observation of the body's response to the applied workload in order to avoid high altitude sickness and the symptoms listed earlier. A more general description of the high-altitude training control will be provided in section "The control of the yearly training process"

While supervising the high-mountain training it is important to assess the physiological response of the body to a stay in a mountain region and to the training effort. One can realize it through a daily measurement of the blood pressure and heart rate, measurement of body weight, cardiac monitoring using a sport-tester, and the measurement of the concentration of lactate in blood.

Before each high-mountain training camp, and after returning from it, the competitors undergo a full medical examination. While in the mountains, if possible, we conduct a complete blood count after the period of progressive adaptation.

We should carefully evaluate the technique of walking, possibly through frequently filming the training in the field [27].

In order to avoid injury, especially in the initial period of the stay, the amount of fluid drunk per day should be strictly controlled, e.g. Font Romeu advise to consume 8 liters of fluid throughout the day [6,8,27].

Chapter XI

THE CONTROL OF THE YEARLY TRAINING PROCESS

Because of its specificity, racewalking is the only athletic competition that is evaluated visually by judges. This has a big impact on the process of training, in which we have to pay attention not only to the excellent physical preparation of a competitor, but also to the need of technical perfection.

The long process of sports training requires a precise control, which should be based on information about the general fitness, technical, tactical, psychical and health preparation of an athlete. It should also take into account the nature of training workouts and competitions. Only the correct methodological approach allows us to conduct a high level training and guarantees the success in sport. The assessment of so called "direct effects" plays a huge role in the entire system of collecting information in the process of training control and results in the in-training control. These control measures must take place in natural training conditions, and under no circumstances they should interfere with the course of training sessions. The obtained information must be both clear and unambiguous, suitable for direct use by the coach in order to correct the current session or to be applied in the next training unit [8,27,38,47].

In the control process we:

- evaluate the state of athlete's organism functions - laboratorial testing,
- compare the results with previous ones, performed on the same athlete in previous preparation stages or other training cycle day,
- compare the athlete's results with analogical results of other sportsman, with a similar or higher sports level.

The training control is an integral part of the training process and cannot be a hindrance in its implementation. In racewalking we can distinguish two types of training process control of an athlete:

- general control, which is not directly connected with the training process,
- direct control of a training process.

11.1. General control

The term "general control" includes":

- periodic medical examination,
- test for checking the knowledge about rules and requirements being in force during racewalking events and about any possible changes in them,
- traffic regulations test.

Periodic medical examination, based on which the athletes are allowed to attend training sessions and gain the right to participate in sports competitions, apply to all athletes. Those under 15 years of age should be subjected to periodic tests every 3 months. On the other hand, all those who have completed 16 years of age, are required to undergo tests every 6 months. Such examinations should be carried out in a sports clinic by a medical doctor with a specialization in sports.

The confirmation of the training work effectiveness of an athlete can be found in sports result obtained during racewalking events. In addition, for the athlete's effort not to

be wasted and to be visible in expected results, one should also be familiar with the rules and requirements of competitions. In such a specific athletic competition as racewalking, subjected to the assessment of judges, one should know exactly what are the rules applied by judges, according to which they assess and control the properness of the technique [27].

As a conclusion from abovementioned discussion, I recommend to perform some control tests before each sports seasons, in order to check athlete's knowledge about the basic rules and requirements being in power on any kind of racewalking events, connected, among others, with:

- the definition of racewalking based on the international IAAF regulations,
- rules for warnings and disqualifications given by the judges for not implementing a proper racewalking technique,
- basic rules of regeneration station placement, rules of using them, placement of the disqualification table, clock settings and so on.

A control of the training process should also include a traffic regulations test. It relates to athletes at all levels of training. One should keep in mind that most of the racewalking training in done on roads with significant traffic. From the youngest age category, we are forced to train on roadsides and streets. We can encounter a variety of dangerous situations, which can be overcome with a good knowledge of traffic regulations.

Therefore, from the first training steps undertaken by adepts of this specific athletic competition, the coach must teach them about traffic laws, road signs and the regulations of walking on city and country roads as well as streets and bike lines. This applies especially to the regulations of traffic outside towns and cities, using reflective vests after sunset in winter, etc. Knowledge of issues related to traffic should be required from athletes of all age categories.

11.2. Direct control

Direct control of the training process can be divided into periodic and in-training control.

- Periodic control allow us to assess the changes occurring in the athlete's body
- (or disposition) under the influence of one or more training units, different workout volume, intensity, type of training workloads, competition, rest, nutrition and other causes of any changes.
- In-training control monitors changes occurring during the training unit, caused by the influence of different workloads, applied with various volumes and intensities.

In the following chapters I present different types of direct training process control (both periodic and in-training), which can be used in racewalking on different training levels from youngsters to seniors [27,29].

11.3. Youngster training control

The control of an athlete's training process starts from the beginning of his athletic career, that is the youngster age. We know that well-implemented principles of proper racewalking technique and systematic training will pay off in later years of sports career. Contrary to what some may think, a youngster training control is not easy. Properly con-

ducted training includes not only activities related to racewalking: techniques, rules and regulations, participating in sports competitions, as well as general racewalking training or special and general fitness exercises.

One of the most important factors in youngsters training control is a systematical (quarterly) determination of a general fitness level, derived from following tests [1,2]:

- running on 600 m (girls) and 1.000 m (boys) distance,
- 12 – minutes test (Cooper's test),
- 3 kg medical ball throw (from behind),
- run with a front flip,
- shuttle run 4x10 m,
- forward body bend,
- sits from lying in 30 sec.

This group of tests can determine whether the general development exercises are conducted properly at such an important stage of the individual development, and whether there are any abnormal changes of the motor skills. The most important tests are the ones indicating levels of strength in racewalking. Quarterly, especially in the first year of youngster (14 years old) training, it is advisable to carry out tests during a distance of 1000 m for girls and 2000 m for boys.

If it is possible, in the winter it is recommended to compete in indoor racewaling competitions which are held as school events. The 15-year-olds can undergo tests on longer distances: 2000 m for girls and 3000 m for boys. It the distance of Junior Indoor Voivodeship Championships held in the winter.

In spring, young athletes should take part in a series of cross-country runs, which naturally are the "battery of psychological tests". The coach may then get to know the athlete in terms of competition involvement, overcoming the difficult weather conditions and variable terrain configuration of the route, as well as competition stress before the start.

In summer juniors take part in a series of competitions, which end with the "Mały memoriał im. Janusza Kusocińskiego" competition . This event is one of the most important for this age category and corresponds to the rank of Polish Youth Championships, where the girls compete over a distance of 3000 m and boys on 5000 m.

It is assumed that if an athlete reaches a result below 27 min for a distance of 5000 m at the age of youngster, and less than 17 minutes for a distance of 3000 m at the age of younger youngster, we should do everything that is possible to convince them to systematically practice racewalking.

In addition to the abovementioned control means in racewalking, it is important to assess the correctness of the technique of walking. The control is carried out on a regular basis, throughout the whole year, for all sessions (evaluated by the coach and through audio-visual media). One can also use pictures or videos taken during a competition.

11.4. Junior training control

The transition to a higher age category in race walking is associated mainly with a significant increase in the distance length, on which the competitions are held. Younger juniors (16 and 17 years) and juniors (18 and 19 years) compete in Polish Indoor Championships on following distances: women - 3000 m, men - 5000 m. Polish Championships

are held in the younger junior category respectively at 5000 and 10,000 m distance, and in the junior category over a 10,000 m distance for both men and women.

Extension of the distance forces the athletes and coaches to conduct the training workout based on a detailed plan of the whole macrocycle. This requires enhanced control of the training process, which aims to eliminate all errors that may occur.

Similarly to the youngster case, it is advisable to perform the following general fitness tests (in November, in January after the Polish Indoor Championships and in April, before the summer competition period):

- forward body bend from lying on one's back,
- sits from lying in 30 sec.
- 12 – minutes test (Cooper's test),
- 3 kg medical ball throw (from behind),
- envelope run,
- pull-ups,
- bending and unbending of the body while lying face up on a bench (back muscles).

As already mentioned, at the age of junior the competing distances are getting longer. This significantly increases the training load and intensity of workouts. It often happens that the athletes, especially during a training unit, try to walk with a speed to which their locomotor system has not yet been prepared, which causes disturbances in racewalking technique. To eliminate these errors, beside conducting technical exercises under the supervision of a trainer on every workout, one should, as far as possible, film the walkers to show them their own mistakes. It is also advisable to carry out the following test every month:

- line walking – 30 m,
- line walking – 30 m with hands on one's back,
- line walking – 30 m with closed eyes,
- slalom walking on 100 m distance,
- maximal speed walk on a 100 m distance.

This test will allow a systematic evaluation of a technical advancement of the training athlete. In order to assess the racewalking technique In a proper way, and for the test to be objective, it is good to invite an athletic judge with required knowledge about competition rules to participate in the assessment. If on the racewalking technique evaluation test a judge will present, as well as the trainer of the athlete and a video camera, it is guaranteed that any deficiencies in the racewalking technique will be noticed and corrected by the walker and the coach. We should pay attention to a proper walking technique all the time, keeping in mind that its quality determines the success in sports competitions.

To determine the walking speed during training sessions in different training periods it is useful to apply the Conconi test. This test, thanks to the simultaneous registration of HR and Speer, has become a reference point for the analysis of HR obtained during the training and theoretically determining the desirable ranges of speed and HR values, corresponding to the individual training measures.

Another type of tests assessing the correctness of goals and assumptions established in the preparation period are indoor competitions, e.g. Polish Indoor Championships. By taking part in them we may determine the current level of specialist preparation during the preparatory period. Before the start of the summer season, for 10 days before the first

competition, it is advisable to carry out a test consisting of defeating half of the planned competition distance with a gradual acceleration at every kilometre, e.g. women are planned to compete at a distance of 10 km, so the test is held at a 5 km distance in the following way: 1st km covered in 5:00 minutes, 2nd km - 4:50, 3rd km - 4:40, 4th km - 4:35, 5th km - 4:30.

With this test, the athlete can comprehend the problematic feeling of passing time, he or she will also gain the ability to self-evaluate their own preparation, and the trainer can evaluate the realization of tactical assumptions and correctness of athlete's conduction during the competition.

In the sports season, the number and types of competitions are selected in such a way so to ensure the best disposition of the athlete for the most important competition of the year. In the sports world, an increasingly popular form of assessing the preparation of an athlete for the season, has become organizing the competitions on a non-standard distances, eg. 15 km or 35 km. In Portugal, national championships for seniors up to 23 years are already official organized at the distance of 35 km.

One of the most important control element of the junior training is evaluating his or her mental toughness. The psychical preparation is usually a source of substantial reserves which make the athlete capable of achieving progress in sports without having to increase the volume and intensity of training [46,47].

Racewalking is characterized by long trainings and an increase in workout volume and intensity with higher age category, as well as longer competition efforts. Competing in racewalking is based on:

- overcoming time, weather conditions, training and competition terrain configuration,
- overcoming ones tiredness and fatigue,
- competing with other athletes,
- confronting judges who evaluate the quality of racewalking technique.

An important role in the competitive sports is played by: motivation for practicing competitive athletics, psychological resistance to unusual situations which do not occur in other track and field events (receiving warnings and requests for disqualification, etc...). Important are also the volitional features, such as perseverance and persistence in practicing the racewalking competition 27].

Abovementioned characteristics can be measured in athletes in the junior age, by using a training sessions tests consisting of overcoming a given distance in different ways:

- long-distance target walk,
- azimuth walk,
- long-distance loop walk.

All of these forms are included in all-year training process. To properly and effectively realize the Schedule plan we have to choose a good set on routes and terrain, for example similar to the vicinity of Kobyla Góra (map).

The long distance target walk starts from a specific location, placed at the distance of 15-20 km from the end destination. It is advisable for the route not to be known to the competitors. The coach can drive the athletes to the starting point with a car, in the direction opposite to the walking one. This distance should be covered at a certain time. It should be performed generally in the walking speed of intensity range adequate to the cu-

rrent training period. During the training, one should observe walker's reactions to what is happening on the road, safety of racewalking, ability to cooperate with other participants on the road, the degree of concentration (which often affects the technique of walking), as well as the relations in the group, and reactions to any changes in the configuration of route etc [27].

The azimuth walk is a form of training similar to the orienteers training [27]. The day before the scheduled training, a place where athletes have to confirm their stay, should be checked by the trainer. During the training the walkers will receive a route plan and a card on which their arrival to a particular route points will be reported. The length of the distance to overcome should not exceed 15 km, with 4-5 reporting points. Also, an approximate time to cover the route should be specified. If the area around the training centre has a good roads with gravel surfaces, we can also use them to plan racewalking events.

Athletes start the race in pairs, freely choosing their partners or partners being designated by the coach. We inform the walkers that durin the walk there will be a control carried out in order to assess the techniques of racewalking. The main purpose of this form of training to learn pair co-operation on the route, to skilfully unfold one's own strength during the distance, and to take into account the strength of one's teammate, who may be one's opponent in a future competition.

The azimuth walk also plays an important role in the promotion of the athletics competition, by allowing for a closer contact with the sports fans and making them more interested in this particular discipline. Azimuth walking should not be trained in an area already known by the participating athletes. Like in target walks, one should organize them on routes with a low traffic.

Walk on a loop, is a variant of the long-distance walking. The goal is to cover e.g. 20 km, by making a loop of 10 km twice. Athletes presenting an equal sports level are divided into small groups. During the training session we pay special attention to the way one walks in the group (as related to cooperation between the walkers, safe behavior, who is leading the team on a given day, etc.). We pay attention to the athlete maintaining a proper technique, walking rhythm, its decomposition rate on individual loops or even sections of the route, and to the same factors which were mentioned in the discussion of long-distance walking. Note, however, that long-distance loop walks are significantly easier to mentally overcome than the target walks [27].

I would recommend to perform the trainings, during which we can assess, among other elements, the mental toughness of walkers, in the late-winter and early spring period. An important factor in this period are the climatic conditions in our geographic zone. Often, the difficult workouts in different weather conditions and areas have a decisive influence on the young walker motivation whether further cultivate racewalking sports or switch to another one.

11.5. Senior training control

The biggest professional ambition of any coach is to work with seniors and achieve with them a significant sports success on a country and world level.

But to achieve this, one has to carefully plan the training, which must then be implemented by the athlete. It is important to collect information on the effects ensued in walker's body in response to the implementation of established training process. So primarily

we measure the responses of individual systems to applied exercises, their quantity and quality. The measurement has to be made during the workout, immediately after its completion or during breaks between exercises.

The point of reference for evaluating the results is athlete's initial state and previous reactions to a given exercise. We can also compare these reactions with other walkers of similar sports level. Based on information obtained from these control groups, we can introduce adjustments to the training plan [27,47].

In the system of collecting information based on control methods of training plays a huge role in ongoing evaluation. It has to be held in natural conditions of training (stadium, route), and be included in the training course. Monitoring and evaluation cannot be interfered with during the sessions and cannot hinder the athlete. Achieving even higher levels of sport and pursuing athletic success forces us to conduct even more detailed and systematic control of the training process. Below we describe the following means of controlling a senior training:

- in-training control
- high-altitude training control,
- registering and analysing training workloads.

11.5.1. In-training control

In-training control is performed using modern monitoring equipment of an appropriate measurement technique. The device should be simple enough and yet provide reliable and objective indicators that can be immediately analyzed. Such kind of control should be conducted on each training unit. To do this, we use the following technical measures [27,47,49]:

- Sport –Tester – a device used to measure heart rate frequency,
- device used for measuring the lactate level in blood,
- cameras - used to evaluate the racewalking technique,
- heart rate and blood pressure measuring devices,
- scales to measure the body weight.

In practice, the in-training control is based mainly on the measurement of cardiovascular reaction to a given load. Reliable measurements are obtained through a Sport - Tester, which in addition to the normal functions of a stopwatch, monitors the heart rate during each phase of training, so that athlete may adjust the current load to their physical abilities, the terrain, weather conditions, and even time zone change.

Moreover, the Sport–Tester :

- is very useful in the competition environment, especially on the 50 m distance,
- shows the optimal rest break time during the training and allows for their adjustment,
- registers the heart rate frequency during medical examination, effort tests or control exercises.

A very important means of practical diagnosis is determining the concentration of lactate in the blood. This allows for an assessment of the correctness of training workload selection for the formation of a certain type of strength, e.g. aerobic and mixed.

In practical application, a test proposed by prof. Żołądź can be very useful. It allows for a specification of a heart rate threshold, threshold speed and lactate threshold. It con-

sists of five six-minutes test exercises on a treadmill, separated by a two-minutes intervals. During each break, immediately after exercise, the capillary blood is taken in order to determine the concentration of lactate. An athlete performs an efforts with the intensity of a specific pulse value. The first exercise is made with intensity being 50 contractions / min lower than the maximum heart rate achieved during a competition. Each subsequent effort is made with a intensity 10 contractions / min higher than the previous one.

During the test, the walker controls their heart rate using a heart rate monitor with built-in memory (sport-tester) and walks with a speed that allows them to maintain the desired heart rate. Based on the distance they covered during the first test, one determines the speed used for the next stages of the test. Analysis of lactate concentrations allows us to determine the last workload, after which the lactate concentration in blood increases continuously, i.e. the workload threshold.

After loading the data from the sport-tester into the Polar Precision Performance computer software, an analysis of heart rate during the test is performed. The lactate concentration analysis and covered distance allow to determine a threshold HR and the threshold speed in continuous racewalking.

Below we presented prof. Żołądź's test results, which was carried out on 30th June 2004, on a tartan track in Krakow, at approx. 18ºC. After a 10 minute warm-up with the intensity of 140 contr / min the athlete (international level) performed five 6-minutes efforts with the corresponding intensity:

150 contr/min in the first effort
160 contr /min in the second effort
170 contr /min in the third effort
180 contr /min in the fourth effort
190 contr /min in the fifth effort

Table 25. Żołądź's test summary, 30th July 2004 r.

	before	I effort	II effort	III effort	IV effort	V effort
HR [contr/ min]		149	159	**170**	180	192
Distance [m]		1320	1400	**1470**	1550	1635
LA [mmol/l]	1,39	1,96	1,79	**2,18**	4,05	9,56
t_{km} [min/km]		4:32	4:17	**4:04**	3:52	3:40

For comparative reasons, in Table 26 we can see test results of the same athlete, but performed earlier, that in on 27th May 2004.

Table 26. Result summary for each test level held on 27th May 2004.

	before	I effort	II effort	III effort	IV effort	V effort
HR [contr/min]		148	**159**	171	182	191
Distance [m]		1270	**1375**	1500	1580	1650
LA [mmol/l]	3,37	1,31	**1,71**	2,63	5,14	11,5
t_{km} [min/km]		4:43	**4:21**	4:00	3:47	3:38

The purpose of the test carried out in June 2004 was to determine the lactate threshold, heart rate threshold, and the speed threshold in continuous walking. Lactate threshold is the boundary separating the aerobic efforts (extensive efforts) from the efforts of a mixed nature (intensive efforts). The pulse threshold was set at 170 contr / min and the march speed 4:04 per kilometer. The intensity threshold expressed as a heart rate or speed is the boundary separating extensive efforts (of an aerobic character) from the intensive ones (of a mixed character). Increasing disposition of an athlete will be manifested by a higher threshold speed. The fatigue will be visible in a higher heart rate at a certain speed or lower speed at a specific heart rate. Table 27 presents the converters simplifying the Żołądź's test, developed by K. Kisiel and W. Mirek.

Table 27. Żołądź's test converters

distance (m)	time (per km)	distance (m)	time (per km)
1000	6,00	1280	4,41
1010	5,56	1290	4,39
1020	5,53	1300	4,37
1030	5,50	1310	4.35
1040	5,46	1320	4,33
1050	5,43	1330	4,31
1060	5,40	1340	4,29
1070	5,36	1350	4,27
1080	5,33	1360	4,25
1090	5,30	1370	4,23
1100	5,27	1380	4,21
1110	5,24	1390	4,20
1120	5,21	1400	4,17
1130	5,19	1410	4,15
1140	5,16	1420	4,14
1150	5,13	1430	4,12
1160	5,10	1440	4,10
1170	5,08	1450	4.08
1180	5,085	1460	4.07
1190	5,03	1470	4,05
1200	5,00	1480	4,03
1210	4,58	1490	4,02
1220	4,55	1500	4,00
1230	4,53	1510	3,58
1240	4.50	1520	3,57
1250	4.48	1530	3,55
1260	4,46	1540	3,54
1270	4,43	1550	3,52

11.5.2. High-mountain training control

High-mountain training camps have, in recent years, become an integral part of training and preparation of nearly all world's leading athletes, competing in strength disciplines [6,8,26,27,29].

During the camps, it is essential to systematically monitor the training process. It is required because of the fact that body's responses to undertaken effort in the mountains differ significantly from those observed in the lowlands. They depend to a large extent on the acclimatization period, which does not have to be the same for each athlete. The time required to complete the acclimatization can be different and is not constant. Other factors that have influence on the acclimatization are the location, weather conditions, season, general training level and training preparedness for the camp and former experience in attending training camps. Therefore, one should keep in mind the need for individualization of the training process and caution with applying training workloads.

The training control during a high-mountain training camp is based mainly on [6,8,26,27]:

- observing organism reactions to applied workloads in order to avoid high -mountain sickness,
- heart rate and blood pressure measurement (morning),
- weight measurement,
- daily amount of fluid intake,
- lactate level measurement,
- using sport-tester during trainings - heart contractions frequency measurement,
- using a camera in order to evaluate the walking technique.

Before every trip to a high-mountain training camp, as well as before every return to lowlands, the athletes undergo comprehensive medical tests, including complete blood counts and cardiovascular tests. During a walker's stay in the mountains, at the end of the adaptation period, I recommend carrying out a morphological test. In order to avoid high altitude disease one should monitor body's responses to the applied workload. Symptoms of such disease and how to avoid it are discussed earlier in the „High-mountain training camps" chapter.

The following table shows the 28 measurement parameters of a world-class athlete's daily check-up, recorded during a high-altitude camp in Johannesburg (South Africa), held on 8th August to 1-st September 2014.

Table 28 Measured parameters observed on a high-mountain training camp.

day	heart rate	blood pressure		training volume	training intensity	lactate level (morning)	lactate level (after the training)
1	44	130	86	12	5.1	1.7	2.6
2	47	135	85	16	5.05	2.3	2.9
3	46	132	87	15	4.54	2.3	3.2
4	49	142	90	20	5.1	2.1	2.8
5	50	143	89	20	4.54	2.4	3.1
6	47	138	86	15	4.57	2.5	5.6
7	45	136	88	25	4.45	2.9	2.6
8	44	135	87	20	4.49	2.2	2.4
9	44	135	90	30	5.0	2.1	2.3
10	43	134	87	25	4.52	1.9	3.2
11	43	135	85	40	4.47	2.1	2.4
12	44	132	86	15	5.1	2.2	2.3
13	42	130	85	25	4.56	2.0	2.3
14	42	129	84	28	4.43	1.9	6.5
15	41	131	83	32	4.58	2.3	2.8
16	42	129	83	12	4.59	1.9	2.1
17	42	130	82	40	4.53	1.8	2.3
18	41	131	83	15	5.1	1.9	2.1
19	40	129	82	32	4.35	2.0	6.5
20	39	128	82	16	5.1	2.0	2.6
21	40	128	82	28	4.26	2.1	6.4
22	40	127	86	24	4.46	2.2	3.1
23	38	126	87	14	5.1	2.2	2.1
24	38	126	86	34	4.23	1.9	6.7
25	39	125	87	12	4.56	2.2	2.1

11.5.3. Registering and analyzing of training workloads

The sports development of an athlete, their fitness level and sports disposition are a result of long-term adaptive changes in the body, under the influence of regular training. Many factors are involved in the comprehensive process of retuning specific body functions. One of the basic ones, having a cumulative nature, are the training workloads: their type, structure, size, ways of application in different periods and training cycles [29,47].

Assuming that the effort (training) loads are a function of physical activity regime and cause its specific adaptive responses, one needs to consider them in a specific measurement conventions. The method of documenting, collecting and analyzing workloads was developed in the Department of Theory of Sports, University of Physical Education in Warsaw [48]. It is based on a division of all the means used in yearly training the process of an athlete into three areas of impact:

- comprehensive means (W),
- directed means (U),
- special means (S).

On the basis of these criteria, sets of training means were developed, which are routinely used in a given discipline or competition. Due to the fact that the exercises from each registered group are performed with a predetermined intensity, we can distinguish five intensity levels. Established criteria are heart rate before workout and immediately after it, duration of the exercise and its intensity. This allows us to compare the training loads used in various training periods and to control the dynamics of training intensity.

11.6. Self-control

In addition to the trials and tests carried out by the trainer or specialist scientific teams, the athlete's self-control is also extremely important. This applies to walkers with the right training experience, who are well prepared and aware of what they are doing, so, in practice, juniors and seniors.

In order to personally control one's training process, a questionnaire developed by von Lisen is quite useful. It provides objective information, such as weight measurement made on empty stomach, morning heart rate measurement in a recumbence, sleep duration measured by the number of hours. Through daily systematic filling out of this questionnaire we can get both objective and subjective information about the athlete's well-being, such as: the motivation to train and compete, quality of sleep, fatigue and discouragement, apetite.

Table 29 shows a modified von Lisen questionnaire. It should be filled by putting an „X" in an appropriate box. It is permissible to modify the questionnaire to meet the specifics of your needs. Yet it is important to continue to use systematically the modified method, as this is the only way to gather adequate and comparable material for a post-training analysis of the changes in an athlete's body [27]. As an example I present my own observations concerning the adaptation performed on a pre-Olympic reconnaissance in Brisbane (Australia), which took place from 19th to 30th September 1999.

Table 29 von Lisen's survey

date day	19.09 (1)	20.09 (2)	21.09 (3)	22.09 (4)	23.09 (5)	24.09 (6)	25.09 (7)	26.09 (8)	27.09 (9)	28.09 (10)	29.09 (11)	30.09 (12)
SLEEP LENGTH												
12 h												
11 h												
10 h												
9 h	x											
8 h		x							x	x		x
7 h			x				x	x			x	
6 h						x						
5 h					x							
4 h				x								
SLEEP QUALITY												
deep												
normal										x	x	x
calm							x	x	x			
interrupted	x	x	x		x	x						
lack				x								
TIREDNESS												
rested										x	x	x
normal								x	x			
tired		x	x				x					
very tired	x				x	x						
exhausted				x								
TRAINING MOTIVATION												
very high												
high									x	x	x	x
low						x	x	x				
very low		x	x		x							
lack	x			x								
COMPETITION MOTIVATION												
very high												
high												
low						x	x	x	x	x	x	x
very low				x	x							
lack	x	x	x									
APETITE												
very high												
high												
low							x	x	x	x	x	x
very low	x	x			x	x						
lack			x	x								

From the beginning of an athlete's sporting career we should teach them to keep and systematically fill out a "Training workout diary". It can draw a bigger picture of the training workout, with listed daily, monthly and annual training means. The walker can note some minor but sometimes important information about the daily workout, such as temperature and humidity, wind, pulse measurement after the training, duration of training, type of training, etc. Systematically filled training diary may be a form of training self-control. Nonetheless, it is very good material for the coach to analyze the implementation of scheduled training process.

11.7. Training control summary

Based on the experience gained while working with athletes with different sports levels, I can say for sure that in order to make a successful training work, one requires not only a vast knowledge of training means, but also a proper control of their implementation. In case of any problems in the implementation of the planned training schedule, an appropriate adjustment should be introduced immediately to the training process. It can be expected to accurate and thus effective only after a correct diagnosis of the problem causes. Without a systematic training process control and training workload modifications, any changes in the established training plan are risky. The reaction of athlete's body to the applied workloads can be unpredictable. Systematic control is a key to understand the properties of athlete's body, and is a condition for a success in sport.

Chapter XII

BIOLOGICAL REGENERATION IN YEARLY TRAINING PROCESS

Biological regeneration is defined as intentional influence on an organism, in order to accelerate and intensify the physiological recreation processes in athlete's body. The main purposes of regeneration are:

- activation of the recreation processes,
- preventive reduction of the training overload effects
- toughening and immunization of the body,
- pain ease,
- increasing the resistance to negative training effects,
- increasing the resistance to external factors like heat or low temperatures.

The effectiveness of the training process depends not only on the workload and training intensity, but also on full recovery after exercises.

In the process of walker's development and predisposition building, the quantity and quality of the training work is essential. However, in order to realize the planned training schedule, the athlete needs to have the possibility of a proper biological regeneration.

An important factor that affects the quality of renewal is the athlete's life values hierarchy. The main goal of the training has to be clearly stated and the athlete needs to adjust his or her personal life in order to achieve success.

The racewalker's yearlong training process should include their biological regeneration methods such as physiotherapy, psychological method and pharmacological method.

12.1. PHYSIOTHERAPY METHODS

Methods of physical therapy are basic in the process of sports training. Introducing regeneration by this method requires systematic use, with particular emphasis on the period of staying on sports training camps. During these camp the method should be intensified because of the increase in training load.

After returning from any sport training or after a period of intensive training and after a series of competitions, the athlete should be subjected to a so-called "check-up", performed by a doctor and a masseur. If any health problems might arise as a result of competitions or training camps, the coach should proceed to immediately remove the walker from the event and select appropriate recovery measures.

All measures intended to improve the movement-muscle resources of a competitor can be divided as follows:

- measures taken directly before and after the training as well as during the training session,
- measures taken directly after the training as well as some time after the training.

The former include all kinds of warming salves and ointments, proper preparation for training sessions, e.g. applying cream on places exposed to abrasion, patching nipples, taping heels and toes. This group also include specific actions taken during the training which do not occur in other athletic competition (except a marathon), namely spraying oneself with water when race walking. It prevents overheating of the walker's body to

which he or she is exposed during the walk that can last up to 4 hours. Pouring should be used in the temperatures equal or higher than 20ºC and in long trainings, i.e. longer than 15 km. The athlete sprays his or herself with water, depending on the temperature and the length of the distance, each 3 or 5 km.

The first group also encompasses the use of energy drinks, drinking water and eating energy bars. During each workout the athlete drinks about 2 liters of fluid over a distance of 20 km. The amount of fluid depends on the temperature. When walking longer distances, i.e. more than 25 km, the athlete eats energy bars along the route. Generally, they are given every 5 - 6 km after covering 15 - 16 km of established training distance, and a similar principle apply during a competition.

The activities of the second group - performed immediately after the training - include ice cooling of the lower limbs (ankle and knee) and muscles in order to decrease the muscle tone and narrow the blood vessels. If a swimming pool is available, we introduce an about 15 minutes long relaxation in water.

After the basic hygienic activities, if there is a need, we apply salve treatments which have analgesic and anti-inflammatory effects on the musculoskeletal system.

Biological regeneration treatments performed some time after the training can be divide into two categories:

- performed manually,
- performed using mechanical devices.

The first group, that is biological regeneration performed manually, includes, among others, the dry massage - which is used as the primary means of regeneration in the whole training cycle.

Dry massage can be divided into: the whole-body and local (partial). The whole-body massage is applied upon the arrival at a training camp (“check-up”), after a long journey, after sports competitions and after long training workouts. During the preparatory period we combine it with short stays in a sauna. It often happens that there arise a need for setting a cervical vertebrae or the pelvis - it is performed during a whole-body massage.

Local (partial) massage is used more often, for example, massaging back after training on a stadium, legs when feeling fatigued, sometimes hands.

Local massage is never used before a competition, in order to maintain adequate muscle tone. Last time we apply it is four days before the competition.

A separate type of massage is a massage preparing for the effort. It is performed around 3 - 3.5 hours before a competition. Due to the fact that competitions in racewalking are held very early in the day, this massage is performed immediately after waking up.

In biological regenerations treatments performed using mechanical devices we include:

- sauna,
- hydrotherapy: brine, centrifuges, water massages, Scottish showers, hot springs,
- cryotherapy,
- physiotherapy.

Sauna - is one of the most pleasant and most effective treatments of cleansing the internal organs and skin of toxins that accumulate in our body. Intense sweating in the sauna is helpful for kidneys, with as much as 75% of all the toxins being excreted through the pores of the skin.

Sauna is commonly used in the preparation period, especially during winter. It is recommended after long trainings (after a suitable rest of about 3 to 4 hours).

Sauna can be combined with hydrotherapy, e.g. brines or Scottish showers. During the competition period, we combine sauna and massage.

Do not combine sauna with a cryogenic chamber treatment.

Hydrotherapy - can be used as a biological regeneration measure all training year round. Brines are most commonly used, because of being possible to apply in any place of stay. They are used especially after pace trainings and long walking distances of 20 - 40 km. Young athletes, who do not have the possibility of using other means of regeneration, are highly recommended to use it.

In the winter preparatory period we combine the hydrotherapy with a sauna + brine + Scottish shower set, which is best applied twice a week.

Generally, hydrotherapy is used rather during the preparatory period than the competition one.

In such high-altitude centers like Font Romeu, in which we are able to train during the Direct Competing Preparation period, we should use the opportunity to use natural hydrotherapy, i.e. hot springs.

Cryotherapy - healing with cold - is defined as using low temperatures in biological regeneration and rehabilitation, especially for athletes who suffered injuries. It causes beneficial body reactions to the cold, and can be used in the treatment of many diseases as well as during a biological regeneration of a physically and mentally tired adults and professional athletes.

This kind of treatment can be applied in form of cryogenic chamber (whole body treatment) and local cryogenic (nitrogen cooling point).

Cryotherapy for the whole body is used in order to:

- heal the movement apparatus in the transition period or any injuries suffered in other training periods,
- increase the impact of sports training[2].

Cryogenic chamber - in my coaching work I use the cryogenic chamber since 2001. We use it for a period of 10 days, 4 - 7 days after returning from a high-altitude training camps. We assume, on the basis of theoretical studies, that this way the effects of high-mountain trainings will be prolonged. (80)

The procedure involves entering into a special chamber and staying there for about 3 minutes. Everyone who enters has to wear an ear band (the low temperatures can result in frostbite), a mask for the nose and mouth (to prevent airways burn), knee-high socks and long gloves (against fingers and toes frostbite).

After a stay in the chamber one should intensively exercise for a period of about 20 minutes, in order to restore full physical functionality.

One cannot clearly determine the effectiveness of using cryogenic chamber in the training process, as it has not been in general use for too long. One can only conclude that it is ideal for treatment of minor injuries (overload, strain) and has a very positive effect on the psyche of the athletes. However, not all players tolerate well the stays in cryogenic chamber, and some have to resign from using it.

Local Cryogenic - (nitrogen point cooling), is considered a very good remedy for the treatment of, for example, small overloads of Achilles tendon, tibial muscle aches, ankles

overloads caused by the slope of training routes. Local cryotherapy in the treatment of sports injuries has to be repeated two or three times a day, every 4-6 hours, for a period of 10 days [4].

Physiotherapy - is used depending on the needs, in form of such treatments as iontophoresis, ultrasound, curapulse, magnetic stimulation with an "Yifor" device, magnetic bed and magnetic laser. The decision of which treatment the athlete should use is taken by the doctor and physiotherapist. The effects of the abovementioned treatments are visible only after a certain time. Although the treatment time is quite long, the use of physiotherapy in modern sport is pretty essential.

12.2. Psychological method

The purpose of using psychological method in biological regeneration is to ease the central fatigue, which is characterized by a higher work effort, signs of muscle pain, reduction of training motivation, lack of focus and difficulties in understanding instructions and commands. In the training process, the psychological methods are typically used with training measures and other regeneration methods.

When practicing race walking, it is good to remember that this competition is very monotonous and time-consuming, often performed on a loop.

Also, training sessions are also held "on loops", and after some time are simply boring. That is why it is so important to introduce to the training sessions some factors, which will break the monotony of walking. They may include:

- appropriate selection of sport centres and training routes,
- cryogenic chamber,
- choosing an adequate basic regeneration form, e.g. a sauna + brine + Scottish showers set,
- pouring water on oneself during trainings,
- using ice after the training,
- magnetic bed,
- free-time organization during the high-mountain camps.

Another case is the period before the competition, during which the athletes can feel increased anxiety or even fear. There are different kinds of relaxing techniques to help them to overcome such situations, such as computer games or physiotherapy, e.g. massages. Trainers should abide by the general principle that an athlete is optimally prepared for a competition if he or she is both in excellent physical and mental condition.

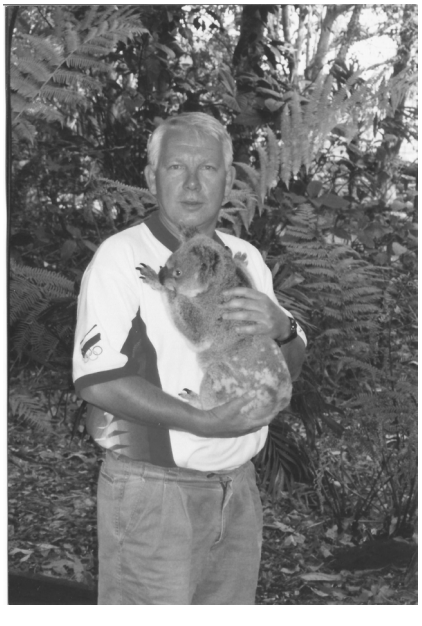
12.3. Pharmacological method

Pharmacological method is crucial in the regeneration measures used in the annual training process. Basically, I would include in it into a "Pharmacological support of the training process". In the yearly training cycle, the method is being used on a regular basis when the need arises, especially in case of muscle pain, swelling of the joints or high levels of lactic acid.

GALLERY

Juniors' competition, 326 Sylwia Korzeniowska.

Preparation of the training route.

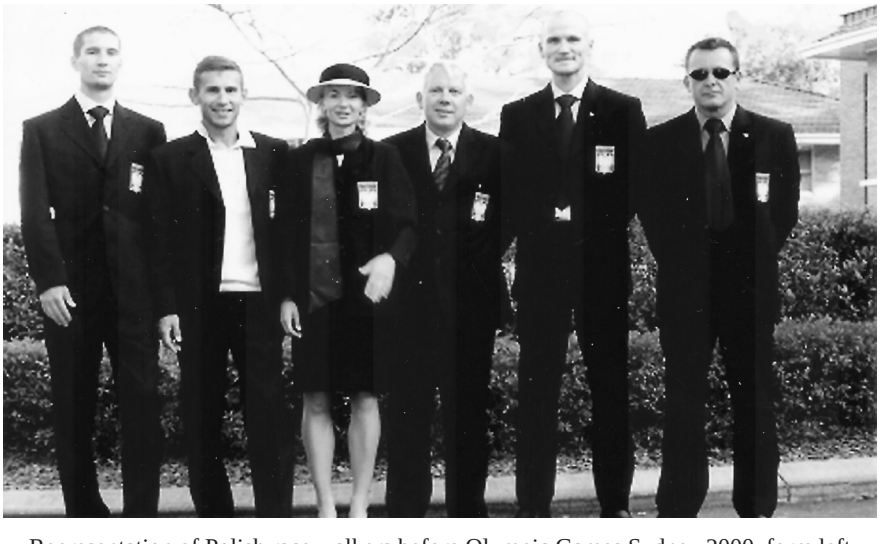


Author with koala bear. Sydney 2000.

Author with Irena Szewińska, Zbigniew Król.

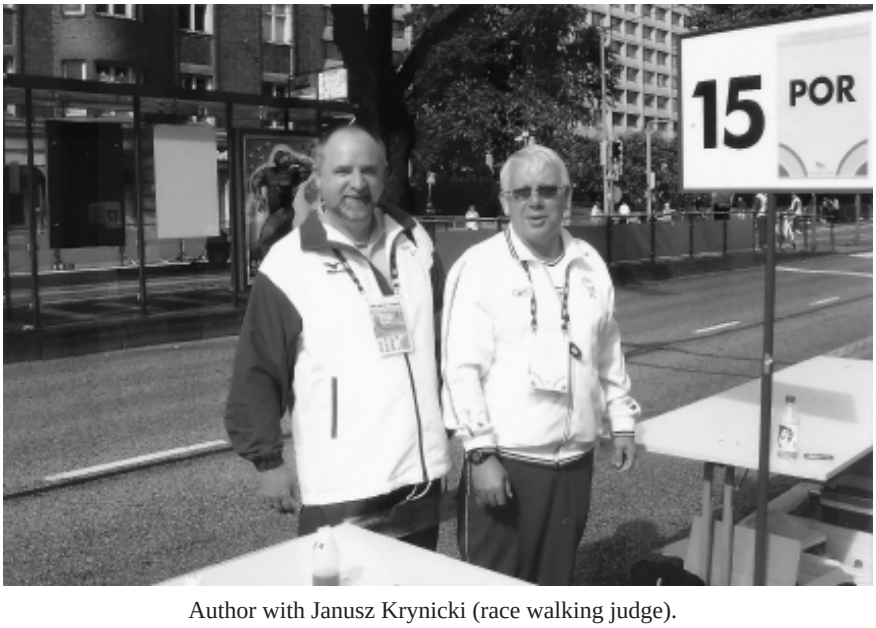
Juniors, from left Deiter, Borgiel, Kuciński, Nowak , Łyp.

Robert Korzeniowski.

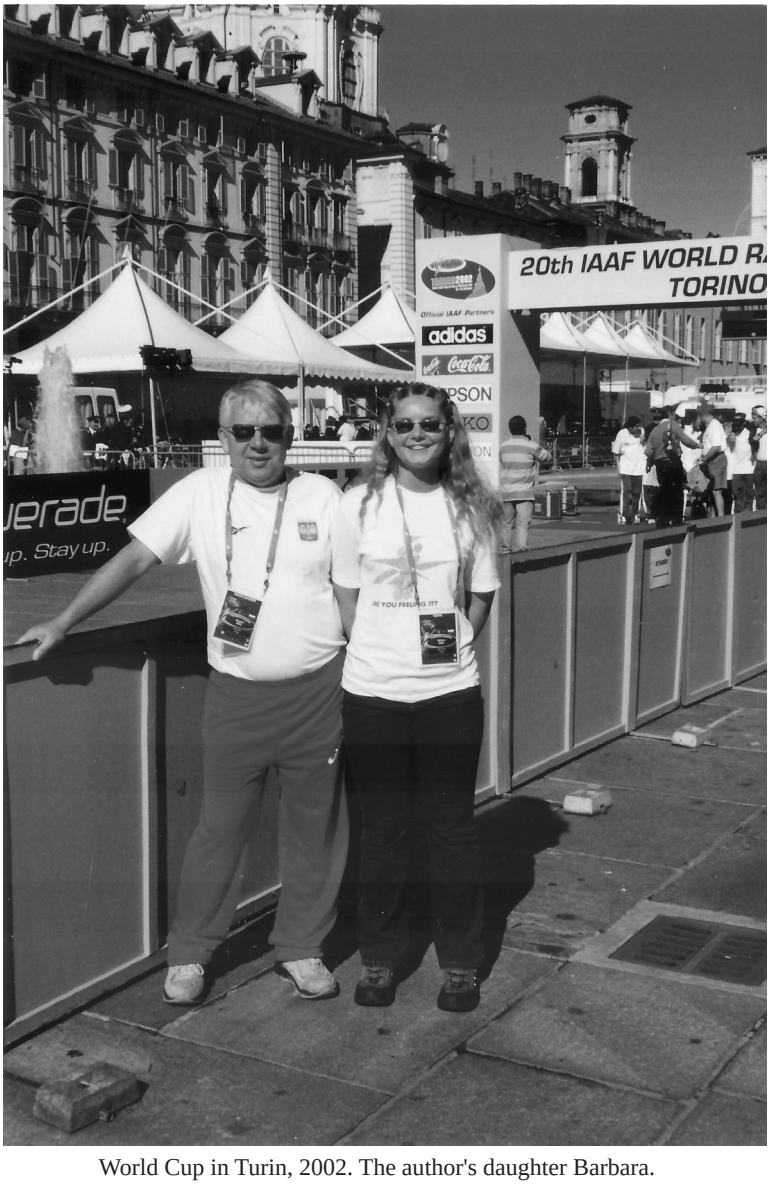


Representation of Polish race walkers before Olympic Games Sydney 2000, form left Magdziarczyk, Korzeniowski, Radtke, Kisiel, Gumowski (physiotherapist).

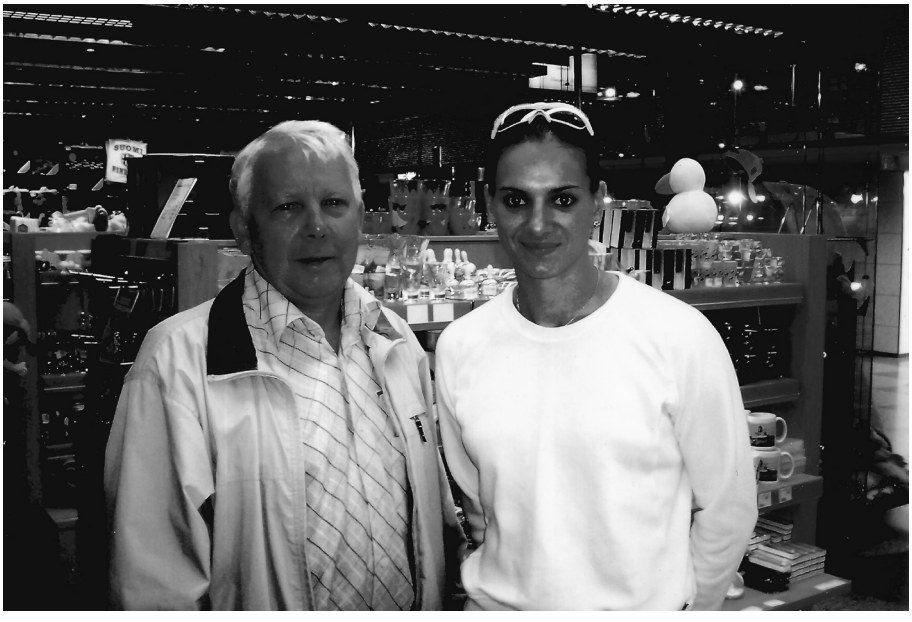
European Championship in Munich, 2002 .



Author with Janusz Krynicki (race walking judge).



World Cup in Turin, 2002. The author's daughter Barbara.



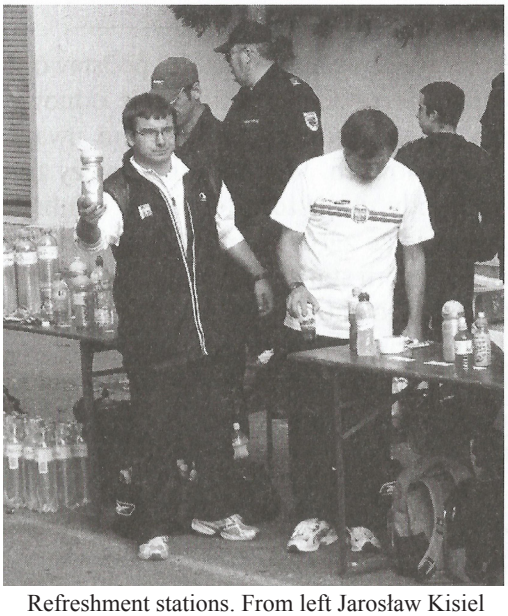
Author with Yelena Isinbayeva.

Polish Championship in Vienna, 2005. From left Mirek, Jarosz, Pabiszczak, Kisiel.

Closing ceremony of the Olympic Games Sydney 2000.


Olympic Games Sydney 2000. From left Kisiel, Magdziarczyk, Korzeniowski, Gumowski.

Juniors' competition, Author, number 47.


Refreshment stations. From left Jarosław Kisiel (Author's son), Stanisław Marmur.

Author with Sebastian Ceo (IAAF President).

Refreshment stations. From left Kisiel , Marmur.

Author during the Olympics, from left Nowak, Sikora, Rosiewicza (Georgia).

Author during the Olympics.

Refreshment stations. Olympic 2012.

Refreshment stations. Olympic 2012.

Author during training camp in South Africa.

Author during training camp in South Africa.

Author during the Olympics.

Juniors' winter training camp.

Representation of Polish race walkers before Olympic Games Athens 2004, form left Magdziarczyk, S. Korzeniowska, Korzeniowski, Kuciński, Sudoł, Kisiel..

Author during winter training camp in Władysławowo (Poland).

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