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WŁODZIMIERZ STAROSTA

University School of Physical Education in Poznań, Branch Faculty of Physical Culture in Gorzów Wlkp.,
Poland

THE CONCEPT OF MODERN TRAINING IN SPORT

Key words: selection, specialization, kinesthetic sensations, sport training.

ABSTRACT

Contemporary sport training requires many hours of practice with increasing physical and psychical loads. Approaching the limits of one's capabilities was ascertained long time ago. It turned out that the human body was able to bear those increasing loads. This applies mainly to athletes achieving international success. Apart from them there are competitors who achieve considerable results with difficulty, and therefore frequently give up competitive sport. No statistical record of such losses has been kept, however such records may be of great significance to future champions. Both types of athletes, novice and advanced, should be taken care of. Is it possible to decrease the applied training loads and thus limit the number of load-linked injuries? Must competitive sport supply premature pensioners? Eliminating all the defects of training is not easy, but its considerable improvement is possible. Improvement means rather a new concept dealing with the most important part of the training – motor preparation – and particularly the increase of training efficiency and technique improvement. The aims of the work were as follows: 1. creation of a new form of motor preparation; 2. presentation of a novel concept of selecting candidates for sport; 3. development of new ways of attaining sport specialization; 4. new formulation of relationships between physical and co-ordination abilities; 5. development of emotions specific to the given sport. The paper presents five important elements of the concept of modern training. Their implementation does not require additional financial resources and does not imply any risk. Some of these proposals were applied in other countries with very good effects (e.g. by female volleyball players of the Japanese national team). Due to their effectiveness, they became the “secret of the coaching workshop”. The originality of these proposals consists of their systemic formulation. They are a synthesis of results of numerous fragmentary studies by various authors, including my own pedagogical experiments, as well as research and pedagogical experience. Some conclusions in the work were based on results of studies conducted using our own method of awakening or refreshing kinesthetic sensations. The method was used in various sports such as ice figure skating, ski jumps and swimming. Greater expressiveness of these sensations was connected with a higher level of technical preparation in a number of sports e.g., skiing, ski jumping, fencing, kayaking, judo, ice figure skating, speed skating, skiing, fencing, boxing and pole vault.

Correspondence should be addressed to: Włodzimierz Starosta, Instytut Sportu, ul. Trylogii 2/16, 01-892 Warszawa, Poland

INTRODUCTION

Contemporary sport training requires many hours of practice with increasing physical and psychical loads. Approaching the limits of one's capacities was ascertained long time ago. It turned out that the human body was able to bear those increasing loads. This applies mainly to athletes achieving international success. Apart from them there are also competitors who achieve considerable results with difficulty, and therefore frequently give up competitive sport. No statistical record of such losses has been kept, however such records may be of great significance to future champions. Both types of athletes, novice and advanced, should be taken care of. The inspiration to commence research into this particular problem was a study of transcripts of interviews conducted with top competitors, illustrating the amount of their training loads.

For example, a European swimming female vice-champion, A. Braszkiewicz, who covers a distance of 2000 km per year claims that, "... while swimming I review the content of my tests, and it is hard to count how many times, lost in thought, I hit the wall of the pool with my head"; Olympic hammer throw female champion, K. Skolimowska states that, "I train every day; the hammer I throw 5000 times a year weighs 9 kg (during competitions only 4 kg)"; female cycling vice-champion, M. Sądlecka cycles 60 km every day, half of the distance with loads; multiple world board sailing female champion, D. Staszewska spends over 200 days away from home training; female modern pentathlon world vice-champion, P. Boenisz trains four times a day from 6 a.m. to 6 p.m.; world record holder and many-time Olympic swimming medalist, F. Van Almsick says that, "Swimming is extremely boring. There is nothing but training and two important events during the year. Something that was once a pleasure becomes a burden."

These facts raise the following questions: Is it possible to decrease the applied loads and thus limit the number of load-linked injuries? Must competitive sport supply premature pensioners? The answers to these questions are not easy. The ways of modernising training are multiple. The easiest one is to select appropriate candidates for sport. Are there any other ways to improve the existing training system, so that it becomes more effective, less strenuous, more human-friendly and less health hazardous? Certainly, yes. Eliminating all the training defects is not easy, but its

considerable improvement is possible. Improvement means a new concept concerning the most important part of the training – motor preparation – and particularly an improvement of training efficiency and technique. The objectives of the work were as follows: 1. creation of new forms of motor preparation; 2. presentation of a novel concept of selection of candidates for sport; 3. development of new ways of attaining sport specialization; 4. modern formulations of relationships between physical and co-ordination abilities; and 5. developments of feelings specific to the given sport.

NEW FORMS OF MOTOR PREPARATION

All components of motor preparation are decisive in achievement of success. The result of sport competition depends on the quality of movements and their accuracy (spatial, time, strength). In tennis, for example, a player who can send the ball precisely at the right time to a designated place wins. Hence, the one who possesses a high level of feeling the racket, ball and court wins. Other forms of preparation are of supportive character (Fig. 1). Changes in this hierarchy constitute the negation of the essence of sport. The level of motor abilities is determined genetically. Everyone has a different level and structure of motor abilities. Their level is affected by the performed exercises. Developing and maintaining inborn reserves is possible thanks to exercises performed throughout the entire life.

Movement stimulates physical, motor, functional and psychic development. That is why movement exercises are called psychomotor exercises. Movement is executed according to a previously prepared programme. Developing such a programme in the athlete's mind is a prerequisite to execute an exercise correctly. A person develops and improves his/her motor ability thanks to movement. The highest intensity of development of motor abilities, and particularly of the co-ordination abilities, takes place between the ages 7-11 and 14-18. The execution of particular exercises develops the efficiency of the central nervous system, and indirectly increases the level of co-ordination, which in turn enables a better execution of movements. In this way a closed and continuously functioning human self-development system, a sort of "perpetuum mobile" is formed.

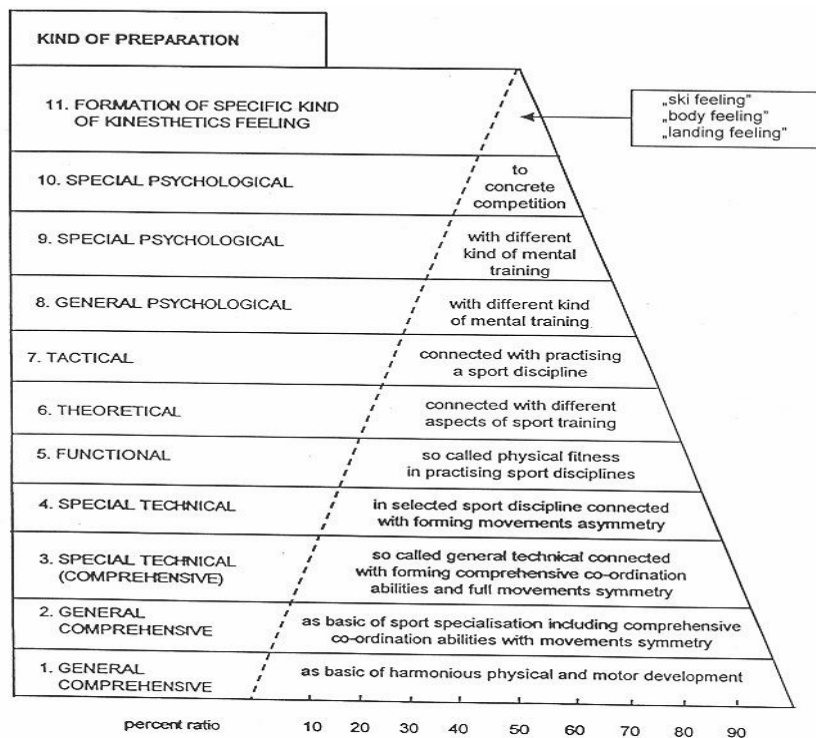


Figure 1. Formation of specific kinesthetic feeling by competitors in comprehensive preparation and many years training (Starosta 2001)

The more complex the exercise is, the stronger its impact on the system, and the longer the period of mastering its technique. Complex exercises require the involvement of more body parts, where the translocation of body parts takes place along various axes. Through complex exercises (especially, acyclical ones) we develop co-ordination abilities, specifically when these exercises are varied, multilateral and unknown to those who practice them. Through their indirect development we affect the development of physical abilities, thus creating the foundation for co-ordination abilities. The latter ones affect, to a large extent, the achievement of considerable success.

NOVEL CONCEPT OF SELECTION CANDIDATES FOR SPORTS

The problem of selection of candidates for sport has remained one of the most important. The proper selection increases the efficiency of training,

assures success for the competitors and decreases substantially the expenditure allocated to training. The increasing level of competitive sport demands participation of highly talented competitors with a versatile preparation and with a high level of co-ordination abilities. Only such athletes are able to achieve success on the international level. In spite of a great number of publications dealing with the problem of selecting candidates for sport, there is still no universally accepted model [23].

The existing system of selection (Fig. 2) has been irrational. It misses one of the stages of initial selection for sport in general, and begins to function from the second stage. This means selection of candidates exclusively for specific sports [20, 22-25]. Such selection was faulty, since the representatives of each sport searched for adequate candidates for their own sports only. This is a very narrow approach. In the course of such selection, many candidates who would have probably achieved success in other sports, are simply rejected. Nearly each sport requires a different composition of

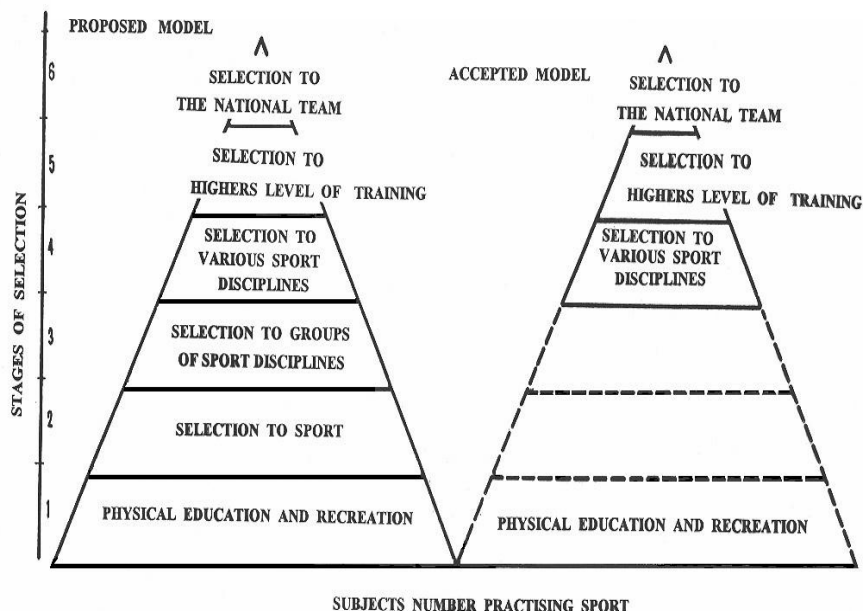


Figure 2. Models of selection child for sport and for higher level of training (Starosta 1983)

features and skills. From the point of view of a specific sport, the system is correct, hence the best candidates have been picked out of hundreds or thousands of candidates (this does not exist anymore in a number of countries). It was not efficient, however, in individual countries. For instance, only 20% of graduates of sport schools become members of the national teams of Belarus [32]. In other countries similar data are still less optimistic. By using the faulty selection system, a large number of candidates with good motor skills were rejected (“those who could not find a sport right for them”). As they were rejected in one sport they did not make any attempt to get transferred to another.

Another weak link in the applied selection system were the criteria of candidate selection. They were frequently subjective, discriminatory and they took into account the general or particular physical fitness of the candidate. Rarely was any larger number of one’s predispositions assessed. In the case of general fitness, the level of physical abilities even in co-ordination complex sports (e.g. team games) was primarily evaluated. Yet, the level of co-ordination abilities was not diagnosed at all.

Even the most important ability, i.e. the ability to differentiate movements was not diagnosed. Its spatial dimension was merely suggested in selection for some sports such as wrestling [11]. No wonder these faults became conspicuous because there are not many tests which would focus on the selection of candidates for sport [16, 24, 25], and moreover, which would be constructed according to H. Gundlach’s concept [5], i.e. one considering identical requirements as regards physical and co-ordination abilities [19, 21, 22, 24, 25]. In most physical fitness tests disseminated internationally, the evaluation of physical abilities is dominant (Fig. 3). Among the most progressive ones is the Eurofit [21, 24], in which the proportion of test tasks focusing on the evaluation of physical and co-ordination abilities is 2 to 7.

AN OPTIMAL WAY OF REALIZATION OF EARLY SPORT SPECIALIZATION

Modern sport demands an early commencement of the training process and specialization. The data from sport practice do not

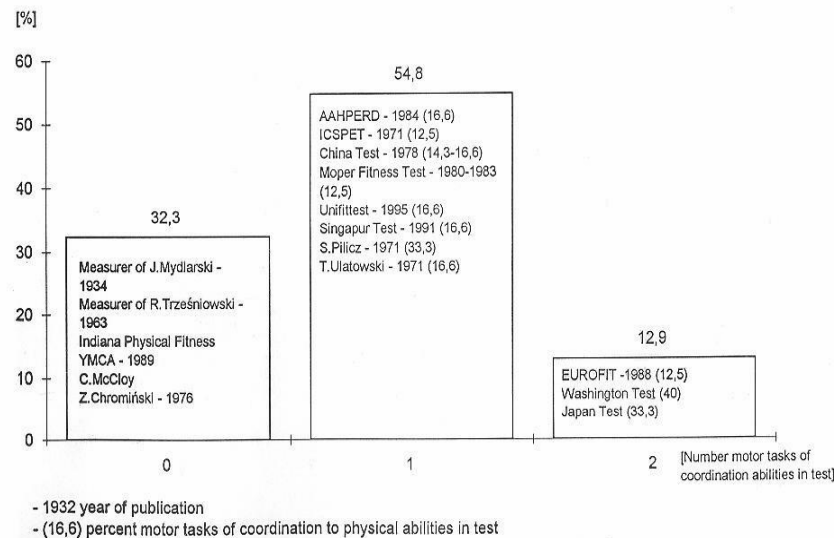


Figure 3. Percentual proportion of motor tasks evaluating physical and coordinational abilities in 31 physical fitness tests by different authors (Starosta 1997)

confirm the necessity of starting systematic training at a very early age [20, 22, 24, 25]. The tendency is not justified either as far as bio-social conditions are concerned [28]. It contradicts the idea of “sport for children” and it is considered to be an invention of those who desire success at all costs. The realization of such experiments exposes children to the risk of loss of health or even life. Early specialization carried out correctly should be treated as an introductory stage of training, beginning at the child’s most optimal age. This stage should not follow the pattern of adult training, since its objectives are quite different. The most important of the objectives should be the development of foundation for future specialization. The most durable objective is versatile motor development, which includes priority development of all coordination abilities. It consists of the skillful use of sensitive periods in child’s motor development, i.e. its particular susceptibility to stimuli (exercises). During this period, between the ages of 7 and 11, the highest increments, as far as various coordination abilities, may be obtained (Tab. 1). The accumulated motor potential makes it easier then to master complex exercises. The competent use of this period will account for the future sport successes [24, 25, 29].

A relevant component of the correctly carried out early sport specialization is the proper amount of exercise directed at general and special motor efficiency. The general principle should consist of gradual, adequately distributed in time, portioning of special exercises. In the first or second year of training, not more than 20-30% of time should be devoted to special fitness, and not less than 30% to general fitness, regardless of training advancement. Surprising was the consistence of opinions in this respect, regarding three different sports (Fig. 4).

Table 1. Average of age to receive precise increase in percent of level coordination abilities (Hirtz 1978)

Co-ordination abilities	Sex	Age of securing the level percentage			
		25%	50%	75%	100%
Movement co-ordination in limited time	M	7.7	9.1	11.4	14.5
	W	7.7	8.8	10.5	15.3
Speed reaction	M	9.3	9.8	11.5	17.0
	W	8.7	10.0	11.9	14.5
Movements differentiation	M	7.9	10.5	12.3	15.3
	W	7.7	9.4	11.3	15.3
Movements rhythmisation	M	8.3	10.4	12.4	15.3
	W	8.2	9.5	10.3	15.1
Balance preservation	M	10.8	12.2	12.7	14.5
	W	9.8	11.2	12.1	14.5
Spatial orientation	M	8.2	11.1	13.3	15.5
	W	7.7	10.5	13.3	15.4

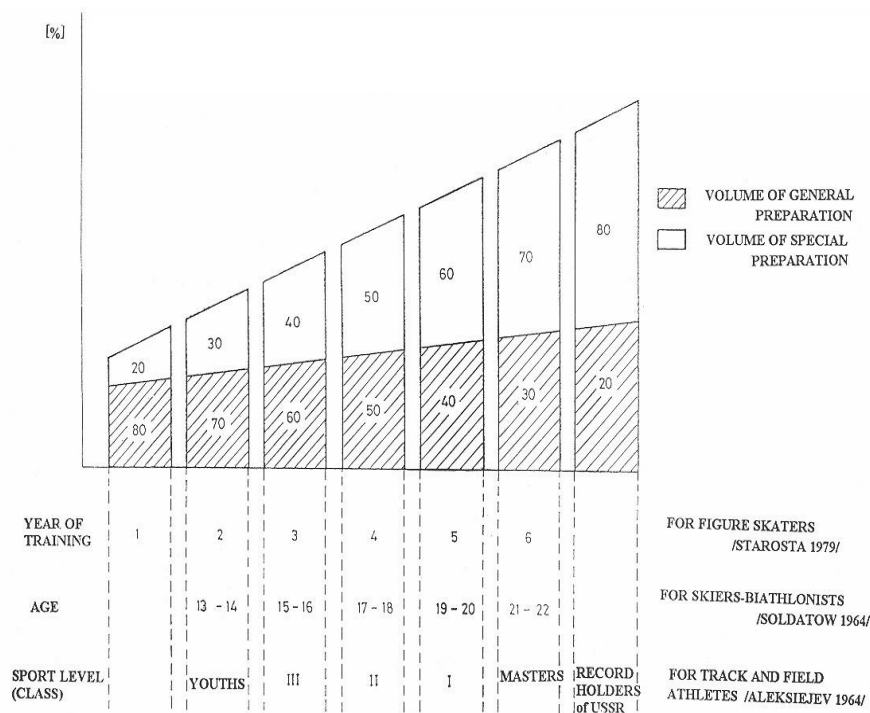


Figure 4. Approximative ratios of general to special fitness preparation in many years training of athletes of different sport disciplines according to years of training, ages and sport class (Starosta 1988)

Each of the authors considered those proportions depending on various factors: age, training advancement, sport class. The proportions were based on the results of research and empirical experiments. They found their reflection in the curricula of sport schools (i.e. in the former Soviet Union and East Germany), as well as in the long-term training of top athletes (i.e. in ice figure skating).

The demonstrated proportions of developing general and special fitness correspond to the Roman principle “the slow and steady wins the race”. This principle was abandoned when thinking about the quick achievement of results. As a result success was achieved by very young competitors; yet at the same time they failed to achieve success at the senior age. An excessive exploitation of a young body did not secure a long-term career. For the sake of a long-lasting success of a young competitor, the above quoted Roman principle should become a keynote in formulating aims and tasks for each particular stage of training: appropriate to the age of the individual (it should consider his/her physical and psychomotor development), and achievable

without risking one’s health. Intensive exploitation of the child’s body which causes injuries, excessive load-linked changes and deterioration of health are prohibited by the Convention on the Child’s Rights [22, 24, 25]. The objectives and tasks of every stage of training should be subject to sustained training. Attaining top results ought to be required only at higher stages. Many facts confirm the rule that a later commencement of systematic training extends the professional career, lowers the injury rate, positively affect one’s health condition and ensures a prolonged period of record winning. Hence, this is the key aim of competitive and professional sport. The longer the athletes compete, the more financial resources they are able to gain for their future life. Perhaps the delayed start of systematic training forms a specific “biological protection” of competitors, which allows them to function more effectively at the higher stages of the training process.

NEW APPROACH TO RELATIONSHIP BETWEEN PHYSICAL AND CO-ORDINATION ABILITIES

These abilities are closely related to each other. By developing one of them the other ones are also affected. Excessive focusing on the development of physical abilities, particularly in children, may either hinder the rise of the level of co-ordination abilities or lower it. Keeping the right proportions in the development of the two abilities, both in the annual cycle (Fig. 5) as well as in the extended cycle, increases training effectiveness (Fig. 6). Co-ordination abilities are more strongly conditioned genetically. Thanks to them we can

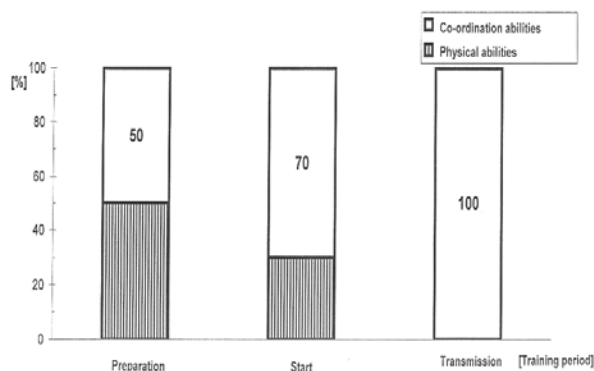


Figure 5. Percentual proportion of means directed of development physical and co-ordination abilities in different training period (Starosta 2003)

recognize mental qualities of the individual and the efficiency of the functioning of his central nervous system. In spite of that, the level of co-ordination abilities is not taken into account when selecting candidates for sport. The relationship of various physical abilities has also been little recognized. We know still little about the existing relationships between physical and co-ordination abilities and they have been the subject of research to a very limited extent. This was because of some theoretical concepts, which stated that only physical abilities could be effectively measured. Some time ago, however, W. Zaciorski [33] ascertained that it was also important to develop co-ordination abilities. A four-year long research conducted on competitors of the Polish wrestling national team [22, 24, 25], confirmed a significant mosaic relationship

of results of various tests of physical and co-ordination abilities.

H. Gundlach's concept [5] suggesting a parallel development of physical and co-ordination abilities was not approved by bio-engineers who reduced motor abilities to physical ones. Therefore, in the training schedules of coaches who dealt with children and adolescents, there were only few traces of means developing co-ordination abilities. However, in their daily work the coaches had to take care of the parallel development of both abilities, and specifically in technically complex sport disciplines. Many coaches, thanks to their professional experience, were able to solve the problem in the right way (observing the results of

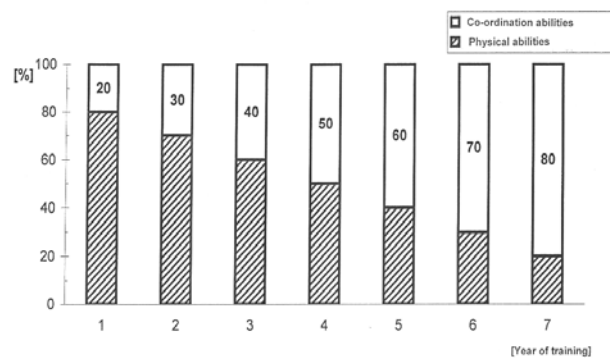


Figure 6. Percentual proportion of development physical co-ordination abilities in many years training (Starosta 2003)

the training). On the basis of their and my own experience, as well as the available literature, I have drawn up a classification of discussion areas and of the risks concerning the relationship between the development of physical and co-ordination abilities (Tab. 2). This classification is of indicatory character and subject to discussion.

On its grounds one may formulate directives facilitating the guidance of the motor abilities development during training, particularly of young athletes. Especially conflicting in character is the development of strength and endurance abilities. Their intensive and uneven development may slow down or lower the development of other physical abilities (i.e. speed, jumping ability, agility), and specifically, co-ordination abilities. Being familiar with these facts is crucial for those who run acti-

Table 2. Indicatory (hypothetical) correlation of physical and coordination abilities in sports training proces – free from the possibility of collisions area (space), discussion and threaten area (Starosta 1999)

Kind of motor abilities		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Physical (fitness) abilities	1. Speed	x	!	0	0	!	0	0	0	0	0	0	0	0	0	!	0
	2. Strength	x	?	!	!	!	!	!	!	!	!	!	!	!	!	!	!
	3. Endurance		x	!	!	!	!	!	!	!	!	!	!	!	!	!	!
	4. Flexibility			x	0	?	?	0	?	0	?	0	?	0	?	0	0
	5. Jumping				x	0	0	0	0	0	0	0	0	0	0	?	0
Coordination abilities	6. Balance preservation					x	0	0	0	0	0	0	0	0	0	0	0
	7. Kinesthetic movements differentiation						x	0	0	0	0	0	0	0	0	0	0
	8. Spatial and time orientation							x	0	0	0	0	0	0	0	0	0
	9. Movements rhythmisation								x	0	0	0	0	0	0	0	0
	10. Adequate speed reaction									x	0	0	0	0	0	0	0
	11. Movements connection											x	0	0	0	0	0
	12. Adaptation (transposition, combination)												x	0	0	0	0
	13. Cooperation													x	0	0	0
	14. Movement suggestiveness (expressiveness)														x	0	0
	15. Muscles relaxation															x	0
	16. Movements symmetrization																

0 - free from the possibility of collision area ? - discussion area ! - threaten area

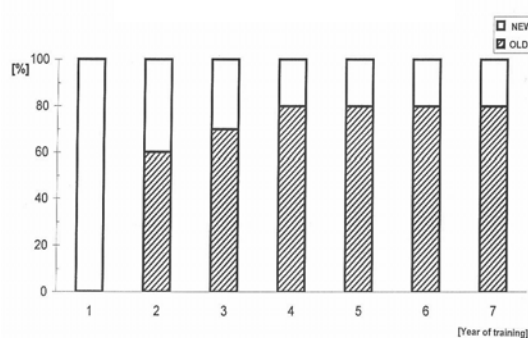


Figure 7. Percentual proportion new (unknown) exercises to old (wellknown) in many years training (Starosta 2003)

vities with children and adolescents. This does not mean that in the training of children one should avoid means developing strength and endurance. However, such means should be applied carefully

and along with exercises forming various co-ordination abilities. For example, after each series of strength exercises, it is indispensable to apply exercises developing the ability to relax muscles. One should be particularly careful about developing strength between the ages of 7 and 11. It is not recommended to develop maximal strength, especially in children, since it lowers their ability to portion it [23-25]. The optimisation of strength exhibition is named “strength precision” [10]. It is an example of a rational combination of development of co-ordination and physical abilities. This kind of precision is necessary in nearly all sports and is considered a feature of the top sport champion level. Without it, it is impossible to achieve high results, in, for instance, track and field, throws or weight lifting.

Similar prudence is essential in the development of endurance. Analogous to strength exhibition, it is connected with the loading of the entire body. A full restitution takes place after

many hours (sometimes even after 48). This requires applying training loads, which would be adequate to the trainees, and making suitable breaks between successive activities. Exceptionally complicated is the development of endurance abilities in complex co-ordination sports. The development of co-ordination abilities requires a high level of concentration, which considerably burdens the central nervous system. Therefore, it is not advisable to apply too many exercises developing co-ordination abilities during one training session, in particular to apply them in the initial stage of the training unit.

In technically complex sports, and in the initial stage of the training this amount may be sufficient. The teaching of new technical elements may take much time then. New exercises should focus on the development of co-ordination abilities on a lower level, characteristic for a particular sport. The development of co-ordination abilities demands the use of a large number of varied exercises and their precise and quick execution in the changing conditions.

In the initial stage of the training, the key aim should be the formation of foundations for future sport specialization. The development of co-

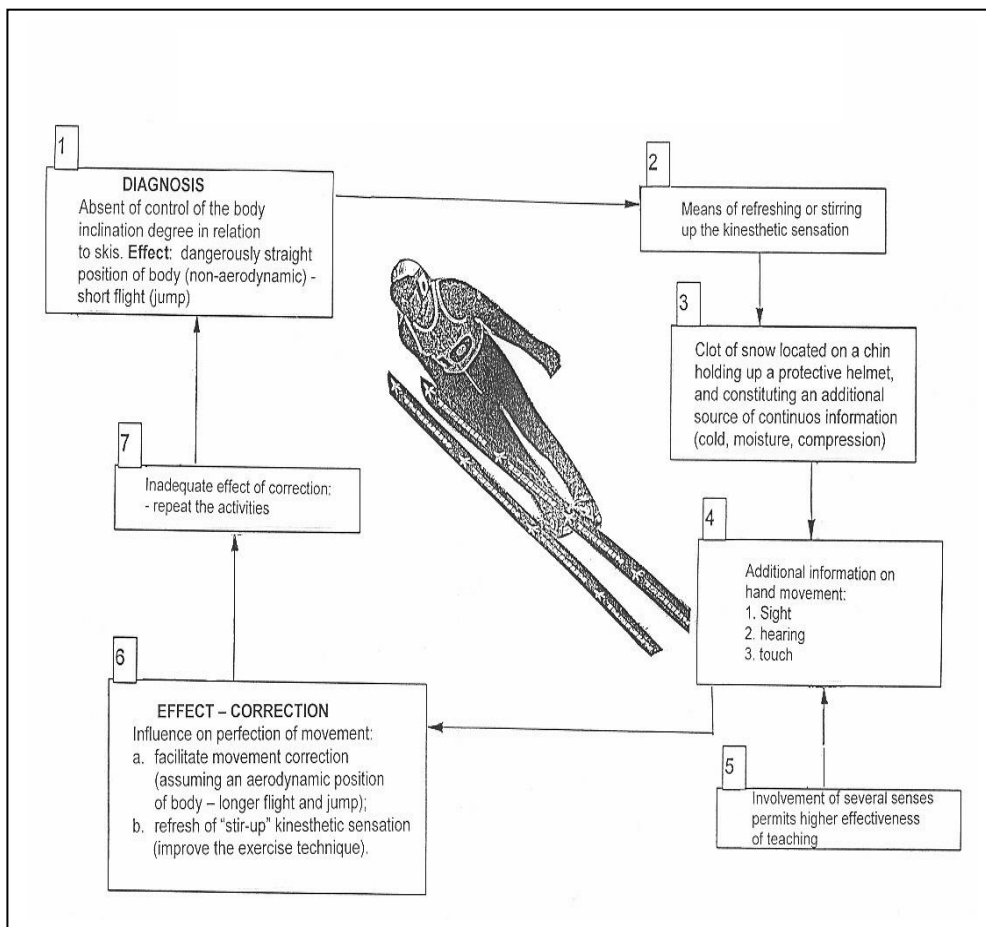


Figure 8. Refreshing or "stirring-up" of kinesthetic sensations during the improvement of ski jumping technique (Starosta 1994)

Co-ordination abilities are developed only by new exercises, which are unknown to those performing them. Hence, some authors [1, 31] propose introducing 15% of this type of exercises into the training program (Fig. 8). This minimal amount depends on the age, type of sport, sport experience, level of advancement and other factors.

ordination abilities, considered to be the leading ones for primary school children, should be dominant [6]: exhibiting quick reaction, maintaining balance, rhythmization, differentiation of movements, spatial orientation (Fig. 11). The critical period necessitates a significant number of various and unknown exercises, which could help

children to overcome the disharmony observed in their movements. The more explicit the critical period is, the more it is necessary to apply varied exercises. In comprehensive motor preparation it is indispensable to develop also the ability of movement symmetrisation, i.e. close efficiency of both body sides.

DEVELOPING SENSATIONS SPECIFIC TO A PARTICULAR SPORT

Kinesthetic sensations, called muscle-joint feelings, constitute a very important component of co-ordination abilities, thanks to them a high degree of movement precision is revealed. These sensations are connected with a particular movement, and thanks to its execution they are refreshed. Sometimes, in order to speed up their refreshment, it is necessary to apply some special methods (Fig. 8). For highly advanced athletes, intervals during training which affect the renewal of kinesthetic sensations, are of crucial importance. This fact is confirmed by a number of examples: outstanding performance of an NHL player B. Orra after a three-month break; winning the Olympic and world shot put titles by Ł. Pieleszczenko after a four-year long break (she trains little and makes week-long breaks, without affecting her technique); scoring the high jump result of 2.30 m by A. Partyka during the Grand Prix, after a three-week long break in the training course.

Forgetting a movement is connected with the “disappearance” of sensations. According to some authors they are not conditioned genetically. However, in people with higher levels of co-ordination, their expressiveness is also higher [18, 24, 25]. They are formed together with learning a specific exercise. Not every kinesthetic sensation is adequate to the performed movement. Thus, it is necessary for the competitor to constantly verify these sensations on the basis of acquired information (external and internal). The more objective they are, the quicker the process of developing movement precision is. Perfecting a technique consists of permanent verification of kinesthetic sensations. During a correctly conducted training, its highest level is in the competitive period (Fig. 9). The process of verification of kinesthetic sensations, according to I. Sieczenow [12, p. 310], takes place owing to the “brightening up” of the dark muscle sensations. He claims that, “...the most important role should be attributed to muscle

feelings, in spite of their darkness, and the least important role to visual/optical acts, in spite of their specificity.” It is a critical statement. It means giving priority to the tactual information channel, and setting it higher than the optical channel. I. Sieczenow defines muscle feeling as “... a total of sensations accompanying every body movement, and every change in the position of muscles in respect to one another.”

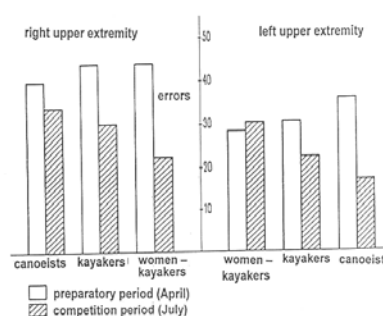


Figure 9. Changes in precision of movement during different periods of training in advanced junior kayakers (errors – total in five measurements in degrees) n = 30

Thanks to this sum of sensations a “body feeling” is formed, and on its basis feelings specific to a particular activity are developed. The importance of these sensations was indicated by N. Bernstein: “Muscle and joint sensitivity fulfills a key basic role in the considerable majority of cases of movement steering. In physiology the whole group of this sensitivity type of organs is called a proprioceptive system” [2, p. 56]. Without the high level of such sensations it is impossible to reach movement precision, and thus technical mastery enabling the achievement of significant sport success.

Kinesthetic sensations are always of specific character, adequate to the performed activity. In this way a large number of various forms of adaptation of the athlete to a specific sport originate. These adaptations, together with co-ordination abilities, form the so-called feelings. The range of these feelings is wider than the number of sport disciplines. For example, in team games we can experience “ball feeling”, “field feeling” “partner feeling”, “opponent feeling,” etc. In rhythmic gymnastics different feelings refer to

different accessories (Fig. 10). Every kind of feeling is composed of a variety of perceptions depending on kinesthetic sensations, as well as on psychological and physiological conditions (Fig. 11). During the competitor's preparation this feeling takes up a special position, as if composing a global effect of the training. It is like an extract or synthesis of all kinds of preparations. Therefore, it is necessary to direct these preparations to form durable foundations for the development of this feeling as a final product of the training. Hence, without the high level of "ball feeling" there is no accuracy of throws into the basket, and without scoring points for throws it is impossible to win in basketball. Throwing accuracy is the key component of the complex and extensive structure of "ball feeling".

It is a new understanding of the specific feeling, which so far has not been formulated in literature (Fig. 11). It is very meaningful theoretically, and even more practically. It may affect a training course, considerably increasing its effectiveness, at the same time lowering the applied loads. Such conclusions can be drawn after studying biographies and opinions of outstanding competitors. For example, swimming record holder and Olympic and world champion (winner of 7 medals, including 5 gold) M. Biondi criticizes the used training system: "...I don't believe in methods which are used to train young American swimmers. From the age of 6 they are forced into the boring, consisting of covering millions of yards, training which takes away the entire joy derived from swimming." Further on M. Biondi formulates his

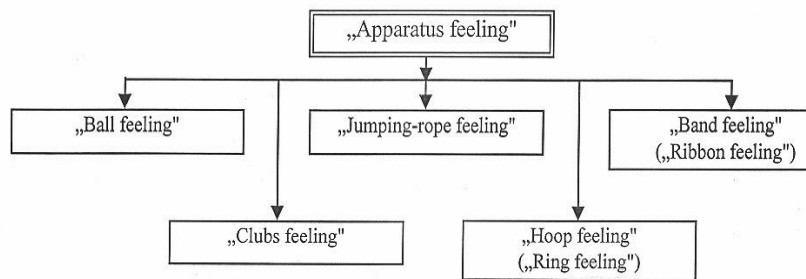


Figure 10. Different kinds of "apparatus feeling" in rhythmic gymnastics (Starosta 2001)

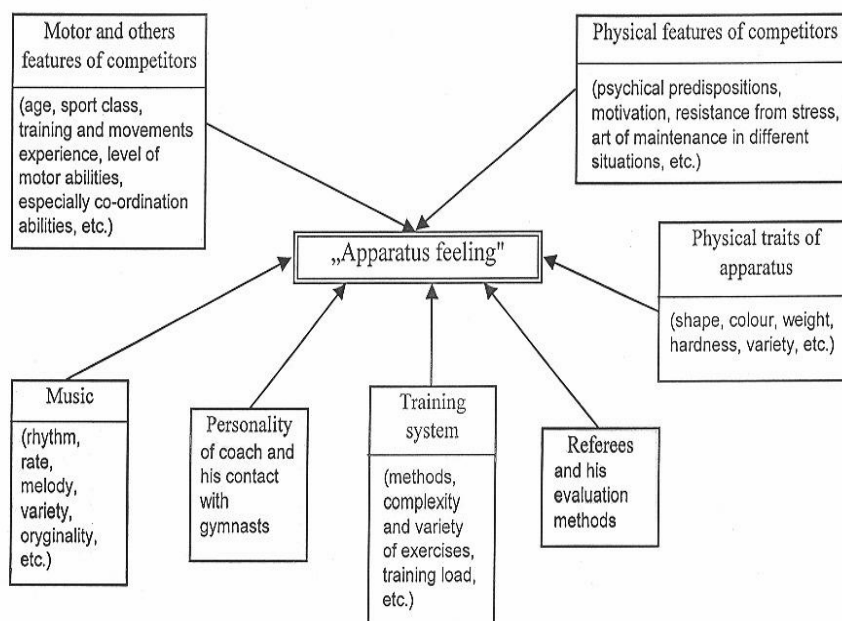


Figure 11. Selected conditions of "apparatus feeling" development in rhythmic gymnastics (Starosta 2001)

own idea of another training system: “I would once like to open a swimming center myself, where there would be no starting posts and no ropes dividing the lanes, and where children would be just taught water feeling and the use of the right technique” [3, p. 8]. A very interesting vision, though perhaps too narrow. It may become the origin of a new training system.

In the declarations of this outstanding and experienced swimmer there is a very strong connection between the “water feeling” and technique. Very often sport technique is understood as a form of movements (Fig. 12), regardless of its internal de-termining conditions called the content. It is characterized by invisible indexes such as the function of the central nervous system, exhibition of will, contractions, tensions and muscle relaxation and use of muscle flexibility. Developing the content means creating definite components of the specific feeling. It is not easy because it requires a simultaneous development of each of the co-

ordination abilities. Among them the leading one is the ability to differentiate movements in their full scope: spatial, time and strength. In order to master the champion’s technique, it is necessary to approach training globally and take into account the two components – “external” and “internal”. Without its rational composition it would be impossible to achieve a high level of suggestive sensations specific to various sports: “water feeling” in swimming, rowing and kayaking; “ice feeling” in speed and figure skating; “ball feeling” in volleyball, basketball, and handball, etc. In pro-longed training the proportions as far as developing forms and technical contents are concerned undergo important changes (Fig. 13). In the initial stage of the training, it is the form that dominates and the content that follows. The more the athlete is advanced, the more content there is. These proportions change depending on the stages of the technique development (Fig. 14). Stage One – developing elementary technique – is characterized only by

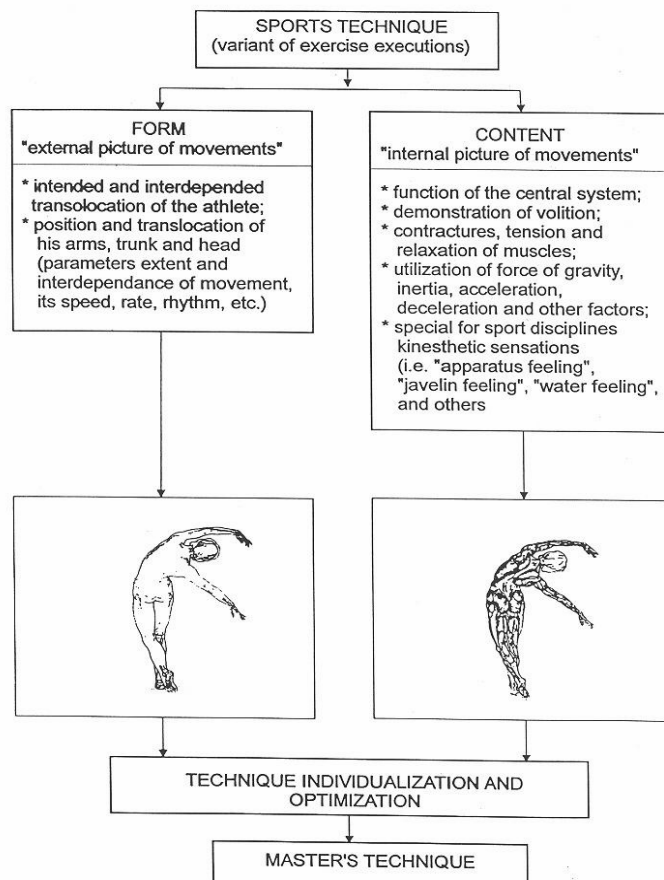


Figure 12. Components of sports technique (Starosta 2001)

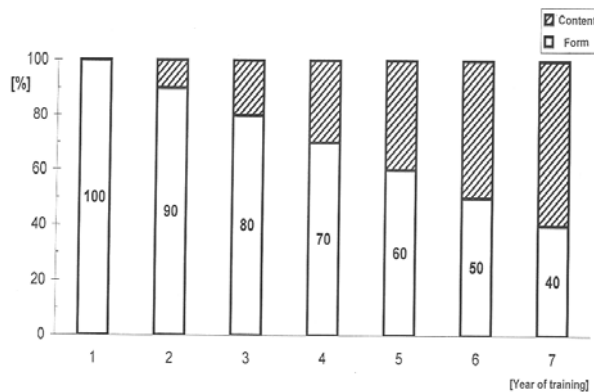


Figure 13. Percentual proportion form to content of sport technique in many years training (Starosta 2003)

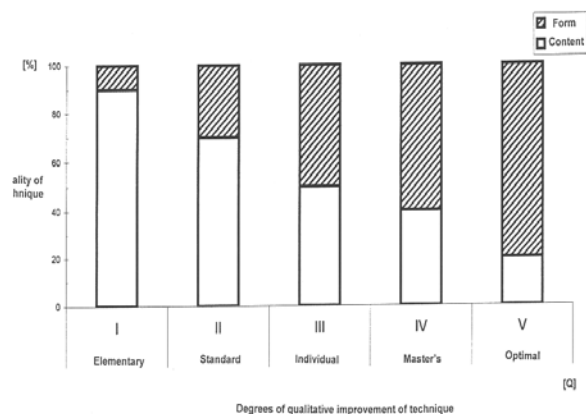


Figure 14. Percentual proportion form to content of sports technique in different degrees of its improvement (Starosta 2003)

form. In the remaining stages, more space is devoted to the content as the qualitative component of the technique. Unusually many exercises focusing on the development of the contents are used in the case of athletes for whom kinesthetic sensations constitute the main information channel. Those athletes relatively quickly achieve a high level of feeling needed in the particular sport.

DISCUSSION

I have presented five important components of modern training as far as athletes' motor preparation is concerned. Their implementation does not affect the general principles of training, but improves certain elements of the training process. Their implementation does not require additional financial resources and does not imply risk. Some of these proposals were already applied in other countries with very good results (i.e. by female volleyball players of the Japanese national team). Due to their effectiveness, these proposals became the "the coach workshop's secrets." The originality of these proposals consists of their systemic formulation. They are a synthesis of results of numerous fragmentary studies by various authors, including my own pedagogical experiments as well as research and pedagogical experiences. Some statements included in the work were based on results of studies conducted with our own method of awakening or refreshing kinesthetic sensations [4, 17, 19, 24, 25]. The method was used in

different sports: ice figure skating, ski jumps, swimming. The higher expressiveness of these sensations was connected with a higher level of technical preparation in an number of sports such as skiing, ski jumps, fencing [8, 9, 14, 18, 24-27], kayaking, judo, figure skating [13-15, 17, 18, 24-37], speed skating [30] skiing, fencing, boxing and pole vault [7].

Conclusions and recommendations:

1. Only individuals with the highest levels of key co-ordination abilities for the given sport should be selected for sport. Apart from their health condition, their level of these abilities should be the main criterion of selection. Its importance should be taken into consideration in technically complex sports.
2. At first, candidates should be selected for sport in general, then after 2-3 years of comprehensive total body conditioning activities and objective observation they should be selected for a group of particular sports (orientation stage), and finally for a specific sport (pre-orientation stage) with a possibility of modifications (dynamic model of selection). Such practice will enable making right choices of sports for athletes.
3. In the course of many years of sport training, rational proportions of developing general and specific physical abilities should play a special role. In the first two years of training, no more than 20-30% of time should be devoted to developing specific abilities, and no less than

- 30% of time should be assigned to general abilities, independently of the period of training.
4. As far as the development of the two kinds of abilities in the long-term training is concerned, a special emphasis should be placed on the development of all co-ordination abilities, and development of only those which are essential in the given sport.
 5. Modern training should be aimed at developing whatever is essential. The most important element which decides upon success in most sports is the complex of specific kinesthetic sensations and co-ordination abilities, which form the so-called feelings, e.g. "ball feeling", "water feeling", "partner feeling", "opponent feeling."
 6. Multiple examples demonstrate that periodical intermissions in the training process enable highly qualified competitors to achieve significant success on the international level.

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