

# TRAINING TIME STRUCTURE (CO-ORDINATION SKILLS) AND THEIR CONTROL IN OPEN AND CLOSED SYSTEMS

JERZY MACIANTOWICZ, DEPARTMENT OF ATHLETICS

*The Physical Training Academy, Wrocław Poland*

The training time structure can be put in some formalised frames which determine the hierarchy of goals and training tasks. In the structure itself three cycles (long, medium, and short) can be distinguished.

There are three stages of development in any athlete's career, and these are comprehensive training, goal-oriented training, and special training. Age differences between athletes in particular training stages can be explained by the biological and mental development of an organism.

The division into different training types can suggest that these are disjoint sets having no common areas. It is a simplified division, and trainers – practitioners reject this definition claiming that a sum of activities in a training process exists as a common area of the technology applied in a given set. While defining technical training, sports theorists usually refer to motor functions, movement skills, and a somatic structure stating that the improvement in the exercise performance technique is parallel to the improvement in energetic mechanisms. There is also a theory that a technical training is a special power training which concentrates on the development of the power of some chosen groups of muscles, fixing at the same time a habit of a proper movement. Sporting technique is also considered through the prism of the level of motor functions and the structure of the movement performed (simple or well-mastered), which may indicate the level of the co-ordination preparation (also in the aspect of a movement rhythm). It is also thought that it is necessary to acquire and master a basic movement rhythm, and that after mastering it, it is much easier to use different indices interchangeably.

The multiplicity of interpretations of this issue often leads to the negligence in the co-ordination preparation. It is thus probable that the negligence is the reason for low training efficiency in many sports disciplines. Criticism directed towards classical concepts of co-ordination preparation suggests that the changes resulting from specific requirements of movement activities in different sports are necessary (Fig.1).

While in movement, the action of skeletal muscles can be either static or dynamic (shortening is a concentric action; stretching is an eccentric action). Metabolic processes connected with ATP decay and reconstruction are the basis for muscle spasms. In a stretch-shortening cycle it can be an elastic quality of muscles, which is characteristic of the tendons arranged in series in relation to the muscle fibres, but only in an excited muscle together with a belly of a muscle and tendons and of any bone-joint connections. Tests on isolated muscles done by bio-mechanics proved that a movement preceded by an active muscle stretching is more effective than a movement starting in a static position. If it is so, what should movement technique, co-ordination, and training exercises be characterised by and how useful in this process is a movement rhythm as a time-space relation? Co-ordination is an effect of the changes of potential energy into kinetic energy and vice versa. In a human psychomotor activity there is locomotive (motor) co-ordination which is a definite range of intensity. The permeation of training means, especially co-ordination elements and their value in a training time structure is proper – either as dominant, complementary, or supporting an organism's potential, often used as compensatory exercises which protect a movement apparatus from any overload resulting from the training volume.



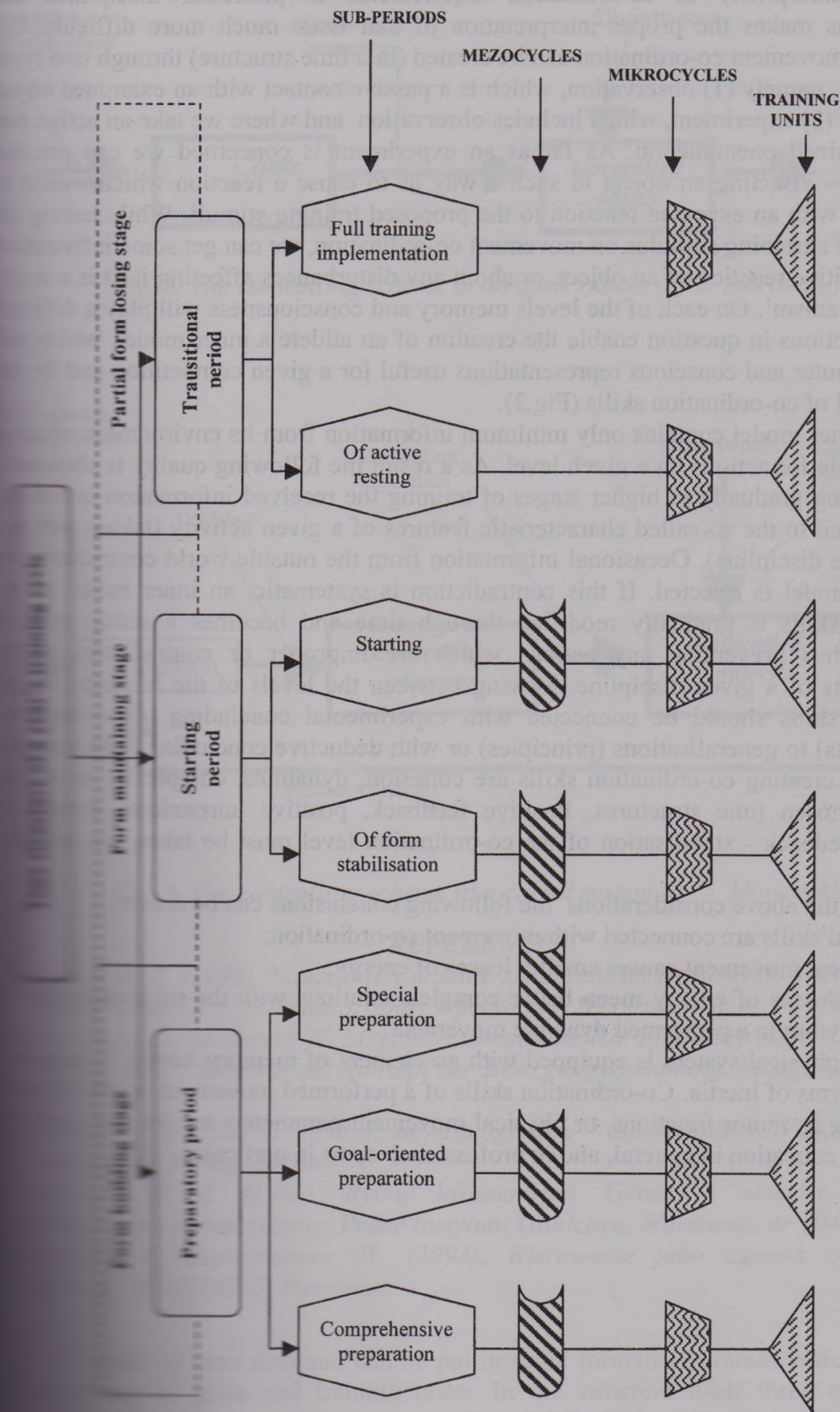


Fig. 1. Time structure of a year's training cycle.



The multiplicity of co-ordination requirements in particular disciplines and competitions makes the proper interpretation of that issue much more difficult. The training of movement co-ordination can be created (in a time structure) through two types of activities, namely (1) observation, which is a passive contact with an examined object (person), or (2) experiment, which includes observation and where we take an active part in an examined phenomenon. As far as an experiment is concerned we can practice controlling – affecting an object in such a way as to cause a reaction which would be compatible with an expected reaction to the proposed training stimuli. While testing the influence of a training stimulus on movement co-ordination, we can get some information about a positive reaction of an object, or about any disturbances affecting it. It is a multi-level ‘mechanism’. On each of the levels memory and consciousness will play a different role. The actions in question enable the creation of an athlete’s inner model, which will determine outer and conscious representations useful for a given competition and for the proper level of co-ordination skills (Fig.2).

An inner model contains only minimum information from its environment which is indispensable for actions on a given level. As a result the following quality is obtained – while moving gradually to higher stages of training the received information is reduced and restricted to the so-called characteristic features of a given activity (taking part in a given sports discipline). Occasional information from the outside world contradictory to the inner model is rejected. If this contradiction is systematic, an inner model of co-ordination skills is gradually modified through time and becomes a stable point of reference thus preventing any actions which are improper or contradictory to the requirements of a given discipline. Moving between the levels of the hierarchy of co-ordination skills should be connected with experimental concluding - moving from details (facts) to generalisations (principles) or with deductive concluding. Characteristic features of creating co-ordination skills are cohesion, dynamics, complexity as well as properly chosen time structures. Positive feedback, positive unrestricted growth or negative feedback - stabilisation of the co-ordination level must be taken into account (Fig, 3).

From the above considerations the following conclusions can be drawn:

1. technical skills are connected with movement co-ordination;
2. rhythmical movement causes smaller losses of energy;
3. smaller losses of energy mean better complex solutions with the maintaining of the outer rhythm in a performed dynamic movement.

Each physical system is equipped with an element of memory having its source in different forms of inertia. Co-ordination skills of a performed movement, as the elements determining its motor functions, or physical movement parameters are the main problem in physical education in general, and in professional sport in particular.



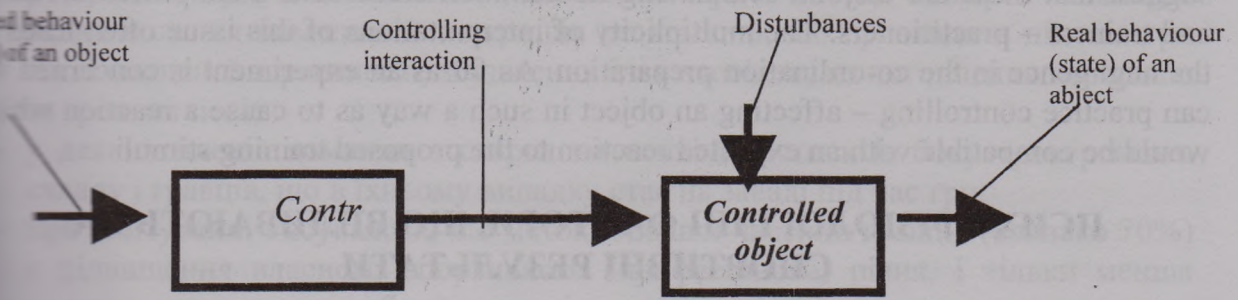


Fig. 2. The controlling scheme in an open system (by J. Morawski)

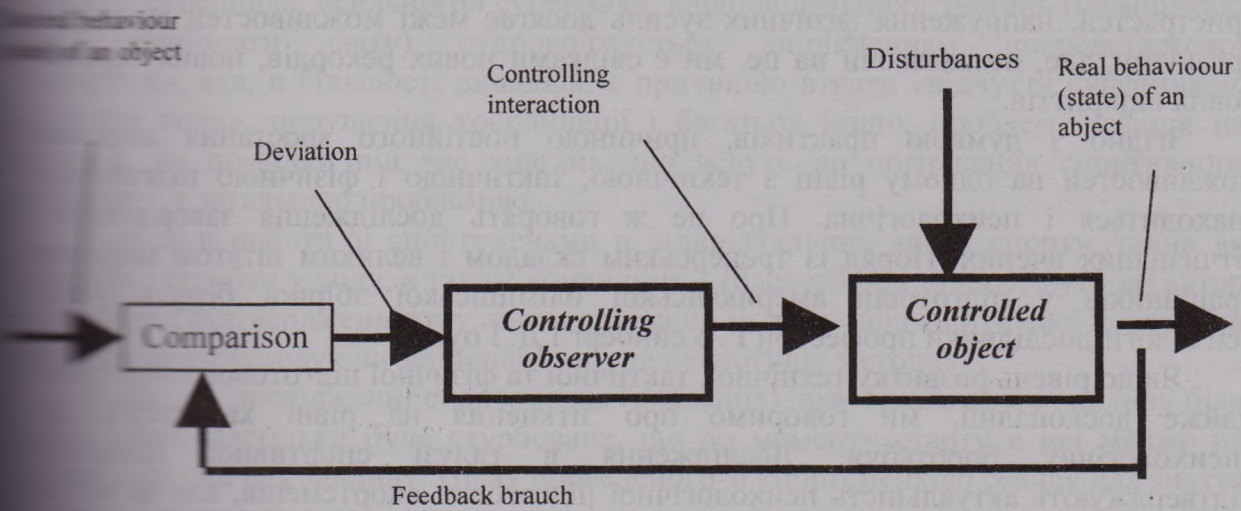


Fig. 3. The controlling scheme in a closed system (by J. Morawski)

**REFERENCES**

Chudowski Z. (1993), *Nauczanie i uczenie się czynności ruchowych (rozważania nad nauką Richarda A. Schmidta)*. Sport Wyczynowy, Warszawa, nr 11 – 12, s. 21 – 30.

Савицький Д. Д., Зациорський В. М. (1979), *Биомеханіка. Фізкультура і Спорт*, Москва.

Савицький Д. (1992), *Rhythmus als Konzept der Bewegungsgestaltung*. Magglingen, nr 8, s. 10 – 15.

Савицький Д., Schnabel G. (1987), *Bewegungslehre – Sportmotorik*. Volk und Wissen Verlag, Berlin.

Савицький Д. М. (1986), *Rytmy lokomocyjne. Geneza i niektóre możliwości sportowego wykorzystania*. Prace Instytutu Lotnictwa, Warszawa, nr 104 – 105.

Савицький Д., Запорожанов В. (1993), *Кірування jako czynnik optymalizacji treningu*. BCM SZKF i S, Warszawa.

The training time structure can be put in some formalised frames which determine the hierarchy of goals and training tasks. In the structure itself three cycles (long, medium and short) can be distinguished. The division into different training types can



suggest that these are disjoint sets having no common areas. It is a simplified division and trainers – practitioners. The multiplicity of interpretations of this issue often leads to the negligence in the co-ordination preparation. As far as an experiment is concerned we can practice controlling – affecting an object in such a way as to cause a reaction which would be compatible with an expected reaction to the proposed training stimuli.

## ПСИХОФІЗІОЛОГІЧНІ ФАКТОРИ, ЩО ВПЛИВАЮТЬ НА СПОРТИВНІ РЕЗУЛЬТАТИ

В.А. МАШИР

*Запорізький державний університет*

Темпи розвитку спорту вищих досягнень говорять самі за себе. Загострення пристрастей, напруження фізичних зусиль досягає межі можливостей людського організму, але, незважаючи на це, ми є свідками нових рекордів, нових перемог, нових відкриттів.

Згідно з думкою практиків, причиною постійного зростання людських можливостей на одному рівні з технічною, тактичною і фізичною підготовкою знаходиться і психологічна. Про це ж говорять дослідження закордонних і вітчизняних вчених. Поряд із тренерським складом і великим штатом медичних працівників у підготовці американської олімпійської збірної беруть участь психологи-дослідники професори Р. Уейнберг і Д. Гоулд.

Якщо рівень розвитку технічної, тактичної та фізичної підготовок спортсменів майже досконалий, ми говоримо про зіткнення на рівні характерів, або «психологічну боротьбу». Дослідження в галузі спортивної психології підтверджують актуальність психологічної підготовки спортсменів, але чи все ми використовуємо в підготовці спортсменів міжнародного рівня? Чи всі резерви нашої психіки? Мабуть, ні. А важливість і необхідність цієї підготовки говорять самі за себе...

Автор провів дослідження команди професійної ліги одного з ігрових видів спорту і виявив психологічні причини погіршення показників. Команда, яка лідирувала в таблиці чемпіонату на початку сезону, несподівано робить один з одним ряд програшів, що приводить її на одне з останніх місць. Дослідження двадцяти спортсменів дали можливість зрозуміти загальну картину факторів, що вплинули на зниження спортивних показників. Спортсмени відзначили ряд психологічних причин, які зумовили погіршення ситуації:

- комплекс «чужого» поля - у випадку пропущеного м'яча команда занепадає духом (граючи на «чужому» полі, команда, в кращому випадку, виходить на «нічию»);
- з остраху зробити помилку виникає страх нести відповідальність за м'яч у критичний момент, тому гравець намагається позбутися м'яча, хоча найчастіше при цьому знаходиться в більш вигідному положенні, ніж гравець, що одержав м'яч;
- після двох та більше програшів команда виходить на гру, не вірячи у свою перемогу, що говорить про занижену самооцінку і психологічну поразку ще до початку гри;