ANNALS of Faculty Engineering Hunedoara
International Journal of Engineering
ISSN: 1584 - 2673

ABOUT THE MOTOR CAPACITY DEVELOPMENT AND THE METHODOLOGICAL SUPERVISING

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ABSTRACT
Specialized literatures consider the psychomotor capacity as a complex function, an ability that integrates both the aspects of the motor activity and manifestations of the perceptive functions. During the volleyball players training, they make many mistakes because some inaccurate methodological extrapolations and, specially, because of the lack of knowledge of the real dimensions of the original (game model) that must be transposed into the training process by analogy and modeling. The authors fructify and combine their own scientific investigation with the investigations of some international experts, offering a valuable methodological material.
The information obtained by new record or by the specialty literature must scrupulously studied and turned to good account during the training process by the people interested in ensure the quality and the efficiency of the training process.
Keywords:
Methodological Supervising, Motor Capacity Development, Volleyball

1. METHODOLOGICAL SUPERVISING OF PSYCHOMOTOR CAPACITY DEVELOPMENT OF A VOLLEYBALL TEAM FROM THE SECOND ECHELON

The psychomotor behavior of every individual evolves based on his abilities, on his physical and intellectual development and on the educational influences that he submitted during his childhood. As a complex function that determines the human behavior's adjustment, the psychomotor capacity includes the participation of different psychical process and functions that assure both the information's reception and the accurate execution of the answering acts. Thru its fundamental components the psychomotor capacity makes possible the pragmatically, esthetical, educational adaptation. Related on the psychomotor capacity, DeMeur underlined some relations that exist between motor capacity, intellect and affectivity. Although, Lapierre considered that the notion of psychomotor capacity is too large to have a precise, categorical and indisputable definition, C. Paunescu underlined that the psychology proves that the motor act represents the foundation of the knowledge and learning organization, so it considerably leads the mental organization of the individual.

Rene Zazzo considers that the psychomotor education represents a fundamental education during the elementary school, because it conditions the entire learning process. The learning process cannot be efficient if the child has not the conscience of his body or he does not know his laterality, he cannot place himself into the space, he does not control the time and he has not enough coordination and stability of his gests and movements. One of the essential life manifestations is the movement; realized by the muscles bound up with the CNS and PNS; the muscles effectively realize the body's accommodation with the permanent modifications of the exterior environment. Based on the information received, NS absorbs and gives orders that, thru the efferent nervous fibres reach to the muscles and connect them by the motor plates; the result is the muscular contractions, translated by the multiple movements made by the human body.

During the volleyball players training, they make many mistakes because some inaccurate methodological extrapolations and, specially, because of the lack of knowledge of the real dimensions of the original (game model) that must be transposed into the training process by analogy and modelling. The authors fructify and combine their own scientific investigation with the investigations of some international experts, offering a valuable methodological material.

Many errors made during the players and teams training could be avoided if the technical manager (inclusive teamwork) would have the competence to give correct answers to some distinct questions, as follow:

- Which is the motor structure of the game (the original) or the causes that lead to the specific energetic solicitations and consumption?
- Which are the structural elements of the game or the technical-tactical actions that request foreground improvements of the motor, functional and psychical indicators?
- Which are the energy sources that support the effort?
- Which are the evaluation tests of the parameters and indicators that allow us to lead the training process?
- How, when and with what must begin the training? etc.

The correct answers of these questions are, mostly, depending on knowledge of the principal dimensions of the game's model (of the original or the properly game). Many specialists (foreign or Romanian) as: W. Baleserro (1990), J.O. Betran & J. Tico (1992), R. Colli & M. Faina (1985), D.E. Colibaba (1975, 2001, 2004), G. Cometti (2002), E. Generale & J. Zaragoza (1992), J. Jole (1990), M. Mandoni (1984), A. Predescu (1973, 1975), T. Predescu, G. Ghitescu (2001, 2003), L. Teodorescu, I. Portnah (1986) s.a., studied them.

Mostly of the above said authors agree that the volleyball game (the original) must be analyzed and knew thru some systemically dimensions that, under analogical conditions, can be improved during the training process. Taking into account the above said authors' opinion, but also according to our experience about solving this problem, we agree that the volleyball game model could be represented accordingly to the next dimensions that accept deductive systemically arguments:

- Motor structure of the game – that determines three types of functional solicitations:
  - anaerobic alactacid
  - anaerobic lactacid
  - aerobic, with alternative manifestation regime or preponderant mixed, joined by psychological (mental) solicitations and some psychological-social relations between team members.
- Energetically systems capacity and power

All these, together, flexibly integrate into the Cycle of the game's phases.

2. METHODOLOGICAL SPECIFICATIONS OF DEVELOPMENT DURING THE TRAINING PROCESS

Next, we present (as far as spatially possible) the essential aspects of these dimensions and some methodological specifications of development during the training process.

Motor structure of the game represents "the dimension cause that provokes the phenomenon effect, namely it determines and, ulterior, it is determined by the physiological, energetically, psychological solicitations etc.

Motor structure of the game, specific to the volleyball game is identified by the follows distinct elements:

1. Natural" skeleton" of the game constituted by:

- fundamental motor capacities and skills (running, walking, jump, volley) mixed and adapted to the game's specific.
- motor abilities adjacent to the motor capacities and skills, hereditary or/and anterior obtained (power, speed, resistance, coordination etc);
- favorable physical development (anthropometric sizes and body constitution);
- psychomotor and psychosocial capacities, hereditary or socially learned (family, entourage, friends)

This natural motor construction (hereditary) is precious and, in the same time, very important, especially during the initial selection process. Ulterior, it is improved and consolidated by a permanent athletic training.

2. Technical motor capacity, specific to volleyball (the elements and the specific technical methods) represent an ensemble of movements (simple, complex, partial, integral, interdependent, cyclic and acyclic, symmetric and asymmetric), different as shape and amplitude and variably or flexibly mixed, depending on the game situation or on the adversary performance.

The most important groups of elements and technical methods are:

2.1. Ball elements and technical methods (heavy of 657 group M and 600 group F) that request a high virtuosity to control, handle and send the game object. They include:

- Diversity of the ball striking methods, when the ball is in the air - flexible, depending on the diversity of the ball catching, keeping, controlling, handling, feint, protection methods etc, and all

these under the adversity and physical and psychical solicitations conditions.

- Diversity of the ball striking methods in offensive or in defence - flexible, depending on the spatial and temporal variability, on the position and reactions of the adversary, on the triple threatening feint effects, on the physical and psychical solicitation regime, on the tiredness etc.

2.2. The elements and technical methods without ball or the movement elements on the field:

- Offensive: necessary to make the individual and collective tactical actions, related to the offensive phases.
- Defense: necessary to make the individual and collective tactical actions, related to the defense phases.

3.Team individual and collective tactical actions (offensive and defence):

The technical structure stereotypically executed, without obstacles or opposition (adversaries, partners, referees). If they appear (lxl, 2x2, 3x3, 2x1, 3x2 etc.) then, they are consciously executed and tactically thought-out.

All the tactical actions (individual, collective, of team) contain interdependent technical elements under the form of operational schemes of game situations' resolution.

4.Specific motor qualities related with the technical methods and the tactical actions:

- speed, differently manifested (reaction, execution, repetition, movement) involved in the technical methods with and without ball, in the tactical actions, in the game phases, in combat on the net etc.
- speed is aided by power (0-5 sec) and capacity (5-20 sec) anaerobic alactacid. The player uses ATP and PC to make maxim efforts: short and rapid sprints, maxim repeated jumps, changing direction, acceleration - deceleration etc.

  The next forms of speed manifestation are involved:
  - reaction speed of visual, acoustic and tactile stimulus;
  - execution speed (rapidity of motor gesture);
  - repetition speed (rapidity of a motor gesture repetition);
  - movement speed - frontal, back, lateral oblique - in fundamental offensive and defence
  - position.

The force is the quality that fundaments the specific physical training of the volleyball players. According to the modern concept of training, to train for force does not necessary mean to develop the force indicators. It means, firstly, to prepare the muscular and functional system involved into the specific instruction regime, concretized by morphofunctional improvement, namely by increasing the contraction capacity, oxidation capacity, muscular flexibility, inter and intramuscular coordination, perfecting of energetically mechanism and, of course, of the force indicators. During the training of volleyball players, the next types of power manifestations have priority:

- Dynamic power that presumes the improvement of all muscular groups (m) geared by the locomotory system in the motor structure of the game, it means:
  - musculature of feet, back, arms for displacement, throwing and pass;
  - abdominal, dorsal, lumbar musculature in order to maintain the equilibrium;
  - musculature of thighs and shanks for jumps, changing the direction and defence game.
- Maximum force - realized by maximal and under-maximal charges (also named by some authors the slow force).
- Force as resistance regime (power) - to use lightly the dexterities with high frequency during the game.
- Rapid force - detente or speed as force (V+F) necessary to jump, to sprint, to strip off shortly, acceleration, change of direction.
- Explosive force (F+V) - placed at the arms' level and necessary to send the ball (pass, throwing).
- Static force and robustness – particularly necessary to the central players (pivots) in the net struggle (blocking plan's occupation, placement, body struggle, stability in field etc.)

General aerobic resistance (aerobic capacity and power) sustains the development of the other capacities and abilities. They improve it by solicitations of medium intensity and for long time, respectively for more than three minutes the body can adapts the big effort functions, becoming stable.

Anaerobic resistance or anaerobic capacity lactacid and alactacid are the quality educated by high intensity solicitations and for almost short time (20-120 sec). FOR VOLLEYBALL GAME, these solicitations time are majority. The appearance and the accumulation of the lactic acid limit the work time. The consumed energy is produced without oxygen, a very important thing for the technical dexterity under the tiredness regime or at the end of the game.

The articular mobility and the muscular flexibility assure the elasticity and the amplitude of the movements.

The skill is a complex psychomotor ability characterized by perspicacity and promptness of finding some motor solution to solve efficiently some game difficulties, anticipated or unanticipated. This ability optimally integrates or combines the next dimensions of motility:

- capacities perceptive - sensitive - representative (visual acuity, peripheral sight, kinaesthesia and spatial-temporal difference, coincidence time, ball sense, placement sense, operational schemes of action, image - body scheme, idiomatic - motor representations),
- neuromuscular coordinative capacity (general, segmental and intersegmental, eyepiece egmental), a movements precision and address,
- mobility and flexibility,
- static and dynamic equilibrium,
- agility and implementation capacity of the indicators of other motor qualities.

Some of these components of ability obtained the status of relative independent abilities, being educated by some special programs of training. Examples: education of taking precision, agility education, ball sense education etc. In volleyball game, in fact, in all sport games, we cannot solve the tactical game situations only by the coordinative capacity, therefore we plead for the concept of ability, in the meaning of above definition.

It is important to know and to model in training: distances covered, types of displacements, displacement speed, frequency of jumps, stops, change of direction, pirouettes etc, solitarily made by each player, on the posts or integrated into the tactical actions, individual, collective and of team.

3. COMMENTS

3.1. GETTING THE ENERGETICALLY RESOURCES

The secret of fructifying these effort dimensions is revealed by the three sources of energy, supplied to the muscle, that is to say:

First anaerobic alactacid system: muscular fibres use ATP molecules adenosine-triphosphoric and PC (phosphocreatine), directly from their content. This delivering of energy phenomenon lasts 10 sec when we work at maximum intensity; Second anaerobic lactacid system: production of ATP made by aerobic glycolysis of blood, where the muscular glycogen and blood glucose (both carbohydrates substances) are separated (metabolized), producing high coefficient ATP. ATP + PC and the glycolysis systems are anaerobic (they do not need oxygen). Glycolysis allows to muscle to work at very high intensity, but it leads to the formation of lactic acid in muscles and blood. Accumulation of the lactic acid leads to a slow anaerobic glycolysis and to the installation of tiredness after about 3 min of intense work. Therefore, to reduce the lactic acid of muscles and blood, we have to interrupt the effort or to continue it but at a diminished intensity. Consequently, we find the third energy source, namely aerobic way; The third aerobic way: supplying energy for efforts longer than 2-3 min, when all the three systems are involved (ATP+PC; glycolysis - aerobic system). Energy sources contribution is very important to establish the length, intensity and methods of work.

3.2. CAPACITY AND POWER OF ENERGETICALLY SYSTEMS

In volleyball, the aerobic efforts alternate with the anaerobic efforts (especially, lactacid and, more rare, alactacid). Episodically, there are phases or short moments (10-20 sec) of time when the players solicit their bodies at maximum (220 beatings/min). It supposes to pass in anaerobic alactacid status and to reach the functional anaerobic lactacid status underlined by apparition of lactic acid in muscles (example: continue pressing all over the field with contra attack, throwing, body struggle under the panel, repeated jumps about 10-20 sec + continue other actions 90-100 sec).

During the game, all the three types of solicitations, above mentioned, appear, it means anaerobic alactacid, anaerobic lactacid and aerobic. In all mentioned energetically systems, we have to make the difference between capacity and power, namely:

- Capacity represents the total energy that the player disposes to accomplish the requested solicitations or the energetically availability for a large work volume - work resistance under anaerobic alactacid regime, anaerobic lactacid regime and aerobic.
- Power (potentiality) represents the intensity of respective solicitations manifestation - body reaction speed or vitality.

Therefore, it is very good to know exactly the optimal stimulus of the capacity (anaerobic alactacid, anaerobic lactacid and aerobic) and the optimal stimulus of the power of these energetically systems. This is a very important aspect of training process, especially, when the subject is the development of the motor abilities that, without some optimal stimulus, do not lead to the expected progress.

In the same time, it is recommendable to begin by education of the energetically capacity and ulterior, of the energetically power.

3.3. ENERGETICALLY RESOURCES RECOVERY

The relation between the consumed energetically process and the resources recovery was studied and it is, generally, known. In this way, T. Bompa (2003, p.209) offers us the next table of the three energetically systems restoring.

Table 1. Restoring time of the three energetically systems

ENERGETICALLY PROCESS	MINIMUM	MAXIMUM
Restoring of muscle phosphagen (ATP and CP)	2 min	3-5 min
Length of lactic acid 02 elimination	3 min	5 min
Myoglobin restoring	1 min	2 min
Length of lactic acid 02 elimination	30 min	60 min
Resistance of muscular glycogen: a) after intermittent activities b) after a long, continue activity	- 2hours to recover 40% - 5hours to recover 55% - 25hours to recover 100% - lOhours to recover 60% - 48hours to recover 100%	
Lactic acid elimination from muscles and blood	- 10 min to eliminate 25% - 25-30 min to eliminate 50% - 60-75 min to eliminate 95%	
Resistance of hepatic glycogen	unknown	12-24 hours

To know the lactic acid accumulations and its elimination time is very important for a coach (table 8).

3.4. METHODOLOGICAL DEVELOPMENT

The information presented in the previous tables must turn to good account during the training process.

Table 2. Training process

Firstly, define these lengt	I steps in order to identify the work system:	
ANAEROBIC ALACTACID	ANAEROBIC LACTACID	AEROBIC
ATP + PC	Aerobic glycolysis	aerobic
1 - 10 sec	10 sec-3 min	Over 3 min
Sprints, change of direction, jumps etc	Continue effort	Game length

This bio-energetically scheme is very important so that the player could endure the effort of this kind: defensive pursuit + contra-attack sprint + throwing and offensive pursuit with the defender opposition. This kind of action of high solicitation leads to the exhaustion of all energetically resources in 7 - 10 sec, from which only the contra-attack last 4-5 sec; the recovery of this energy last 20 sec 9if the player interrupts the effort) or he "moves down" on the aerobic recovery fund of some lower intensity exercises.

During the match, a low concentration of lactic acid accumulates in blood and there is a small recovery of this energetically metabolism. A training program must content the next elements:

- Number of sprints: minimum 3 sprints
- Cover distance begins, for example, with 800 m, and then the running distances become shorter to maintain a high intensity: 2x400; 4x200; 8x100; 4x100 and 8x50m etc.
- Effective work time (example, 30 sec)
- Rest interval: at the beginning 90 sec and then, according to the covering distance time.
- Solicitation/repose relation: 1:3; 1:2; 1:1.
- Total covered distanc4e during a training (it must be more than 3200 m; 2 - 2.5 miles, according to S. Brown, 1993).

Number of training on week

- medium and long running: 2-4 x/week;
- short sprints: 3-5 x/week.

Other methods of anaerobic functional capacity development:

- accelerated running alternated with walking or jogging;
- fartlek adapted to high intensity efforts.

Examples: 400 jogging + 200m walking + sprints alternated by 100m walking (10 min) + running on the hill 100m and 100m walking (6 min) + sprint of 50 m alternated by 50m walking (3m). Under the limits of anaerobic solicitations, appears also the development strategy of speed, detente, agility, maximum force and power. For develop the named qualities they use the so-called neuromuscular training, with the follows amendatory: a more efficient sending of the nervous impulses to the effectors muscles, a more efficient coordination inter and intramuscular, collection of more rapid muscular fibres that act stronger in order\r to make the movements.

Neuromuscular strategy belongs to the next methodological way (conf. T. Bompa, 2003; Colibaba, 2004, G. Cometti, 2002 etc):

1. Adaptation period of the body or the period of morphofunctional substratum preparation and of the cardio respiratory system for the next neuromuscular solicitations. This step lasts about 3-6 weeks, depending on the age, experience, training level, training time etc. They work especially for the entire musculature (global or selective for the stabilizer musculature), for the resistance, skills, technique etc. (conformable with the training time - phase I).
2. Maximum force development (Fmax) high charged (70-110%) and few repetitions (1-2). Fmax development means the development of the recruited rapid fibres (FT - fast twitch = fibres). This result appears only by rising heavy dumb bell. Work time for Fmax is about 4-6 weeks. They use different weighting exercises as the genuflections, abdomens, rising on the toes etc. (training, phase II).
3. Power development or the improvement of the coefficient of engagement or discharging the rapid muscular fibres. On this purpose, they use some charges lower than 70% of maximum possibilities, but made with maximum rapidity. They use explosive, rapid and strong movements as jumps, sprints, throwing etc. On this purpose, they use plyometric exercises, with medicinal balls, agility exercises, jumps with genuflections, acceleration-deceleration with the medicinal ball etc. They work 4-5 weeks (2 training x 30 min) necessary recovery 1-4 min after each exercise; (it corresponds with training phase III or before competition).
4. Maintenance of Fmax and power index during the competition time for keeping the neuromuscular adaptations anterior realized (detente, speed, agility etc.). Therefore, they work also during the competition time, for force and power 2 times every week (it corresponds with the competition time).
5. During the transition time, we try to maintain the force anterior obtained. Generally, they work, 2 times every week of 40-60 min, low charge for the antagonistic and stabilizer muscles.

Aerobic energetically system (oxidative)

- It needs at least 3 min effort to install the real stable condition (stady sted); it means equilibrium between the oxygen contribution and the oxygen necessity of the body. Generally, they work for the aerobic system minimum 10-20 min during the competition time and depending on the training level presented during the training time.
- We must distinguish the differences between the aerobic capacity and the aerobic power;
- Aerobic capacity is educated by appliance of low and medium intensity efforts that last more than 15 min. In volleyball, they use long running (until 60 min), uniform rhythm, 70% maximum intensity, cardiac frequency of 120-164 beating/min;
- Methods: continue effort, Fartlek, Talk-Speed etc.
- Aerobic power needs efforts of 3-5 min, 80-95% maximum intensity; lot of energy consumption; it ensures the foundation of the physical condition in volleyball; it is recommendable to work at under maximum intensity and with pauses of 1/3 and ¼ of effective work time. Example - a 3 min effort = 3x60 sec = 180 sec; 1/3 and ¼ of 180 = 90 and 45 sec; in pause, FC recoveries about 120 ± beating/min.
- Aerobic training is considered one of the most efficient recovery means. In this way, after a very hard period, when we are very tired, we can use the aerobic training to oxygenate the body, to eliminate the toxins by perspiration and the lactic acid by its decompositions in contact with O_2.

4. CYCLE OF THE GAME'S PHASES

The game is permanently animated by the battle between the two teams in order to win the ball. This dispute is limited by a series of moments that indicate the game's phases for the both teams. Figure 1 surprise very well these game's moments and phases which, joined by records (numbers) permit us to make a close analyze of the game performed by team and by every player apart. From presented photo, it is important to remember:

a. when the team A get the ball, it begins a five moments cycle (I-V) who, ideally, should finish by success (V);
b. team B simultaneously goes through the same moments and phases in reverse order (V-I), it means in defence. It is ideal that the team B gets as rapid as possible the ball, before the team A reaches the final phase;
c. the number of ball possessions cannot be equal for the both teams. Difference appears when the ball does not belong to any team, respective: at the beginning of the match, during the engaging between two and, especially, during the offensive and defensive followings, when the ball does not belong to anyone (consequently appears the rule "who dominate the net wins the game"!);
d. calculate the length of the attack and defence phases in order to appreciate the game tempo; find the optimal rhythm and tempo for your own team.

To improve the game performed by the personal team and to settle some real instructional objectives, it is recommendable to proceed as follow:

- Analyze very carefully the ball winning moments (I) and the ball loss moments (V).
- Analyze the other game's moments and phases to identify the strong and the weak points of the game performed by your team.
- Systematize the conclusions on three game components: attack, defence and panel follow (offensive and defensive). In this way, it will be much easier to make the algorithm of the objectives based on the training periods.
- All the game sequences (moments, phases, relations, game tempo etc.) are trainable.
- You can analytically approach them, in cyclic succession, in antagonistic relation, under physical and psychical solicitation or under analogical conditions.
- Try to identify any relations between the effort's dimensions and the cycle of game's phases.

5. CONCLUSIONS

The information obtained by new record or by the specialty literature must scrupulously studied and turned to good account during the training process by the people interested in ensure the quality and the efficiency of the training process. Nevertheless, we underline the next significant conclusions:

- it is the principal dimension of the original that must be scrupulously analyzed for avoid the incorrect extrapolations from other disciplines (athletics, dumb bell etc) and the methodological confusions committed in solving the training objectives. Essentially, this motor structure specific to volleyball supposes the transfer and the modelling of the work regime of the locomotory system, by training; it includes the adjacent anticipated improvement (morphological, functional, energetically and psychological).
- Volleyball is a sport game with a great motor diversity and complexity that alternatively implicates the three mentioned energetically mechanisms: anaerobic alactacid, anaerobic lactacid and aerobic. Alternation or combination of the solicitation is limited by the next relative values:
  - 10-30 sec - anaerobic alactacid + anaerobic lactacid
  - 30-90 sec - anaerobic lactacid + anaerobic alactacid
  - 90-120 sec - anaerobic lactacid + aerobic
  - identify the optimal relation between solicitation regime and the length of the optimal rest intervals;
  - limit the instructional objectives directed to the capacity and power of energetically systems.

From the specific motor qualities, much confusion appears during the training for force development. In this view, we specify the follows:

- in present, they use the force training as principal mean of muscular system preparation, of contraction capacity, of inter and intramuscular coordination, of oxidation, of muscular flexibility, of energetically mechanisms improvement, of force indicators etc. that, together, contribute to the permanent increase of physical specific training level;
- during the traditional training, they worked according to the Russian pyramid model, it means with small charges (8 x 70-75%) and it ended with big charges and small number of repetitions (1x100%). consequently, they worked for resistance, for slow fibres (slow-twitch =ST - red). Today, after a period of muscular system global training, they begin by very big charges (1-2 x 85-110%) and, gradually, they pass to lower charges and more repetition. As a second variant, they work for rapid muscular fibres (fast-twitch = FT-white) and they consider that the neuromuscular system is relaxed and prepared for increasing the maximum force;
- attention when they pass from the specific training for maximum force development to the power development and resistance training;
- use alternatively and/or in combination the muscular contraction types (concentric, eccentric, plyometric, isometric and by electro-stimulation).

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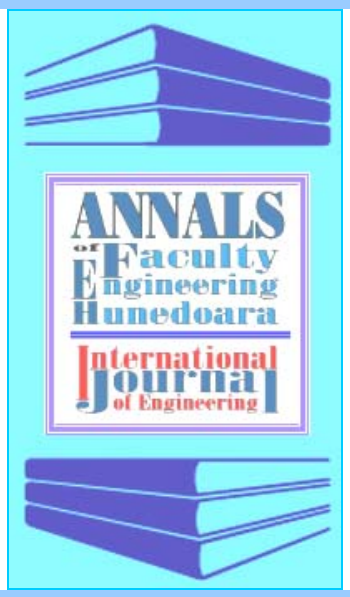

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