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STUDY REGARDING PROPRIOCEPTION IN FOOTBALL BETWEEN AGE 10 TO 12 YEARS OLD

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Abstract: *The study on proprioception in football game aims to present and demonstrate the importance of proprioception in performance sports, but especially in football game, for the age group 10 -12 years. Proprioception helps to raise awareness of the position and movement of the joints at every moment as shown by the bibliographic sources presented in the article. The experiment on football players with age between 10 and 12, emphasizes the importance of proprioception in their sports development. The automation of strengthen movements through proprioceptive training leads to the alternation of muscle contraction and relaxation, improvement of steady state, maintenance of posture with limited support, increased attention and the response of the neuromotor system to external stimuli. Applying the test for precision adaptation in kicking the ball and hitting it with the head substantiaes the working hypothesis and confirms by its results the correctness of the experimental activity.*

Keywords: *proprioception, balance, muscle contraction, football.*

1. Introduction

Football is truly a phenomenon known worldwide, being practiced in over 130 countries and has over 25 million legitimate players. With a modern history of over 100 years, besides attracting millions of viewers and billions of viewers, today's football trains and carries out ideas based on specialized and professional attitudes and mentality.

PROPERTIES s. F.

1. activity of proprioceptive sensitivity; its result.

2. perception of the self itself. (<fr proprioception).[3]

Julius Caesar Scaliger was the first person to describe the position of the

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movement as a 'sense of locomotion' in 1557. Centuries later, in 1826, Charles Bell comes up with the hypothesis that information about the position of the muscles is sent from the muscles to the brain, which was in contradiction with the ideas of the time. In 1880, Henry Charlton Bastian renamed the 'sense of muscles' with the term 'kinaesthesia', and points out that the information comes not only from the muscles, but also from the joints, skin and tendons. Alfred Goldscheier, a renowned German neurologist, classifies kinaesthesia as the sensitivity of muscles, tendons, and joints around 1889.

It was not until 1906 that Charles Scott Sherington introduced the terms 'proprioception,' 'interception,' and 'extrovertness.' 'Extractives' are sensory organs such as eyes, ears, mouths and skin that receive information from the outside, while 'interceptors' provide information about internal organs. On the other hand, 'proprioception' is defined as the care of movement and posture derived from muscles, tendons and joints.[4]

The movement of different parts of the body is controlled by somatic and sensory functions. The collective functioning of these systems is essential for an effective proprioceptive sense. A somatosensory system is composed of sensory receptors, sensory neurons in peripheral structures and neurons in cortical structures. Somatosensory receptors are classified in thermoreceptors, photoreceptors, mechanical receptors and chemoreceptors. These receptors receive information from the peripheral somatic area such as tactile stimuli, proprioceptive stimuli, heat and skin and epithelial information, skeletal muscles, bones and joints, internal organs, and the cardiovascular system, and are then transmitted to the cortical structure. The Pacini Corpses, Merkel's disc and Ruffini's corpuscles include mechanical receptors are specialized to provide central nervous system information about touch, pressure, vibration, and skin tension.[5]

Proprioceptive is more than a sense of movement, whereas proprioception is awareness of the position of the joints, and kinesthesis describes the feeling of the movement of the joints. The signals received from the mechanical and cutaneous receptors are important in the control of the knee joint movement (kinaesthesia), and their position (the sense of the joints). Using proprioceptive, the human body knows where to place its extremities and how to move smoothly, with great accuracy in different positions such as maintaining the equilibrium position as well as turning its eyes closed. In the event of injury or trauma, proprioceptors may be affected. In the sphere of researchers, it is debated whether an individual whose proprioceptors have been affected are more vulnerable to injuries or not.[6]

Ownership is the capacity of the body to sit in space and perceive movements. It is of vital importance to know the speed and the force with which a movement is performed because it plays a fundamental role in the articular stability. For the time being, proprioceptive re-education consists of the body's ability to respond precisely and coordinated to unpredictable movements by stimulating existing nerve receptors.

Over the years, the effectiveness of various techniques applied to prevention has proven to be effective, but proprioception has always been a subject of debate and for now it is difficult to demonstrate its effectiveness. The

literature also tells us that in the case of a sprain, the primary prevention method is not effective but at the same time has been shown to be very effective after recovery, but especially to prevent relapse. It is also believed that proprioception compared to techniques such as bandaging has fewer side effects, considering that the bandage may break during play or cause irritation, whereas proprioception does not have these effects. [7]

In the soccer game we often encounter situations where physical contact with the opponent is present, as well as a high intensity effort, explosive moves and ball. These actions, combined with the presence of intrinsic risk factors such as injuries, cause players to be exposed to a high degree of injury during game play. Concretely, a study on injuries in Spanish football during the 2008/2009 Championship demonstrates that the injury rate is 5.65 per 1000 hours of activity, but also the fact that the risk of injury is 12 times higher during an official match than during a training session.[8]

Thus, based on the above, we can say that proprioception helps to raise awareness of the position and movements of the joints at every moment. Hence the importance of practicing sport to identify unpredictable body movements and the rapid development of solutions to correct them before an injury occurs.

Due to this increasing importance given to proprioception, it is up to date that there are many sports disciplines where proprioceptive exercises are applied in the training, not just in the football game, for example in athletics, volleyball, handball and so on.

Therefore, setting and developing these types of practice during athletes training will inevitably reduce the risk of injury, especially in the area of the ankle and knee joints, studies showing that they are the most affected during the practice of football, indicating the injury being about 12 -13% of the total players.

Generally, the most frequent injuries of athletes occur as a result of single actions, deriving from articular destabilization. These aspects demonstrate shortcomings in specific training: coordination and proprioception. Force, constancy, speed and ability to move can only provide absolute control through an excellent development of general dynamic coordination. Postural and movement coordination depends on the distinct activities of the receptors of the locomotor apparatus, namely proprioceptors.

In the human body, we find the proprioceptive system consisting of proprioceptive nerve receptors that are found in the muscles, joints and ligaments and which detect the degree of muscle tension and elasticity.

The cerebellum processes this information and sends it to the muscles to make the necessary adjustments of tension and elasticity as an automated and reflex process. Being an extremely fast and automated process, we can say that proprioceptors are part of an execution control mechanism.

In addition to being a source of somatosensory information, maintaining body position, performing normal routine movements, or while practicing sport, when a lesion occurs, the proprioceptive system deteriorates, producing a deficiency of proprioceptive information that reaches the subject. For this reason, the injured person is prone to another injury.

However, the proprioceptive system can be trained by specific means of action that can help us improve strength, coordination, balance, reaction speed in certain situations, and not to compensate for the loss of sensations caused by a joint lesion, but also to avoid the risk that this will happen.

It is known that proprioceptive training comes with a positive contribution to the exercises already used in the training. Through proprioceptive training, the athlete learns to take advantage of the reflex mechanisms, improving the stimuli that facilitate efficiency gains and reducing the inhibiting factors that lead to its decline. In this way, reflexes such as stretching, which may occur before an unforeseen situation (eg. loss of balance), can manifest itself in a correct form (maintaining the balance) or incorrect (causing a major imbalance). Through proprioceptive training, incorrect reflexes tend to be eliminated to optimize the response.

It is demonstrated that any improvement in strength is due to neuromuscular stimulation. In relation to force, we think of muscle mass, but we cannot forget that all processes take place in the nervous system orders. In brief, it is known that in order to improve the strength through training, functional and structural action means must be used. Reflection processes that include prophecy are closely related to strength training along with their own progress that can be achieved through intermuscular coordination and intramuscular coordination.

- Intermuscular coordination: refers to the interaction between different muscle groups that produce a determined movement.
- Intramuscular coordination: refers to the interaction between motor units of the same muscle.
- Proprioception (Reflection Processes): refers to the processes of facilitating nervous inhibitors through better control of stretch reflexes and contraction reflexes that can lead to adaptations at the level of intermuscular coordination.

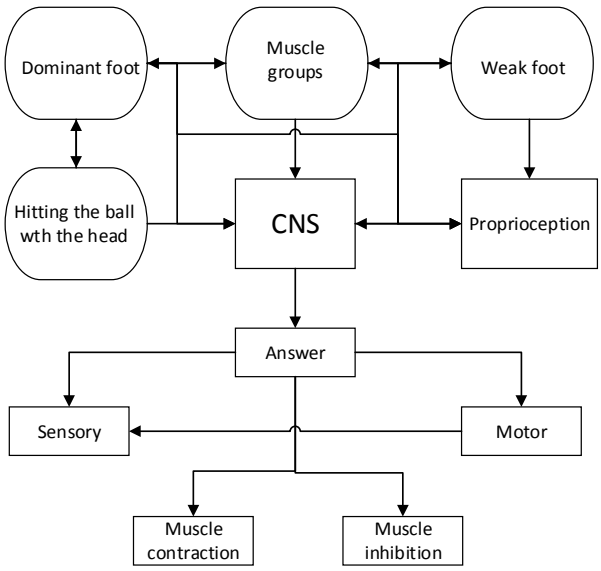

Fig. 1. *Proprioceptive scheme*

2. The Content of the Research

2.1. Hypothesis

If we apply the experimental program designed to stimulate proprioception in the preparation of the 10 to 12 years old junior footballers, we assume that we will achieve superior results both for maintaining balance and for executions based on alternating muscle contraction with relaxation.

The experimental period was eight weeks. The research included five subjects legalized at a football club in Brasov aged 10-12. In the research we applied two tests, one initial and the other final. Initial testing was conducted at the beginning of the experiment to record the baseline from which we start the study. Between initial testing and final testing, an individualized training program based on the relationship between muscular contraction and proprioception was applied, aiming to improve the technical element of the ball by kicking the ball (using the lath) and hitting the ball with the head on the spot. The experimental program was accomplished by alternating one-and-a-two-legged training, maintaining the posture with limited support, executions with closed eyes, attention-based executions and response to external stimuli, and executions based on the alternation of muscle contraction with relaxation.

In this regard, we used the ball precision adaptation test, using a specific balance and muscle contraction equipment called 'Bosu Ball' in this regard. The use of this equipment is intended for research and activities aimed at training, improvement and evaluation of the proprioceptive system.

The test consists of placing the athlete on two legs, maintaining the balance on 'Bosu Ball', and striking the ball alternately for the first time with his palpable foot with the elbow, the second time with the clumsy foot also with the wrist and the third time with his head. The athlete will perform fifteen executions, five for each of the three listed items.

The ball must be sent to a fixed point at a distance of 5 meters

Only the correct strokes of the 5 executions for each listed item will be counted.

2.2. Research results

We present in the tables below the values recorded by the five subjects and their meanings in the two initial and final tests.

Initial test data Table 1

Name	Kicking the ball with the dominant foot	Kicking the ball with the weak foot	Hitting the ball with the head
P.D	3	2	2
D.R	4	1	3
V.A	3	2	3
B.R	2	1	2
G.M	4	3	4
Average	2.8	3.2	1.8

Final test data Table 2

Name	Kicking the ball with the dominant foot	Kicking the ball with the weak foot	Hitting the ball with the head
P.D	4	3	3
D.R	4	3	4
V.A	3	4	4
B.R	4	3	3
G.M	5	4	5
Average	4	3.4	3.8

Data media – Centralized Table 3

Test	Initial testing	Final testing	Final average	Progress
Kicking the ball with the dominant foot	3.2	4	3.6	0.8
Kicking the ball with the weak foot	1.8	3.4	2.6	2
Hitting the ball with the head	2.8	3.8	3.3	1

2.3. Interpretation of the researched data

Following initial testing, subjects scored an average shot of the ball with a handy foot of 3.2, while after applying the experimental program, the subjects scored an average shot at the final test of 4.

There is a progress achieved in the final test of 0.8, as can be seen in graph 1.

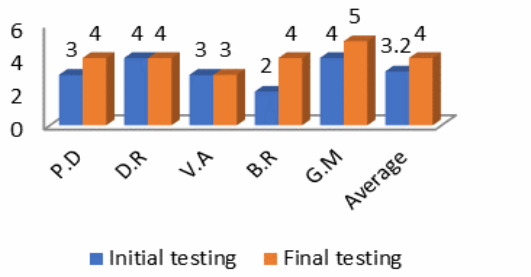

Chart 1. *Comparison of initial results vs. final results - kicking the ball with the dominant foot*

Following initial testing, subjects scored an average ball bumping of 1.8, while after applying the experimental program, the subjects scored an average shot of the ball to the final test of 3.4.

There is a progress achieved in the final test of 2, as can be seen in graph 2.

Following initial testing, subjects scored an average shot of the ball with the 2.8 head, while after the experimental application the subjects scored an average shot of the ball at the final test of 3.8.

There is a progress achieved in the final test of 1, as can be seen in graph 3.

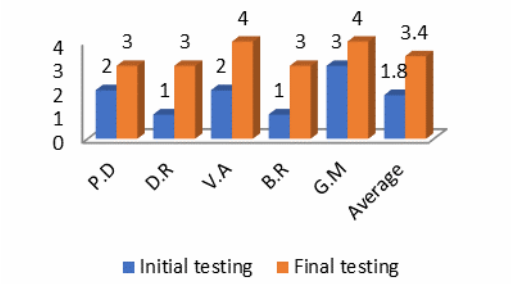

Chart 2. *Comparison of initial results vs. final results - kicking the ball with the weak foot*

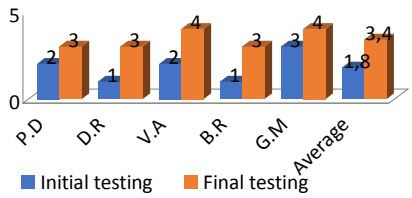

Chart 3. *Comparison of initial results vs. final results - kicking the ball with your head*

After the experiment, it is possible to state that each of the five subjects progressed in the final trials at the three evaluated technical procedures. Consequently, the average obtained in the final test is superior to the initial average for each of the three procedures under assessment.

3. Conclusions

The conclusions of the experimental study focused on two directions:

a. the results recorded after the Ball Precision Adaptation Test;

Subjects involved in the research have perfected the proprioceptive capabilities based on the experimental program, achieving better results at final testing, as shown in the chart 4.

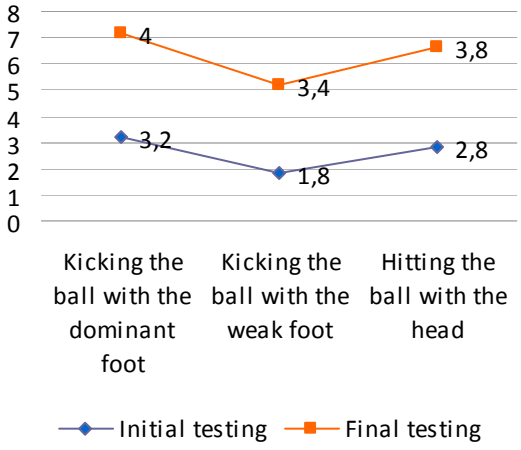

Chart 4. *Overall evolution of results Initial testing vs Final testing*

b. the relationship between proprioceptive training and general coordination:

- The regulation of the spatio-temporal parameters of the movement refers to the adjustment of the movement in

time and space in order to obtain an efficient execution in a certain situation. For example, when we hit a ball in unstable balance, sending it to a fixed point, we calculate the distance from where the ball was launched and the time it will reach to adjust our movements. The relevant drive systems to improve spatial-temporal distance appreciation are the launches and passages of objects of different sizes and weights.

- Balancing capacity in both situations, both static and dynamic, anticipates possible situations prior to technical execution (anticipation mechanism). The specific drives for balance improvement are: sitting on one leg, twisting the upper and torso, maintaining the posture with limited support on irregular surfaces or exercises with eyes closed.
- The ability to orientate in space is done fundamentally with the help of the visual system and the proprioceptive system. We can improve this capacity by training with attention-response systems to external stimuli.
- Muscle relaxation is very important because an excessive tension on the muscles that do not take part in a certain action may have undesirable effects on the coordination of movements limiting the speed and strength (the occurrence of fatigue). We propose the use of drive systems based on the alternation of tension-relaxation periods trying to consciously control them.

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