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THE INTEGRATION OF MUSCLE STRENGTHENING IN THE IMPROVEMENT OF MUSCULAR AND TECHNICAL PARAMETERS OF YOUNG FOOTBALLERS

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Summary: The study aimed to evaluate the effect of an integrated muscle strengthening program on the improvement of muscular and technical parameters in young football players.

There were two objectives, scientifically to measure the impact of integrated muscle strengthening on young players, and practically to present an educational tool for coaches and students to understand this concept of training. To carry on this research, we proceeded to a development of the 8-week program applied to a sample of 24 well-trained players of the first division under 18 years. The hypotheses put forward, were confirmed through the educational intervention and the results obtained were significant. Our results have increased the importance of strength training integrated into the training of young footballers. The margin progress of the experimental group was significant compared to the control group, and the impact of this concept proved to be positive in the approach to the physical preparation of young footballers. It is recommended to pay attention to the concept of integrated muscle building, with all its technical components.

Keywords: integration, muscle strengthening, improvement, muscular and technical parameters, young footballers.

Introduction

The match is always the goal of training, reflecting the quality of the player and characterizing the efforts made which will serve as a benchmark to guide training (Reilly 1994). Muscle strengthening is an increasingly important place for all serious footballers. It is essential to work on physical parameters, both on impacts and to work on endurance (Bell 2000). The

concept of integration is in fact synonymous with improving physical qualities through the motor skills specific to the activity practiced.

It is a question of making the difference between the purely athletic preparation which, too, can advance the individual, and the * specific football * preparation, which will allow the improvement of the specific qualities which the football player must possess."(Cometti 1993).

Football, being a sport with some physical contact, it is imperative for a high-level player to have a physique capable of absorbing the multiple loads of opponents. Indeed, in a single football match, a player, especially if he plays as a midfielder or a striker, can suffer more than twenty tackles (Dellal 2008). Liveliness will give him confidence in the face of the different loads of his opponents. Liveliness gives the player an explosive power quality, that is, the player can move very quickly on the field.

By following the right weight training program, the player can have a liveliness which can leave much slower defenders in place (Le Gallais 2007). This explosiveness can also allow the player to have a sudden and violent ball strike which can surprise the opposing goalkeeper. Indeed, it allows the player to keep a high level of power throughout the duration of the match. The goal of muscle strengthening training for the footballer is to gain explosiveness and speed, but also to be more solid during contacts, and to win aerial duels, by jumping higher than other footballers (Gorostiaga 2006).

A completely different and completely new approach compared to conventional preparation. It consists in reversing the trends and recommending the parameters of strength and explosiveness as the basis of physical preparation in football (Lambertin 2000). Through this approach, we have allowed ourselves to ask the following main question: Does the optimization of integrated muscle strengthening can be beneficial and contributes to acquire a significant physical potential for the practice of high-level football? And does specific football, muscle strengthening can bring about a significant change in physical potential and the technique of the young footballer without disturbing his harmonious development on the football and physical level?

Our main hypothesis was that the optimization of muscle strengthening and its association with the technical-tactical training of young footballers under the age of 18 can only be beneficial and contribute to the acquisition of significant physical potential in the practice of football. Secondly, the muscle strengthening integrated into the planning of the training has harmful effects on the performance and performance of the young player, that is to say, it is a hindrance to his football development.

Research Objectives. The ambition expected in this research is to know the effects of muscle strengthening integrated into the training of young footballers:

a - From a scientific point of view, try to prove through our experimentation the effectiveness of this approach in the development of parameters of (strength) in young U-18 footballers.

b - However, on a practical level, we will try to orient the coaches and educators of this category as well as the students in STAPS and encourage them to integrate muscle strengthening in their programming in order to achieve their objectives in the training of young Algerian footballers.

It will be devoted to three essential points where we will expose a whole literature which has direct links with our thematic to know at first, the physiological bases of the muscular contraction and the theory of the muscular contraction as well as the maturation at the young football player, while in the second time we will discuss an analysis of football activity and the requirements of football in addition to the distribution efforts in football.

While the third point will be reserved for the analysis of the exercise of muscle strengthening in football and its planning and conduct of the training process and the importance currently occupied by physical preparation integrated into modern training (Cometti 2002).

In the literature on the sport of completion, more and more, we see appearing the notions of the control of the training and the optimization of the training. In the case of the training process, the main part of controlling the training consists above all in checking its adaptation to the ever-changing conditions, with a view to carrying out fundamental training tasks. In planning and managing the training process, it is very useful to logically plan for the future development of the training process and its effects (Abrahams 2013).

Sports theorists admit that when organizing the instruction of players of high-level teams, it is necessary to ensure the operation of a few elements:

- Preventing results and shaping the characteristics of the best athletes and world teams.
- Analysis of physical, technical and tactical preparation while conducting sports combat.
- Definition of the level of mental preparation.
- The development of information which presents the characteristic of the general and specific functional possibilities of the organism of the football player (above all, it is necessary to define the indices of the capacity and the adaptation of the organism to the loads of training).
- Regarding the player's self-improvement″ of knowledge and know-how ″- Knowledge of the level.

- The unity of the training, competition and biological renewal process.

Generally, force, speed, and power form a whole which must tend to approach the conditions encountered in racing. What we are saying is that strength training must be adapted to the race. For middle- and long-distance athletes, it should aim to improve the power and duration of muscle contraction without causing weight gain. The ultimate goal is to improve stride performance in normal conditions as well as in a state of fatigue (Kunz 1991).

Sometimes the three contraction phases - eccentric followed by isometric and concentric - follow each other at such a speed that it becomes impossible to differentiate them. We then speak of Plyometric contraction (Jacques 1997).This type of work of the muscle is particularly interesting because a little like the elastic that one stretches and which recovers by itself, its initial shape (biomechanical sector), it makes it possible to recover the energy stored during the stretching phase (eccentric) for use in the contraction phase (concentric).The consequence is that in plyometrics, the muscle can develop a strength 1.5 to 2 times greater than the maximum isometric force (Legeard 2005).

Methods

In accordance with the aim of the research, it was necessary to accomplish the following tasks:

a) Analysis of the particularities of dynamic training within the experimental group.
b) Determine the effectiveness of this method of improving the parameters of strength or muscle qualities.
c) Compare the results of group 1 and 2.

Participants: Twenty four (24) well-trained players of first division soccer under 18 years were tested. Were followed for 8 weeks (experimental group), one benefited in addition to their weekly training from two integrated weight training sessions lasting 45 minutes, the other group (control group or control group) followed a program without integrated weight training sessions, that is to say ordinary training.

To carry on this study, I took advantage of the practical internship, as part of our first year as a magister to make contact with the coaches and leaders of the club, it is a premeditated choice, or it focused on a population players from the category under 18, the number of which is 24 players, breaks down as follows.

Experimental group: 12 U-18 players "experimental sample" so I was responsible for training during the whole time of the experiment, that is to say 8 weeks.

Control group: 12 U-18 players "control sample" that the coach responsible for the team takes care of separately from the experimental group.

The experiment tests:

[1] Speed (20 m) without Ball (Seconds).

[2] Vertical jump test (Sargent jump test, vertical leap) (centimeters).

[3] The “killy”chair (minutes).

[4] Speed (20 m) with ball (Seconds).

[5] Speed (20m) without Ball and with change of direction (Seconds).

[6] Speed (20 m) with Ball and with change of direction (Seconds).

[7] Ventral sheathing test (minutes).

The implementation process of integrated muscle strengthening training:

a) A quantity of work for our players.

b) An adaptation of the exercises for each.

c) Maximum time for individual coach intervention.

Results

After having exposed the methodology of our study, here are the results of the tests carried out on the two samples (control group and experimental group). In this chapter, we will dissect the results obtained in the Pre-tests and Post-tests, to try to validate the assumptions made in this study. The battery of tests developed for this study made it possible to follow the evolution of the muscular qualities of each player, throughout the experiment, regardless of the group to which they belong to E.G or C.G.

Table 1

The results of the pre-tests of the two groups (E.G and C.G)

	Experimental group		**Control group**		**T Calculated**	**T Board**	**D of F 2N-2**	**Statistical threshold**
	X	S	X	S				
Speed (20 m) without ball	3.75	0 .19	3.73	0.17	2.09	1.71	22	0.05
Vertical jump test	41.83	6.12	37.58	6.33	1.60			
The “killy”chair	2.00	1.05	2.41	1.39	0.67			
Speed (20 m) with ball	4.14	0.03	4.26	0,0006	165			
Speed (20 m) without Ball and with change of direction	7.39	0.32	7.55	0.40	1.05			
Speed (20 m) with Ball and with change of direction	9.75	0.70	10.04	0.58	1.05			
Ventral sheathing test	2.48	0.67	2.66	0.81	0.59			

Legend: E.G: Experimental Group C.G: Control Group

Statistical analysis of the results of the pre-tests represents the data from the tests of the parameters of the strength or muscular qualities (strength-speed, power, explosiveness, strength-endurance) and technics to measure before the intervention experimental, that is to say before the application of the training program, with a statistical threshold of 0.05, a degree of freedom 22, and "t" of Student = 1.71.

We note that the test results are almost identical for the two groups, and the values obtained show that there is no significant difference between the two study groups, and the experiment will confirm or refute us. The assumptions previously made.

Table 2

The results of the post-tests of the two groups (E.G. and C.G.)

	Experimental group		**Control group**		**T Calculated**	**T Board**	**D of F 2N-2**	**Statistical threshold**
	X	S	X	S				
Speed (20 m) without Ball	3.37	0.22	3.75	0.20	4.37	1.71	22	0.05
Vertical jump test	47.83	5.83	40.17	4.80	3.37			
The "killy"chair	3.47	1.23	2.61	1.06	1.75			
Speed (20 m) with ball	3.56	0.25	4.09	0.28	4.68			
Speed (20 m) without ball and with change of direction	6.64	0.23	7.42	0.31	6.75			
Speed (20 m) with ball and with change of direction	8.66	0.66	9.98	0.47	5.40			
Ventral sheathing test	3.43	0.79	2.05	0.65	4.47			

The evolution of the parameters, of the force or muscular qualities at the end of this experiment seems significant, because in the E.G, the driven training shows a significant improvement of the parameters of the force in comparison with the C.G.As mentioned (Bodineau 2007) integrated into global practice, physical preparation can give a dominant work (speed, endurance, muscle strengthening ...) through specific forms (games, duels, exchanges). This approach is tacit in the training of young athletes: they prepare by repeating tactical sequences or technical gesture progressions, however, it is impossible to precisely parameterize the efforts and to define their nature. How to truly develop aerobic power play, speed or strength in random opposition situations dependent on technical-tactical responses"

Comparative analysis of the two groups shows that in pre-tests, they perform similarly, except for almost all the tests. On the other hand, in post-tests, the experimental group differs

from the control group with statistically superior performances for the tests (Speed 20 m without ball, Speed 20 m with ball, 20 m without ball and with change of direction).

Table 3

The results of the pre-tests and post-tests of the experimental group

	Experimental group				**T Calcula-ted**	**T Board**	**D of F N-1**	**Statistical threshold**	**Meaning statistical**
	pré-tests		post-tests						
	X	S	X	S					
Speed (20 m) without Ball	3.75	0 .19	3 .37	0.22	5.06	1.79	11	0.05	Significant
Vertical jump test	41.83	6.12	47.83	5.83	7.71				Significant
The “killy”chair	2.00	1.05	3.47	1.23	6.08				Significant
Speed (20 m) with ball	4.14	0.03	3.56	0.25	9.62				Significant
Speed (20 m) without Ball and with change of direction	7.39	0.32	6.64	0.23	8.05				Significant
Speed (20 m) with Ball and with change of direction	9.75	0.70	8.66	0.66	9.66				Significant
Ventral sheathing test	2.48	0.67	3.43	0.79	13.51				Significant

Discussion

If we notice the results of the pre-tests and post-tests obtained from the E.G., we observe significant improvements in the parameters of the force. What confirms us in our experimental approach, in the sense that a training of muscle strengthening integrated into football training is likely to bring considerable improvements to the physical qualities necessary for good performance as demonstrated (Lambertin 2000). It is the improvement of the physiological potentials of the player in close relation with the motor skills of football activity (Lloyd 2013), show that strength training followed by endurance training allows better development of the strength than in reverse order. So it is all about planning strength training first, then training to develop aerobic capacity.

Whereas (Taelman 2003) suggests also integrating the physiological, technical and tactical parameters of football activity. In fact the player, through the phenomenon of transfers, will benefit from the development of a particular quality to improve other qualities essential in the practice of football. The observations established between the pre-tests and post-tests are confirmed by the study with a significant improvement for most of the tests carried.

By comparing the results obtained by the two groups, we can affirm that the integration of specific muscle strengthening exercises in football training was beneficial for the experimental group. Indeed, we note in the latter significant improvements for the majority of the tests (T calculated, T table 1.79, $p < 0.005$). Improvement of parameters of strength or muscular qualities. These results support certain longitudinal studies in team sports which have also found muscle improvements following specific training (Cometti 2014). Gorostiaga et al. studied the effect of physical preparation on the performance of a male team. The same research team lingered in 2008 on a female team (Gorostiaga 2006).

Conclusion

The development of strength and explosiveness is at the heart of modern physical preparation, and more particularly in a discipline such as football, muscle development is an essential component of training because it allows you to run faster, jump higher, throw harder and dominate your opponent in duels. When you do not integrate the muscle strengthening work into the workouts scheduled for the week, as Carpinelli mentions (Carpinelli 2004), it is rare for the coach to sacrifice time for muscle development. However, it appears that relatively short work, limited in series of effort and not very restrictive, has certain effectiveness". Without good aerobic skills the player has trouble recovering, not only during the match, as a result the defensive folds that the player did while trotting in the first half he makes them by walking in second Half time, which is prejudicial to tactical replacement and in my eyes it is as important as good explosiveness, but also during the work week and the season (Leroux 2006).

In another way the muscle strengthening integrated into the training of young footballers gives significant results and considerably improves the muscular qualities and consequently the physical qualities necessary in the practice of football and contributes to prepare the young player to approach the higher category in all serenity and confidence.

Determining the impact of integrated muscle strengthening on performance among young footballers was our initial ambition. At the end of this work, what assessment can we make?

The aim of this study was to observe and analyse a training process for young Algerian U-18 footballers from standard training sessions and/or exercises (weight training, muscle strengthening and plyometric). The purpose of this analysis was to quantify and qualify the activity of the footballer during a preparation cycle, our study made it possible to determine the specific training of the footballer and the differences that characterize it (Guillaume & Perrey

2005). Some coaches recommend strength training before the season exclusively in the room. These training sessions consist of general and standard muscle building exercises where all disciplines come together, because they would allow a physical effort almost identical to that of physical exercises specific to football. However, these integrated weight training exercises have greater variability than that of indoor exercises (Gaillaud 2010). This form of work does not allow rigorous control of the activity of young players. Thus, in accordance with the training objectives, the trainer will have to choose between conventional controlled physical training (indoor exercises) and an integrated physical training (integrated muscle building) more difficult to control (muscle building exercises integrated into specific training soccer). It has been shown that even in an activity with a strong technical component; physical preparation can be useful, either to reduce the intensity relative to the execution of a given exercise, or to give an additional capacity, which allows the sportsman high level to achieve better performance in physical, energetic, technical and tactical terms (Legeard 2005).

In the field of muscle strengthening, Gilles Cometti recommends chaining in the same session and even alternating between each series the general and specific exercises (Cometti 2014), in order to transfer the physical skills to the technical level. We can also link in the training program a period of strength development and a period of technical work. Integrating a physical component into football training. The transfer will be done directly on the field with specific instructions. The integration of these new athletic qualities of play activities which are complex (also called quality transfer) and primarily on the integration of physical qualities acquired in specific skills to alleviate the problem mentioned above, but in this case the time spent in search of the athletic gain will be less and the athletic gain will be much longer to obtain but on the other hand the specific performance gain will be faster (Hassman & Kentta 1999). In training practices, this category of exercises is often a missing link detrimental to the progress of young players. Is it possible, if not desirable, to want to simultaneously develop non-specific and specific physical qualities (Daniel Le Gallais 2007)?

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