



- Fizyolojik Parametrelerinin Değerlendirilmesi. Bed. Eğit. Ve Spor Bil. Dergisi, cilt II, Sayı 2: 16-24.
- Kutlu, M., GÜR, E., KAMANLI, A., 2001, Plometrik Antrenmanın Genç Futbolcuların Anaerobik Güçlerine Etkisi. III. Uluslararası Akdeniz Spor Bilimleri Kongresi, Muğla. ; 207.
- Kürkçü R, Çalışkan E, Şirinkan A, ERCİŞ S., 2007, 12 – 13 Yaş Greko-Romen Güreşçilerinin Vücut Yağ Yüzdesi, Kuvvet, Esneklik, Aerobik ve Anaerobik Güç Özelliklerinin Bir Sezonluk Değişimleri, SPORMETRE, A.Ü. BESYO Spor Bilimleri Dergisi 2.
- Olaru, A.M., 1994, Sportif Yüzme; Teknik, Taktik, Antrenörlük Bilgisi, s:10-11, Adana.
- Otman AS, Demirel H, Sade A., 1995, Tedavi Hareketlerinde Temel Değerlendirme Prensipleri. 16. Ankara: Hacettepe Üniversitesi Fizik Tedavi ve Rehabilitasyon Yüksekokulu Yayınları: 14-20.
- Ozcaldiran, B.; Durmaz, B., 1993, Egzersiz ve yüzme antrenmanlarının motor gelişime etkileri./The effects of exercises and swimming training on motor fitness.
- Polat, Y, Çınar V, Şahin M, Pepe O., 2003, 14 yaş çocukların fiziksel uygunluk düzeyleri ile antropometrik özelliklerinin incelenmesi, İ.Ü Spor Bilim Dergisi, 11;3 ÖS:127-130
- Tamer, K., 2000, Sporda Fiziksel-Fizyolojik Performansın Ölçülmesi ve Değerlendirilmesi, 2. Baskı, Bağrgan Yayınevi Kültür Matbaası, ss. 36- 38. Ankara.
- Zülkadiroğlu, Z., 1995, 5-6 yaş grubu kız ve erkek çocuklarda 12 haftalık cimnastik ve yüzme çalışmalarının esneklik ve kondisyonel özellikleri üzerine etkisi. Yüksek Lisans Tezi, Çukurova Üniversitesi, Sağlık bilimleri Enstitüsü, Adana.

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EFFECTS OF THE STRENGTH CAPACITY IN BASKETBALL AND CONSEQUENCES ON THE SPECIFIC TECHNICAL ELEMENTS

IZZO RICCARDO E.^{1,2}, GOMEZ PALOMA FILIPPO ³, RAIOLA GAETANO³

Abstract

Imagine we have to find a reason why in recent years different sports, including basketball, have been radically changed on a technical, tactical and physical level, and it has made many supporters unfollow this sport. In our opinion, we will surely take in consideration the abandonment of the sports-specific technique for the athletic prowess, since the physical one is more or less the same or slightly reduced. This, of course, is thanks to the management of regulation that the judges have made much more tolerant than the physical contact, something that even at the dawn of this sport wasn't admitted at all. Then, in the 1970s-1980s, we have witnessed a more athletic management of the rules, but always respecting the specific technique of the sport, to finally reach the real struggles for kilos and muscles at the expense of refinement and technical precision that, in our opinion, has changed the aesthetic essence of the sport, more specifically that of basketball. However, beyond these elements of historical analysis, the truth is that today the basketball player, though in proportion with his role, must be a stronger and more robust athlete and he must be able of standing up to his opponent in matches where the threshold of personal foul has been significantly raised. It goes without saying that to do this and to make the search for the athletes efficient, the selection is based on the role and, above all, on the physical aspect, by leaving the technical evaluation as the last important factor among those valid for a choice. All this has brought coaches, and in particular the physical-athletic trainers, to work more on the strength, which represents the decisive element and that we will talk about in this paper. In particular, the work is more concentrated on the maximal strength, the strength endurance, the explosive strength and the concept of relative maximal strength referred to the important neuro-muscular mixture that the athlete has to use in these particular specific actions. For example, in the execution of a jump to hoops the muscles should not be providing a maximal and continuous strength both in elevation or hibernation, but they must follow specific schema of neuro-muscular delivery so to avoid that the use of maximal strength to elevate the body could affect the precision of the action itself, something that would lead to a negative performance. This is the reason why we talk of strength relative to the action.

Keyword: Maximal strength, rapid strength, strength endurance, speed strength, explosive strength and precision.

Introduction

The question maybe is which aspects of the strength will be more decisive and which will be more

complementary in a game like basketball. It must be said that it's not so easy to define the general concept of strength since we have to consider physiological and

¹ Health and Sport Science Faculty, Urbino, ITALY

² Olimpia Milano basketball EA7 Youth Formation Manager, ITALY

³ Salerno University, ITALY

Email: riccardo.izzo@uniurb.it



psychological elements of the strength itself, each one with different aspects and influenced by various factors (Weineck 1999). Therefore, in this work, only aspects particularly related to the use of strength and that are familiar to the sports-characteristics of basketball will be discussed. The most recognized forms of strength in major sports are certainly the maximal and rapid strength and the strength endurance with, specifically in basketball, the explosive strength, and other subcategories that represent even more distinctive elements for those athletes who are more talented and with some external characteristics that make them necessary, such as the size of the field, the range of the efficiency time of technical elements both for the defense and the offense. It goes without saying that selecting the most appropriate types of useful strength for the basketball player is important to carry on the most correct and efficient physical-athletic and technical work plan. (Cfr., Grosser, Ehlenz 1984, Luthumann, Antritter, 1987, 11).

Premise

During the training sessions, players are often required to deliver a level of strength that is ideally designed for a high level sportsman, without taking due account of those items of the important basic work parameters such as the age, the sex, the objectives, the real possibilities and the level of the athletes in question. Sometimes the demands of the work programme are far from being appropriate and possible for individuals, often because of insufficient abilities. This specially happens in non-high level/non-professional and youth sector where things must be reached with considerable professionalism and great sensitivity. These difficulties are due, in the mentioned areas, even for the scant means and time required by a certain kind of proposals. In this context, it's just possible to rationally and proportionately try to come closer to the ideal working conditions with great professionalism and ethics.

If in the past basketball was considered a game where the athletic and physical prowess were of main importance, in recent years there has been an amazing evolution for which to a type of player, physically impressive but relatively and athletically normal, it is privileged a type of athlete who is physically impressive and uses physical contact as his main tool during the offense and the defense, and leaving behind the purely technical issue that in the past years had made the difference in the quality and selection of players. The specific technical training has then taken second place also because the current application of the game rules allows, or even privileges, the hard athletic game.

Imagine for a moment the giants of the NBA, the leading exponents of the physical stressing: with no doubt, they represent an outstanding example of the inestimable value of the physical aspect in modern basketball. Unlike the athletes of the Italian League, the NBA athletes have intensified too much the physical-athletic element and also the technical preparation that

has become, for a long time, just of extreme specialization in some technical and tactical elements or so. For example, knowing how to get rebounds or a good defense, how to be a good block for the team or be prepared and know how to do the pick and roll play, the fulcrum of the modern technique in the world of basketball. The Pick and Role, for example, has become so important and essential because of the physical stressing and the bias in the rules towards the defenses, in addition to technical impasse that seems the only technical-tactic arm-resource to play basketball today.

At a National League level, during a match, only players with a high level athletic training have those specific requirements that make them able to reach the end of the match, we'd say it's almost too excessively, at the border-line. However, It should be noted that perhaps this obvious and necessary training, strongly concentrated on strength and no longer on the ability of being speed like in the past, has become the cause or the pre-existing cause of the exponential increase in varied types of traumas. Therefore, almost in every sports club strength gets trained somehow, since it is a decisive factor for achieving better quality performances. Professional clubs usually have specialized trainers for this specific field of strength, sometimes leaving an adequate work on other equally important qualities, such as general endurance and strength endurance.

All parameters of strength needed for basketball, then, must be boosted in the best possible way, though not recklessly: the basketball player is not a bodybuilder. As already stated, the mastery of technique and tactics is nothing more than the ability to be able to put in practice during the match, at the right moment, the acquired deep knowledge of specific techniques that play a prominent role, but always considering that the physical condition and the strength represent additional means or supplementary factors that are absolutely compelling.

At this point, we would like to make a reflection on the highly sensitive issue of the youth sector, or better, on how it would be useful to consider the younger in his best moment of physical-technical involvement, so from 12 to 19-20 years of age, and we would say that for psycho-biological and anatomic-physiological reasons we should divide this period in two brackets: a first of general training and structuring, and a second in which the player is asked to reach, if necessary, a maximal level of strength (maximal strength). That's necessary as it's the final compendium of a training aimed at the maximal specialization that cannot pass through the border-line level of the physical-athletic training and, obviously, also the tactical-strategic-technical one. However, in this work, we also experientially and epistemologically deal with the physical-athletic work, by leaving the technical-tactical one to another different abstract.



The importance of strenght in basketball

From what it has been said before, it results extremely important the need for the basketball player to develop strength, indispensable for every kind of movement, but correctly in parallel to the development programme of other skills that are necessary to the completeness of every athlete. There are several important reasons that highlight the indisputable importance of this ability: first of all, the increasing of the specific ability of performance depending on the result and the possibilities allowed by regulation.

Especially here typical qualities of rapid speed turn out important, such as jumping strenght (elevation), launching strenght (passings, shootings, etc.) and the ability of being speed, or that of reaction and acceleration. A team composed by players with good a ability of jumping will dominate their opponents in airballs, rebounds, and jump shots, as well as in layups, blockings and, moreover, the percentage of number of ball possession would be higher. The latter value often indicates the key to the final victory. A good shooting strenght allows the player to perform for a long time and, at the same time, it makes it hard for the oponents to intercept him. In the relatively limited areas of the field, in a one-on-one match, the ability of reaction (or better, of fast twitch) becomes important to prevail on the opponent. Many instructors – coaches believe they can solve the problem of a bad execution of a technical action, for example, in the one-on-one match (1O1), with the mere administration of extra exercises and without concentrating the work on conditional quality that then makes the real difference; to improve the efficiency of the above described action it is still given great importance to the technical-coordination basis, thus the problem is not evaluated in a more widespread and complete way. Increasing strength in the best possible way means also getting a most efficiency of the technical-conditionals abilities, reaching a general athletic preparation that is crucial to win the tackles and prevail on the opponents, but it's not just that: how could it be possible to increase the ability of supporting the loads of the exercises without ad adequate base that allows to adopt even more efficient training methods? Let's take as example the typical training method of the explosive strenght: the plyometrics. In points of fact, the high psycho-physical load that involves the use of this method assumes a good development of the strenght and a locomotor system, articulations, ligaments and tendons, obviously together with muscles, which is properly prepared and however physio-anatomically ready to work; moreover, for this reason, this method is not very suitable in youth age until about the 14-15 years just because there's not a definitely formed structure and strong articulations, muscles, ligaments and tendons yet. We think it should be noted in this regard, especially at a youth level in general and not only on an under-15 level and single pyrometry, that many traumatic incidents that populate the youth activities, particularly the more structured

one, perhaps is even the cause that does not allow the final structuring of young athletes as well as progressive educational proposals relating to the training load and the amount of it in addition to the total amount of the work; very often it's not taken in consideration that the work to be carried out in one year can be done even in just three months just to avoid the skeletal-muscular structures responsible for movement an unsuitable work which could lead to poor structuring of the latters that maybe in long terms may be the causes of traumas. Let's remember that the whole body, particularly in the first age bracket and, even if to a slightly lesser extent, in the second age bracket, needs to stratify and adapt its components in congenial and physiological times so to strengthen itself in an appropriate way .

The aim of the training of the strenght is also an important factor for the strengthening of those small muscular zones which usually are not active, and therefore are not solicited or improved enough with the simple adoption of habitual training loads or during the match; this work is extremely useful to strengthen the entire muscular structure however, although to a lesser part, form an integral part of sport specific movements and actions. They also prove to be even more useful as a support for the prevention structure for some traumas where the performed action has required, for different reasons, an extra use of strenght, and that's thanks to the use of this complementary muscles that the "system" stands.

In this case we talk of supplementary training (Izzo R.E. 1998) and compensation training when the aim of the work on the strenght development is to strengthen those muscles that tend to weaken, such as the abdominal muscles or the gluteus maximus, or to fortify the antagonistic muscles or groups of muscles that would otherwise be overlooked. We would be particularly helped in the study of these issues, obviously individual, by the use of advanced technologies such as the surface electromyography and other ones, in order to determine with precision the various individual needs and prepare a fair and adequate working plan.

Therefore, the prevention of traumas (and not their increasing!) is an additional important aim to be pursued by improving strength. Recent statistical studies have detected the growing incidence of risks and injuries within a game like basketball in which the high intensity of physical contacts, the considerable loads and overloads in jumps and especially once back down on the field, sudden stresses of articulations and fast changes of direction are very usual today and lead the athlete to long periods of absence from the field with serious different consequences for everybody. Strong muscles are certainly able to protect the locomotor system and the skeleton by acting as a load attenuator to which the muscular-skeletal system, and in particular the capsules and ligaments, is continually subjected. A good parameter of youth strenght in team



sports, which amplifies the possibilities of traumas due to different causes but substantially the important contact with the opponent, will be crucial for the performance of key elements of the same sports as the power in the kicks, jumping, running, the explosiveness in the proposition of the actions themselves that will essentially take shape in the performance. An athlete with good strength quality will certainly be advantaged in prevention and also sometimes in traumatic resolutions, a strong structure helps to avoid specific traumas and reduce their entity. Being strong also helps preventing those diseases that today have become "professional diseases", i.e those traumas for stress overloading due to an excessive training or too many played matches; let's remember that professionals of any sport have a weekly workload of about thirty/thirty-five hours of border-line work, but let's also remember that the high-level youth sectors is given about fourteen, nineteen, twenty hours of work, and don't forget about the amateur senior and youth sector with an average of eight/ten hours, including competitions. As we have mentioned and as we will see later, the items that we consider of main importance are a good muscular structure, which develops over the years and not with hasty and just overloading work, but in a varied and progressive way. A muscular structure that draws advantages from the body axis stabilization, the balance of/between the muscles themselves and also from the care of core stability. The goal to achieve such qualities is the proposition of exercises that are coherent and functional to the various disciplines, aimed at stabilising the three weakest links of the body structure of the athletes: knee, back and shoulder.

The most frequent cause of injuries, in our opinion, is the bad connections which often are created between muscles that work in a competitive way, more specifically the abdominal and dorsal muscles and possible muscular imbalances which are created, as suggested by the word itself, by alterations of the musculature. In the vast majority of cases, these negative changes are caused, on the one hand, from a probable shortening and disproportionate use of strength of the agonistic muscles and, on the other hand, it is essentially an imbalance that may be the result of a weakening of the muscles that have not been sufficiently synergistically trained to major muscles.

Remember also that these muscle imbalances may be also due to the fact that, by their nature, certain groups of muscles tend to weaken (as in the case of the already mentioned abdominal muscles and the gluteus maximus), while others tend to shorten (such as the hamstring and the femoral-internal muscles), which is common in sprint and jump athletes, and so in basketball players. Talking about workloads, far removed from the common thinking of people working (or suspectly working) in this field, the overwork, or better an unbalanced or abnormal quantities of working load proposed for young students and

advanced athletes (including the high-specialized ones) generates substantial risk factors, especially if sustained over time by creating a substantial weakening of various overstressed structures that superficially seem normal but, when stimulated by an activity of overwork like those above mentioned technical elements, may easily break down like those athletes that have not played for serious injuries and that start playing too early. So it may not always be true that training "a lot" is always better.

Conclusion

As mentioned above, at this point the strength training comes into the game as compensative physical work that can cancel any muscular alteration to transmute the athlete in a real racing machine on the playing field.

That's because this is the real task of a technical team, making every athlete the better possible well-performing with group and specific trainings and in relation to his quality without exceeding this idea, including a "bad" use of medicines.

Finally it should be noticed once again that a skilled work on the strength capacity, once established the intrinsic quality of the athlete-individual, certainly leads to a growing use of the specific sporting dexterity quality of the athlete. The last remarks has to be made for the building of this great ability that has to be built during the youth age by considering, with great care and respect, the age in which it is proposed. The proposed work must also be long and progressive with appropriate workloads that should not ever overcome the physiological and anatomical intrinsic parameters of the different ages just to tightly build the resistance of the involved structures, muscles, ligaments and tendons. These, in turn, will be useful for the solidity of the articulations by essentially making a rational, real and optimal prevention work as well as for the future of the individual.

Bibliography

- Anokhine, P. K., 1974, Teoria generale dei sistemi funzionali in della cibernetica biologica e medica", Mosca.
- Bosco, C., 1997, La forza muscolare - aspetti fisiologici ed applicazioni pratiche, S.S.S., Roma.
- Bosco, C., 1985, La preparazione fisica nella pallavolo e sviluppo della forza negli sport a carattere esplosivo-balistico, S.S.S., Roma.
- Bosco C., Viru A., 1996, Biologia dell'allenamento, S.S.S., Roma.
- Calligaris, A., Mondoni M., 1993, Analisi funzionale e biomeccanica della pallacanestro, S.S.S., Roma.
- Casella, C., 1980, Principi di fisiologia, La Goliardica Pavese, Pavia.
- Cattaneo, L., 1986, Compendio di anatomia umana, Monduzzi Editore, Bologna.



- Cometti, G., 1988, Les méthodes modernes de musculation, tome 1: Données théoriques, UFR STAPS Dijon.
- Forni, I., CAPPELLINI O., 1987, Compendio di meccanica articolare, Argalla Editore, Urbino.
- Fox, E. L., 1982, Fisiologia dello sport, Editoriale Grasso, Bologna.
- Harre, D., 1977, Teoria dell'allenamento, S.S.S., Roma.
- Izzo, R.E., 2013, La preparazione sportiva del giovane atleta, Bologna.
- Jakowlew N., Die bedeutung der homoostasestörung für die Effektivität des Trainingsprozesses, Medizin und Sport.
- Scelsi G., 2013, La froza come prevenzione, Scienza e Sport, Ed Sport Italia srl., n.18-2013,pg. 72-73.
- Weineck J., 2000, La pallacanestro ottimale, Calzetti e Mariucci, Perugia.