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Original article

BIOMECHANICAL ANALYSIS OF FUNDAMENTALS IN BASKETBALL THE REBOUND

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Abstract

Objetives. In view of a physical and athletic preparation, before technical-specific increasingly targeted, this work seeks to clarify from various points of view, the technical, tactical and mainly the biomechanical one, those that are the constituent elements of the fundamental of the rebound to order to optimize the specific preparation.

In basketball, bouncing consist in the action of recovering the ball, after carrying out a wrong shot. It is of fundamental importance either in defense, giving the opportunity for a new ball possession and then you can set up a new offensive action as well as to have the opportunity to go in fast break, or in attack since it offers players an additional opportunity shooting placing itself thus as one of the items among those that often give the final victory. For this reason a good basketball player has to learn to take care of this aspect of the game.

Knowing how to defend the rebound is also a necessary feature during the competition; the player executing a cut off, looking at the place themselves in front of his opponent, holding it essentially away from the basket and jump effectively preventing him from rebounding.

Keywords: Technique, Tactical, fundamentals, offensive rebound, defensive rebound.

Introduction

In the collection, numerically very high, the individual fundamental basketball relevance of a statistically powerful certainly it is held by the rebound. In the context of a physical and athletic preparation, before technical-specific more and more increasingly targeted, this work seeks of clarify from various points of view, the technical, tactical and mainly the biomechanical one, those that are the constituent elements of the fundamental of the rebound in order to optimize the specific preparation.

The knowledge, sometimes superficially considered, physical systems, muscles and related elements, certainly allows it qualifies the intervention of the proposition of the field work in a more targeted as well as scientific.

Basketball is not just a game of action and reaction is also a sport of anticipation, the ability to correctly predict the development of an action of the opponents and to program their own, in order to choose the technical and tactical moves that will produce optimal results.

In any action of the game of basketball, both the attacker and the defender will never have certainty as to the mode of action of the opponent, the choices are always defensive and offensive will always be determined by the behavior of the opponent (Altavilla, Raiola, 2015).

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can set up a new offensive action as well as to have the opportunity to go in fast break, or in attack since it offers players an additional opportunity shooting placing itself thus as one of the items among those that often give the final victory (Altavilla, Raiola, 2015). For this reason a good basketball player has to learn to take care of this aspect of the game. Knowing how to defend the rebound is also a necessary feature during the competition; the player executing a cut off, looking at the place themselves in front of his opponent, holding it essentially away from the basket and jump effectively preventing him from rebounding.

In the rebound at the technical level as biomechanically, are recognizable four phases:

- The loading phase, phase of energy accumulation;
- The boost phase, phase ballistics dispensing of energy acquired at the preceding phase of loading, with maximum extension of the lower limbs with the aid of the counter-movement of the arms;
- The phase of flight, the end of which parable there is the catching of the ball;
- The landing phase, phase where the subject, with the ball, again takes contact with the ground.

Basically it is to make a jump charging as quickly and as effectively as possible reach the greater height, in full extension, to take possession of the ball before opponent, systematically using the body to protect itself from the interventions of the jump opponent.

Introduction

The rebound, fundamental both defense and attack, allows to get hold of the ball in the case of a missed shot by the opposing team, after the ball has

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bounced off the iron of the basket. During this aerial phase the athlete can take possession, in the highest point of his own elevation. For a good bounce they are undoubtedly fundamental excellent ability of elevation, timing, and a high capacity of explosiveness. In the execution of this fundamental it is important to start from a good position (posture), made of a solid and balanced starting base (thus of support), and make a good deadlift from the ground, stretching the whole body, as rapidly as possible to get hold of the ball, taking with two hands at the same time to the sides of the same or, in case of presence of adversaries prepared to disturb the action of possession in relapse, one above and one below the ball itself.

As regards the rebound in defense there is to say that in addition to the importance of his specific technique, performed while jumping order to obtain possession of the ball, in the relapse from the jump has to be carried a rotation of the feet, which goes to anticipate that of the hips, and finally that of the shoulders, to give an appropriate balance at the whole body, of about ninety degrees (90 °, Fig.1), and to allow for the immediate offensive position of the player, as well as the defensive rebound by the same opponents.

The amplitude between the foot is always quite significant, so as to overcome at least partially, the figure of the opponent that was cut out during the previous phase of shot. (Fig.2)

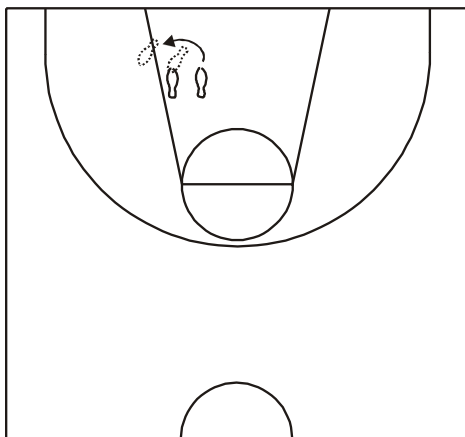


Figura 1 * Rotazione deipiedida effettuare durante il ritorno a terra per favorire l'apertura di contropiede.

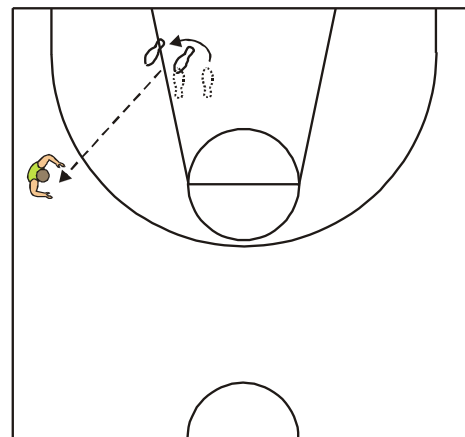
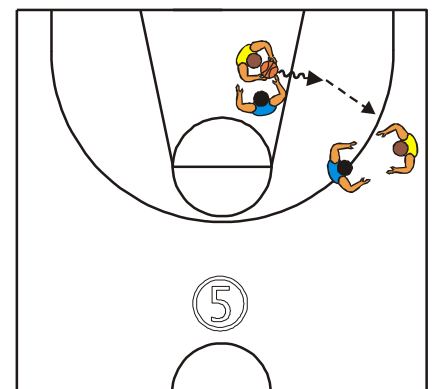
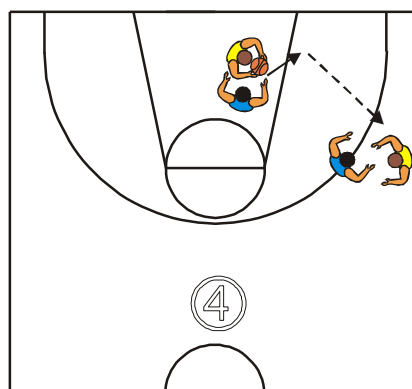
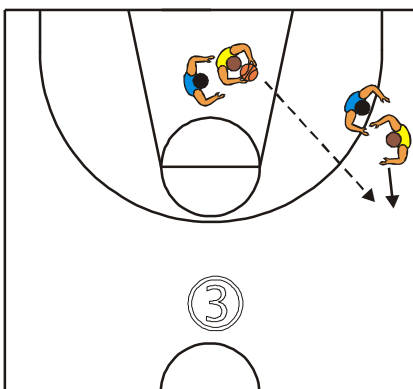


Figura 2 * Esempio di apertura "breve" di contropiede.

The purpose of the twist performed during the landing phase by the rebound is therefore that to favor the dynamics of the new action toward the attack of the rebounder (Izzo, 1996), putting it into direct on the opponent obvious advantage that, the contrary, still has the feet towards the field goal, and then he will be in a delay condition and must in any case and always turn Solutions of opening (Fig. 3, 4, 5):

around before starting the return to defense, thereby facilitating the situation of supernumerary of those who was defending and now attacks, giving the opportunity to a numerical superiority on defense (action fast break, 5vs4 initial).

Analysis of the phases



In the rebound, even biomechanically, are identifiable four phases: loading, boost, flight and landing.

Basically it is, once taken position, to make a jump charging as quickly and as effectively as possible to reach the greater height, in full extension, order to take possession of the ball before the opponent. The strength for a good elevation is being generated by a perfect synchronization of the movements between the lower and upper limbs; the first charging of energy by means of a pre-stretching, the seconds, accompanying with a boost in the upper of the lower limbs.

Charging phase

The legs are spread apart as the width of the shoulders, a key condition for maintaining a good balance while

jumping, ankles as well as knees are bent (Lanzetta, 1982). The first reaches an angle of about 30 °, while the latter reach a much wider angle of about 90°; even the hip joint reaches a decrease of approximately 60 °. The trunk remains in a vertical position so that the center of gravity is lowered further by making it less effective gesture. The upper limbs participating in the Loading extending behind the crankshaft inflected The set of these movements have as their purpose the accumulation of energies to be used later in the boost phase. In fact, the hip flexion, bending the knee and dorsiflexion of the foot make it faster and more efficient contraction ultrastretching hip extensors, knee and plantar flexors of the fingers (Hocmuth, 1983).

Articolazioni	Movimento	Contrazione	Gruppo Muscolare
Caviglie	Flessione dorsale	Eccentrica	Estensori
Ginocchia	Flessione	Eccentrica	Estensori
Anche	Flessione	Eccentrica	Estensori
Tronco	Flessione	Concentrica	Flessori
Spalle	Oscill. basso-dietro	Eccentrica	Flessori
Gomiti	Flessione 90°	Isometrica	Flesso-estensori
Rachide Cervicale	Estensione	Concentrica	Estensori

Boost phase

The lower limbs extend allowing the pushing action. The upper limbs, bent at 90°, oscillating for low-forward high allow a further raising of the center of gravity which facilitates the pushing action.

Articolazioni	Movimento	Contrazione	Gruppo Muscolare
Caviglie	Estensione	Concentrica	Estensori
Ginocchia	Estensione	Concentrica	Estensori
Anche	Estensione	Concentrica	Estensori
Tronco	Estensione	Concentrica	Estensori rachide
Spalle	Oscill. Avanti-alto	Concentrica	Flessori
Gomiti	Estensione	Concentrica	Estensori

Phase of flight

The flight phase sees as the end of the ball socket. The lower limbs as well as the upper reaches maximum extension, trunk remains upright and looked athlete facing the ball.

Articolazioni	Movimento	Contrazione	Gruppo Muscolare
Caviglie	Massima estensione	Eccentrica	Flessori
Ginocchia	Massima estensione	Eccentrica	Flessori
Tronco	Si rettifica	Isometrica	Stabilizzatori
Spalle	Fless. e adduzione	Concentrica	Cuffia dei rotatori
Polsi	Flessione palmare	Concentrica	Flessori

Landing phase

Once he gripped the ball begins the landing phase. The subject resumes contact with the ground recreating a state of optimal balance. The center of gravity falls within the base of support and the fall is cushioned by the action of the lower limbs that bend. The first joints to cushion the landing are the ankles (the most exposed to possible injury) through their dorsiflexion, simultaneously bend knees and if necessary also the trunk. The upper limbs grip the ball, carry it tight and protected, in the chest, bringing your elbows out.

Articolazioni	Movimento	Contrazione	Gruppo Muscolare
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Caviglie	Massima estensione	Eccentrica	Flessori
Ginocchia	Massima estensione	Eccentrica	Flessori
Tronco	Si rettifica	Isometrica	Stabilizzatori
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Polsi	Flessione palmare	Concentrica	Flessori

Let's look at the muscles, joints and levers involved in implementing the act. Starting from the bottom up the joints involved are the interphalangeal fingers, ankles, knees, hips, shoulders, elbows, and finally into the socket of the ball intervene interphalangeal wrists and hands. The muscles, both during landing detachment that, at least for the lower limbs are the same even if affected by different types of contraction. They are in fact interested in all the muscles of the lower limbs that synergistically work to the phase of detachment and for the landing phase. Also in this case the muscles stabilizers of the trunk cover an important role: abdominal (rectus, obliques, transverse) paravertebral, important not only to maintain balance during the flight but also to prevent injuries to the lumbar spine. In the action of the upper limbs are involved all the muscles synergistically, either the drafters or the hip flexors. In the catch of the ball they play an important role as the biceps, the brachial artery, the adductor muscles of the shoulder, the hip flexors of the wrist and finger flexors. The levers concerned change according to the stage where you are. Ankles, if during thrust levers are gender II°, in which the focus is the support of the forefoot, the power goes from the heart to the ankle joint, the resistance is from the fulcrum inside of the hock, in the landing phase becomes of gender III°; the resistance and power have in fact reversed. The knees and hips are levers of the first kind: in fact both the fulcrum is between the strength and power. The shoulders, the action of the outlet ball are levers III kind in which the focus is the articulation, the power the deltoid and pectoralis major, and the resistance the ball (Dapena, Indiana Un.).

Biomechanical analysis

Charging phase

Mechanical aim: Accumulate power to run a good detachment.

Biomechanical factors: Wide support base. Ability to maintain static balance. Basin relatively high.

Biomechanical principles: The stability is increased by increasing the area of the supporting base. The stability of a body is directly in relation to the support base. The pre-stretching muscle allows a greater accumulation of forces.

Boost phase

Mechanical aim: Generate maximum strength and transfer it to the ground to rise as high as possible.

Biomechanical factors: A growing force produced by the body.

Biomechanical principles: The action sequence in the joints of the body increases the upward push. Newton's first law: for the ending of a movement, the inertia must be overcome. The vertical speed at the start must be maximum to reach the largest possible vertical potential height.

Phase of flight

Mechanical aim: Maximum elevation.

Maximum elongation of the whole body.

Biomechanical factors: Extending the spine facilitates the lengthening of the upper limbs.

Biomechanical principles: The higher the force discharged onto the ground the greater the phase of flight. If you jump vertically, more erect the bust is more easily maintains the balance.

Landing phase

Mechanical aim: Return to the starting position but in possession of the ball. Eventually regain the lost balance in flight. Amortize landing to avoid trauma.

Biomechanical factors: lower-emphasis.

Biomechanical principles: stability is increased by lowering the center of gravity. If the line of gravity moves to the outside of the support base it must be made a quick adjustment in order to regain the equilibrium (Extract of Biomechanics conference, 2000).

Conclusion

We believe in the light of the above have suggested some scientific elements which make strong reference, not only from the point of view of the scientific study and theoretical argument, but also as a means of verification and application of work protocols increasingly targeted qualification and the specificity of the proposed training, reporting their work system elements more and more specific and above all directly related to the fundamental considered, leaving a job, until now very popular, dedicated to a generic training is no longer sustainable in the sport today.

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