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Application Analysis of Functional Motion Screening (Fms) in Sports

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ABSTRACT. *With the gradual development of China's sports industry, sports protection has gradually received widespread attention. More and more coaches and athletes have gradually valued the harm caused by sports losses. Since the introduction of functional motion screening, it has been widely used as a method for assessing physical function. Based on the overview of functional movements, this paper proposes the main applications of functional movement screening in physical training, including the purpose, content, and scoring system.*

KEYWORDS: *Sports field, Functional movement screening, Sports training*

1. Functional Action Overview

A good movement pattern is an important guarantee for movement safety and movement efficiency, and is also the result of the normal physiological structure and function of the human body. The performance of any action needs to support the joint movement through muscle force, and then show the action. Only when the muscles and joints are functioning properly, the human body can present the correct movement pattern [1]. For a specific person, our movement patterns are often affected by various events, leading to poor motor function, including developmental, traumatic, and acquired. But no matter what causes the poor function of the action, it will affect our action mode, making us unable to complete the action in the safest, labor-saving and optimized way to achieve the action [2]. Thereby reducing movement efficiency and increasing the risk of sports injuries. Functional movements are actions that are based on biomechanics and meet the needs of objective environmental changes. This type of action usually involves multi-planar, multi-joint forms of movement under the control of the body's trunk musculoskeletal and nervous systems.

2. Differences between functional and non-functional actions

From a structural perspective, functional movements take physical training as an example, which is more suitable for bodybuilding and strength lifting crowds, and

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the movement posture is fixed and single. Non-functional movements take physical function training as an example, which is good for dance, competitive sports, and military confrontation The crowd is more applicable, showing a variety of movement characteristics and multi-dimensional movements, which occur immediately and change disorderly [3].

From the perspective of the purpose, using the bench press as an example, for people with shoulder injuries, bench press can indeed strengthen the muscle strength of the upper limb belt and improve the shoulder's motor function. It is a functional movement training. However, during competitive sports competitions, athletes complete the “push-up” movement of the upper limbs without back support. Therefore, for athletes, bench press is a non-functional movement training.

It can be seen that in practice, coaches should arrange corresponding training methods according to the specific tasks of different stages of training, so that physical fitness training and physical functional training complement each other and jointly promote the realization of specific training goals.

3. Functional Motion Screening Application

3.1 Purpose of Functional Action Screening

American physical therapist Gray Cook has designed a method of physical function assessment called Functional Movement Screen based on years of sports clinical rehabilitation experience, which is used to evaluate the basic movement patterns of subjects. It consists of 7 simple test actions and 3 additional exclusion tests [4]. As a method of body function and movement inspection, it fills in the shortcomings of traditional assessment tests in terms of movement modes and body posture tests. This test can confirm the limitations, asymmetry, compensation, etc. of the completed movement of the subject, and screen out the poorly-functioning movement modes: and then expose the human body's defects in basic flexibility, stability, and overall movement modes. insufficient. To help coaches develop targeted correction training plans, correct and reconstruct basic movement patterns, and achieve the goal of reducing sports injuries. At the same time, this method only requires the ability of the coach or tester to observe the basic movement patterns that they are very familiar with, and does not diagnose the medical problem of the subject; the test tools and movements used during the test are relatively simple, so Widely recognized by test subjects and coaches.

3.2 Functional Action Screening

(1)Squat. Squats are used to test the motion of the hip, knee, and ankle joints and whether they are symmetrical. The overhead bar is used to test the symmetry of the muscle chains on the shoulder joints and the spine. Athlete stands slightly wider than shoulder width with both hands holding the rod at the same distance (elbows and rods are at 90°) [5], then straightens his arms up and over his head, slowly squats

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down to keep his thighs below the level and tries to keep Keep both feet on the ground, keep the natural curvature of the head and torso, keep the rod above the head for 3 consecutive times, and record the test score. If it can't be completed, lower the score by one stop and pad 5cm thick supports under the athlete's feet to complete the above action.

(2)Stride. Steps are used to test the flexibility and stability of the power chains on both sides of the hip, knee, and ankle joints. Athletes have their feet close together and their toes are under the railing. Adjust the railing to the same height as the athlete's tibial tubercle. Hold the lever with both hands to keep it level on the neck and shoulders. The athlete slowly lifted one leg across the railing and touched the ground with the heel, while the supporting leg remained upright, the center of gravity was placed on the supporting leg, and remained stable; slowly returning to the starting position, the athlete completed 3 consecutive times and recorded the test score. Then change the opposite leg and repeat the above action to complete the test again.

(3)Squat in a straight lunge. Lung squats are used to test the mobility and stability of the ankle and knee joints. Measure the length of the athlete's tibia[6]; the athlete steps on the proximal end of a test board (150cm × 13cm × 5cm) with his right foot, with his right hand behind his head behind his body and his left hand holding a long rod below and behind him, keeping the rod tight Back of head, thoracic spine and sacrum; measure the same length as the tibia from the right toe and mark it, then take a step forward with the left foot as the mark of the heel drop, and then squat the hind knee behind the front heel Touch the board, and always keep both feet in the same straight line, complete 3 consecutive test scores. Later bilateral upper and lower limb exchanges were completed and the test was completed again.

(4)Shoulder joint flexibility. Shoulder joint flexibility test Comprehensive evaluation of shoulder joint rotation, extension and adduction ability. Athlete is standing, both hands are fisting, one hand is from top to bottom with the back of the hand against the back and try to move up along the spine; the other hand is sliding from top to bottom as far as possible to record the shortest distance between two punches; exchange the position of the upper and lower hands, repeat the test, record the test Score.

(5)The straight leg is actively raised. Evaluate the flexibility of the hamstring and soleus muscles, maintain pelvic stability, and the ability to actively stretch the opposite leg. Athlete's body is lying on his back with his hands on both sides of his body, palms facing upwards, test boards (150cm × 13cm × 5cm) placed horizontally under his knees, ankle dorsiflexion, knee joint straight, vertical bar placed vertically on the center of hip and knee Position; raise one leg while keeping the opposite leg in contact with the test board, then change the opposite leg to complete the test, complete 3 consecutive times, and record the test score[7].

(6)Torso stable push-ups. Trunk stability push-ups mainly test the stability of the human trunk, and at the same time directly evaluate the strength of the upper limb push. Athlete lies on his back with his toes close to the ground and his arms extended slightly wider than the shoulders. The thumbs of his hands and the top of

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his head are kept in a straight line, while the knee joints are stretched as far as possible to keep the thumbs of his hands and the upper edge of his forehead in a straight line (The female hands keep the thumb and the edge of the jaw in a straight line), the trunk maintains a natural straight posture; the athlete's upper limbs are pushed up to raise the body as a whole, and the body must not shake during the completion of the action, which is completed 3 times in a row. If it can't be completed, reduce the score by one stop, and use the action that the thumb of the male hands and the edge of the jaw are kept in a straight line (the thumb of the female hands and the edge of the areola are kept on a straight line), and complete 3 times [8].

(7)Rotation stability. The rotation stability test is to evaluate the neuromuscular coordination ability of the subject and the ability to transform the power chain. The subject started with a kneeling push-up, shoulders and hips at a 90 ° angle to the torso, and the ankles remained flexed. Place a test board (150cm x 13cm x 5cm) between the knee joint and the hand so that the knee, feet, and hands come into contact with the board. The subject lifted the arms and knees on the same side, and the raised elbows, hands, and knees were kept on a line and parallel to the test board. The frontal plane of the body should be parallel to the ground; the shoulders and knees are flexed so that the elbows and the knees can contact each other for 3 consecutive times. If it cannot be completed, reduce the score by one gear and use the opposite arm and knee lift to complete 3 consecutive times.

4. Functional Motion Screening Scoring System

The scoring system for functional action screening is 4 levels, ranging from 0 to 3, with 3 being the highest score, as shown in Table 2. Among them, the scoring details of the single action test and the pain screening links in the “shoulder joint flexibility”, “trunk stabilization push-up”, and “rotational stability” tests, see “Action: Functional Movement Training System”.

5. Conclusion

All in all, the use of functional motion screening in the field of sports can be used as part of a physical examination. When performing the test, the test subject is required to complete the action to the maximum extent possible. The analysis of the characteristics of the item must be strengthened. Excellent results. Based on the scoring results, functional correction methods and means that meet the specific characteristics are formulated.

References

[1] Shojaedin S S, Letafatkar A, Hadadnezhad M, et al (2014). Relationship between functional movement screening score and history of injury and identifying the predictive value of the FMS for injury [J]. International Journal

ISSN 2522-3488 Vol. 4, Issue 2: 45-49, DOI: 10.25236/IJNDES.040209

of Injury Control and Safety Promotion, vol. 21, no. 4, pp. 355-360.

[2] Leite M M D A G, Bolling C, Reis D (2018). COMPARISON OF FUNCTIONAL MOVEMENT SCREENING (FMS) SCORE IN FUTSAL PLAYERS [J]. British Journal of Sports Medicine, vol. 48, no. 7, pp. 624-626.

[3] Dingenen B, Malfait B, Vanrenterghem J, et al (2019). The reliability and validity of the measurement of lateral trunk motion in two-dimensional video analysis during unipodal functional screening tests in elite female athletes [J]. Physical Therapy in Sport, vol. 15, no.2, pp. 117-123.

[4] Andrew H, Charles A, Jake S H, et al (2017). Functional Movement Screening and Paddle-Sport Performance [J]. Sports, vol. 5, no. 2, pp. 37-40.

[5] Bring B V, Chan M, Devine R C, et al (2011). Functional Movement Screening and Injury Rates in High School and Collegiate Runners [J]. Clinical Journal of Sport Medicine, vol. 15, no. 1, pp. 620-655.

[6] Kiesel K, Plisky P J, Voight M L (2017). Can Serious Injury in Professional Football be Predicted by a Preseason Functional Movement Screen? [J]. North American journal of sports physical therapy (NAJSPT), vol. 2, no. 3, pp. 147-158.

[7] Glass S M (2015). Strength, balance, and range of motion as modifiers of the effect of external load-bearing on functional movement behaviors in the military recruitment population J]. Dissertations & Theses - Gradworks, vol. 28, no. 2, pp. 64-70.

[8] Waldron M, Gray A, Worsfold P, et al (2018). The Reliability of Functional Movement Screening and In-Season Changes in Physical Function and Performance Among Elite Rugby League Players [J]. Journal of Strength and Conditioning Research, vol. 30, no. 4, pp. 910-918.