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Abdominal Exercises: A Review Study For Training Prescription

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Abstract : *The abdominal muscles are composed of four muscles that must be trained in the same way as the other muscles of the body.This mucular group are very important for postural control in exercises and prevention of low back pain. The objective of this study was to review some questions about abdominal exercises and their practical application, helping the work of the professional training prescription.We used articles in the database: Scielo, Pubmed and SciencDirect resulting in a total of 24 articles used to produce this paper. Knowledge of the issues related to the Electromyographic Activity; stabilisation exercises and abdominal therapeutic exercises is of fundamental importance for professionals working with human movement.*
Keywords : *abdominal, trunk, training, rehabilitation, spine.*

I. Introduction

Abdominal exercises are quite accomplished in training rooms. The practice of these exercises is very important because the lack of stability of the core muscles is a risk factor for the development of low back pain. In addition, more than 80% of the problems of low back pain are correlated with the lack of strengthening of the trunk musculature [1,2]. The trunk musculature, in which the abdominal wall is also part, is composed of muscles that are in anterior view: m. rectus abdominis, m. internal abdominal oblique, m. external abdominal oblique and transversus abdominis, lateral view: m. quadratus lumborum, and in the posterior view: erector spinal and muscles and m. latissimus dorsi. These muscles, when worked together, form a kind of inflatable structure, by generating intra-abdominal pressure [3]. In addition to these muscles, the iliopsoas also assists in pelvic balance, participating in hip flexion movement. The importance of the work of the abdominal muscles is not restricted only to the resisted training, but also in daily activities, since a good activation of these muscles in daily activities prevents injuries associated with the activities [4], besides these muscles help in the maintenance of the curves of the spine [5]. Most of the movements of the change and pelvis are made mainly by the Rectus abdominis and External abdominal oblique muscles [6]. Thus, in view of the variety of abdominal exercises and in order to assist professionals working with training prescription, it is extremely important to clarify issues related to abdominal exercises and their applicability, justifying a review that addresses the most important issues relevant to this theme.

II. Materials And Methods

To do so, a study was carried out in the database Scielo, Pubmed and SciencDirect, of which 24 articles were selected. In the period that includes the month of February and Mach of 2017. The descriptors used were: abdominal muscle ; Electromyographic Activity; stabilisation exercises and therapeutic exercises. Evidence that did not communicate the proposal, whose purpose was not the eletromyography, stabilization, and rehabilitation aspects were discarded.

III. Results And Discurssion

3.1 Abdominal Exercices Prescription

The effectiveness of abdominal exercises, whether for aesthetic purposes or for rehabilitation should be done with a good technique of execution, so that the activity does not become inefficient or that can intensify or produce pain in the region of the spine. Another determining factor for exercise efficiency is their choice, because according to Axler and McGill, 1997 [7] the abdominal exercises cause a relative overload to the spine and its prescription depends on factors such as on a number of variables such as fitness level, Training goals, history of previous spinal injury, and any other specific factors to the individual, however an exercise that generates little overload in the column is the horizontal side support, because it activates very well the obliqua muscles and it generates little overload in the spine, besides working The in quadratus lumborum, a great stabilizer of the trunk. For the increase of the stabilization of the trunk it is necessary that exercises are done of strengthening for the musculature of the abdomen [8].

Exercises that actively flex the trunk may not be the best option for individuals with low back pain because they increase the pressure in the intervertebral disc [9], and for individuals with osteoporosis the risk of fractures may increase [13], Some patients may be asymptomatic in exercises where the spine is in a neutral position. Already individuals with facet joint syndrome, spondylolisthesis, and vertebral or intervertebral foramen stenosis may not support exercises with Ab slide and Torso Track by the extended spine position [10].

People with low back pain (LBP) have an activation delay of the transverse abdomen muscles [11,12]. A focus in the management of Chronic low back pain (CLBP) patients has been the specific training of the deep abdominal (internal oblique and transversus abdominis) and lumbar multifidus muscles, And for the treatment of CLBP the suggestion is the execution of stabilizing exercises, as they are effective in reducing pain [14].

3.2 Swiss Ball And Traditional Abdominal Exercices.

The use of Swiss ball for abdominal training has been done for some years [15] and studies have been done to examine the recruitment of trunk muscle during the performance of exercises performed on this equipment [16,17,18]. Escamilia et al.(2010)[19], analyzed muscle activity in 8 abdominal exercises performed on the Swiss ball (Roll-out, Pike, Knee-up, Skier, Hip extension left, Hip extension right, Decline push-up, Sitting march right) and 2 traditional abdominal exercises (Bent- Knee sit-up and Crunch). The results were: the upper portion was more activated by electromyogram (EMG) signals in the roll-out exercises compared to the others, except pike and crunch and a very low activation in the sitting march right. The lower abdomen was also highly activated by signs of EMG in the pike, relative to the others, except the roll-out and hip extension right and significantly lower in the sitting march right. The external oblique EMG signal was higher in the pike knee-up, and skier, the lower activation was in the sitting-right exercise compared to the others. The internal oblique EMG signal was larger with pike, and smaller in the sitting march right, compared to the other exercises.

3.3 Abdominal Crunch.

The crunch exercise is most commonly performed in weight rooms, it is characterized by flexing the spine (without the low back losing contact with the ground) with the feet on the ground. When this exercise is performed with overload it activates all 4 abdominal muscles, the transverse abdomen, fulfills its function by compressing the viscera, in order to free the rib cage for movement. For beginners it is interesting to perform this exercise with the arms crossed on the chest, to decrease the arm of the resistance. Already for application of overload, it is interesting that the person put the weight in the hands put him as far as possible from the spine [20].

3.3 Abdominal Crunch In The Machine.

The moment arm of the resistance is higher in the initial phase of the movement and decreases until the end of the movement. To keep the pelvis fixed in the device, the hip flexor muscles do isometric contraction, increasing the efficiency of the abdominal wall muscles. If movement continues from complete spinal flexion, isotonic contraction becomes of the flexors of the hip and the abdominal muscles begin to contract isometrically to maintain the posture of flexion of the spine. Individuals with LBP may present pain in the lumbar region, as both the iliopsoas and the rectus femoris pull the spine and pelvis anteriorly, causing pelvic anteversion [20].

3.4 Reverse Crunch

This exercise should be used by previously conditioned individuals because the position of the knee flexed along the movement execution provides the highest torque throughout the movement and due to the isometric action of the hip flexors along the movement. When performed with the knee semi-flexed, the concentric phase should occur to the point where the line of action of the feet arrives at the axis of movement (approximately at the end of the thoracic spine) from this point forward, Favors the flexion of the spine, the action of the abdomen. Muscle contraction becomes eccentric for spinal extensors and the abdomen completely relaxes (even with spinal flexion) at the moment when most of the lower limb passes over the axis of motion [20].

3.5 Spine Flexion In Vertical Pulldown

The main advantage of this exercise is the easy manipulation of load in the device. As the resistance arm increases while the spine is flexed, this may favor an active insufficiency of the abdominal muscles and should not be performed by beginners. The shoulder should stay in adduction and the elbow in extension. In the flexion phase the performer feels the abdominal musculature, since it remains in isometric contraction, preserving the lumbar spine and the pelvis [20].

3.6 Abdominal Plank

Exercises such as the abdominal plank leave the spine in neutral position and are used in the prevention and treatment of low back pain [21,22]. This exercise is used in trunk strengthening training including intrinsic abdomen muscles such as the inner and outer oblique of the abdomen [23], an exercise that works the abdominal region in greater proportion to the erector spine [24]. Kim et al. (2016) ,did a study in which they analyzed the movement of the lower limb in three types of exercise plank: standard plank exercise; The plank exercise with unilateral isometric hip adduction; And the plank exercise with bilateral isometric hip adduction. Was a significant difference in rectus abdominis, external oblique, and internal oblique muscle activity between the different plank conditions. The EMG activity of the abdominal muscles was significantly greater during the plank exercise with unilateral isometric hip adduction and with the plank exercise with bilateral isometric Hip adduction compared with the standard plank exercise. The plank exercise with the plank exercise with unilateral isometric hip adduction resulted in significantly greater abdominal muscle activity than the plank exercise with the plank exercise with bilateral isometric hip adduction, except for the right rectus abdominis. There was no significant difference between the right and left sides of the same muscle in each position.

IV. Conclusion

The abdominal muscles need to be trained regularly, not only thinking aesthetically, but also for the health of the body as a whole, since the stability of the trunk is essential for the performance of exercises and for daily life. The precise prescription for each type of population makes all the difference, since incorrect prescription, in addition to leaving the exercise inefficient, can cause injury or aggravation of muscle joint injuries.

Finally, the knowledge of exercise prescription professionals should be vast and cover anatomical, kinesiological and biomechanical aspects in relation to the abdominal musculature, considering the variety of exercises and its application with effectiveness.

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