

MUSCULAR FATIGUE REPERCUSSION ON PROPRIOCEPTIVE SYSTEM IN SOCCER PLAYERS.

Nerín MA, Montaña JA, Carrasco L.

Department of Health, Physical Activity and Sports Sciences. San Antonio Catholic University of Murcia, Spain

Introduction

There are many sensory receptors in the body, most of them are located or grouped forming the senses (taste, sense of smell, sight, tact, ear). Its function is the relationship between body and outer world. There are also another type of sensations that serve fundamentally in order that person meets in harmony with his environment, we mean: sensations of movement of extremities, sensations of position in the space of each one of members, balance, etc... This group of position and kinesthetic sensations are grouped under a common concept called proprioception.

With which, we can define the proprioception as the set of sensations that are registered in the organism thanks to the information gift by sensorial proprioceptive receptors, that are in the skin and the joints, muscular and tendinous structures, and that are completed by the contributions of the sense of global position of the body, the movement and the vestibular system (felt of the balance).

When we speak about proprioception work, what are we working?

There is a concept that must be clear. When we speak about of "partial deafferentation" (lack of conduction on the routes of the sensorial receptors), we do not have to fall in the mistake to think that we will improve the aptitude to transmit of the receptor with proprioceptive exercises; what we will try is to improve the capacity of response of the muscular structures of the zone to try to protect it during the physical activity, thanks to a better motor control.

They exist a great variety of exercises called *proprioceptive* in different bibliographical sources, whose only real aim is to improve the motor control of an extremity, a joint, or a muscular group. Therefore it will be more correct to speak about sensitive-proprioception-motor reeducation than proprioception work. It is necessary to develop exercises that include in their bases the different levels of work for a correct sensitive-proprioception-motor reeducation, these are:

Level 1. Level of spinal work. We must develop exercises of proprioceptive reeducation that try to stimulate strategies of reflected answers of defense. The developed exercises, that try to reinforce the reflected answers in spinal marrow, will promote mechanisms of defense by means of reflected stabilizations in conditions of physical stress over to the normal thing.

Level 2. Level of work centred in the cerebellar activity, trunk of brain and neuromuscular spindle. The aim of the proposed exercises to work at this proprioception level is based in promoting answers of automatic motor control, and fundamentally the maintenance of the position of a member as well as the general position.

Level 3. Level of work centred in voluntary motor activity, cortex. We tried to improve the fine motor control of the sportsman and the final integration of the specific sport gesture by means of the execution of the exercises raised at this level. Our aim will be to execute complex and specific motor acts adapted to the sport that is practised, in order that he acquires new movement patterns which improve quality and economy of execution of movement_(10,11).

Methods

Ten male soccer players (experimental group) and ten healthy male students (control group) took part in this study. Informed written consent was obtained from all participants, and the project was approved by the ethical committee of the Catholic University of Murcia. The subjects underwent two experimental trials. In the first trial, the soccer players, as well as the control group, were tested with the aim to familiarize with the isokinetic dynamometer (BIODEX SYSTEM3PRO) and to establish reference values for knee joint position (subjects were asked to abstain from strenuous physical activity for at least 24h before testing). For this, the subjects had their dominant knee moved actively to a predetermined target position (45° in extension movement at 60°/s). When subjects reached the target position they were informed of that and were supposed to remember how it felt and that they would



The Rehabilitation of Sports Muscle and Tendon Injuries

be asked to find the same position later. Subjects were kept in the target position about 10 seconds and then moved their legs to a neutral position (90° of knee flexion). This was repeated a total of three times, where the examiner recorder the digital output of this positions. Two days later, in the same resting conditions and following the same procedures to adapt the dynamometer to the subject's characteristics, they were testing like the first trial and a one more time after a fatigue exercise (repetitive extension movements to exhaustion at 60°/s). The variation degrees recorded were analysed using MANOVA with repeated measures.

Results and Discussion

The preliminary results obtained show a remarkable alteration in the subject's ability to repositioning their knees in the position requested in fatigue state. This alteration was more sensible in students than in soccer players so the adaptation to sport training and fatigue tolerance may be two factors to take into account in the proprioceptive system.