

In order to regain full physical function after an injury or a surgery, it's not enough to reach full range of motion and maximally strengthen all muscles, but, above all, the patient should gain proper balance and coordination amidst all structures that provide balance and proper functioning in various situations of every day life, trainings or other injury-prone situations.

Our brain is responsible for all our reactions. The reaction it undertakes, is based on the information received from the mechanoreceptors (receptors – the sensors of the proprioception) that are found in the muscles, joint capsules, ligaments, tendons and skin. The remaining part of the information about our localisation and balance comes from the organ of vision and the vestibular system that is responsible for the body balance. Having analysed the data from the above systems our brain coordinates actions of the locomotor system in order to perform the given step correctly and not lose control in an emergency situation.

If there's an injury – muscle, ligament, joint capsule tear, our managing systems don't receive full information about the situation, because when the structures were damaged, the emergency sensors were damaged, too. This leads to a significant delay or incorrect defence reaction, which might lead to successive overburdening and injuries. Here is an example: a four-times delay in the tension of muscles stabilizing the knee after a total tear of the ACL, which means that if we slip, the knee will give way and sprain before the muscles tense in defence.

The reconstruction of the proprioception is the most important task of the post operative and post traumatic management. We need a special training to quickly restore damaged receptors or to allow to take over their function by other structures. It's not immediately done, some say the process may take up to 9 months.

The knee, just like any other joint, has a muscle and ligament stabilization. If, after the reconstruction of any of the ligaments we don't have a subconscious – uncontrolled muscle defence reaction, even the best graft will overstretch or tear, just like own tissue. Intensive supervised training will allow to work out and automatize proper reactions. Thus in our sports training situations as well as in our every day activities, our locomotor system's reaction will be proper and ensure our safety.

The elimination of incorrect patterns, movements and reactions that have been developed in order to fit the condition of the damaged structure is a very important part of rehabilitation and recovery. The incorrect mechanisms can be as follows: abnormal gait or limb positioning which aimed to protect the limb against another injury or to rest one side. These reflexive mechanisms damage the surgically reconstructed structure, eg. a ligament.

During a well managed and done training of the proprioception, the patient regains the feeling of safe functioning and starts to "believe" in the limb, which is crucial in every day life and undertaking favourite activities.

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