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A new concept of dynamic neuromuscular reprogramming using Huber® device

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BACKGROUND

Pathologies like Lower limb joint traumatism of are frequent in sports activities. Sports activities, alpine skiing in particular, expose very frequently to anterior cruciate ligament rupture (every year, in France, 1 skier out of 3 will suffer from a knee sprain and around 16 000 will suffer from anterior cruciate ligament rupture). The neuromuscular reprogramming remains the more important phase in the rehabilitation treatment of the knee joint instabilities. The techniques to improve the proprioception did not evolve since the invention of the pulley-therapy and of the Freeman platform. Today, it seems that motor coordination training using a motorized oscillating platform (Huber® device) could represent a real innovation in this domain.

OBJECTIVES

The goal of our work is to optimize the neuromuscular reprogramming and to favorise the return to the socio professional and sports activities.

METHODS

The patients (men and women, aged between 25 and 50 years old) are divided in 2 groups by randomisation: 21 patients in the treatment group and 21 patients in the control group. Each group undergoes 1H30 hours of rehabilitation a day, 5 days a week, during 10 weeks. The Huber group will undergo 5 rehabilitation sessions with Huber a week (5 x 20 min.) instead of the "Proprioceptive" protocol as part of the common rehabilitation program.

The investigations will assess: functional response (Lysholm-Tegner scale; IKDC 2000), pain (VAS), imbalance (stabilometry), postoperative knee residual laxity (KT 1000 arthrometer), injured knee oedema/ effusion. An isocynethic evaluation (Biodex) will also be carried out. All assessments will be carried out in the pre-operative and in the 3rd, 6th, 12th, 24th and 52nd post-operative week.

PRACTICAL PROTOCOLS

The Huber® device, produced and distributed by LPG Systems France, generates a permanent adaptative regulation of the joint protection while soliciting preferentially the proprioceptive system. This new procedure also allows the patients to carry out a double task exercise protocol and to solicit mainly the tonic muscles. During the post – surgical or post – traumatic rehabilitation of the knee instability the neuromuscular reprogramming is practiced on the Huber device as soon as the patient could put again his foot on the ground. Initially, the plateau oscillates slowly and with a low amplitude and the exercises are not difficult. Then, there is a progressive increase of the parameters in order to attain a maximum level towards the end of the rehabilitation programme.



DISCUSSIONS

The Freeman platforms, extensively used for the knee joint traumatism, produce motor programs that are not adapted because based mainly on the visual and vestibular system. On the other side, the rehabilitation programme using stable platforms seems to solicit mainly the somesthetics afferents inputs. This type of rehabilitation programme is more effective but more limited and more separated from physiology. In fact, all the traditional techniques have the inconvenience to realize an isometric workout at the knee level. The hypothesis of this trial assesses the possibility of a functional improvement of the knee, after the training of coordination, proprioceptivity and joint stabilisation mechanisms with the HUBER system, by an active anticipation of reflex activities in a complex environment (platform imbalance and the visual feed-back produce a double task condition).

REFERENCES

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