Efficacy of the Power Balance™ bracelet to improve balance and flexibility: A randomized controlled trial
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Keywords: Balance; Flexibility; Sport performance

Objective. – The Power Balance™ bracelet is a “product conceived by athletes for athletes whose intention is to optimize the sports performances. Power Balance™ gains an enormous success at the top athletes for whom the balance, the strength and the flexibility are very important”. The aim of our study is to estimate the efficacy of the Power Balance™ bracelet to improve balance and flexibility.

Patients. – Thirty adults healthy adults, from 20 to 50 years old.

Material and method. – We conducted a double-blind randomized controlled study. The Power Balance (PB) group used a bracelet acquired from an approved retailer. The control group used an identical bracelet without holograms. The presence or the absence of holograms was masked.

The subjects of every group underwent an evaluation of the balance by statibometric analysis (SATEL platform) and an evaluation of flexibility (distance finger-ground) with and without the bracelet. A second randomization was made in each group for the order of performing the evaluations with and without bracelet.

Results/Conclusion. – The analysis of the results is in progress. The preliminary results are in favour of an improvement of the performances of balance and flexibility with the bracelet in both groups, without significant difference between the groups PB and control. These results are in favour of an efficiency of the bracelet related to its placebo effect.


Brain–computer interface: New approaches for disability
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Keywords: Paralysis; Brain–computer interface

Paralysis has many causes including trauma, stroke, infection, and autoimmune diseases. The primary damage can be manifested in the brain, spinal cord, spinal nerves, or the muscles themselves. Over the past years, most research devoted to paralysis has involved cell biology approaches (i.e. embryonic stem cells). Although such approaches represent the ultimate cure hope for paralysis, effective application is still now limited due to the number of breakthroughs that are required. However near-term solutions are possible. Technology could help to restore motor function in impaired patients. Brain–computer interfaces and virtual reality devices are systems that can be used for patients in order to provide or supplement sensory motor functions that have been lost. Brain–computer interfaces rely on the translation of neural volitional signals into control signals for external devices. In a similar way, different researches have demonstrated that motor imagery can be used to promote post-injury training in patients with stroke. Motor imagery has become paradigmatic in the study of the relation between cognition and action because of its crucial role in motor planning and execution. MI refers to ability to mentally rehearse functional movements without executing movements. In this short lecture, emergent applications using these various techniques will be presented and discussed in relation to extensive functional and structural plasticity of the cerebral cortex. The interaction with physical medicine and rehabilitation will be discussed.


Rehabilitation robotics: The role of the exoskeleton
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The Canadian recommendations [1] conclude that there is a high level of evidence that the sensorimotor training provided by robots improves upper limb function and motor function at elbow and shoulder level. There is also a high level of evidence that robotic devices do not improve the motility of the wrist and hand. The grip is fairly taken into account at the present time by the robotic for the upper limb while the transport function is widely favored. The type of existing robots is essentially manipulendums: The handle is caught upon installation of the patient and is transported into the space. Suspension systems associated with a virtual environment such as NeReBot [2] provide a comprehensive work without assistance in handling. The design of these manipulendums robots extracted the problem of joint centers of rotation and seeks to control the end effector (hand). Conversely exoskeletons attempt to control each robot joint, and try to prove that this type of control has a better result. In their motorized version, not yet commercialized, the principle is to adjust the controls on each axis by an actuator through a global algorithm for joint coordination. The robot Armeo® is a non-motorized upper limb exoskeleton designed on the basis of the robot T-Wrex [3]. One randomized controlled trial (RCT) has evaluated its effectiveness after stroke in the chronic phase. Comparatively, 13 RCTs were conducted on the robot In Motion (manipulandum), its only commercial competitor. Among the RCTs done with robots subacute phase of stroke, all but one showed an improvement of the transport function of the upper limb in the treated groups. Thus a place for this type of care may exist in rehabilitation process subject to the same effectiveness of exoskeletons.

References

Interest of automatic motivity involvement in hemiplegic patients rehabilitation
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Keywords: Automatic motivity; Hemiplegia; Rehabilitation

Introduction. – Many patients present gripping disability after a stroke. Most of conventional rehabilitation techniques are based on intentional motivity and repetitive exercises. The main objective consists in comparing the effects on the recovery of gripping ability of a rehabilitation program carrying out automatic motivity with the usual rehabilitation program.

Methods. – We conducted a prospective randomised, single-blind clinical trial. We compared 2 groups of 5 patients with hemiplegia, at least 6 weeks after a vascular brain injury:
– a group of patients participated in a rehabilitation program including exercises of aiming a mobile target on a motorised table. Moreover, patients continued their usual rehabilitation program;
– the control group had a rehabilitation program including exercises of aiming an immobile target on the same table as the other group. Moreover, patients continued their usual rehabilitation program.

Evaluations were carried out before the start, immediately at the end of the rehabilitation program, then after 2 weeks. The main scale was the Fugl-Meyer