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P062

The feasibility of training with FES-assisted cycling: Psychological, physical and physiological consideration

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Objective The literature contains considerable data showing that such programs are crucial to reduce the consequences of physical inactivity of people with SCI. The objective of the study was to assess the physical, psychological, functional and financial feasibility of training a paraplegic subject on a FES-assisted recumbent bike – initially fixed on a stationary stand and then over open terrain. At the end of a 12-month training, the patient was invited to participate in an international competition (Cybathlon 2016).

Material/Patients and methods Feasibility indicators related to physical, psychological, functional and financial tolerance. Physical, psychological and functional indicators of training impact.



Results Mr. J.P., 47-years-old was paraplegic for 21 years, T3, AIS-A with no zone of partial preservation. Feasibility indicators: no osteoarticular, cutaneous, or cardiorespiratory morbidity was noted. The acceptability score of the training constraints increased from 51 to 59/65 and satisfaction was high around 8/10 and peaked at 10/10 the day after the competition. The pedaling duration increased from 1 to 26' on the recumbent bike and from 1' to 15' on open terrain. The total cost of the bike + the stimulation was estimated at 7650 €. Impact indicators: no significant changes were found with BMD and the body mass. Thigh circumference did not significantly increase. Cardiorespiratory measures during exercise tests did not show any improvement. SF 36 showed significant improvement of more than 10% and score on the Rosenberg Self-Esteem Scale rapidly improve from 36 to 39/40 and remained at a level of 40/40 up to the competition. Mr. J.P. distinguished himself during Cybathlon 2016, by reaching the objective of covering 750 m in under 8 minutes, at an average speed of 5.80 km.hr and a maximal speed of 6.14 km.hr. He finished 6th out of 12.

Discussion/Conclusion A person who has been paraplegic for many years (more than 20) with a high lesion level (T3 AIS-A) can undertake this type of challenge if the prerequisites are met; this type of training is without danger if the safety precautions are respected; the training itself, the challenge of participating in a competition, and the sheer pleasure of cycling outdoors without attracting stigmatizing attention all had a powerful impact on JP's self-esteem and perceived quality of life.

Keywords FES-assisted cycling; Spinal cord injury; Training impact; Feasibility

Disclosure of interest The authors have not supplied their declaration of competing interest.

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