Can the direct measurement of the load applied on the residuum of individuals with transfemoral amputation fitted with bone-anchored prosthesis help to improve the rehabilitation program?

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Abstract

To strive to improve the rehabilitation program of individuals with transfemoral amputation fitted with bone-anchored prosthesis based on data from direct measurements of the load applied on the residuum we first of all need to understand the load applied on the fixation.

Therefore the load applied on the residuum was first directly measured during standardized activities of daily living such as straight line level walking, ascending and descending stairs and a ramp and walking around a circle. From measuring the load in standardized activities of daily living the load was also measured during different phases of the rehabilitation program such as during walking with walking aids and during load bearing exercises.[1-15]

The rehabilitation program for individuals with a transfemoral amputation fitted with an OPRA implant relies on a combination of dynamic and static load bearing exercises.[16-20] This presentation will focus on the study of a set of experimental static load bearing exercises. [1]

A group of eleven individuals with unilateral transfemoral amputation fitted with an OPRA implant participated in this study. The load on the implant during the static load bearing exercises was measured using a portable system including a commercial transducer embedded in a short pylon, a laptop and a customized software package. This apparatus was previously shown effective in a proof-of-concept study published by Prof. Frossard. [1-9]

The analysis of the static load bearing exercises included an analysis of the reliability as well as the loading compliance. The analysis of the loading reliability showed a high reliability between the loading sessions indicating a correct repetition of the LBE by the participants. [1, 5] The analysis of the loading compliance showed a significant lack of axial compliance leading to a systematic underloading of the long axis of the implant during the proposed experimental static LBE.

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