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Biomechanics of transfemoral amputees fitted with osseointegrated fixation: Loading data for evidence-based practice

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This presentation will provide an overview of the load applied on the residuum of transfemoral amputees fitted with an osseointegrated fixation during (A) rehabilitation, including static and dynamic load bearing exercises (e.g., rowing, adduction, abduction, squat, cycling, walking with aids) [1-10], and (B) activities of daily living including standardized activities (e.g., level walking in straight line and around a circle, ascending and descending slopes and stairs)[11-13] and activities in real world environments [14-17].

A particular emphasis will be placed on the outcomes of several studies for an evidence-based design of the rehabilitation program and components of the fixation (e.g., implant, abutment)[6-7, 9, 16, 18-23].

It is anticipated that this work might contribute to the current effort aiming at shortening the rehabilitation program and reducing the incidence of replacement of abutments [23-26].

Figure 1. Overview of Osseointegrated Prosthesis for Rehabilitation of Amputees (OPRA) relying on a fixation (A) including an implant (B) inserted into the femur (C) as well as an attachment unit (D) made of an abutment (E) penetrating the skin (F) of the residuum (G) and a retaining bolt (G).

Figure 2. Measurement of loading including a six-channel transducer (A) mounted between plates (B) connected to an adaptor (C) and the abutment of the osseointegrated fixation (D), and a long pylon (E), a frame (G), and a weighing scale (F).
Figure 3. Side (left) and front (right) views of the prosthetic limb including a multi-axial transducer (A) mounted to designed adaptors (B) that were positioned between the Rotasafe (C) and the abutment (D), and the knee mechanism (E).