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Osseointegrated, percutaneously derived implants for rehabilitation after transfemoral amputation - via the endo-exo implant system®

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Introduction: Osseointegrated, percutaneously guided implants - so called endo-exo prosthetics (EEP) - have been used to a limited extent since 1999 for rehabilitation after major amputation. Meanwhile, implant survival times of more than 15 years have been achieved. The obligatory colonization of the skin penetration site of the implant does not necessarily lead to an intramedullary, periprosthetic infection. This circumstance can be explained by the interconnectivity ingrowth of the bone into the three-dimensionally structured implant surface. This sufficiently prevents the formation of an infection-promoting connective tissue layer between bone and metal.

Material/Method: A total of 110 EE femoral prostheses were implanted (6 x bilaterally amputated) in 104 patients between August 1999 and October 2016. The implant is produced by casting from a CoCrMo alloy coated with titanium nitride. The first step is the implantation (Figure 1) of the intramedullary module with subsequent wound closure. After safe osseointegration of the endomodule after 6 weeks, the skin was penetrated (Figure 2) with docking of the components receiving the exoprosthetics in a second surgical step.

Results: The retrospective analysis shows that a total of 324 operations were required for the 110 implantations performed. Of these, 220 operations were performed using the two-stage implant procedure. The remaining 104 surgical interventions were soft tissue problems at the skin interface, 7 fracture restorations, 8 explantations with 3 reimplantations and minor corrections to the prosthetic components. The initial infection problem with severe soft tissue irritations at the skin interface could be effectively countered by changing the design of the components. From January 2010 - October 2016, only 12 surgical procedures were necessary. It has also been shown that even prolonged soft tissue infections involving the distal end of the femur do not necessarily lead to an ascending periprosthetic infection. Patient satisfaction was predominantly high. Regarding to the wearing and operating comfort of the prosthetics, the recovery of a tactile sensation, the so-called “osseoperception”, and the considerable increase in mobility are these very positive aspects. When using the bone-guided prosthesis, special attention must be paid to the orthopaedic technical treatment. In particular, the axial alignment of the prosthesis abutment requires specific handling in order to achieve an optimal walking pattern and to prevent possible consequential damage to the hip joint and spine.

Conclusions: Bone guided percutaneous prosthetics for rehabilitation after transfemoral amputation can be considered sufficiently safe according to the available data. Therefore it represents a valuable treatment option for patients after transfemoral amputation who would otherwise not be able to rehabilitate satisfactorily.

Biography

Marcus Oergel currently working as professor at the Trauma Department, Hannover Medical School, Germany.

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