

Master Thesis in Biomechanics

DESIGN OF A BIOMECHANICALLY OPTIMIZED SCAFFOLD FOR MANDIBULAR RECONSTRUCTION

The Julius Wolff Institute is within the university structure of the Charité - Universitätsmedizin Berlin. As a research institute, we run applications and basic research in the fields of orthopedics and trauma surgery. Our main research field is the regeneration and biomechanics of the musculoskeletal system.

Background

Mandibular reconstruction after tumor resection is a challenging procedure usually performed using an autologous vascularized bone graft fixated with reconstruction plates (Figure 1). However, the non-physiological biomechanical environment induced at the injured site and donor site morbidity can negatively impact the healing outcome and patient quality of life. Tissue engineering allows exploring alternative solutions to traditional bone grafts such as scaffolds, i.e. structures able to support the formation of new functional tissues. However, if scaffolds can biomechanically support the bone healing process in mandibular reconstruction remains to be investigated.

Your Responsibilities

In this context, the Julius Wolff Institute is looking for a highly motivated individual for an internship or Master thesis. You will develop finite element models of reconstructed mandibles and design a scaffold to investigate its biomechanical impact on the healing outcome. The student will also simulate several biting tasks, design implant fixation and study their effect on the biomechanical environment within the mandibular defect. The project is part of a close collaboration with clinical partners.

Your Profile

- Student of Mechanical Engineering, Computer Science, Mathematics or a related discipline
- Knowledge of finite element modelling
- Team player and strong communicator
- Work on own initiative
- Quick learner and willing to share knowledge
- Excellent grades are expected



Figure 1. Traditional mandibular reconstruction.

Contact

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