MONASH
ENGINEERING

MONASH University

Faculty of Engineering
Summer Research Program 2023-2024

Project Title: Jaw Fracture Repair using 3D printing and Biomechanics of Chewing

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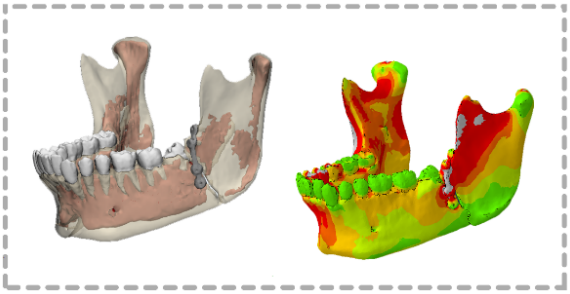
Objective

The custom design of an implant for the fixation of a simple fracture at the angle of the lower jaw that does not change natural jaw biomechanics.

Project Details

Mandible (lower-jaw) fractures account for ~40% of all instances of maxillofacial trauma and can occur due to a variety of incidents (e.g. assault, oropharyngeal/congenital disorders, cancer, vehicular accidents, sporting accidents or falls). Current treatment aimed at restoring mandibular function and aesthetics by immobilizing the fracture with fixation mini-plates and screws is not free of morbidity. Approximately 30% of mandibular fracture patients experience postoperative complications, such as mal-union (bone segments not fusing properly), malocclusion (tooth misalignment), infection, and joint dysfunction. Moreover, there is no consensus on the optimal surgical interventions for certain types of mandible fracture. We propose that a significant cause of post-surgical complication is the appearance of strain environments in the fracture zone and around the implants, which are not conductive to healing.



Prerequisites

Experience in Finite Element Modeling is required.

Additional Information

Applicants may be required to attend an interview.