CALT Computer-Aided Laser Treatment of Hard Tissue
Laser Positioning System

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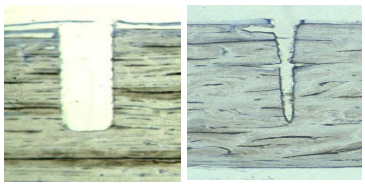
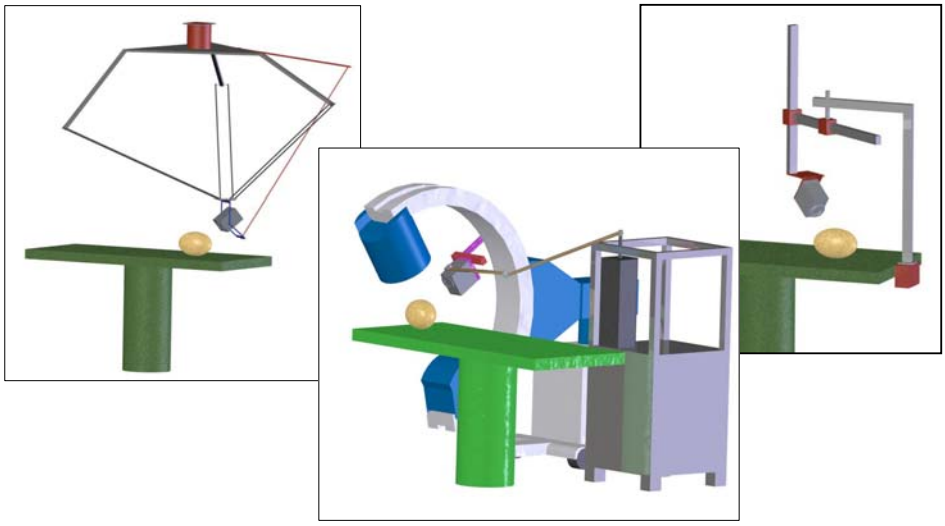
Laser Bone Cutting (Osteotomy)

We are developing a laser-based, non-contact cutting tool to perform osteotomy without mechanical stress and vibrations. With respect to conventional mechanical approaches, the laser method reduces procedure invasiveness while significantly increases cut accuracy and precision. Furthermore, the development of a positioning system will allow 3D cuts that are currently impossible with a saw.

Example of structural joints [CAESAR]



Comparison of a cut using a saw or a laser [CAESAR]



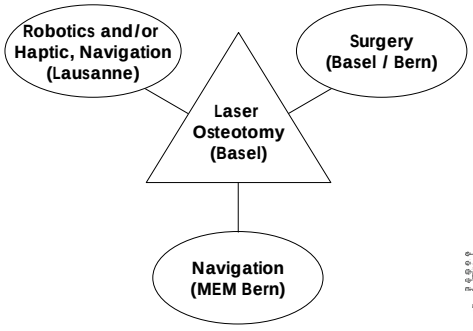
Project goal

Our primary objective is to provide a surgeon with an instrument that enables him to apply a computer-assisted pre-operative plan to an intraoperative situation.
Our research focuses on two areas: (1) navigation and (2) mechanical positioning.
We currently evaluating several semi-active and haptic systems that will help the surgeon position the laser beam over the patient in an easy and accurate manner.

Number of DOF	4 – 5
Working volume	hemisphere ∅ 1300 mm
Accuracy	< 1 mm (x, y, z)
Loading capacity	5 kg

Application field

Laser-based cutting will enable the use of bone fixation implants to be avoided. In addition, structural joints (dovetail, mitre, etc.) can be produced and assembled. Thus, this technology offers substantial potential for improving maxillofacial and ENT surgery.



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COMPUTER AIDED AND IMAGE GUIDED MEDICAL INTERVENTIONS