Development of a preoperative plan plugin for fracture and deformity correction treated with the iFixation Hexapodalic platform.

Project Management and Software Development
for Medical Applications

General Info

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Project Abstract

Last semester we started to develop a plug-in for our software with a student of the course. This semester, we want to resume the project by adding some graphical elements that will allow surgeons to recognize the mechanical axes of bones and fracture rotation points. These axes and points are fundamental to orthopaedic surgery which requires the use of external fixators.

Background and Motivation

When treating a congenital deformity or in most fractures, two bone components are distinguished and must be aligned according to the mechanical axes of healthy bones. For this, the surgeon analyses X-rays and defines the mechanical axes, rotation points and displacements, prior to surgery. This process is called preoperative planning.

When the surgery involves the use of implantable devices in the body, the preoperative planning depends on the mechanical qualities of the device. Hexapod fixators are commonly used during some orthopaedic treatments to correct fractures/deformities.

iFixation is our hexapod fixator for the treatment of fractures and deformities. This device reduces the fracture/deformity according to a software indication. The idea of including this plug-in in our software is to facilitate the analysis of the treatment by means of 2D graphical tools. These tools will be developed as a preoperative planning.

Student's Tasks Description

- **Frontend**: Development of the plugin's graphical tools code.
- **Versioning**: Update the repository Github according to the modifications made.
- **Testing**: Validate the plugin performance through unit testing
- **Good coding practices**: Write an easy-to-read code, commenting each relevant part.
- **Most important**: Bring a strong desire to learn and help to create useful technology in medicine.

Technical Prerequisites

Web programming (HTML, CSS, JavaScript). Version manager (GitHub).

References

Check the attachments.

Please send the completed proposal to ardit.ramadani@tum.de, lennart.bastian@tum.de and tianyu.song@tum.de. Please note that this proposal will be evaluated by the BMC coordinators and will be assigned to a student only in case of acceptance.

Example of x-rays to work with:

Example of a case treated with the hexapodal iFixation frame:

Severe Valgus/external rotation deformity