



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

Project Management and Software Development
for Medical Applications

General Info

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Project Abstract

Develop a plug-in for a website with graphical tools to allow the surgeon to select the sizes of the different components of the iFixation fixator prior to surgery.

Background and Motivation

Hexapod fixators are commonly used during some orthopaedic treatments to correct fractures/deformities. During surgery, the surgeon selects which components are best suited to the patient. This is done iteratively by placing and removing rings and bars of different sizes on the patient's leg. As you can imagine, this task takes time and energy from the surgeon during a risky surgical procedure.

We wish to perform this same process virtually through a plugin added to our website. This plugin should contain some graphical tools that will allow the surgeon to select the correct ring size. The rings should be represented by 2D elements that will be superimposed on the two X-rays of the patient (Anteroposterior and Lateral). Once the size of the rings has been selected, the plugin will calculate the length of the 6 bars that join the two rings and form the Hexapod platform. Knowing the length of the bars, their sizes are known. The information of the rings and the bars is the output of the plugin.

It is important to mention that the graphical elements must be designed in a clear and pleasant way for the surgeon. The plugin code should be well commented and easy to read. Versioning tools such as git should be used.

Student's Tasks Description

- **Frontend:** Development of the plugin's graphical tools code.
- **Backend:** Calculation of the lengths of the bars.
- **Versioning:** Creation of repository in GitHub with each of the changes and/or additions 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.

Example of x-rays to work with:



Example of a case treated with the hexapodal iFixation frame:

Severe Valgus/external rotation deformity



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.