Pressure and Blood Flow Regulating System Inside an Orthopedic Cast

Shamaev, Betty

Shoshan, May

Purpose of the Experiment: Today, it is impossible to control inner-cast pressure during the patient's healing process. The human limb can change its volume after an injury therefore irregular pressure can be formed within the cast. This pressure can harm the wanted bone position, delay the patient's recovery and might cause irreversible damage to nerves and tissues. Solution and working procedure: Our solution is a pressure regulating system which contains an air bag that replaces the cast's soft layer, and is installed using a new casting method. The system consists of a sensor, a micro-controller, an air pump and a user interface. The micro-controller will instruct the air pump to control the pressure according to the sensor's readings and the doctor's recommendation. At the beginning of the casting process the doctor will set the system and determine the wanted pressure, after that there is no need to interfere and the system is working on its own and regulating the pressure. Besides the ability to regulate pressure the system can identify a dangerous pressure values and problems in itself (such as a hole in the air bag) and notify the user. Conclusions: During the project we built a fully functioning prototype which can be used as a base for a marketable product. Our product is simple, mostly reusable and is providing a solution for a well-known medical issue. We predict our product becoming a wide-spread, standard part of the casting process.

Awards Won:

Third Award of $1,000