



Proceedings of the Human Factors and Ergonomics Society Annual Meeting

pro.sagepub.com

doi: 10.1177/154193120004402602

Proceedings of the Human Factors and Ergonomics Society Annual Meeting July 2000 vol. 44 no. 26 140-143

## Ergonomic Design of a Mechanical Device for Increasing the Rate of Union in Open Fractures of the Tibia

Pan Kok Long<sup>1</sup>

Halimahtun M. Khalid<sup>2</sup>

Ha How Ung<sup>3</sup>

<sup>1</sup> Faculty of Medicine and Health Sciences

<sup>2</sup> Institute of Design and Ergonomics Application

<sup>3</sup> Faculty of Engineering, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

### Abstract

Open fractures of the tibia resulting from motor vehicle accidents often take a long time to unite and sometimes do not unite at all. The patients are usually treated with rigid external fixators and immobilized for long periods. Without adequate physiological use, the bone and soft tissue takes longer to heal. This paper reports the development of a mechanical device, based on a hierarchical design approach. The process involves identification of functional requirements from both the expert and user population, which are then mapped on to design parameters. The outcome is a device that allows patients to mobilize their injured limb while they are still bed-bound. The device is being tested for usability and reliability in an on-going study, which is aimed at comparing the treatment of two groups of patients: one using the device in the course of their rehabilitation, while the other does not.