Evaluation of the Effectiveness Wu Casting Technique for use to create Transtibial Sockets using Liners

RJ Clements
Faculty of Health Sciences, Prosthetics and Orthotics, George Brown College

The prosthetic socket of a transtibial prosthesis is the interface between the prosthesis and the amputee. Consequently, it is the most important part of the prosthesis since its fit determines the success of the device. Currently there are different methods of obtaining an impression of an amputee’s residuum to create a socket. There are methods using plaster bandage such as hand casting, vacuum casting, pressure casting and CAD (computer aided design). Dr. Yeongchi Wu from the Centre for International Rehabilitation (CIR) in Chicago has developed and refined an inexpensive reproducible method of casting a transtibial patient under vacuum pressure while weight bearing. The technique was founded for use in developing countries with poor resources and unskilled clinical practitioners. There have been no published articles on the success or failures of the system, outside of Dr. Wu’s limited number of articles and ISPO (International Society for Prosthetics & Orthotics) presentations, and specifically no publications from outside sources to assess the method. Currently in developed countries many transtibial sockets utilize some type of liner (made of various materials) as a buffer between the patient and the socket itself.

To allow these liners to function effectively the outer socket must provide adequate equal force application throughout the entire socket surface. This equal force distribution is referred to as Total Surface Bearing (TSB). The Wu Casting system has reportedly found success creating sockets without liners, however some clinical practitioners believe this system may be extremely effective to create sockets with liners. The purpose of this study is to evaluate how effective the Wu Casting Technique is to generate accurate impressions of transtibial residuums for prosthetic sockets using liners. If the system proves effective this would offer a tool to prosthetists to help improve the quality of care for amputees in Canada.

Benefits to College: From an educational standpoint this study would provide an excellent opportunity for students in the Prosthetics / Orthotics programs to complete relevant research. Working with an external clinic will help initiate practice based research within our profession and strengthen the relationship between the college program and centres of clinical excellence.

Benefits to Industry: The most important benefit of this study is the answer to the clinical question. If the casting system in question has merits the influence on clinical practice will help many amputees.

George Brown College, with 30,000 full- and part-time students and more than 900 faculty in more than 150 programs, aims to be a top community college of choice for applied research investment by industry and other partners. Its applied research strengths include advanced engineering and microelectronics; nursing and the social sciences; health informatics; IT; and design and new media. George Brown is currently allied with nine other Ontario colleges in the Colleges Ontario Network for Industry Innovation, started with a $3.5m grant from the Ministry of Research and Innovation. CONII is building college capacity to bring research to the marketplace.