Conference paper title:
Embedding Engineering Skills into Prosthetics and Orthotics Degree Education: Examples of Approaches Implemented and Outcomes

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Introduction: It has been established that Degree of Prosthetics and Orthotics program should address topics on developments in biomedical and rehabilitation engineering, which undeniably have led to improved diagnosis, new treatment intervention and more reliable outcome evaluation.

Methods: Courses employed, apart from the curricular which has significant engineering components – i) Biomechanics of Prosthetics and Orthotics, ii) Biomechatronics, iii) Invention Design assignment in Prosthetics and Orthotics Clinical Practice.

Results: In Biomechanics of Prosthetics and Orthotics, each student undertake 3D motion analysis of a prosthesis user and an orthosis user under different walking conditions. Study design development and data analysis were conducted to make comparisons between the different gait characteristics set by each student pair under the supervision of the lecturer. Students were able to apply 3D biomechanics software skills to quantify patients’ gait performance and supplement their future clinical prescription and assessment. In Biomechatronics course students were exposed to the principles of Rehabilitation Engineering technology and the latest integrated engineering application in the field of Prosthetics and Orthotics. As a group assignment they designed a prototype of smart prosthetic leg, which was conducted using a cooperative approach where each group member was responsible for one design component. The invention design assignment as part of their Clinical Practice required each individual students to make use of their clinical experience and propose a better solution, technically, for a selected problem they encountered during the course.

Discussion and Conclusion: These exercises links their clinical assessment skills with the technical skills of motion analysis and raw data manipulation to justify gait assessment, and trained them to work integratively in a group to produce an optimal solution based on research and product development. As Prosthetics and Orthotics students with adequate engineering background and skills, they were also able to critically analyse their clinical practice experience with an ingenious eye for design.