Improving mobility for individuals with limb loss: the latest research

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Speaker's information

Dr Laurent Frossard is currently an Adjunct Professor at the Queensland University of Technology (QUT) and University of Sunshine Coast (USC). He is an active researcher, project manager and entrepreneur. He has over 25 years of experience both in academia and private industries in Australia, Canada and Europe. He is leading several large scale research projects and collaborates with over 120 professionals in more than 50 organizations worldwide.

His initial expertise in injury prevention and rehabilitation relates to the development of biomechanical tools and improvement of basic knowledge of rehabilitation and locomotion of individuals with lower limb loss fitted with osseointegrated implant and socket. He is currently considered as one of the very few independent experts in the clinical benefits of bone-anchored prostheses.

His academic track record includes over 140 publications, multiple grants and the supervisions of several domestic and international postgraduate students. He is regular reviewer for funding bodies and top-ranked journals such Nature and PLoS.

He has also worked as consultant for various organizations focusing on a wide range and health-related issues such as: health economic evaluation of surgical procedure (osseointegration), design of orthopedic implants, online medical education, teaching innovative procedural skills, implementation of new allied health role and hospital service innovation.

As the chief Scientist Office at YourResearchProject Pty Ltd his mission is to help professionals in academia, healthcare and industry to boost their research activities by providing customized support to plan research projects, collect data, analyze results, write publications and promote research outputs.

Background

The world of prosthetics is fast moving: are we really on our way toward bionic human! New technologies emerging regularly have the potential to revolutionise way individuals with limb loss are treated and fitted with ever more performing prosthesis. This presentation will give an overview of the ground-breaking treatment options already available while reviewing the key scientific drivers for future developments.

This webinar aimed at developing a comprehensive rehabilitation program for individuals fitted with conventional socket – suspended and innovative bone-anchored prostheses.

Methods

This webinar relied on the review of approximately 30 recent scientific publications as well as 20 years of personal experience in academic and industrial research in the field of rehabilitation and prosthetics in particular.

Results

This presentation focused on the following key points:

- Aetiology of limb amputation worldwide and in Australia, including incidence, distribution by level of amputation, gender, prevalence, cause, workforce,[1-4]
- Limitations with current socket-suspended prosthesis including mobility and fitting options (e.g., choice of components),[5-18]
- Fitting options to attach prosthetic limbs to residuum with strong emphasis clinical pathways for bone-anchored prostheses using osseointegrated screw-type or press-fit fixations,[19-29]
- Shortcoming of evidence about clinical outcomes of bone-anchored prostheses including evaluation of benefits (e.g., health-related quality of life, sitting, embodiment, osseoperception, range of movement, function) and safety (e.g., superficial and deep infection, breakage of components, loosening),[27, 30-58]
- Future technological develop in the field of bionics including change in medical practice, 3D printing, smart materials, generic and specific wearable instruments, big data, personalised digital human, neuromuscular control of prosthesis.[59-88]

Discussion

This webinar contributed to:

- Understand current options to fit prostheses to individuals experiencing limb loss,
- Comprehend the state-of-the-art in prosthetic fitting for complex case-mix,
- Appraise the static and dynamics rehabilitation load bearing exercises for patient using bone-anchored prosthesis.

Conclusion

The field of prosthetics care is now entering an unprecedented phase of exciting developments when new imagery technologies enabling precision medicine relying on personalised digital human will enable safe and efficient human-prosthetic interfaces in the next decade.

To know more

For more information on how to access the podcast, please contact Beth Sheehan beth.sheehan@essa.org.au) or Sarah Hall (Sarah.Hall@essa.org.au) from ESSA.

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