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Title
The future of prosthetics: affordable, 3D-printed, multi-grip myoelectric prostheses for children

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Summary
In the UK, a Bristol-based prosthetics company have been awarded a development contract from the NHS (National Health Service) to conduct the world’s first clinical trial for low-cost 3D-printed stylish bionic arms for children.

Introduction
The adequate provision of upper limb prostheses for children and young people is complex, reflecting the changing size, diversity of activities, as well as early social and psychological development. At present via the NHS (National Health Service), the majority of patients with upper limb differences are either provided with a passive prosthesis (cosmetic only), or a body-powered, single grip prosthesis. This limited choice reflects cost-effectiveness and durability of these prostheses (NHS England, 2015). However, almost half of all upper limb amputees abandon their prostheses, attributed primarily to a lack of functional gain. With recent advances in robotics, the production of multi-grip, myoelectric prostheses have become a reality, but with the cost of these prostheses between £25,000 - £80,000, they are rendered inaccessible for the majority of patients. In the United Kingdom, multi-grip myoelectric prostheses are not routinely commissioned on the NHS.

Methods
Phase 2 is a randomized control trial (stratified randomisation, with cross-over design) with 8 transradial participants between the ages of 8 and 17 at 2 NHS Centres. The trial compares the Bristol-based prosthetics companies product, the Hero Arm; an affordable, 3D-printed multi-grip myoelectric, with a single-grip myoelectric at a similar price-point routinely commissioned by the NHS. Users will spend 3 months with each prosthesis. The primary outcome measure will be an Action Research Arm Test, alongside additional measuring of time in use (recorded remotely

via an activity monitor built into the prosthesis), Canadian Occupational Performance Measure (COPM), Pediatric Quality of Life Questionnaire (PedsQL) and qualitative, semi-structured interviews.

Results

Phase 2 is ongoing, but the Bristol-based prosthetics company will present initial findings at OT World 2020.

Conclusion

The Bristol-based prosthetics company will investigate whether the provision of an affordable, multi-grip, myoelectric prosthesis will equal and surpass function in children and young people in comparison to standard NHS care. The authors anticipate the results providing a clear pathway for multi-site adoption of affordable multi-grip, myoelectric prosthetics under normal NHS care. In so doing, this initiative will involve a step change in care, making myoelectric prosthetics an option for all children and young people that require them.

References

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