

Qualitative Needs Assessment for Development of a Smart Thumb Prosthetic

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Abstract : Purpose: To critically assess deficits following thumb amputation and delineate elements of an ideal thumb prosthesis from the end-user perspective. Methods: This was a qualitative study based on grounded theory. End-user stakeholder groups of thumb amputees and prosthetists were interviewed. Transcripts were reviewed whole first for familiarity. Data coding was then performed by two individual authors. Coded units were grouped by similarity and reviewed to reach a consensus. Codes were then analyzed for emergent themes by each author. A consensus meeting was held with all authors to finalize themes. Results: Three patients with traumatic thumb amputation and eight prosthetists were interviewed. Seven themes emerged. First was the significant impact of losing a thumb, in which codes of functional impact, mental impact, and occupational impact were included. The second theme was the unique nature of each thumb amputee, including goals, readiness for prosthesis, nature of the injury, and insurance. The third emergent theme was cost, surrounding government funding, insurability, and prosthetic pricing. The fourth theme was patient frustration, which included mismatches of prosthetic expectations and realities, activity limitations, and causes of devices abandonment. Themes five and six surrounded the strengths and weaknesses of current prosthetics, respectively. Theme seven was the ideal design for a thumb prosthetic, including abilities, suspension, and materials. Conclusions: Representative data from stakeholders mapped the current status of thumb prosthetics. Preferences for an ideal thumb prosthetic emerged, with suggestions for a simple, durable design. The ability to oppose, grasp and sense pressure was reported as functional priorities. Feasible cost and easy fitting emerged as systemic objectives. This data will be utilized in the development of a sensate thumb prosthetic.

Keywords : smart thumb, thumb prosthetic, sensate prosthetic, amputation

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