
CONFERENCE ABSTRACT

"The infinity loop of healthcare innovation: Development of an integrated rehabilitation pathway for spinal surgery through design thinking"

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Introduction: One of the biggest fears of most clinical researchers is the translational “valley of death”, where scientific evidence (what is known) is lost in translation towards clinical practice (what is done). Bridging this know-do valley is challenging, and often targeted through developing a clinical “pathway”. Traditional frameworks for pathway development are known to be researcher-centered and linear. To overcome these shortcomings, we propose design thinking as a new framework for developing more user-centered clinical pathways. Whereas today, design thinking is increasingly embraced by healthcare for designing ‘things’ such as medical software or devices, we aim to also pave the way for design thinking in ‘pathway’ design. In particular, we adopted design thinking in developing a rehabilitation pathway for patients undergoing spinal surgery to improve the suboptimal outcomes such as persistent pain, disability and sick leave.

Methods: From 2017 to 2022, we adopted the infinity loop of design thinking (revisualization of Stanford’s d.school framework) to develop an evidence-based, integrated rehabilitation pathway for patients following spinal surgery (more specifically lumbar fusion), and reported this in line with the ‘Guideline for reporting research involving design’. The infinity loop includes five phases, which are non-linear (back-and-forth is possible), continuous (‘trying to solve a problem can help you better understand it’), and user-centered:

- i) Empathize: to understand (explicit and latent) user needs, we observed the current practice in a prospective cohort of 36 patients and engaged through semi-structured interviews with five patients and 31 healthcare providers.
- ii) Define: we formulated two problem statements, one for each user group (patients and healthcare providers), that together underline the pathway characteristics needed: easy-to-use, evidence-based, interdisciplinary and transmutal.
- iii) Ideate: we summarized the current evidence in a meta-analysis of 18 randomized-controlled trials, and gained 122 consensus statements from a multidisciplinary 31-member expert panel via a modified Delphi study, which was validated by nine patients.
- iv) Prototype: a time-task prototype of the rehabilitation pathway was created in line with the principles of process mapping. This prototype underwent iterative cycles of mono- and

multidisciplinary feedback and improvement and patient involvement on clarity of the final prototype.

v) Test: testing is currently ongoing in a tertiary hospital. The effectiveness (in terms of disability and return to work) and implementability of this rehabilitation pathway will be evaluated. Feedback loops with qualitative user feedback through interviews with patients and focus groups with healthcare providers will continuously improve the design.

Results: An integrated rehabilitation pathway for spinal surgery was designed, and is ready for implementation. This rehabilitation pathway is evidence-based, addresses the needs of patients and providers, and involves innovative components such as prehabilitation, early mobilization, uniform communication through leaflets, videos and website, and limited postoperative restrictions. This use case provides a practical guide for adopting design thinking in the context of clinical pathway development.

Conclusion: The infinity loop of design thinking can serve as an easy-to-use framework for quality improvement in healthcare. By transitioning from researcher-centered to user-centered design, the resulting clinical pathway can facilitate implementability and improve user satisfaction.