

# A review of hand and wrist robotic rehabilitation devices – the current state of evidence.

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## Background

- Robot-assisted rehabilitation has been researched for 20+ years.
- Recent developments have led to a new generation of robotic devices aimed at improving function in the hand and wrist.
- Understanding the effectiveness of these devices in neurological rehabilitation is complicated by the complex interplay between muscles, nerves and tendons in the hand and wrist.

## Aim

- Summarise current literature relating to the use of robotic devices in rehabilitation of the hand and wrist.

## Methods

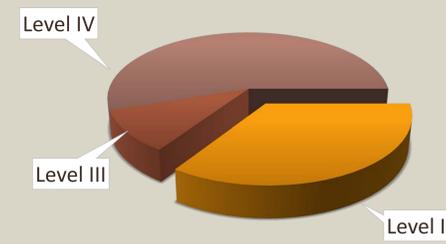
- Multiple databases were searched to identify relevant studies.
- Only studies with actively actuated devices and tested in Proof-of-Concept trials were included.
- Participants with non-progressive neurological conditions of all ages were included.
- A narrative review approach, employed the International Classification of Functioning, Disability and Health (ICF) as a framework, to summarise the existing evidence related to the use of hand and wrist robotic devices for neurorehabilitation of the hand and wrist.

## Results

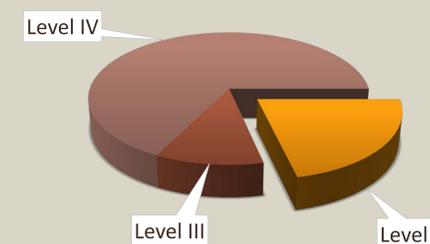
Robotic Devices Identified



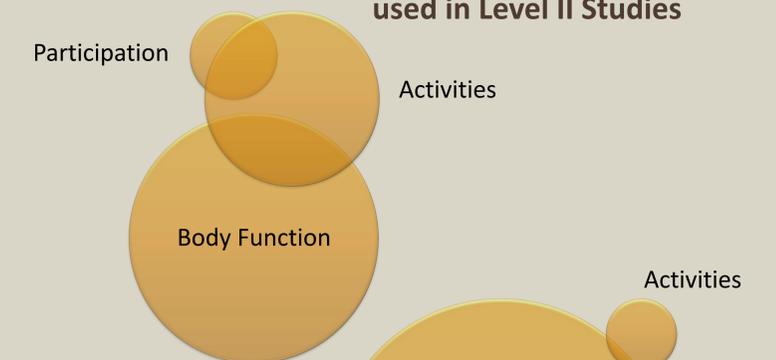
NHMRC Levels of Evidence – Hand Studies



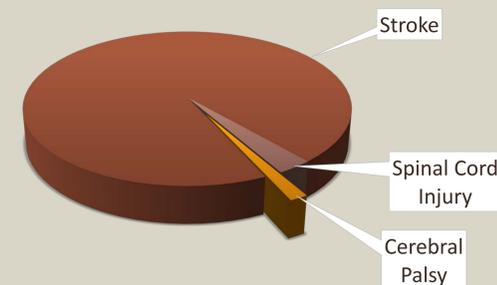
NHMRC Levels of Evidence – Wrist Studies



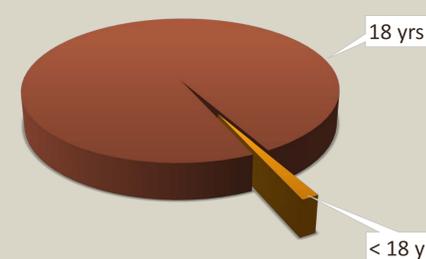
ICF Domains Targeted by Outcome Measures used in Level II Studies



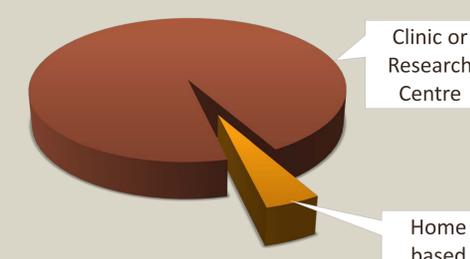
Diagnosis of Level II Study Participants



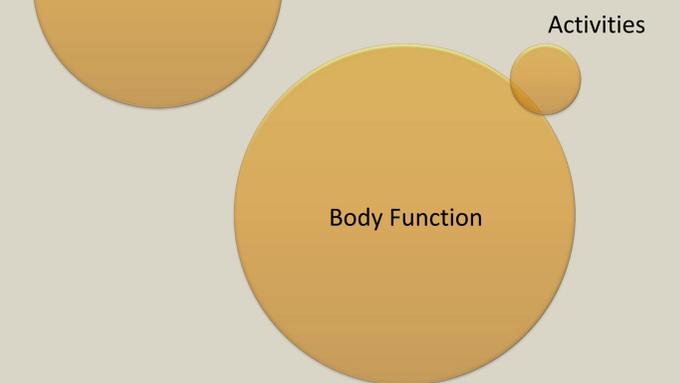
Age of Level II Study Participants



Level II Study Location



ICF Domain Targeted by Level II Studies



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## Conclusion and the Future

- High level evidence (Level II to IV) exists covering a broad cross-section of available approaches; however due to the limited quantity of evidence, clinical decision-making regarding the use of rehabilitation robotics in clinical contexts is not recommended.
- Before robotics are implemented into clinical practice further robust research is required, specifically in the areas of paediatrics. Additionally, studies into the efficacy of robots at the ICF level of activity and participation need to be conducted, as well as investigations into the impact of the environment.