

## Mitsui Sumitomo Insurance Welfare Foundation Research Grant 2016: Report of Research Results

- (a) Title: Grip-torque and pinch-torque hand strength of Older Adults after Falls: A pilot study exploring the use of grip strength to establish normative data and as a marker of frailty in geriatric patients presenting with falls and other non-fall reasons in a tertiary hospital
- (b) Primary Researcher: Wong Ting Hway, General Surgery, Singapore General Hospital  
Co-researcher(s): A/Prof Tay Shian Chao, Hand Surgery, Singapore General Hospital  
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Ng Yee Sien, Rehabilitation Medicine, Singapore General Hospital  
Seow Chuen Chai Dennis, Geriatric Medicine, Singapore General Hospital

- (c) Summary: Include the outline and conclusions of the research

It is known that weak grip strength is a measure of frailty. In our study, we tested a novel grip strength device on patients known to meet frailty criteria (cognitively impaired fallers). Our hypothesis was that sustained grip strength, supination, pronation would be weaker in frail patients than expected by maximum grip strength alone.

We found, as expected, that supination, pronation was weaker in frail patients than expected by maximum grip strength alone. Interestingly, sustained grip strength was not weaker than expected.

- (d) Aim of Research

Our hypothesis was that sustained grip strength, supination, pronation would be weaker in frail patients than expected by their maximum grip strength alone. The goal was to examine if hand function could be an earlier detector of frailty and / or whether specific targeted interventions could be formulated if we knew more about the grip strength beyond crude maximal grip strength alone.

- (e) Method of Research & Progression

50 patients were recruited from a geriatric falls clinic, from March to June 2016, and baseline assessment of activities of daily living, cognition, hand function and anthropomorphic measurements taken. Repeat assessment was performed at 1-month, 3-months and 6-months, with follow-up measurements conducted until December 2016.

- (f) Results of Research

As hypothesized, supination and pronation was weaker in frail patients than expected if correlated to maximum grip strength alone (Tables 1 and 2). Interestingly, sustained grip strength was not weaker than expected. Also, the difference in strength of supination and pronation was more marked for the dominant hand, with less difference between the supination and pronation strength for the non-dominant hand relative to maximum grip strength.

In addition to our findings, we found a weak correlation between supination, pronation and activities of daily living, suggesting that some of our frail cognitively impaired patients could benefit from future therapeutic interventions targeting hand function.

Table 1: Comparison with Community Controls – Grip Strength (Male): 1a Right Hand; 1b Left Hand

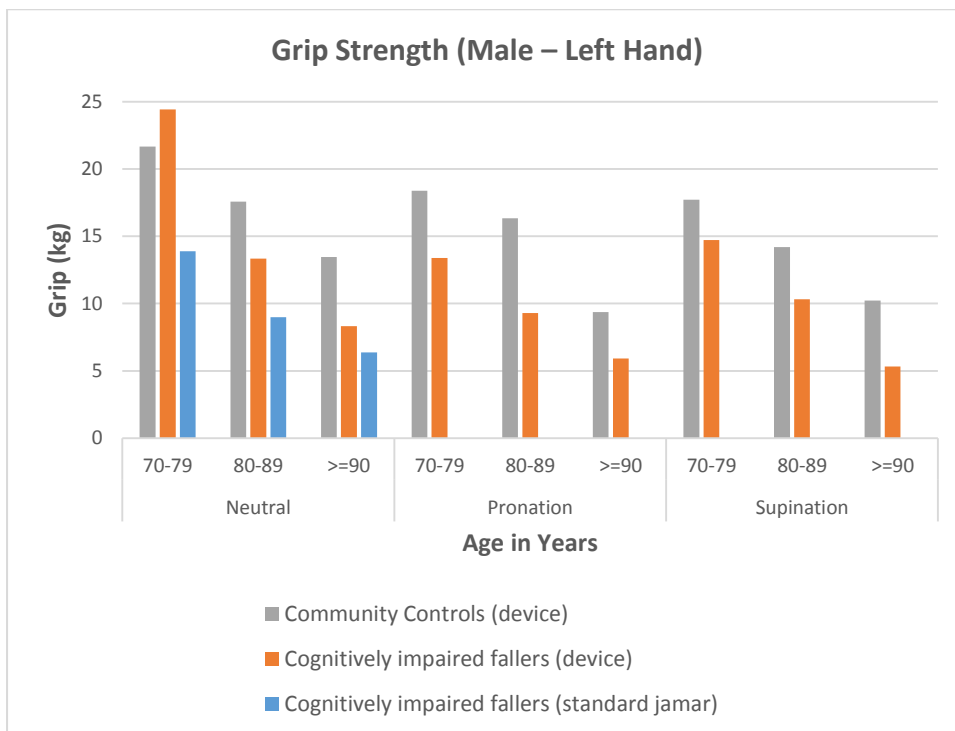
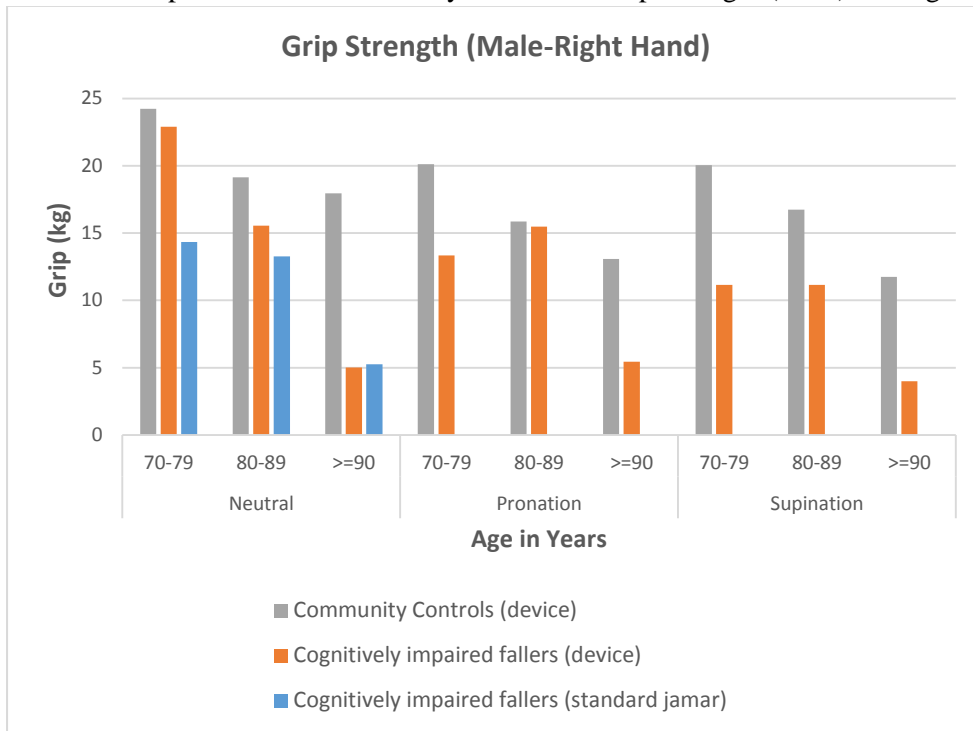
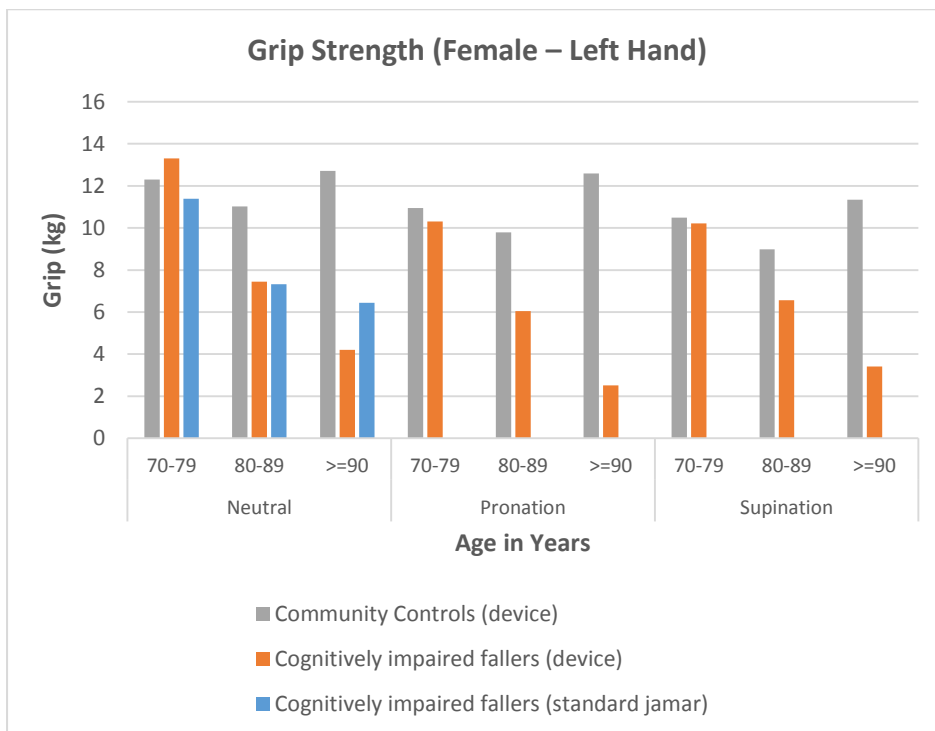
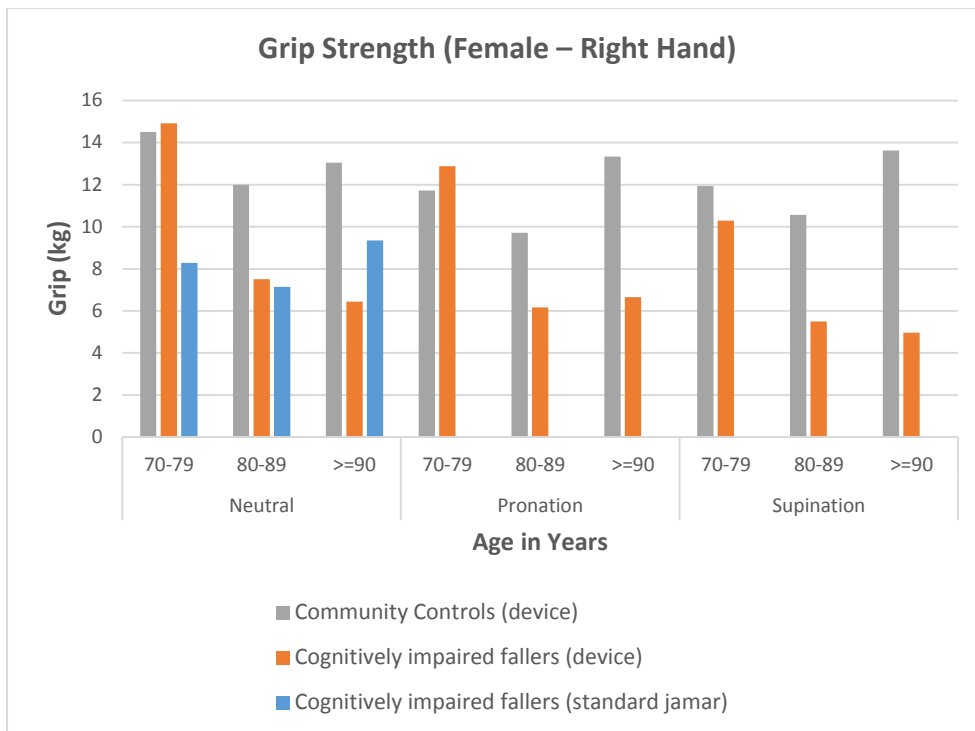


Table 2: Comparison with Community Controls – Grip Strength (Female): 1a Right Hand; 1b Left Hand



(g) Future Areas to Take Note of, and Going Forward

Our study has two main implications: Firstly, there may be a correlation between activities of daily living and hand function that goes beyond crude maximal grip strength. This is an unexplored area of study. Secondly, our study population of cognitively impaired persons were able to comply with the complex instructions required to operate the novel grip strength

machine. This may have therapeutic potential in future as currently many physical therapeutic interventions focus on walking-related rehabilitation, which is not without its risks e.g. fall risk.

(h) Means of Official Announcement of Research Results

We will report our study fundings in a peer-reviewed journal and will acknowledge the funding received from the Mitsui Sumitomo Insurance Welfare Foundation, and update the Foundation when the paper is accepted.