



Rehabilitation
Engineering &
Applied
Research

Seat Elevators in Everyday Life

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Disclosure

Georgia Tech was funded to conduct this study by Quantum Rehab.

Study Objective

- To measure how people used their iLevel power adjustable seat height (PASH) system in their every day lives
- To describe why people use their iLevel PASH systems

iLevel Monitoring Study Methods

- 24 participants
- Recruited from anywhere in the country
- Use an power wheelchair with iLevel power adjustable seat height (PASH) system as their primary mobility device



iLevel Monitoring Study Methods

- Sensors and data logger
 - Wheelchair occupancy
 - In-seat movement
 - Wheel Speed
 - Seat Height
- 2 weeks
- No interaction with equipment
- mEMA
 - survey twice a day
 - why and where they used the PASH in the past 6 hours

Participants

- 13 Men, 11 Women
- Average age: 47 (21-75)
- 73% White
- 64% attended or completed college
- Varied diagnoses, including:
 - Muscular dystrophy (n=4),
 - CP (n=3)
 - MS (n=2)
 - Osteogenesis imperfecta (n=2)
 - SCI/D (n=3)
 - Polio (n=2)
 - Inclusion body myositis (n=2)

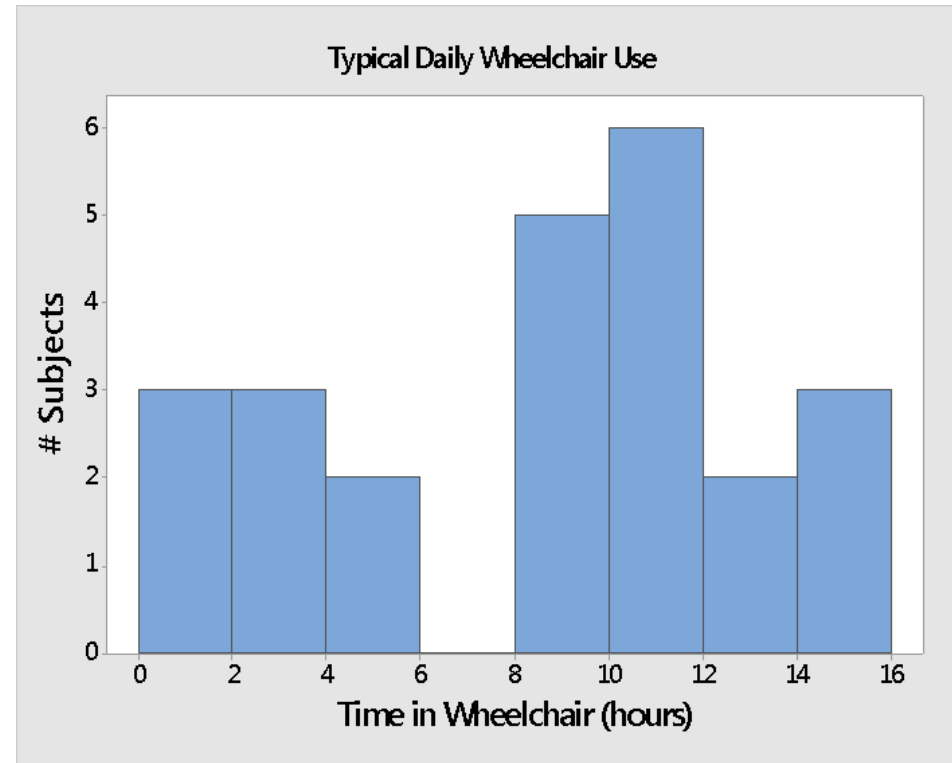
Participants

- Average time using a wheelchair
 - 13 years
 - 1 new user
 - Others were > 2 years
- Average time with a PASH system
 - 3 years
 - 12 were in their first year
- Only 3 had a PASH system on their first wheelchair
- 50% had another mobility device (cane, walker, manual or power wheelchair)

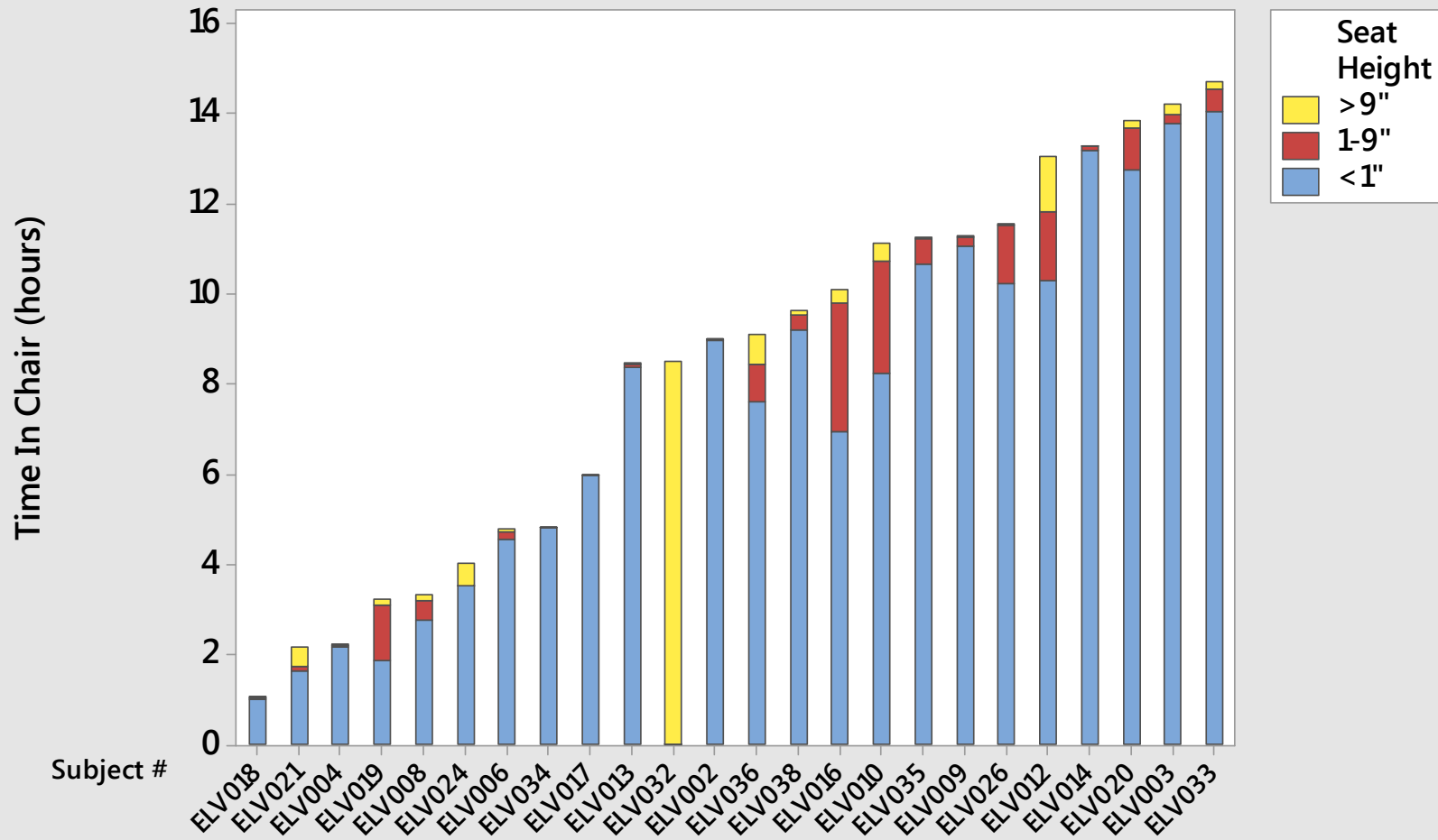
Data

- 453 days!

Time in Wheelchair



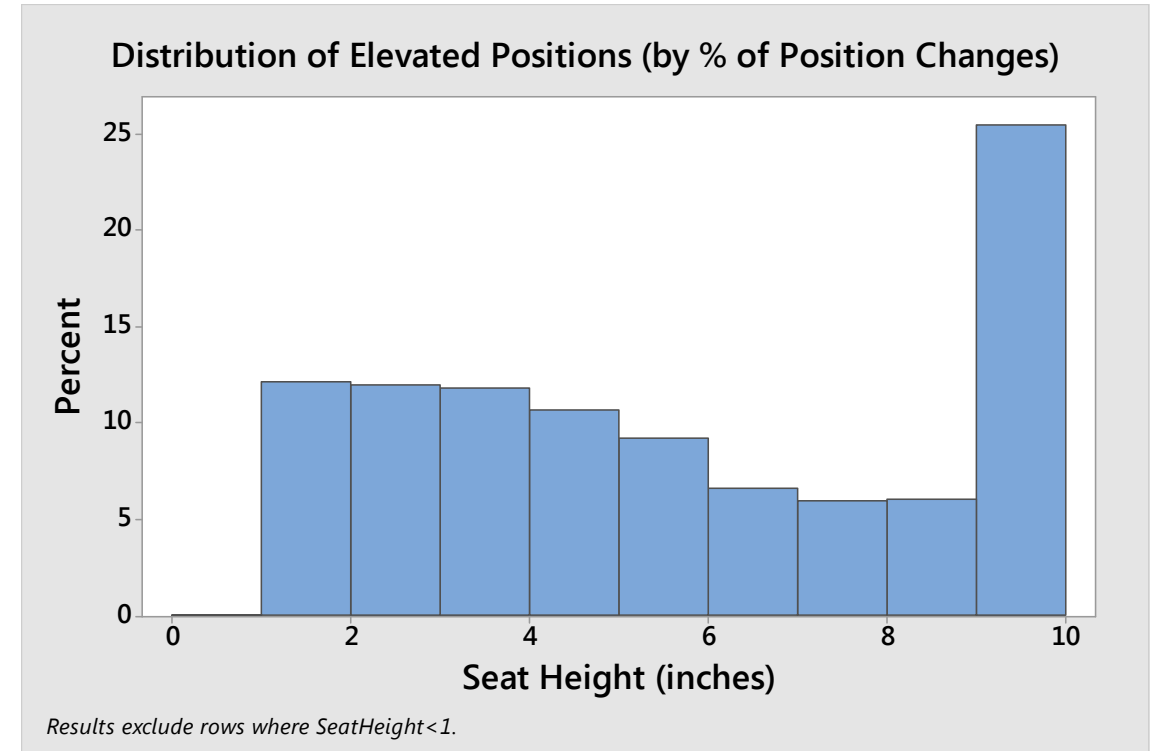
Time in Chair by Seat Height



Changes in Seat Height

Variable	Mean (SD)
# Times Change Seat Height	6.9 (5.0)
# Times Elevate > 9"	1.0 (1.0)

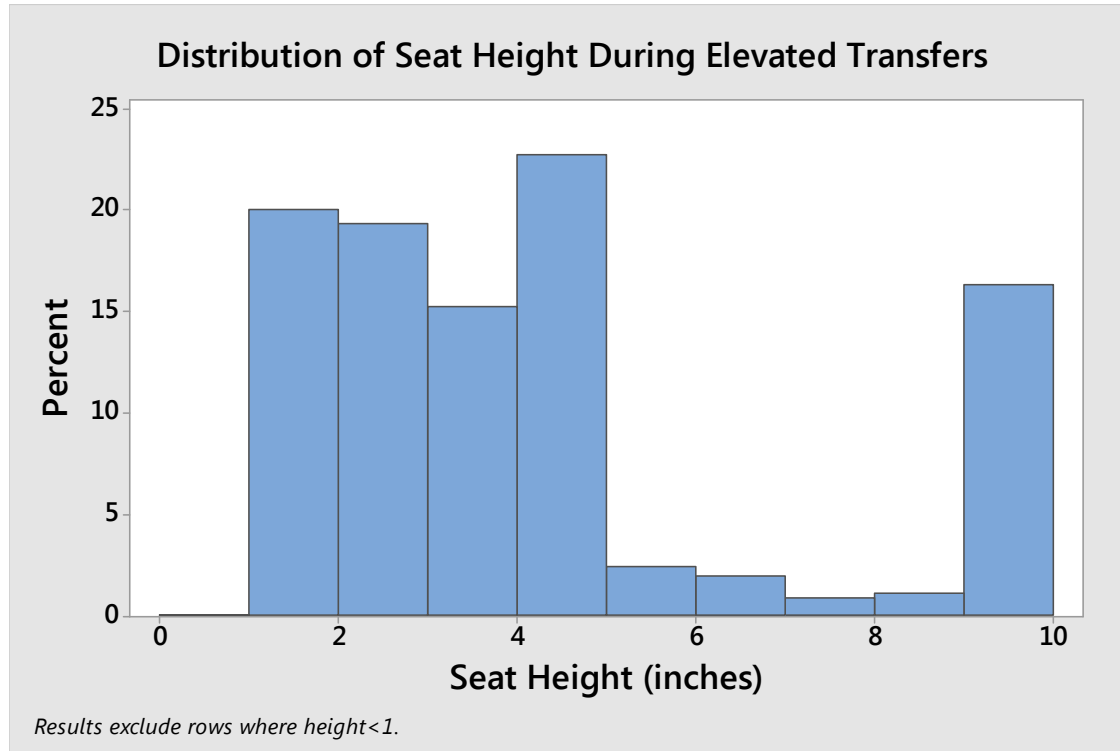
11 people used the feature every day



Transfers

- 8 Transfers per day (in + out)
- 6 of 15 mEMA responders (40%) reported using PASH for transfers
- 16 of 24 people transferred while elevated at least once
- 14 people changed the seat height between transferring out and transferring back in (at least once)

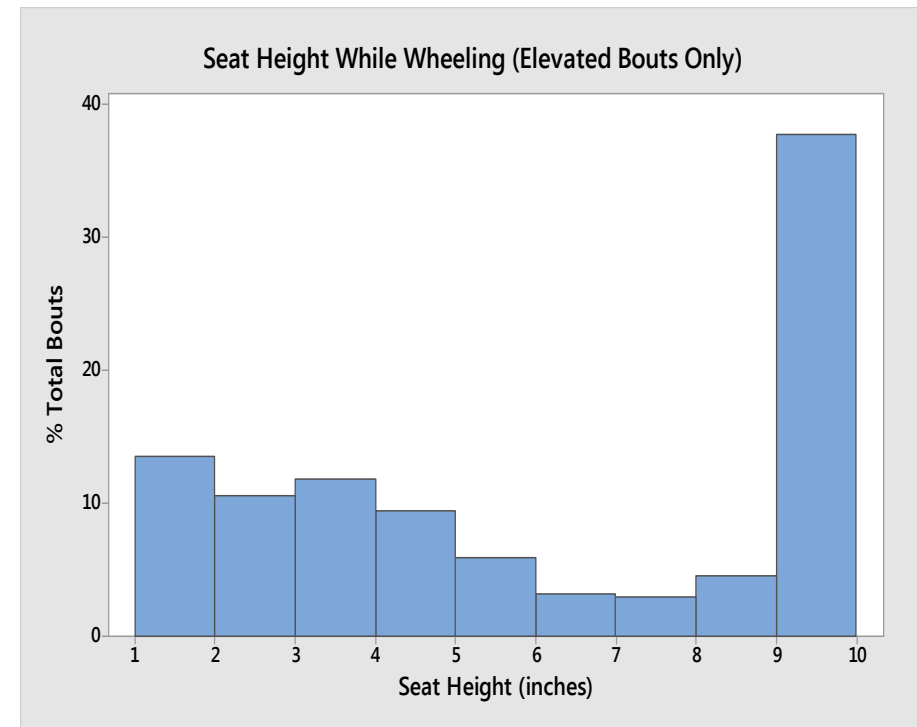
Transfers



- 0-5"
 - Level surfaces for seated transfer
 - Sit to stand
- 10"
 - Manual lift by caregiver
 - Mechanical lift (height to assist in placing sling or lift)

Elevated Mobility

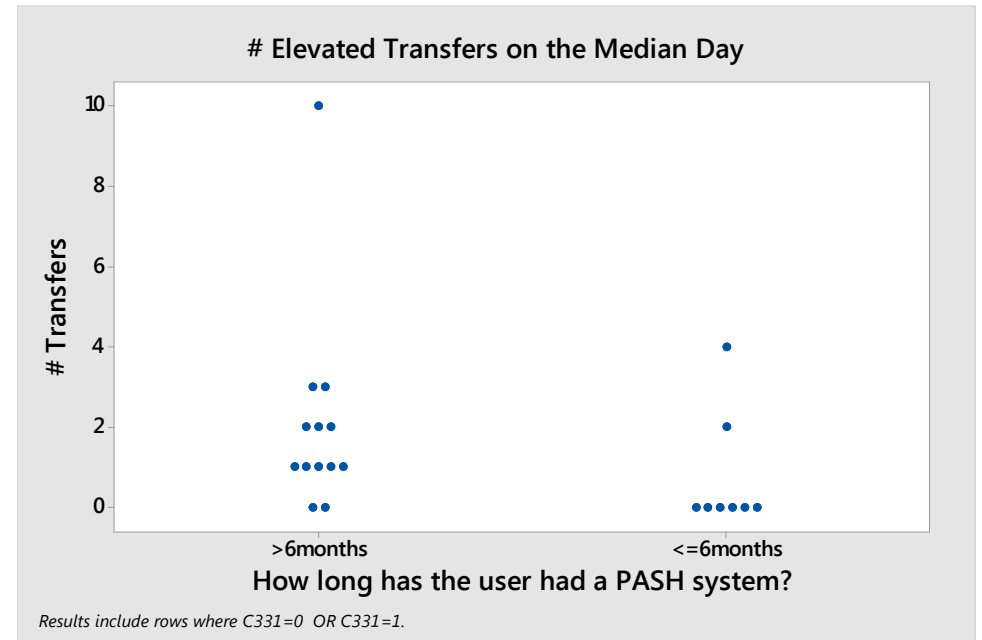
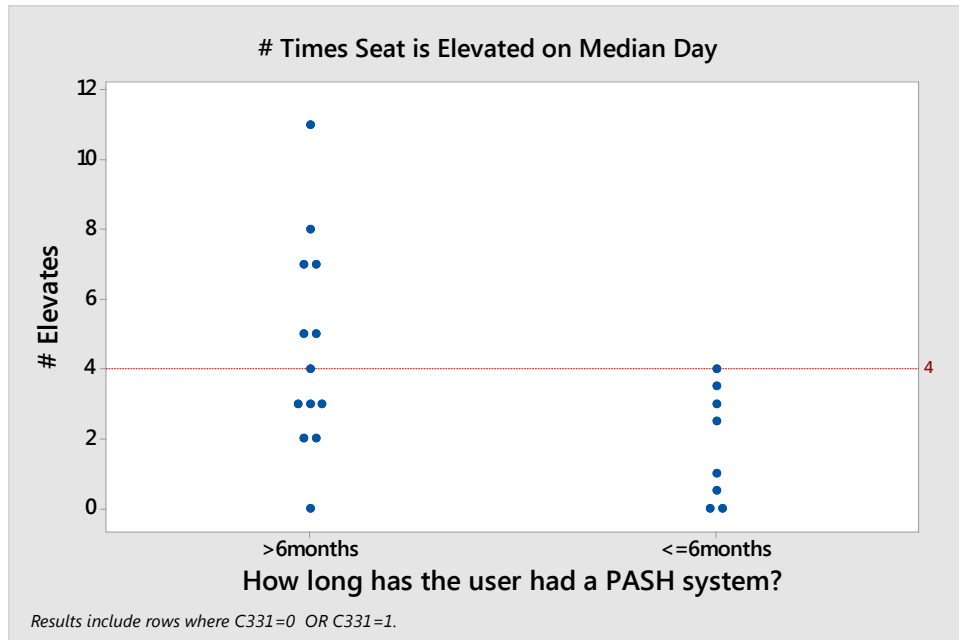
- Only 4 of 15 mEMA responders reported using PASH for mobility
- 23 of 24 participants wheeled while elevated at least once during the study
- 9 participants wheeled >20% of their bouts while elevated
- Fast bouts
 - 4% bouts > 1 m/s while not elevated
 - 2% bouts > 1 m/s while elevated



Reach

- 12 (80%) of 15 mEMA responders reported using PASH for reach
- When elevated, people moved around in their seat more frequently than when they are not elevated.
 - Active while elevated!

New vs. Experienced Users



Discussion

- Many participants used the feature
- Function
 - Transfers: Level lateral transfers, assist with sit to stand, raise for dependent transfers
 - Improve reach (everywhere)
 - Level eye gaze, improve sight (into sinks, back of shelf, closets...)
 - Daily tasks
 - Safety during outdoor mobility
- Training!

Thank you!

Chris Maurer, MPT, ATP

Stephen Sprigle, PhD

Chris Hanes

The team at Quantum Rehab

Quantum reps who set up chairs

Participants!