Wheelchair Cushion Degradation During Everyday Use
Stephen Sprigle, PhD, PT
Rehabilitation Engineering and Applied Research Laboratory, Georgia Institute of Technology

Introduction

- In the US, wheelchair cushions are deemed durable medical equipment – therein, the life expectancy is 60 months
- Understanding variations in cushion performance over time during use can inform design and clinical interventions

Objectives

- Document cushion performance over lifespan
- Identify predictors of cushion degradation
- Develop and validate a clinical measure of seat cushion degradation

Methods

- 138 different cushions studied
  - Most common: Jay2 (32), Roho Hi Profile (26), Evolution (14)
- Repeated measures on 24 cushions

Data Collection

- Client evaluation – diagnosis, weight, pressure ulcer history
- Visual inspection of cushion
- Seated posture and cushion performance measures using human and buttock model interface pressures

Interview & physical exam
IPM with user
IPM using model

Visual inspection & dimensioning
Loaded contour depth
Impact dampening

Results

Both model and subject pressures indicate NO relationship over time

Black: IPM using buttock model
Red: IPM using cushion user

Look at variability of red model data compared to variability of black subject data

Conclusions

- Strong positive correlation between temperature and relative humidity
- Controlled tests did not reach steady-state, while most empirical bouts reached steady-state after approximately 90 minutes

Acknowledgements

- This research was conducted as part of the RERC on Wheeled Mobility, which is supported by Grant H133E080003 from the National Institute on Disability and Rehabilitation Research of the U.S. Department of Education.

For more information, please visit
www.mobilityerc.gatech.edu