

Functional Outcomes of Wheelchair Seating and Positioning in the Elderly Nursing Home Population

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A Research Slide Lecture
from the website of Wheelchair University
(<http://www.wheelchairnet.org/>)
Wheelchair University is a project of the
Rehabilitation Engineering Research Center (RERC) on Wheeled
Mobility

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Abstract

- The purpose of this study was to investigate whether or not the elderly who reside in nursing home and sit in a wheelchair for 6 hours a day or longer, benefit from a custom fit wheelchair and seating system. Through an experimental design 24 people (60-98 yrs.) were randomized into two groups (intervention and control) and they received a new wheelchair, cushion and custom seat back. All were given four outcomes tests at specific time intervals. The administration of the Rand SF-36, QUEST, wheelchair mobility and postural stability tests were performed to compare current systems with custom prescribed systems.

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Full Citation

- Full citation of the published research:
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Focus Points

- Elderly population
- Nursing homes
- Inadequate wheelchairs
- Inadequate seating systems
- Nursing Home Policy barriers
- Inadequate funding, knowledge, & improper health care

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Research Need

- Document functional status changes
- Enhance justification of payment for wheelchairs and seating systems in the elderly nursing home population

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Purpose(s) of Study

- Investigate the individualized w/c seating needs of 60+ year old residents
- Investigate how custom fitted w/c & seating systems will be beneficial
- Strengthen the idea that outcome documentation will aid in justification of payment to funding agencies

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Research Objectives

- Proper seating and mobility intervention will improve a person's:
 - Independent mobility
 - Forward & Lateral Reach
 - Quality of Life
 - Satisfaction with Assistive Technology (w/c +seating system)

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Subjects

- 3 nursing homes participated
- 34 people randomly assigned to either
 - *Intervention Group*
 - *Control Group*

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Inclusion Criteria

- Wheelchair used for 6+hours a day
- 60 + years
- Ability to understand commands and answer in a coherent and consistent manner.
- Ability to self-propel their wheelchair a distance of 25 ft.

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Exclusion Criteria

- Existence of decubitis ulcer
- Dementia
- Alzheimer's Disease

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Methods

- All 4 dependent variables administered to the subjects.
- Physical Evaluation performed by a Licensed OT
- 3 Visits with 3 month time intervals
- Data analysis to compare intervention & control groups and pre & post test interventions

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Intervention/Control Time Frame

- Intervention Group:
 - **Visit 1** measurement in "old w/c" *Evaluation*
 - **Visit 2** measurement in "new w/c"
 - **Visit 3** measurement in "new w/c"
 - Control Group:
 - **Visit 1** measurement in "old w/c"
 - **Visit 2** measurement in "old w/c" *Evaluation*
 - **Visit 3** measurement in "new w/c"
- (* 3 months between visits)

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1. W/C Mobility

- *Test #1:*
 - 25ft straight on level tile surface
- *Test #2:*
 - 10ft, rt. turn (90°), 15ft =total 25ft on level tile surface
- *Both tests recorded in time (seconds)*

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2. SF-36

- Contains 36 questions regarding subjects perception of their quality of life
 - *Administered in a one to one fashion*
 - *Questions/answers read aloud to subjects*

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The MOS SF-36

A 36-item short-form (SF-36) was constructed to survey health status in the Medical Outcomes Study. The SF-36 was designed for use in clinical practice and research, health policy evaluations, and general population surveys. The SF-36 includes one multi-item scale that assesses eight health concepts: 1) limitations in physical activities because of health problems; 2) limitations in social activities because of physical or emotional problems; 3) limitations in usual role activities because of physical health problems; 4) bodily pain; 5) general mental health (psychological distress and well-being); 6) limitations in usual role activities because of emotional problems; 7) vitality (energy and fatigue); and 8) general health perceptions. The survey was constructed for self-administration by persons 14 years of age and older, and for administration by a trained interviewer in person or by telephone.

See <http://www.sf-36.com/>

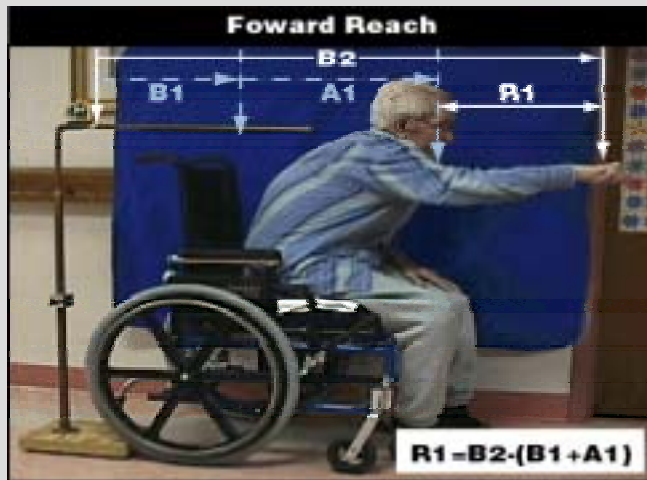
3. Measure Forward Reach



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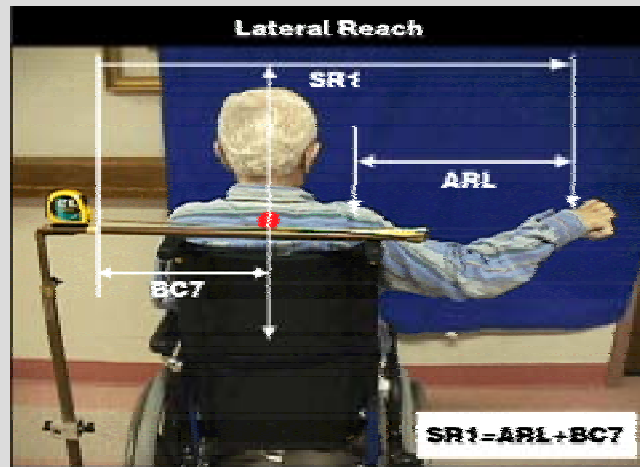
3. Measure Forward Reach



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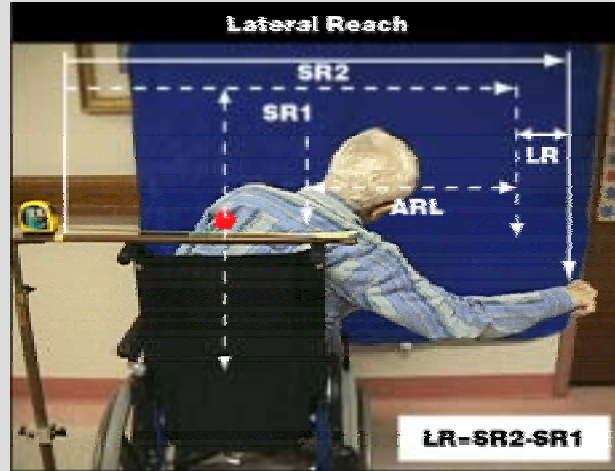
3. Measure Lateral Reach



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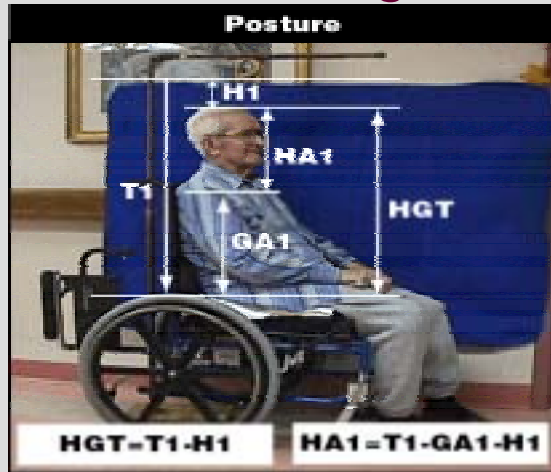
3. Measure Lateral Reach



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3. Measure Sitting Posture



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4. QUEST

- QUEST: Quebec User Evaluation of satisfaction with assistive Technology
- 1-5 rating scale for Satisfaction & Importance levels with current w/c & seating system
 - *Administered in a one to one fashion*
 - *24 variables for "Importance"*
 - *19 variables for "Satisfaction"*

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QUEST (Quebec User of Evaluation of Satisfaction with assistive Technology) possibly available summer 1999

Authors: Louise Demers, M.Sc. OT(C), Rhoda Weiss-Lambrou, M.Sc. OT(C), Bernadette Ska, Ph.D.

The Quebec User Evaluation of Satisfaction with assistive Technology (QUEST) is a structured and standardized measure of user satisfaction with a wide range of technology devices. The concept of satisfaction consists of two factors related to assistive technology DEVICE (8 items) and SERVICES (4 items). QUEST can be self-administered or interview-based. With regards to its psychometric properties, QUEST has been tested for internal consistency, test-retest stability, content validity and factorial validity. It is available in English and French and a Dutch version translation was also constructed. QUEST will soon be published by the Matching a Person & Technology Inc. Please send your name and mailing address to the following address if you would like to order a copy of QUEST when published:

Contact: Dr Marcia J. Scherer, Director

The Institute for Matching a Person & Technology
486 Lake Road
Webster, NY 14580
(fax)716-671-3461

Results: Demographics

- No significant difference between groups with regard to age, gender, race, or facility
- At baseline: **34** total: **19** Intervention Group & **15** Control Group
- At study completion: **24** total, **12** Intervention Group & **12** Control

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Continued

- **Age:** 82.4 +9.8
- **Race:** 91% Caucasian
9% African American
- **Gender:** 81% Female
19% Male
- **Facility:** NH "1" = **30%**
NH "2" = **43%**
NH "3" = **27%**

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W/C Mobility "Univariate"

- Test 2 "Intervention Group"
- Visit 3-Visit 1 -8.53 sec p=0.042 *44.39
- Baseline Test 1= 41.52sec n=18
- Baseline Test 2= 52.92sec n=18

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W/C Mobility "Univariate"

- Test 1 "Control"
- Visit 3 - Visit 2
- **-16.36sec** $p=0.006^*$
- Visit 3 - Visit 1
- **-13.95sec** $p=0.002^*$ 35.02
- Baseline Test 1 = 48.97sec $n=14$
- Baseline Test 2 = 66.36sec $n=14$

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* @V2 = +2.41sec



SF-36 "t-test"

- Social Functioning:
 - Intervention: Visit 2-Visit 1
+8.04 p=0.007 n=14
 - Control: Visit 2-Visit 1
-18.75 n=14
 - Intervention: Visit 3-Visit 2
-9.38 p=0.011 n=12
 - Control: Visit 3-Visit 2
+15.38 n=13

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SF-36 "t-test"

- Role-Physical:
 - Intervention Group:
 - Visit 2-Visit 1 **+21.43** **p=0.033** n=14
 - Control Group:
 - Visit 2-Visit 1 **-8.92** n=14
- Role-Physical:
 - Intervention Group:
 - Visit 3-Visit 2 **-8.33** **p=0.045** n=12
 - Control Group:
 - Visit 3-Visit 2 **+16.67** n=12

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Forward Reach "Univariate"

- Intervention Group:
 - Difference between Visit 3-Visit2
 - **+22.97mm** $p=0.016$ $n=12$
- Control Group:
 - Difference between Visit 3-Visit 2
 - **+42.69mm** $p=0.039$ $n=13$

*no significant results for student t-tests between groups

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Planar vs. Contoured Seat Backs

- Forward Reach "Intervention" At Visit 2:
 - Contoured= **-7.33mm** p=0.035 n=9
 - Planar= **+77.75mm** n=4

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Planar vs. Contoured Seat Backs

- Lateral Reach "Control":
- Visit 3-Visit 1:
 - Contoured= **-55.80mm** p=0.022 n=5
 - Planar= **+50.17mm** n=8
- Visit 3-Visit 2:
 - Contoured= **-77.07mm** p=0.011 n=5
 - Planar= **+45.29mm** n=8

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Sitting Posture

- No significant results to report
- Trends indicate that both groups GA distance increased after receiving new w/c + seating system

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QUEST "Satisfaction Variables" t-test (V2-V1)

- *Global Satisfaction:*
- Intervention:
+**1.00** p=0.002 n=13
- Control:
-0.36 n=14

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QUEST

- Other variables indicating increased satisfaction as a result of intervention:
 - Comfort
 - Simplicity of Use
 - Dimensions
 - Durability
 - Appearance
 - Multi-purposefulness
 - Adjustments

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Conclusions

- W/C Mobility:
 - Overall the subjects got faster
- SF-36 (Quality of Life)
 - Only 2 of 8 health concepts improved
 - Maybe due to statistical power: would need an average of 17 per group to see a difference of 20+ points, would need 255 per group to see a 5 point difference.

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Conclusions Continued

- Posture:
 - Forward reach did increase but lateral reach did not.
 - Controlling for different types of seat backs proved that lateral reach is affected by contoured seat back.
 - No difference in sitting posture.
- Quest (Satisfaction with AT)
 - Overall a higher degree of satisfaction

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Clinical Observations

- Subjects were more knowledgeable with decisions of choosing AT
- Proud of new wheelchairs
- Moving around was easier
 - Less weight to propel
 - Wheelchair dimensions were reduced
 - Not afraid to reach for TV remote due to lessened fear of falling out of w/c

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Limitations of Study

- Subjects mean age of 82.4 @V1
 - Declining population
- Low “N” value at completion of study (34 dropped to 24)
- Threat to internal validity: testing
- Methods of measuring lateral Reach
 - *Seat backs, measurement errors*

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Final Thoughts

- Results indicate major benefits of custom w/c & seating systems.
- Strong framework for future research.
- In process of doing a 6 month follow-up study of participants.

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