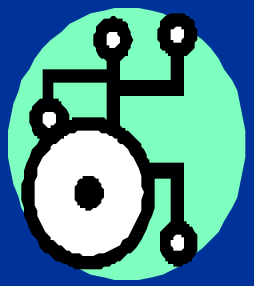
Community-Based Exercise, Secondary Conditions, and Participation in Individuals with Mobility Impairments

Molly Listenberger, OTD/S
Washington University School of Medicine
Program in Occupational Therapy



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MFH Health and Wellness Program

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Principal Investigators: David B. Gray, PhD, Washington University &
Robert Funk, CEO, Paraquad

Problem

- Persons with disabilities (PWD) among most inactive subgroups in U.S.
- Lack of health promotion → increased secondary conditions and decreased health, well-being, and participation
- Surgeon General's Call to Action

Center for Disease Control, 2005; Nary et al., 2000; USDHHS, 2000; USDHHS, 2005; Verity, 2006

Literature Review: Effects of Exercise

- Improves strength/cardiorespiratory endurance
- Reduces risk and experience of secondary conditions
- Improves participation

Costa et al., 2001; Ditor et al., 2003; Dodd et al., 2006; Froehlich-Grobe & White, 2004; Hicks et al., 2003; Keyser et al, 2003; Klebine, 2003; Nash et al., 2007; Pang et al., 2006; Taylor et al., 2004; Schmidt Hanson et al., 2000; Taylor et al., 2006; van den Berg et al., 2006; Verellen et al., 2007

Research Needed. . .

- Expand fitness data collection in people with disabilities
- Participation as true participation
  - In an individual's natural environment (both at home and in the community)

Research Hypotheses

- A community-based exercise program will be associated with:
  1) Improved strength and cardiorespiratory endurance
  2) Decreased frequency of secondary conditions
  3) Increased frequency and quality of participation

Participants

- Purposive sample from greater St. Louis
  - Age: 18 years or older
  - Mobility impairment requiring the use of an assistive device (cane, crutch, walker, wheelchair, scooter)
  - Reside in community setting

Measures

- CORE: Demographics and Secondary Conditions
- PARTS/M (Gray, Hollingsworth, Stark & Morgan, 2006): Participation
- Fitness assessments
  - 1-repetition maximum: Strength
  - Rating of perceived exertion (RPE), speed, and heart rate: Cardiorespiratory Endurance

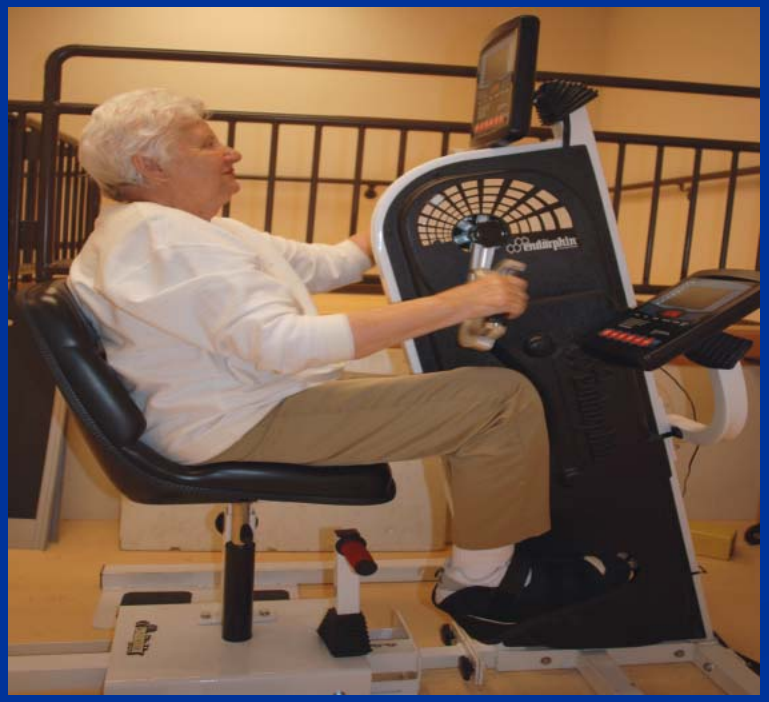
Fitness Assessment: Strength

- **Uppertone**

- 1-Repetition Maximum
  - ***Rickshaw***
  - ***Chest Press***
  - ***Rowing***
  - Triceps
  - Biceps

Fitness Assessment: Cardiorespiratory Endurance

- **Endorphin® Arm/Leg Ergometer**



- 9-minute test: arm
- 3 stages of 3 minutes each (increasing resistance)
  - RPE
  - Speed
  - Heart Rate

Fitness Assessment: Cardiorespiratory Endurance

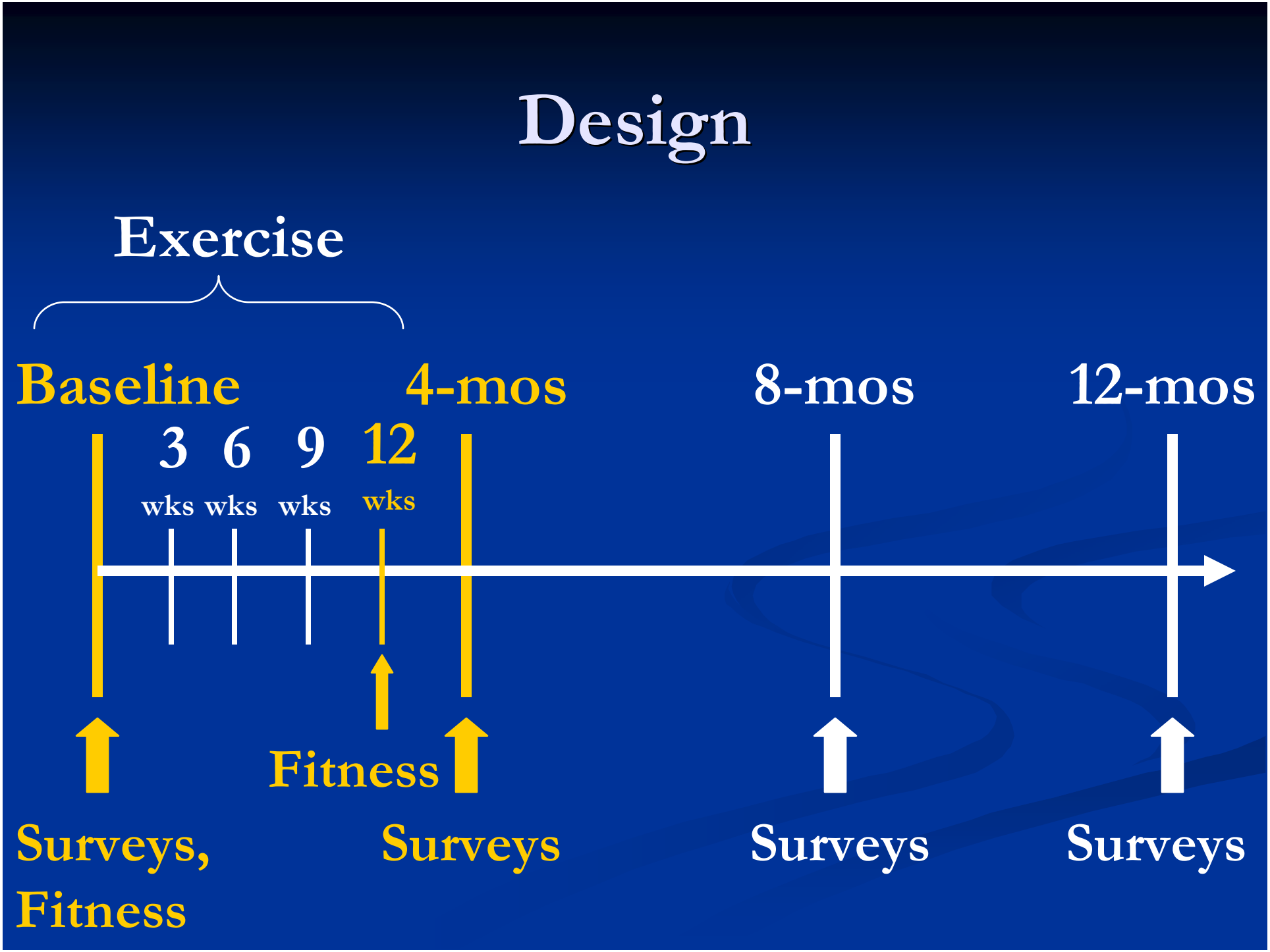
- **Active Passive Trainer**

- Same 9-minute test as arm ergometer
- Option for different settings:
  - **Active**
  - Active/Passive
  - Passive

Procedure

- Baseline CORE and PARTS/M surveys
- Health education workshop
- Baseline fitness assessment
- Exercise 1-3 times a week for 12 weeks
- Final fitness assessment at 12 weeks
- Follow-up survey at 4-months with CORE and PARTS/M

Design



Data Analysis

- Demographics: Descriptive statistics
- Strength: Multivariate repeated measures analysis and post-hoc paired t-test
- Endurance: Wilcoxon, Paired t-test
- Secondary Conditions: Sign test, Paired t-test
- Participation: Paired t-test

Results

Demographics (CORE): N=35

Variable	# years	Frequency %	n
Age	44.7		
Gender			35
Female		54.3	
Race/Ethnicity			35
Caucasian		68.6	
African American		25.7	
Other		5.7	
Primary Disability			27
Spinal Cord Injury (SCI)		25.7	
Cerebral Palsy (CP)		22.9	
Multiple Sclerosis		8.6	
Other		20.1	
Primary Mobility Device			35
Power wheelchair		40.0	
Manual wheelchair		34.3	
Cane/Walker		17.1	
Scooter		8.6	

Strength: 1 Repetition Maximum

Left arm

- **Rickshaw**** (N=29)
  - 30.7 lbs → 39.7 lbs
- **Chest press**** (N=31)
  - 48.0 lbs → 58.1 lbs
- **Row**** (N=31)
  - 47.9 lbs → 65.4 lbs

Right arm

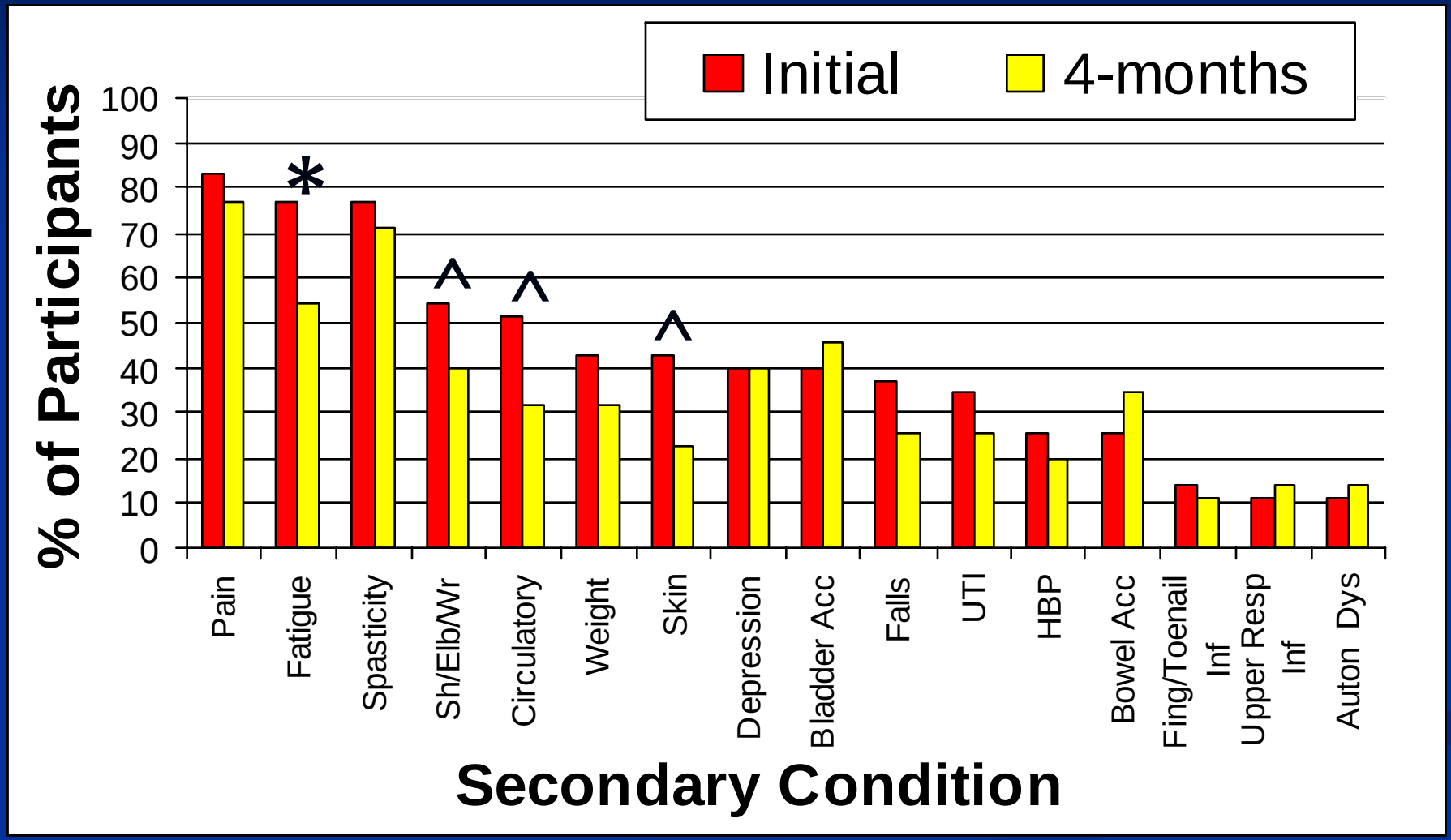
- **Rickshaw**** (N=28)
  - 32.2 lbs → 41.5 lbs
- **Chest press**** (N=31)
  - 45.9 lbs → 54.8 lbs
- **Row**** (N=31)
  - 48.0 lbs → 65.3 lbs

****All were significant at the .001 level!**

Cardiorespiratory Endurance

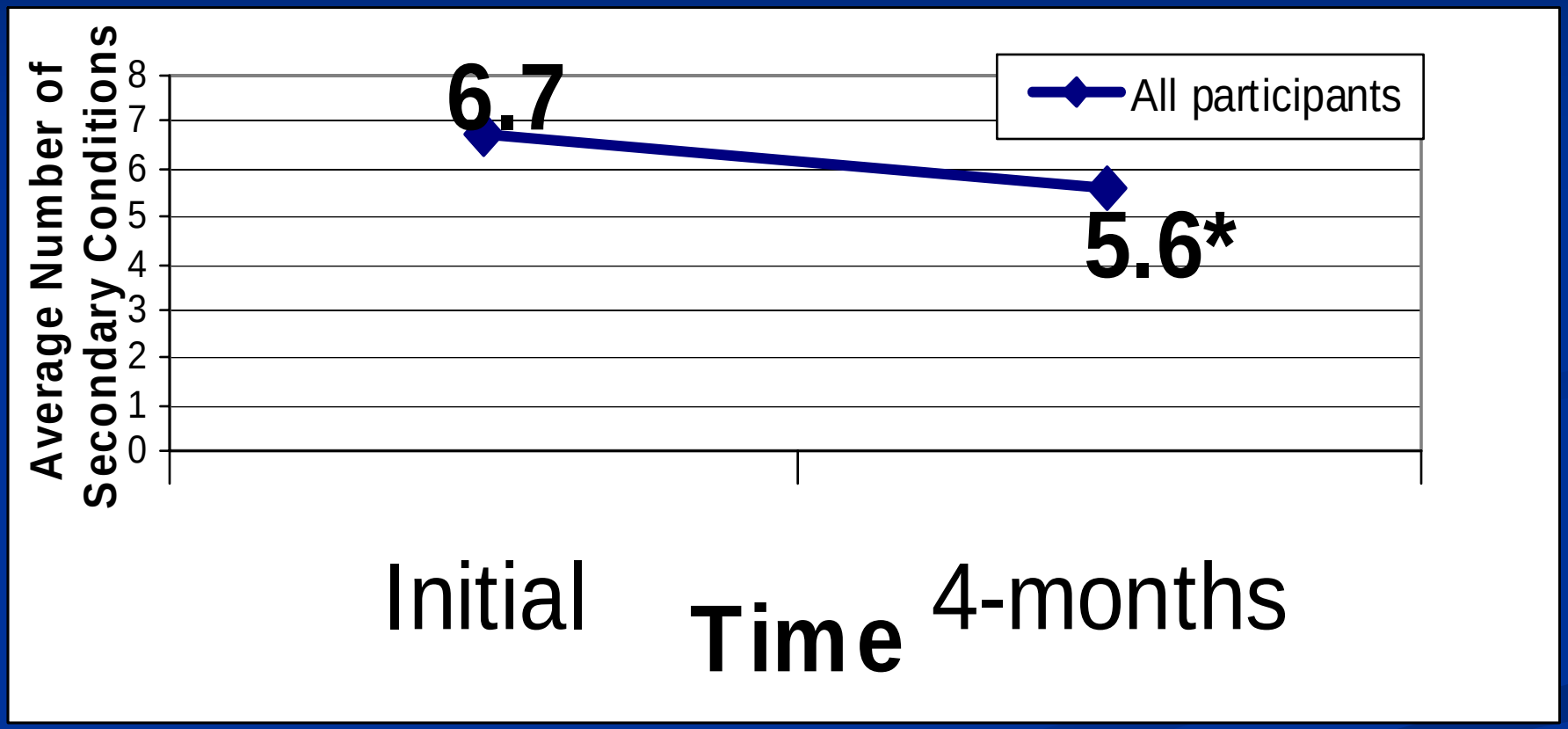
- Average speed
  - Arm Ergometer (N=12): No significant difference
  - Active Passive Trainer (N=9): **Wilcoxon test approached significance p=.066**
- Heart Rate
  - Resting (N=31): Increased slightly, t-test not significant
  - Recovery (N=21): Decreased slightly, t-test not significant
- Rate of Perceived Exertion (N=18)
  - Decreased slightly, t-test not significant

Secondary Conditions (CORE): Percent of Participants



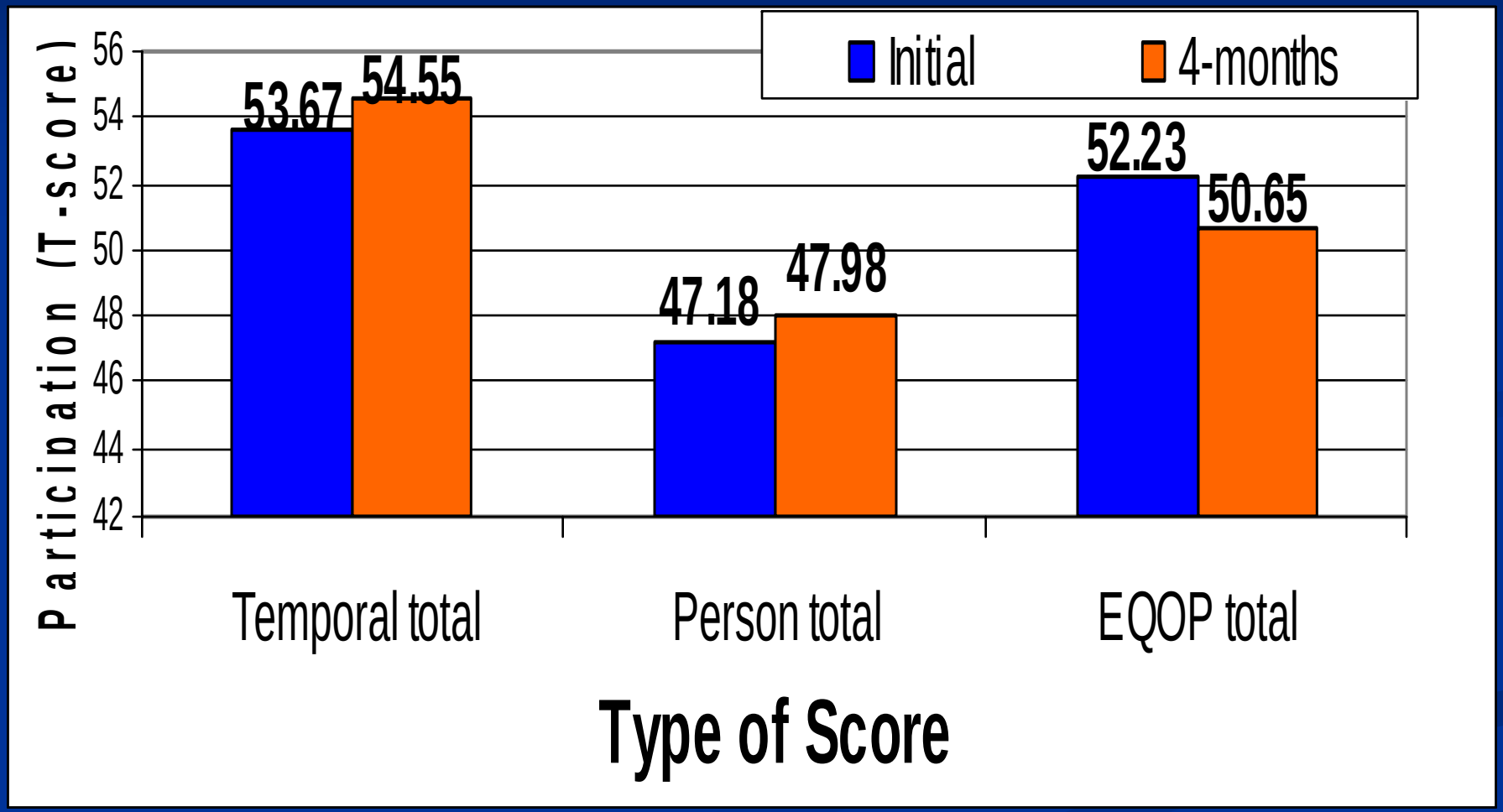
* = significant at .05 ^ = approaches significance

Secondary Conditions (CORE): Average Number Per Participant



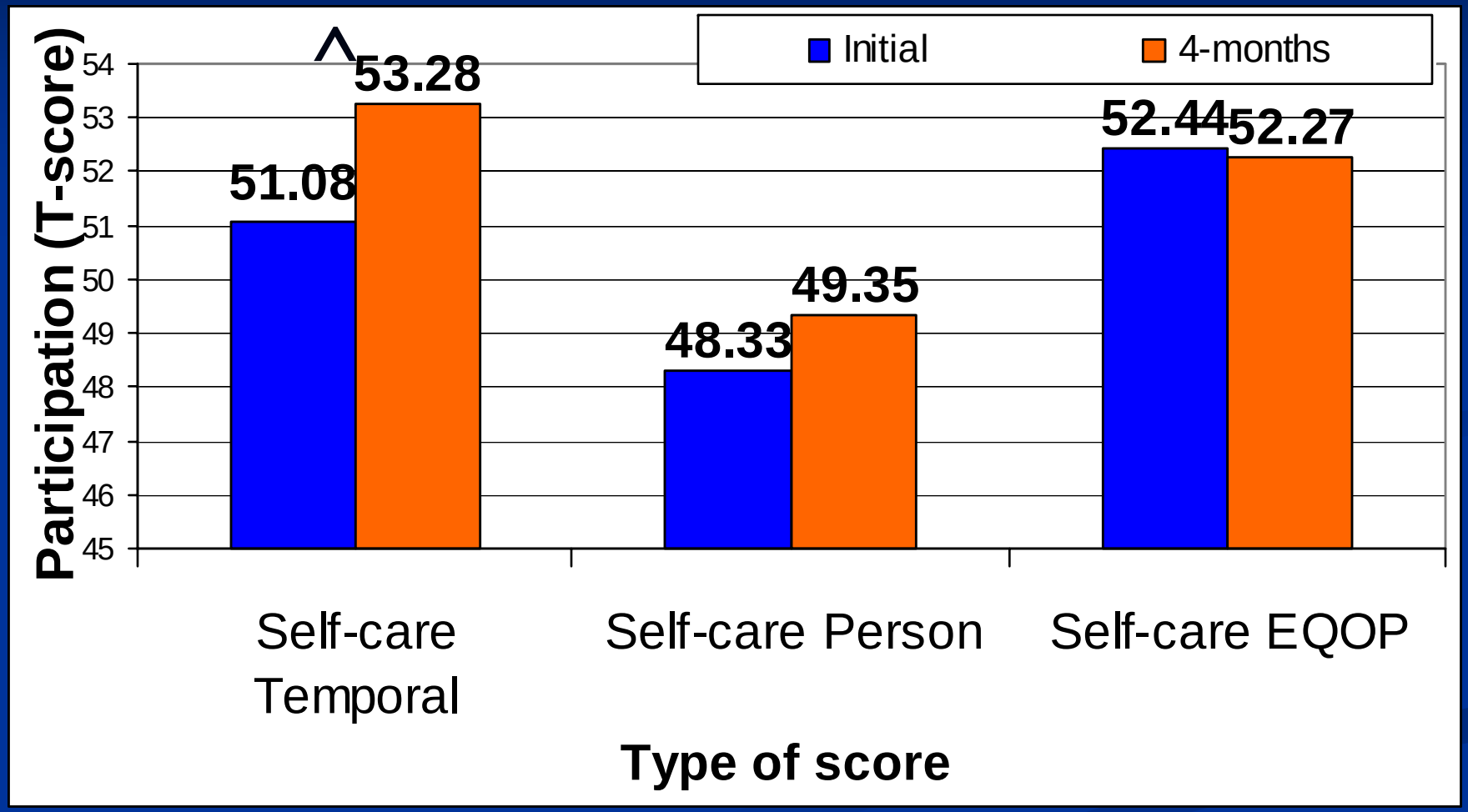
*p ≤ .01

Participation (PARTS/M): Total Scores Temporal, Person, and EQOP



No significant difference

Participation (PARTS/M): Self-Care Scores



^ = approaches significance

Beyond numbers. . .

- Focus groups
  - Participants' experience of secondary conditions, experience in the exercise program, and participation in home/community activities

Focus Group

- Eligible participants: completed 12 weeks of exercise and second round of surveys
- 2 groups conducted
  - Group 1: 9 participants (5 male, 5 manual wheelchair, 4 cane/crutch/walker)
  - Group 2: 8 participants (4 male, 3 manual wheelchair, 4 power wheelchair, 1 cane/crutch walker)

Secondary Conditions

". . .After the exercise program they are gone, so I can't say that I have them. I mean seriously I used to take anti-depressants. . . I had a pressure sore and now it's gone, my UTI [urinary tract infection] is gone too."

Secondary Conditions (cont)

"I was scared to come out of the house. I used to carry pills, and I was scared to exercise. I lost 40 pounds and discontinued my diabetic medicine."

Participation

"I feel stronger and I can do hills and I can do transfers better because I'm stronger in my arms."

"I do the same amount of things, just get there a little quicker, maybe. It helps as far as day to day stuff, helps me with other things."

Focus Group: Participants' General Perceptions After Exercise Program

- Improvement in strength
- Decrease in some secondary conditions
- Increase in satisfaction with participation
- Improvement in psychological functioning
- Opportunity for social interaction

Discussion

- Increased strength—Positive impact on daily activities
- No overall change in cardiorespiratory endurance
  - Speed approached significance—increased efficiency in activities
  - No change in heart rate—similar to previous studies

Discussion (cont)

- Decreased secondary conditions–Possible decreased healthcare costs
- Limited change in participation
  - Potential confounders
  - Positive findings from focus groups
- Overall, community-based exercise = promising intervention to improve functioning and health in individuals with mobility impairments

Limitations

- Sampling bias and small sample size
- Discontinuity across exercise equipment and malfunctioning of equipment
- Lack of high-tech/automated fitness measures
- 4-month time period

Future Directions

- Continue study—larger number of participants and longer time period to measure effects
- Additional qualitative measure of participation
- Incorporate activities to increase self-efficacy and self-management
  - Goal: to **enable** participation

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