

# Preventing Falls in the Elderly

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# Falling in General

## Reasons

- Fear of Falling (Desrosiers et. al., 2009)
- Balance or Motor Control
- Weather
- Inattention
- Medical Condition
- Obstacles
- Surface
- Muscle Weakness
- Vision (Salmoni et. al., 2006)

## Statistics

- Unhealthier elderly falls associated with dizziness, disease or disability.
- Healthier elderly falls associated with environmental factors such as stairs or obstacles.
- 30% of 65 year-old women will fall
- 13% of 65-69 yr-old men will fall and 31% of 80-84 yr-old will fall (Warshaw et. al., 2006)

# Exercise Guidelines

- Recommendations to prevent/reduce falls:
  - Include strength, balance, co-ordination and reaction time exercises at least twice per week at moderate intensity.
  - Include at least 5 minutes of walking everyday.
  - To reduce fractures, seniors should add weight resistance exercises (Skelton & Beyer, 2003).

# Exercise and Fall Prevention

- Exercise programs have been found to reduce falls in the elderly.
  - In a study published in 2009, only 8 weeks of exercise training 3 times/week (including calisthenics, muscle power, body balance, and walking training ) decreased the incidence of falls in the elderly population by 12% (Iwamoto, et al., 2009).
  - In only 5 weeks, a study utilizing the Nijmegen Falls Prevention Program was able to reduce the incidence of falls in the elderly by 46%. The class met twice a week and the program focused on balance and coordination movements as well as walking lessons and obstacle avoidance (Weerdesteyn, et al., 2006).

# Purpose

- The purpose of this project was to determine whether 45 minutes of chair aerobics twice a week could improve fall risk assessment scores in the elderly.

# Participants

- Men and women aged 60 to 86.
- Attendance varied greatly from week to week.
- Data was initially collected on 8 people, but only 5 were present for the final evaluation.
- All of the participants were somewhat mobile, although their ability levels varied. Some were quite active while others needed assistance either because of poor mobility or poor vision.



# Exercise Intervention

- Class Frequency:
  - 2 days/week, 45 minutes/day
- Exercise Type:
  - Chair Aerobics- movements performed sitting or standing
- Equipment:
  - Chairs, balloons, basketballs
- Examples of exercises:
  - Squats, arm raises, side bends, military press, and walking heel to toe
- Weekly Activity:
  - Each week we incorporated an activity that often times focused on hand-eye coordination.

# Data Collection and Analysis

- Data was collected using the Functional Fitness Assessment Worksheet (Rikli & Jones, 2001).
  - The assessment measured:
    - Flexibility
    - Balance
    - Agility
    - Muscular strength and power
- Seniors unable to follow test protocol completed a modified version.
- The final assessment was completed using the same modifications present on the initial assessment.

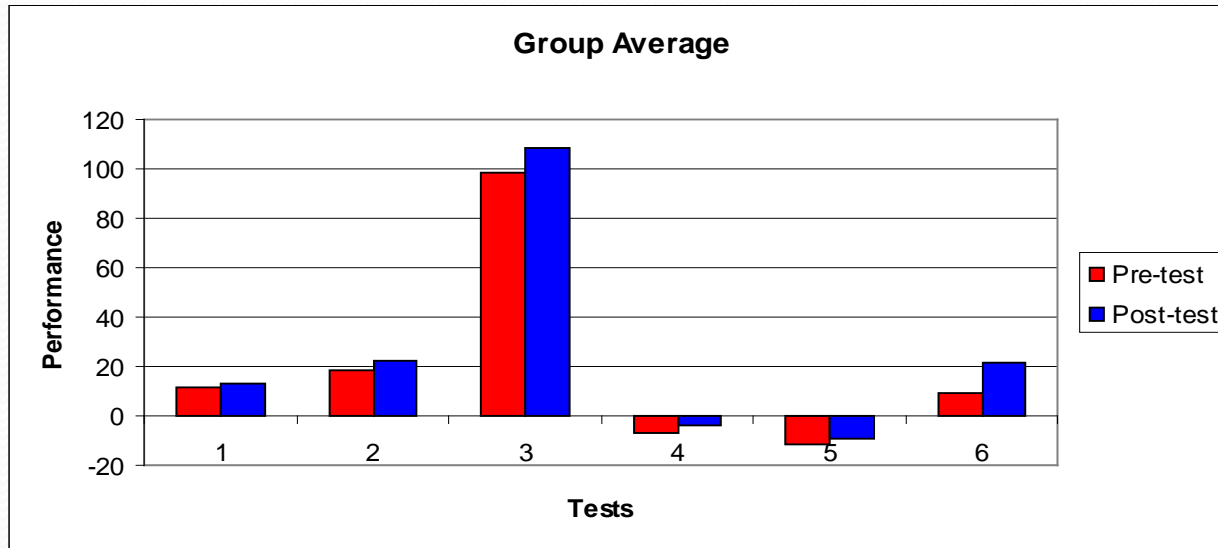
## **ANALYSIS**

- Results were analyzed using Microsoft Excel
- Each senior's final assessment was compared to the initial in every category to determine percent change, which was then averaged to determine each person's overall percent change.
- Each person's percent change was then averaged to calculate the overall change of the 5 seniors in our study.

# Group Results

- Overall we found an increase in performance in all of the tests except for one (Eight Foot Up-and-Go test).
- The test we found the greatest increase was the chair sit-and-reach test (43% increase).
- We found a decrease in the eight foot up-and-go test (136 % decrease with Brittany's score and a 10% decrease with out Brittany's score).

# Group Results



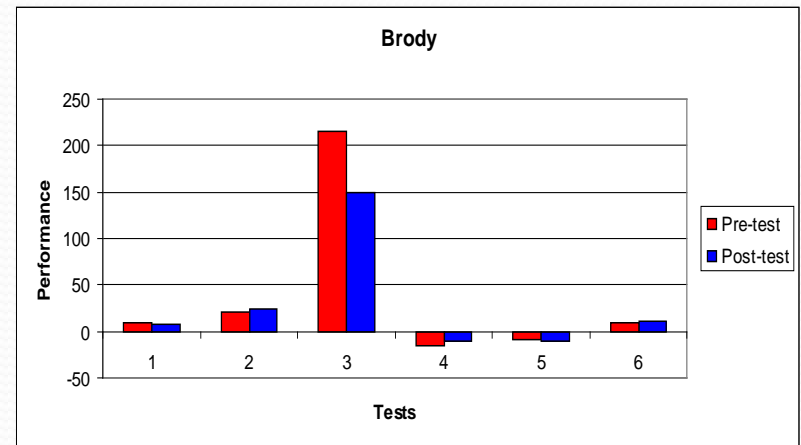
#	Test	
1	Chair Stand Test	# in 30 seconds
2	Arm Curl Test	# in 30 seconds
3	Two Minute Step Test	# of steps
4	Chair Sit-and-Reach Test	Nearest ½ inch
5	Back Stretch Test	Nearest ½ inch
6	Eight Foot Up-and-Go Test	Nearest 1/10 second

# Group Results

<b>Group Average</b>	
<b>Test</b>	<b>Performance</b>
Chair Stand Test	12% Increase
Arm Curl Test	20% Increase
Two Minute Step Test	10% Increase
Chair Sit-and-Reach Test	43% Increase
Back Stretch Test	20% Increase
Eight Foot Up-and-Go with Brittany	136% Decrease
Eight Foot Up-and-Go without Brittany	10% Decrease

# Brody's Results

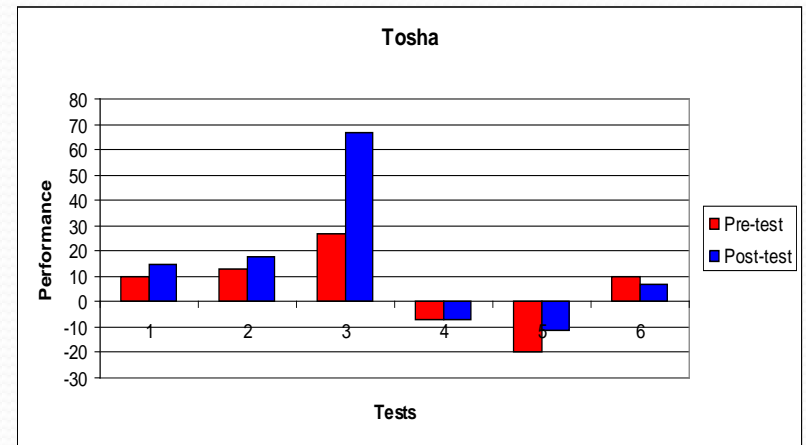
- Brody had a decrease in 4 of the 6 test. (Due in part to a recent knee injury.)
- But he did increase in the arm curl and the chair sit-and-reach tests.



	Brody	
#	Test	Performance
1	Chair Stand Test	20% Decrease
2	Arm Curl Test	14% Increase
3	Two-Minute Step Test	31% Decrease
4	Chair Sit-and Reach	38% Increase
5	Back Stretch Test	11% Decrease
6	Eight Foot Up-and-Go Test	31% Decrease

# Tosha's Results

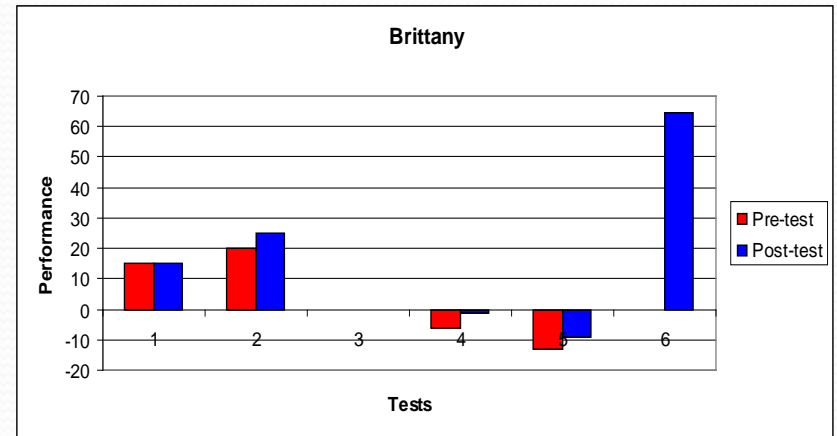
- We found that Tosha increased the most out of anybody.
- She increased by at least 30% in 5 tests and stayed the same in the chair sit-and-reach test.



Tosha		
#	Test	Performance
1	Chair Stand Test	50% Increase
2	Arm Curl Test	38% Increase
3	Two-Minute Step Test	148% Increase
4	Chair Sit-and Reach	0% Increase
5	Back Stretch Test	45% Increase
6	Eight Foot Up-and-Go Test	32% Increase

# Brittany's Results

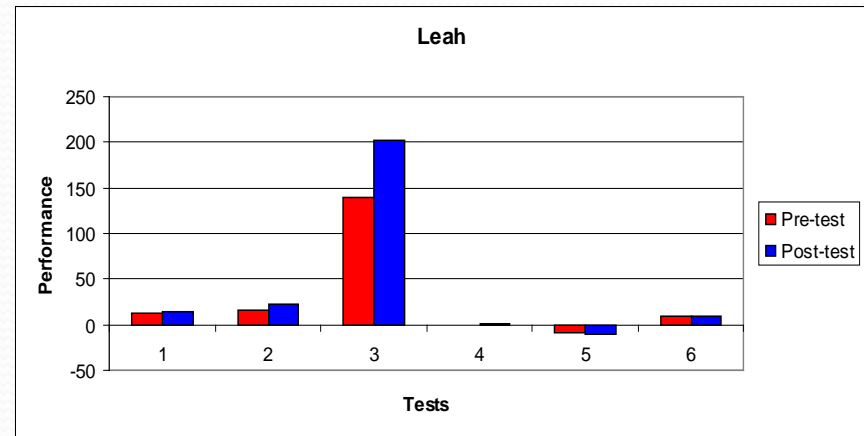
- Brittany increased in 4 tests.
- The eight foot up-and-go test had a really high increase due to her not being able to complete it the first time.
- Brittany did stay the same in the chair stand test and the two minute step test (which she actually didn't do either time.)
- Brittany has Parkinson's disease and we don't know if her huge increase was due to the effects of the disease or the exercise class.



Brittany		
#	Test	Performance
1	Chair Stand Test	0% Increase
2	Arm Curl Test	25% Increase
3	Two-Minute Step Test	0% Increase
4	Chair Sit-and Reach	16% Increase
5	Back Stretch Test	29% Increase
6	Eight Foot Up-and-Go Test	65% Increase

# Leah's Results

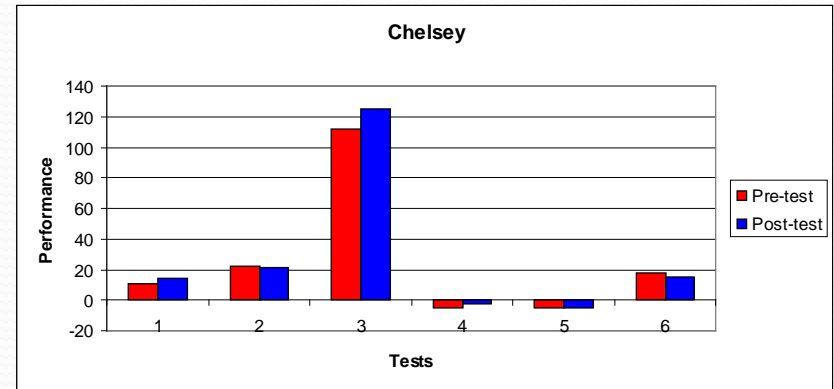
- Leah increased in 3 of the tests and stayed the same in the chair sit-and-reach test.
- Leah decreased in the back stretch test and the eight foot up-and-go test.



Leah		
#	Test	Performance
1	Chair Stand Test	8% Increase
2	Arm Curl Test	42% Increase
3	Two-Minute Step Test	45% Increase
4	Chair Sit-and Reach	0% Increase
5	Back Stretch Test	11% Decrease
6	Eight Foot Up-and-Go Test	9% Decrease

# Chelsey's Results

- Chelsey increased in 4 of the tests and stayed the same in the back stretch test.
- She decreased in the arm curl test.



Chelsey		
#	Test	Performance
1	Chair Stand Test	27% Increase
2	Arm Curl Test	5% Decrease
3	Two-Minute Step Test	12% Increase
4	Chair Sit-and Reach	40% Increase
5	Back Stretch Test	0% Increase
6	Eight Foot Up-and-Go Test	18% Increase

# Discussion

- We think we would have found less of a decrease in the eight foot up-and-go test, but Brittany's results affected the rest of them, throwing the percentage off.
- If Brittany's score wasn't included, there would have only been a 10% decrease.
- We are not sure why such a decrease took place in the eight foot up-and-go test.
- We also think that Brody's scores would have been a lot better if not for his recent knee injury.

# Discussion

- Forty-five minutes of chair aerobics twice a week increased individual scores on the Functional Fitness Assessment Worksheet.
- We think that the functional fitness assessment was increased due to an increase in seniors' flexibility, muscle strength and balance.
- This improvement will hopefully decrease their chances of falling.
- Our results agree with previous research in showing that physical activity can help decrease the chances of the elderly falling (Iwamoto, et al., 2006; Weerdesteyn, et al., 2009).

# Limitations

- Low attendance
- Medications that caused drowsiness
- Injuries
- Parkinson's Disease
- Different ability levels
- Lack of equipment

# Implications and Future Directions

- Seniors who exercise for 45 minutes a day, 2 days a week can improve their functional abilities.
- Advice: Incorporate different exercises, including: balance, resistance, strength, and flexibility and find ways to encourage participation and keep seniors motivated.
- Next step: Increase the length of the study, the amount of subjects, the frequency of the exercises and make attendance mandatory. Doing so will give us a clearer understanding of the effects of exercise on fall prevention in the elderly.

# Diversity Aspect

- At first, we were hesitant to work with the elderly population because we were unsure of their capabilities and risk of injury.
- We doubted whether the seniors would take us seriously and started with the assumption that they would be critical and overbearing.
- Our site experience helped us learn how to better communicate with the elderly population and how to relate to their unique situations.
- We used this knowledge to help us effectively motivate the seniors based on their individual needs.
- We learned about their strengths and limitations and how to work through these problems to better implement an exercise program.

# References

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