

# Using Exercise and Other Physical Therapy Interventions to Optimize Functional Mobility

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The 2018 **Kennedy's Disease** Conference  
ASSOCIATION

# Disclaimer



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General exercises discussed and demonstrated in this presentation should not be taken as individual exercise advice. Exercise prescriptions will vary widely among individuals based on many health factors. We recommend consulting your medical professionals (i.e. physician, physical therapist, etc.) to evaluate your physical health, determine the most appropriate exercise prescription, and monitor the safety of your program.



# Physical Therapy and Kennedy's Disease

- I. Importance of Exercise and Physical Activity
- II. Exercise Research in Kennedy's Disease
- III. Considerations, Precautions, and Adaptive strategies
- IV. Foot and Ankle Considerations
- V. Exercise Recommendations for Varying Functional Levels
- VI. Question & Answer Session

# **Importance of Exercise and Physical Activity**

# Physical Activity vs Exercise

## Terminology

- **Physical activity:** any motion of the body that results from skeletal muscle contraction and energy expenditure
- **Exercise:** any physical activity used to develop or maintain fitness, or a skill.
- **Sedentary:** those using < 10% of their daily caloric expenditure in the performance of moderate or high-intensity activities



# 2018 Physical Activity Guidelines

- 10 year literature review abundantly demonstrates that physical activity is a best buy for public health.
- Detailed summary of both disease prevention and health promotion benefits.
- Major findings: Improves deep sleep and executive functioning, decreases depressive and anxiety symptoms, improves physical function and quality of life and decreases fall risk and fall related injuries and contributes to older adults ability to remain independent.
- Recommend 150-300 minutes of moderate activity/week
- Recommend combining Aerobic and Strength training

# Activity in Kennedy's Disease - Preliminary

- Average daily steps for men with KD = 3,655
- Compared with NHANES age 60-64 men = 4,455
- Average hours of activity over 10 days
  - Sedentary = 20 hrs
  - Light = 3 hrs
  - Moderate = 1 hr
  - Vigorous = 0 hrs

# Activity in Kennedy's Disease

- Subjects who walked more had better health related quality of life and TUG times.
- Older subjects expended less energy throughout the day.
- Independent of age, those with worse TUG and AMAT values spent less energy throughout the day.



# Why should we Exercise?



- Improve Physical Fitness
  - Aerobic
  - Balance
  - Body weight
  - Energy-Expenditure and Fatigability
  - Flexibility
  - Functional Activity
  - Strength
- Reduce risk of adverse health outcomes
- Optimize physical function
- Enhancing Quality of Life
- It Can be enjoyable

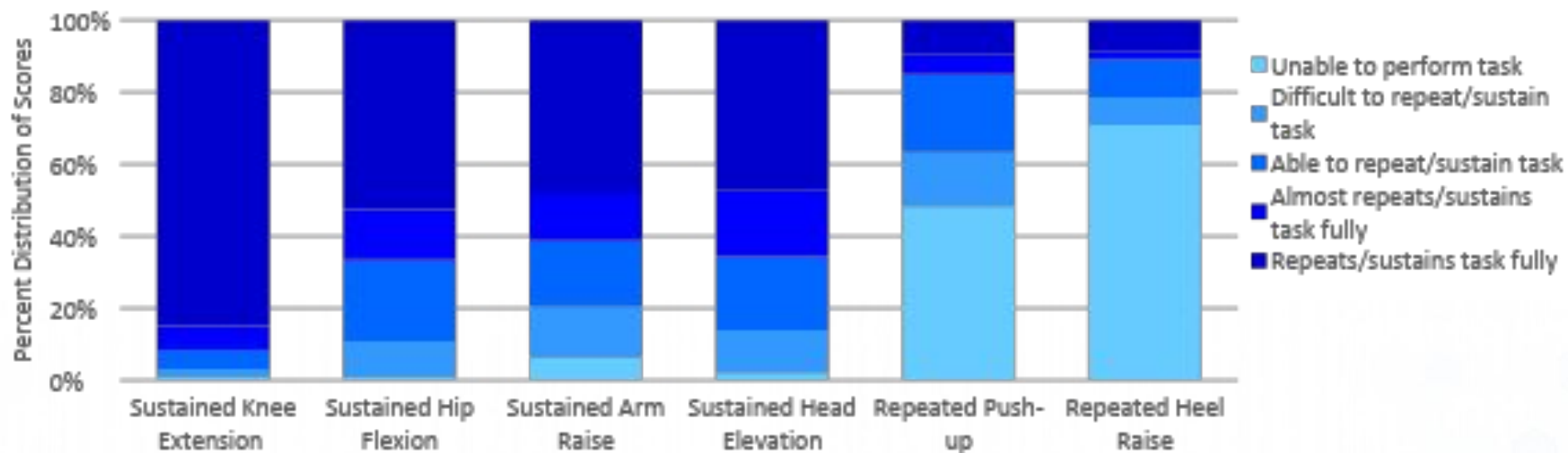
# **Exercise Research in Kennedy's Disease**

# Muscle Patterns in Kennedy's Disease

Muscle group	SBMA percent of healthy control (%)	Muscle Function
Upper extremity		
Lateral pinch	48%	Fine hand skills and grip
Elbow flexors	42%	Bringing object towards body
Elbow extensors	38%	Pushing and bracing falls
Shoulder abductors	32%	Overhead movements
Lower Extremity		
Hip flexors	70%	Lifting thigh
Hip abductors	57%	Side-to-side movements and balance
Hip extensors	48%	Upright mobility
Ankle dorsiflexors	45%	Lifting the foot during walk
Knee extensors	36%	Upright mobility

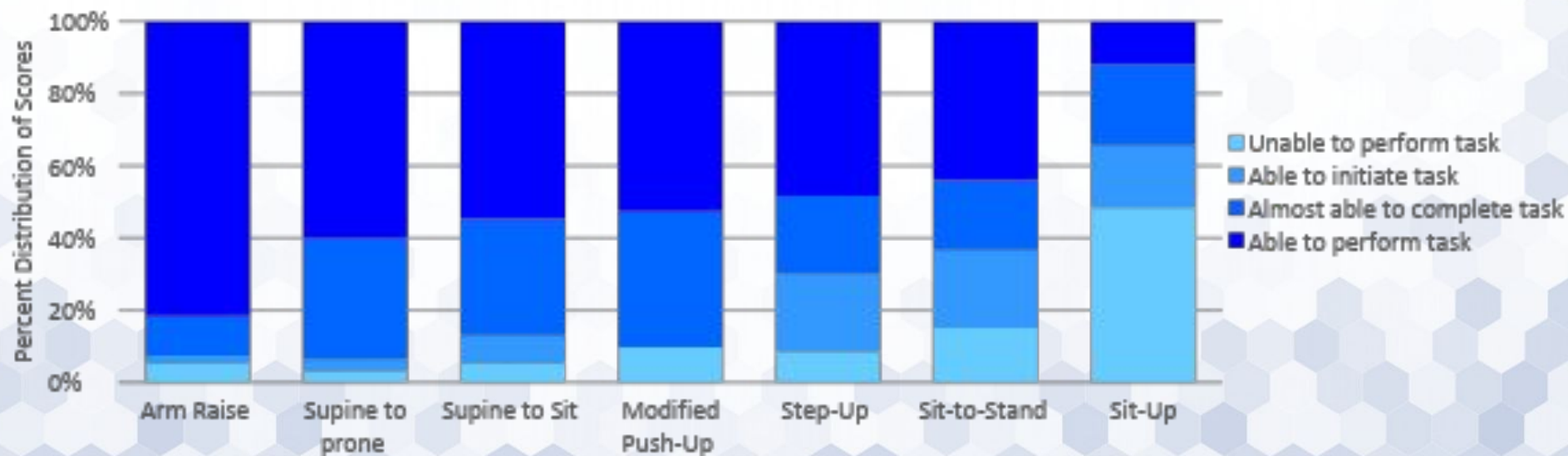
## Endurance Tasks

(Mean = 14.9/21 or 71%)



## Functional Tasks

(Mean = 14.42/24 or 71%)

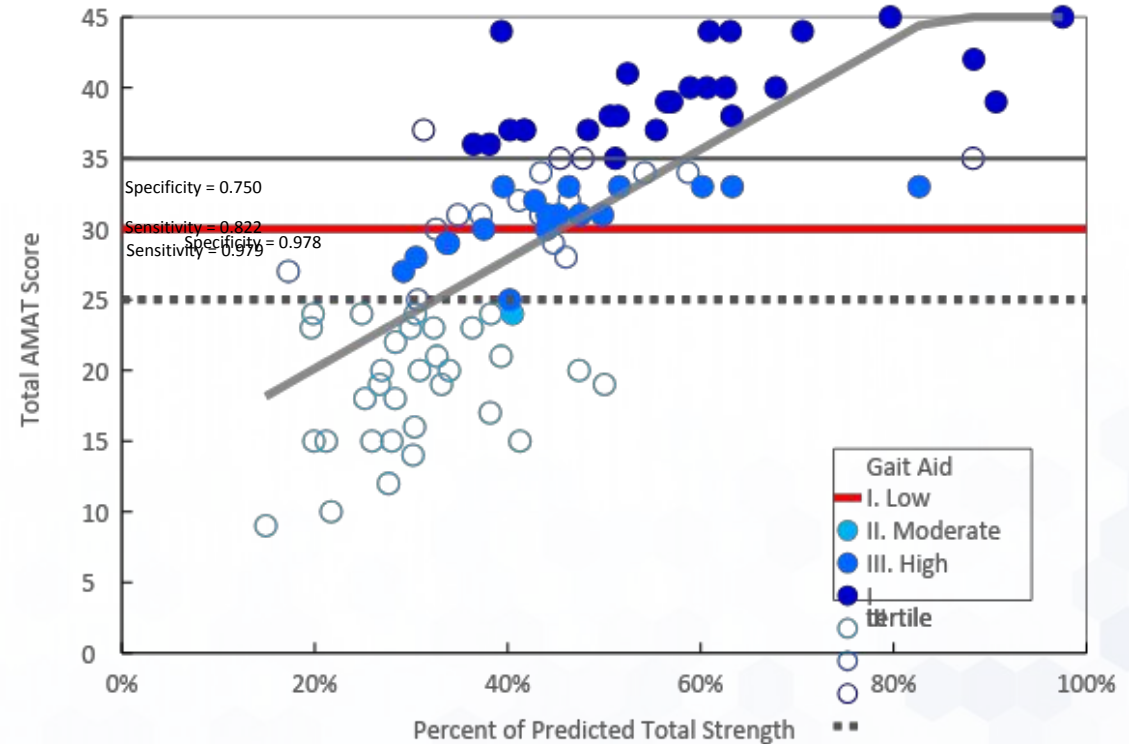




# AMAT and Functional Levels

## AMAT Functional levels

- I. 0 – 24
- II. 25 – 34
- III. 35 – 45



When AMAT < 30, we highly recommend the use of a gait aid ( cane, walker, etc.)



RESEARCH ARTICLE

## A randomized controlled trial of exercise in spinal and bulbar muscular atrophy

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- 12-week “moderate” intensity functional exercise
- This exercise appears to be safe: no complaints/falls
- Response to exercise was slightly greater in those with low initial functional level than those with high functional level

## Effect of aerobic training in patients with spinal and bulbar muscular atrophy (Kennedy disease)

N. Preisler, MD

G. Andersen, BSc

F. Thøgersen, BSc

C. Crone, MD, PhD

T.D. Jeppesen, MD

F. Wibrand, PhD

J. Vissing, MD, PhD

- 12-week moderate intensity cycling program
- No improvement of VO2 max
- Lack of recovery between sessions, worsening of ADL, CK increase
- Significant increase in maximal work capacity (18% increase)
- Significant increase citrate synthase (CS) activity – mitochondria building themselves up



# KD Case Report: Police Officer

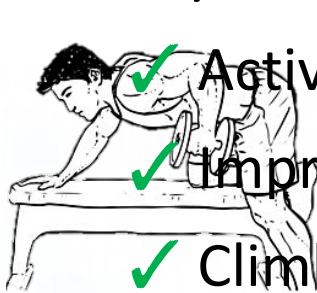
- 56-year-old male police officer diagnosed with Kennedy's disease
  - Diagnosed for 2 years with 41 CAG repeats
  - Changes in his strength and cannot lift weights like he used to
  - Difficulty with stairs, raking the yard, walking long distances, and other daily activities
  - Inability to run, jump or play sports with previous coordination and confidence
- 15-week combined moderate to high intensity exercise program
  - weight lifting (stacked weights)
  - balance training
  - bodyweight functional exercises



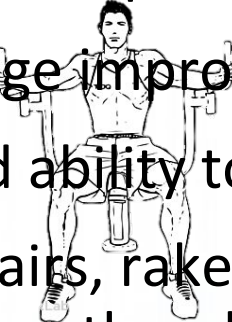
# KD Case Report: Police Officer

- 56-year-old male police officer diagnosed with Kennedy's disease

✓ Activity age improved from 61 to 53  
✓ Improved ability to lift weights  
✓ Climbs stairs, rakes the yard, plays basketball, walks long distances, and completes other daily activities with more ease  
✓ Able to move with coordination and confidence



Bent Over Row



Arm Flies



Plank



Lunges



Step Ups



Overhead Press



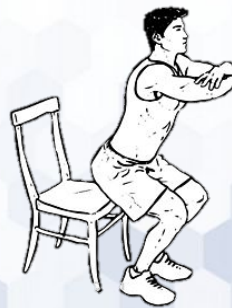
Chest Press



Lateral Pull Down



Knee Extensions



Squat



Single Leg Stand



# **Considerations, Precautions, and Adaptive strategies**

# Considerations before beginning exercise

- Have a health professional (i.e. physician or physical therapist) evaluate your physical health and functional ability
- Make a list of barriers to your selected exercise and discuss with your health professionals
- Aerobic, strengthening, stretching, and functional exercises should be included as a part of an exercise program
- In addition to exercise, make sure that you are eating and sleeping well and managing stress levels
- Musculoskeletal examinations may reveal problems that are unrelated to Kennedy's disease and may be resolved through therapeutic interventions



# Exercise Challenges and Precautions

## Muscle Overload

- A standard approach when attempting to build muscle that needs to be avoided by those with muscle disorders

## Muscle Overuse

- Repeating and sustaining muscle actions excessively

## Muscle Tears & Trauma

- Causing injury to a muscle

# Exercise Recovery

Tolerable	Warning signs
Minimal, dull, tight, or achy feeling at rest, not during exercise	Ache or sharp pain at rest or during exercise
Soreness in the muscles used	Muscle and joint pain
Soreness for 2-3 days	Continual soreness
Soreness occurs 24-72 hours after exercise	Soreness during exercise or within 24 hours
Soreness improves with movement and stretching	Pain doesn't improve with movement; requires ice/rest

# Recovery is as important as the Exercise

- Refueling: Hydration and Nutrition
- RICE
  - Rest, Ice, Compression, Elevation
- Listen to your Body
  - Recognize increased fatigue, pain, or time needed for recovery
- Cross Training
- Allow your muscles to repair through Sleep
- Reduce Stress with Breathing exercises
- Plan Ahead: Schedule time for exercise and recovery



# Exercise Considerations

- NEVER Think “~~No Pain No Gain~~”
  - Muscle overuse may cause irreparable muscle damage
  - Do not exercise through pain or strain
- Quality over Quantity
  - Train at a submaximal intensity to avoid muscle overload
  - Proper Posture, Form, and Technique. Activate the core!
  - Focus on movement control over speed
- Do not focus only on weakest muscles. Exercise and condition all muscles. Think groups of muscles rather than individual muscles



# Adaptive Strategies

Aquatic  
Therapy



Rollator



4-point  
Cane



Ankle-foot  
Orthosis

Knee  
Brace



Nu-Step

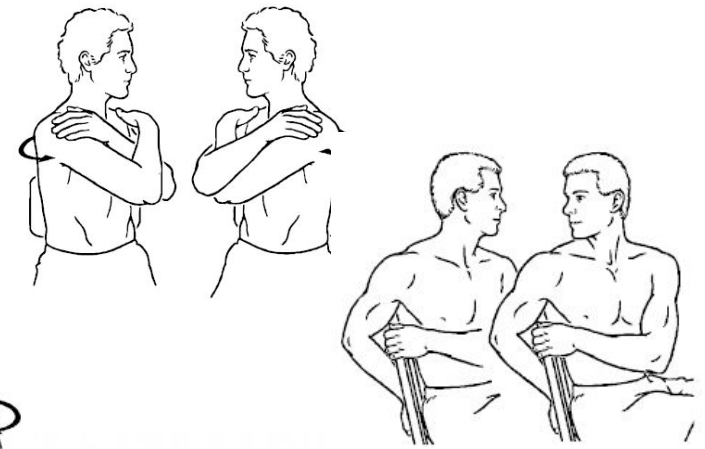
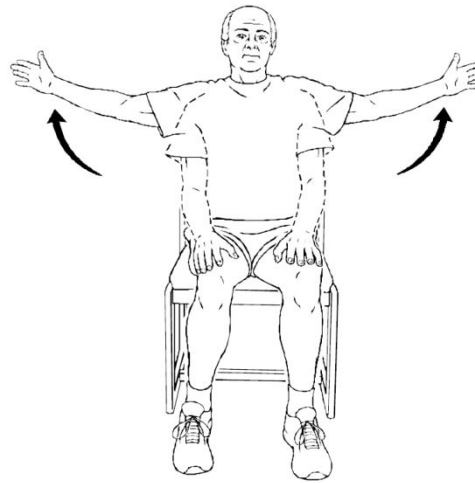
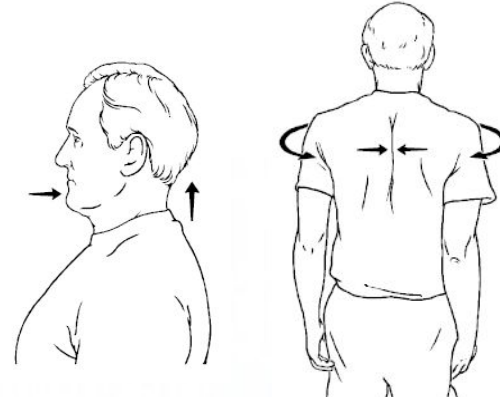


Recumbent Bike



# A Word about Postural Training

- Performance improves as posture does
- “Core” muscles of back, stomach, and hips used
- Low intensity exercise that can be performed anywhere
- Improves respiration and breathing
- Spinal joints receive added stability, reduced pain and stiffness



# Balance Training

## Static Balance on One Foot



One Hand

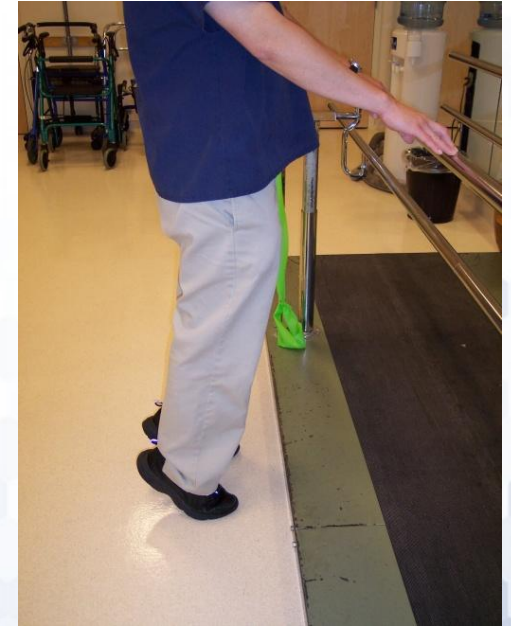


No Hands

## Dynamic Balance



Tandem Stance



Tip toes

# Foot and Ankle Care



# Ankle Strength and Tightness

Helpful Demonstrations:

- Stretch your Achilles tendon
- Test your ankle dorsiflexion strength
- Test your ankle eversion strength
- Test your ankle eversion joint range of motion
- Can you perform a double limb heel raise?

Highly recommend AFO use if you have foot drop

- Foot drop is due to anterior tibialis weakness



# Qualities of Supportive Shoes

1. Shoe base should be v
2. Sole should be wider
3. As little upper-shoe n
4. The heel counter sho
5. The shoe should NO
6. The shoe should NO
7. Shoe should bend v
8. Shoe should have r



Avoid





# **Recommendations for varying Functional levels**

# Muscle patterns in Kennedy's Disease

## Muscles affected early

- Shoulder abductors
- Elbow extensors
- Knee extensors
- Hip abductors

## Muscles to preserve

- Hip extensors (G maximus)
- Hip abductors (G medius)

# Finding your training zone

- Intensity
  - Exercises should be adjustable to be more easy or difficult based on performance and results
  - Use 10 RM for strength and functional training (1RM dangerous)
  - Use talk test or RPE for aerobic training
  - Exercise form is an important intensity feedback
- Frequency: 2-3 times per week
- Exercise should mirror the way we function
  - We function at a submaximal level that is repeatable and sustainable
  - We recommend avoiding sports that involve running, cutting, and high exertion (i.e. tennis, volley ball, etc.)

# Monitoring Exercise

- Jou
- Tra
- Ra

## *Rating of Perceived Exertion Borg RPE Scale*

6		
7	Very, very light	How you feel when lying in bed or sitting in a chair relaxed. Little or no effort.
8		
9	Very light	
10		
11	Fairly light	
12		Target range: How you should feel with exercise or activity.
13	Somewhat hard	
14		
15	Hard	
16		
17	Very hard	How you felt with the hardest work you have ever done.
18		
19	Very, very hard	
20	Maximum exertion	
		Don't work this hard!

setbacks

y monitors



Exercise Elements	Level I Powered mobility	Level II Gait aid or orthotic use	Level III No gait aid use
	Level I Powered mobility	Level II Gait aid or orthotic use	Level III No gait aid use
Mode of	hands, active range of motion, active range of motion, functional training on a or at bedside	nts) or isometric, functional training	Isotonic (free weights), functional
Assistance	once required for most exercise activities	gym, clinic, and door activity	
Frequency	/week, once or twice per day	, once per day	
Sets	sets per muscle group	muscle group	
Reps	10 - 15	10 - 12	8 - 10





# Level III: Patients Who Don't Use a Gait Aid

## Isotonic Free Weights



## Core Strengthening



## Hip Strengthening



# Level II: Patients Who Use a Gait Aid

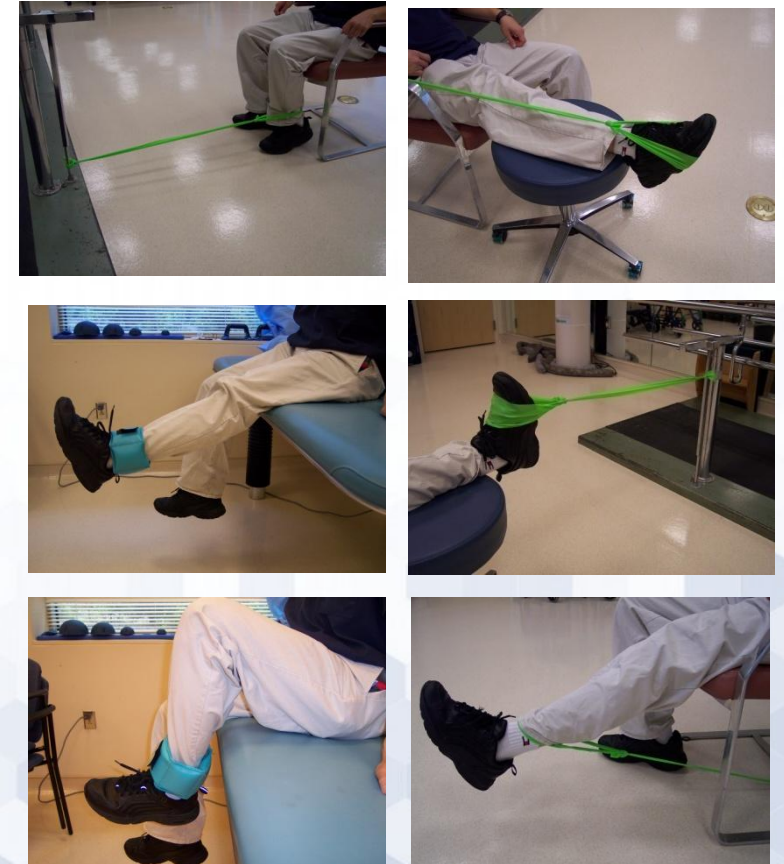
## Shoulder, Elbow & Wrist with Bands



## Stretching



## Leg Resistance Training





# Level I: Patients Who Use Powered Mobility

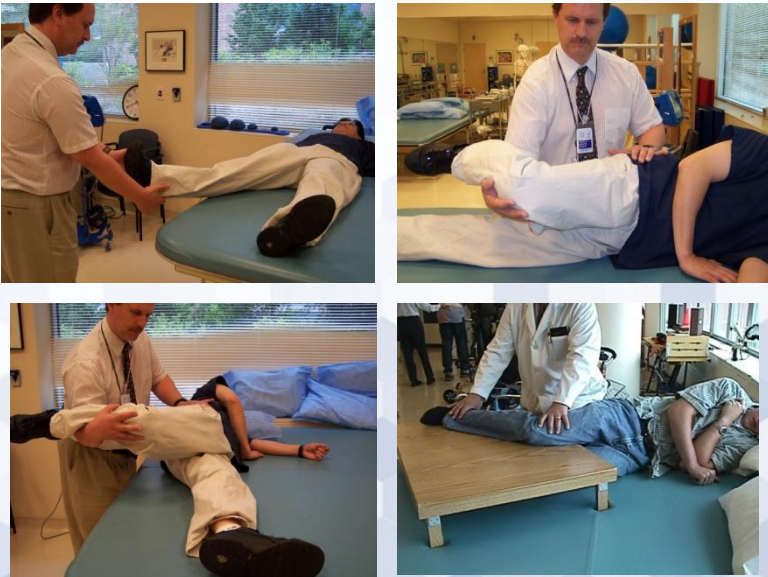
Isometric, Active Range of Motion



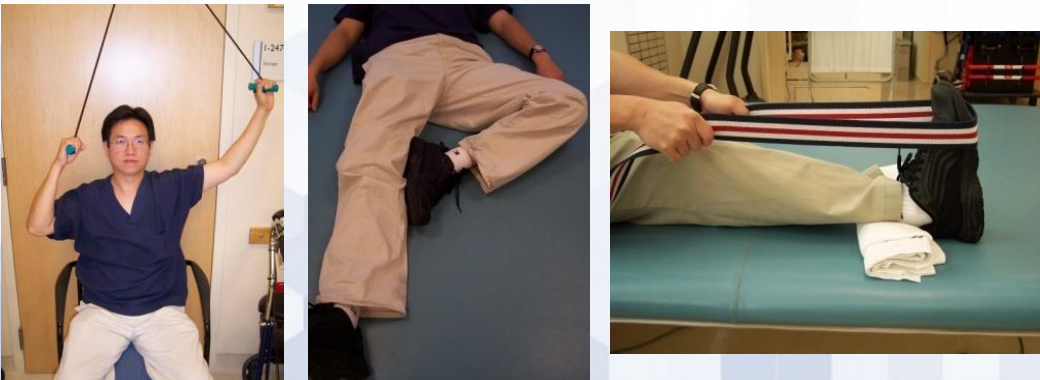
Reaching with Table Assist



Active Assistive to Resistive



Flexibility





# Turn A Towel Into A Home Gym



# Flexibility: Range of Motion is Critical

- Muscle Tightness negatively affects range of motion and function
- Prolonged sitting can result in tight hip flexors, which affect walking posture and hip extensor strengthening





# Examples Of Function Specific Training Exercises



Sit to Stand



Stairs



Rolling



Supine to Sit

# Summary

1. Avoid inactivity
2. Have a health professional evaluate your physical health before beginning an exercise program
3. Monitor all that you can and communicate with care provider and health professionals about responses to exercise
4. Exercise intensity can be adjusted up/down to fit every functional level and also when gains or setbacks occur
5. Do not work until exhaustion and do not exercise through pain
6. Exercise safely in an appropriate environment with stable supports
7. Posture and form is key to any activity, especially exercise

# Acknowledgements



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# Questions & Answer



***Thank You for your attendance***



# Strength and Function: Reserve Capacity

