

# Post-Polio Syndrome and Exercise



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**Programs**  
**St. Jude Centers for**  
**Rehabilitation and Wellness**



# The Therapy Gyms





# The Wellness Center



# CARF certified since 1976

- Commission for Accreditation of Rehab Facilities
- 50,000 programs at 22,000 locations.
- It is an international accreditation company
- Their purpose is that through a consultative survey every 1 to 3 years, program strengths and weaknesses are identified and improvement ideas are discussed.
- This results in ongoing improvement in the programs surveyed for the persons served. We are SCI certified as well as OP Medical and Brain Injury.

# Programs/Services Offered at St Jude CRW

- Outpatient Neuro Rehab
- Outpatient Ortho/Sports
- Wheelchair/Seating Clinic
- Pelvic Floor Rehab
- Cognitive Recovery Center
- Chronic Pain Program
- Cancer Rehab
- Hand Therapy
- Driver Assessment Program
- Aquatics Therapy

# Programs Offered Through Synergy/ Wellness

- Massage
- Gentle Yoga
- Acupuncture
- Silver Sneakers
- Balance Classes
- Supervised Circuit Training
- Club Ped
- T'ai Chi
- “Let’s Be Big” Parkinsons Class

# Effects of Inactivity

- 1.Deterioration of cardiovascular performance/efficiency
- 2.Metabolic disturbances
- 3.Difficulty maintaining body weight
- 4.Disturbed sympathetic nervous system activity
- 5.Decreased muscle strength and endurance
- 6.Possible emotional disturbances

# Benefits of Exercise

1. Decreased heart rate and blood pressure
2. Change in skeletal and cardiac muscles with improved work capacity and efficiency
3. Increased myocardial vascularity
4. Decreased blood coagulability
5. Decrease in fat with increased lean body mass
6. Increase cellular sensitivity to insulin
7. Decreased muscle tension
8. Improved sleep
9. Increased muscle endurance
10. Favorable changes in blood lipids and cholesterol
11. Increased motivation for improving other health habits



# Exercise Program Guidelines

- ✓ Unique to each individual's needs
- ✓ Able to discern between exertional vs. disease-related fatigue
- ✓ Should not cause muscle soreness or pain
- ✓ Should not lead to fatigue that interferes with daily routine
- ✓ Strengthening ex only with muscles at 3 to 3+/5 strength
- ✓ Progression of ex is slow
- ✓ Determine overuse vs disuse deconditioning
- ✓ Pacing should be incorporated into program
- ✓ Exercise plan should include rotation of exercise types (stretching, aerobic, strengthening)
- ✓ Should be done regularly
- ✓ Should be a set program with a time limit & specific exercises

# Exercise Program Guidelines (con't)

- ✓ Exercises should be alternated regularly
- ✓ Exercises terminated immediately when experience fatigue (typically described as “twitching” sensation)
- ✓ Rest breaks should be interspersed in exercise program

# Types of Exercise

- Aerobic
- Strengthening
- Stretching
- Aquatic

# Aerobic Exercise

**Definition:** Exercises that stimulate the heart rate and breathing rate to increase for a sustained period of time.

## Modes of Aerobic Exercise:

- Walking over ground/Treadmill/Ellyptical/StairStepper
- Upper Body Ergometer
- Stationary Bike
- Swimming/Aqua Jogger

**Prescription:** 3 times/week for 20-30 minutes at light to moderate intensity (Borg scale of 12-14); consider 1 minute rest for every 2-5 minutes of ex to avoid fatigue initially.

**Precautions:** Resting heart rate needs to be below 100 bpm; Should not cause muscle fatigue (15-30 minute recovery), general fatigue, or muscle pain. Persons with overwhelming fatigue pursue with caution.

# Borg Scale - Rate of Perceived Exertion

- 6. Very Easy
- 7. Minimal recognition of effort
- 8. Very light (comfortable walking pace)
- 9. Can just start to hear your breathing
- 10. Conversation easy
- 11. Zero Exertion
- 12. Light exertion – This is where you are developing your aerobic system
- 13. Somewhat hard
- 14. You can hear your breathing but you're not struggling
- 15. You can talk but not in full sentences – At top end of developing aerobic system
- 16. Hard work – Just below anaerobic threshold
- 17. Very hard, Getting uncomfortable and tired
- 18. Breathing is heavy and you can no longer talk
- 19. Extremely hard, Body screaming at you to stop
- 20. Max exertion



# 20% Rule

“Non-fatiguing conditioning program that is especially effective if fatigue due to deconditioning is the primary issue.”

1. **Establish maximum exercise capability** (i.e. able to pedal arm ergometer for 20 minutes then begin to feel fatigue)
2. **Begin program at 20% of max capability for 1<sup>st</sup> month** (i.e. 4 minutes of arm ergometer pedaling each session at Borg scale of 12-14)
3. **Increase 10% each consecutive month** (i.e. 6 minutes pedaling in the next month at Borg scale of 12-14)

# Aerobic Ex Training in PPS: Process Evaluation of a Randomized Controlled Trial (2016: Voorn, Eric)

**Methods:** 44 severely fatigued individuals with PPS exercised 3 times/weekly for 4 months on stationary bike at 60-70% of heart rate reserve.

**Results:** None of the participants were able to train within the target heart rate range for > 75% of the designated time. They could not adhere to a high intensity aerobic program. They did train at their anaerobic threshold most of the time with Borg perceived exertion score of 12 or greater. Neither muscle function nor cardiorespiratory fitness improved.

**Conclusions:** Exercise primarily focusing on LE's is difficult and a more individualized approach using large muscle groups would be more beneficial. Training intensity prescriptions based on the anaerobic threshold and ratings of perceived exertion (Borg) rather than a fixed % heart rate reserve offers a more individualized target for aerobic training in PPS.

# Strengthening Exercise

- Research overwhelming supports that muscle needs to be at least 3/5 and “functionally important” to consider for strengthening.

## Low-Level Strengthening Program

- Criteria: Able to complete 3-4 reps movement with muscle with no pattern of substitution
- Start at 0-3# of resistance with free weight or exercise band
- Hold contraction for 2-5 sec followed by 2-5 sec rest
- Start at 2-5 reps performed 2-3 times per week (work up to 10 reps if no symptoms then increase resistance and lower reps back down)
- Focus on sustained exhalation to eliminate Val Salva and activate abdominals to stabilize trunk/pelvis in exercise
- Set scapular stabilizer muscles prior to upper body exercises

Other Considerations: Isometrics for muscles 2-3/5 for circulation and joint stability; Core strengthening for spinal stabilization; Pilates Reformer

# Stretching Exercises

- ❖ Improves muscle length and joint range of motion for daily activities
- ❖ Helps in managing pain, reducing risk of osteoporosis, and reducing risk of falls
- ❖ Important to do when muscle weakness present to prevent contractures

## Key Areas of Focus:

- Chest Wall/Pects & Abdominals – optimize breathing
- Hip Flexors/Knee Flexors/Ankle Plantarflexors – optimize ability to walk & balance
- Cervical Motion – optimize ability to drive and for balance
- Thoracic Extension/Rotation & Shoulder Elevation/Abduction – optimize shoulder movement for self cares

“Gentle Yoga” (Hatha Yoga) – improves breathing, flexibility, balance, decreases stress, & increases body awareness

# Aquatic Exercise

- ❖ Recommended in warm pool (88-90 degrees)
- ❖ Can use for strengthening, flexibility, and aerobic ex
- ❖ Water buoyancy can be supportive or it can create resistance
- ❖ Caution to avoid overuse and fatigue

## Benefits:

- Decrease pain
- Increase circulation
- Decrease negative effects of gravity
- Improve muscle relaxation
- Improve endurance
- Reduce edema
- Improve well being



# Summary of Other Research Findings with Exercise in PPS

- ❑ Common Denominator – “Keep activity & exercise with reasonable limits to avoid fatigue or pain”
- ❑ Borg scale consistent with EMG recorded level of fatigue
- ❑ Perceived decrease in sensation of fatigue correlated with better post-exercise recovery
- ❑ Submaximal exercises with rest periods superior to exercises up to sensation of exhaustion
- ❑ Anaerobic threshold and BORG better targets for aerobic training rather than heart rate reserve
- ❑ Strengthening program for thumb – EMG showed improvement in central motor command (training effect) but no hypertrophy of muscle fibers noted

# Special Consideration with Exercise

- Lifestyle changes priority before starting exercise program.
- Those less affected by muscle weakness generally experience more pain than those who are weaker due to a pattern of daily activity that was too strenuous.
- If experiencing fatigue, soreness, &/or pain, need to modify the exercise prescription.
- Traditional training programs are not appropriate nor are standard timelines for measureable outcomes.
- Be cautious if participating in group exercise. Maintain your pacing.
- Need aerobic exercise tolerance of 15-30 minutes to effect weight loss.
- If a muscle is 3/5 or better with no substitution BUT extremity has compensated for years for a significantly weaker contralateral extremity, it should not be stressed by further attempts at strengthening, especially true of the upper extremities.

“Be an Intelligent Hypochondriac!”

“Listen to your body and adopt a program that avoids the strain.”

Dr. Jacqueline Perry

# THANK YOU!

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