

AAPA/ AAOS Musculoskeletal Galaxy

- **Title: Orthopaedic Rehabilitation Techniques**
- **Travis Randolph, PA-C, ATC**



LEARNING OBJECTIVES

- Identify appropriate exercises for a patient's home exercise program
- Identify appropriate stretches to help restore a patient's range of motion
- Understand how to develop a post-operative rehabilitation protocol
- Identify rehab exercises that your patients should avoid during physical therapy



DISCLOSURES

- I am a paid speaker for Ferring Pharmaceutical's Euflexxa Injection Workshop for Physician Assistants.



Orthopaedic Rehabilitation Techniques



Principles of Rehabilitation

- Enhance the recovery of injured tissue while avoiding stresses that may prove detrimental to the healing process
- Promote an environment to facilitate healing
- Decrease Pain and Effusion
- Early PROM to avoid arthrofibrosis



Principles of Rehabilitation

- Gradual restoration of muscle strength and endurance
- Restore Neuromuscular Control
- Focus on the entire kinetic chain
- There are few things you can do to speed up recovery, but several things you can do to slow it down



Tissue Healing Process

- **Inflammatory Phase** (lasts up to 2-5 days)
 - Homeostasis
 - Vasoconstriction/ platelet aggregation/ thromboplastin makes clot
 - Inflammation (swelling, pain, heat and redness)
 - Vasodilation/ phagocytosis (engulfing of particles by the cell, i.e. macrophage)
 - Dilation of the blood vessels allows nutrients, white blood cells, antibodies, enzymes and other beneficial elements into the affected area to promote healing and reduce infection



Tissue Healing Process

- **Proliferative Phase** (lasts 2 days to 3 weeks)
 - Granulation
 - Fibroblasts lay bed of collagen
 - Fills defects and produces new capillaries
 - Fibroblasts continue to reorganize and aid in the development of new tissue and accelerate the healing process
 - Contraction
 - Wound edges pull together to reduce effect
 - Epithelialization



Tissue Healing Process

- **Remodeling/ Maturation Phase (3 weeks to 2 years)**
 - 3 New collagen forms which increases tensile strength (scar 80% as strong)
 - Cellular activity declines with time and the number of blood vessels in the affected area decrease and recede



Lower Extremity Rehabilitation

Range of Motion Exercises





Lower Extremity Rehabilitation

Strengthening Exercises





General LE Rehab Guidelines

Range of Motion

- Knee Extension: heel props/ prone hangs
- Knee Flexion: heel slides/ wall slides
- Stationary Bike: start with seat high and move down as ROM improves
- Ankle: ankle pumps/ drawing the alphabet

Strengthening Exercises

- Quads sets, 4-way Straight Leg Raises (SLR), Short-Arc Quads, Mini-squats, Lunges, Step-ups, Squats, Calf raises, 4-way Ankle
- Balance/ Proprioception:
 - Balance on one leg/ eyes closed/ steamboats



General LE Rehab Guidelines

Meniscus Repair vs Meniscectomy

- Meniscus Repair
 - Post-op knee brace locked in extension and TTWB for 6 weeks
 - ROM: 0 – 90 degrees only; unlock brace as ROM improves
 - D/C brace after patient can perform a SLR
 - Progress to full ROM at 6 weeks
- Meniscectomy
 - Crutches for 2-3 days; gradual progression to WBAT
 - Try to eliminate and avoid activities that may increase swelling



General LE Rehab Guidelines

ACL Rehab Principles

- Crutches and Knee Brace 4-6 weeks (may vary based on graft selection)
- Importance of SLR and achieving full extension early
- Understand graft selection– allograft tissue may require longer immobilization
- Any other repairs? (i.e meniscus, articular cartilage)
- Average 6 – 9-month rehabilitation process
- Isokinetic testing to determine RTP
- Avoid open kinetic chain leg extensions
- Proprioceptive exercise/ Core Stabilization/ Jump Training



General LE Rehab Guidelines

OCD Lesions: OATS vs MACI vs Allograft vs Microfracture

- Post-op knee brace with crutches (NWTB) for the first 6 week
- Immediately started on CPM device the day after surgery for early PROM and utilized up to 3 months; CPM is used for approximately 6-8 hours per day (MANDATORY)
 - Early PROM assists in cellular orientation and prevents adhesions from developing
- Return to sports in 6-9 months; high impact activity may be resumed in 12-18 months
- RTP Criteria: normal gait, full ROM/ strength while pain-free, no recurrent effusions



Upper Extremity Rehabilitation



Upper Extremity Rehabilitation

Range of Motion Exercises





Upper Extremity Rehabilitation

Strengthening Exercises





General UE Rehab Guidelines

Range of Motion

- Shoulder: pendulums, wall-walks, table slides, passive assist motion with a cane
- Internal Rotation stretch for Posterior Capsule: Sleeper stretch, cross-body, towel stretch
- Pectoralis/ Anterior: door or corner stretch

Strengthening Exercises

- RTC: resisted internal and external rotation
- Periscapular: rows, “W”, “T”
- Serratus Anterior: serratus punches/ push-up plus
- Deltoid: lateral raises and forward flexion
- Biceps/ Triceps/ Forearm



General UE Rehab Guidelines

Shoulder Rehab Principles for RTC and Labrum

- Shoulder ARC brace for 6 weeks with PROM; Begin AROM and strengthening exercises at 6 weeks
- Strong emphasis on proprioceptive exercises in patients with instability and avoid abducted/ external rotation
- Focus on rotator cuff and scapular stabilization exercises to help with positioning of humeral head
- May start push-up progression with a block around 4 ½ months for anterior labral repairs



Lumbosacral Rehabilitation





Lumbosacral Rehabilitation

- Posterior Pelvic Tilts
- Knee to chest stretching (glutes/ hamstrings)
- Mad Cats (lumbar/ thoracic vertebral segments)
- Donkey Kicks (glute max)
- Fire Hydrants (glute med)
- Glute Bridges
- Dead Bug
- Planks



Summary

- There are few things you can do to speed up recovery, but several things you can do to slow it down
- Begin early range of motion as soon as possible to avoid arthrofibrosis
- Be careful to avoid exercises/ movements that stress the injured/ repaired tissue
- Don't forget to include exercises for the entire kinetic chain
- Proper form and technique is just as important as the appropriate exercise



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