



CSEP – CEP

Upgrade Workshop

Presented by:

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Outline

- Defining a Post-Rehabilitation - Type Client
 - Complete Matching quiz on Musculoskeletal conditions
 - Stages of Healing of Soft Tissue Injury
 - General Protocol for Exercise Management of Musculoskeletal Conditions
 - Exercise applications for the following musculoskeletal conditions:
 - Impingement Syndrome
 - Patellofemoral Syndrome
 - Osteoarthritis
 - Activity – Transitional Assessment - Overhead Squat Test
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What is a Post-Rehabilitation-Type Client?

In my own professional experience I define the post-rehab - type client as the following:

1. An individual who has recently been discharged from physical therapy, chiropractic, or any other clinical environment that treats an ailment. (The true meaning)
 2. An individual who has previously had an injury and was discharged from a clinic but did not maintain exercises for a period of time. They are not experiencing symptoms but still have some minor residual dysfunction (incomplete ROM, etc).
 3. An individual who has been sedentary for a long period of time (greater than a 1 year) and exhibits dysfunctions in stability, strength, and ROM but no real symptoms (but could be on the way unless intervened)> **Pre-habilitation**
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Stages of Healing for Soft Tissue

- What is an injury?

It is an interruption in the continuity of a tissue.

- Mammals do not regenerate tissue they repair it with dense connective tissue (DCT) scarring.

- 3 Phases of Soft Tissue Healing:

1. Inflammatory Phase (0-6 days)

2. Repair phase (3-21 days)

3. Remodeling Phase (up to 1+ year)

*** Within a wound there is usually overlap of these processes both spatially and temporally. ***

Inflammatory Phase (0-6 days)

■ **Acute:**

- 3 mechanisms to stop blood loss: local vasoconstriction, platelet reaction, and coagulation cascade.
 - Vasoconstriction reduces blood loss.
 - Platelet reaction initiates clotting and releases growth factors that attract reparative cells to the site.
 - Coagulation cascade affects clot formation
 - Macrophages cleanse the site
 - **In short:** Blood loss prevention and cleansing by macrophages.
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Repair Phase (up to 2 months)

- Fibroblasts produce a supportive network of types 1 and 3 collagen.
 - Epithelial cells migrate from the periphery toward the center of the wound to enact re-epithelialization.
 - Decreased number of inflammatory cells.
 - Decreased collagen fiber organization (randomly laid down)
 - Tensile strength of the wound is only 25% of normal 3-4 weeks post-injury.
 - **In short:** Laying down of collagen in an unorganized fashion
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Remodeling Phase (2-4 months up to 1+ years – time course largely unknown)

- Fibroblast activity decreases and habitual loading produces increased organization of the extra cellular matrix.
- Types 1 and 3 collagen continue to proliferate, replacing immature collagen precursors and resulting in contracture of the wound.
- Scar tissue formation results in decreased size and flexibility of the involved tissues.
- Remodeling causes collagen fiber alignment along lines of habitual stress, with tensile strength increasing for up to 2 years post-injury.
- **In short:** Loading needed to organize the collagen

How does a CEP help during the healing process?

- **During the Inflammatory response:**

Treatment should be focused on decreasing pain, edema and preventing progressive chronic inflammation (ice and compression)

Maintain the mobility and strength of adjacent joints and soft tissues while the acutely injured areas are rested as well as maintain cardiorespiratory fitness (CEP's role)

The Team: Physiotherapist or Chiropractor on their own or working in conjunction with a CEP.

How does a CEP help during the healing process?

■ **During the Repair Phase:**

Treatment goals should focus on applying light loads that will provide a stimulus for the tissue to remodel.

Monitor symptoms and signs closely: Any increase in pain, warmth, or edema is a signal that the loads are exceeding tissue capabilities.

Low loads can be in the form of stretching, joint mobilization, range of motion activities, submax isometrics, or weight-bearing. (PT/DC and/or CEP)

Maintain other fitness parameters. (CEP's role)

The Team: Physiotherapist or Chiropractor alone or with assistance from the CEP where guided.

How does a CEP help during the healing process?

- **During the Remodeling Stage:**

Treatment needs to be focused to orient the collagen along the lines of stress best suited to accommodate the functional loads required.

This tension can be in the form stretching, active contraction, resistive loads, or electrical stimulation.

Progress from general exercises to activity-specific exercises.

The end of tissue remodeling is unknown and may take months to years for completion.

The Team: Physio or Chiropractor and CEP working together.

How does a CEP help during the healing process?

■ **Post-Rehabilitation Phase:**

After discharge, the CEP can with the guidance of a Physio or Chiro can perform:

- Fitness Assessments
- Program Cardio respiratory conditioning
- Program Musculoskeletal conditioning
- Functional Conditioning for work, sport, or ADL's
- Help client achieve health goals (weight reduction etc.)

It is important for the CEP to adhere and integrate medical advice into their programs.

**** Exercise is the key to long term management of most Medical Conditions - Dr. Michael Jones (AAHFRP)****



**Stay
Awake!**

When do you know that there has been too much overload?

1. Increased pain that does not resolve within the next 12 hours.
2. Pain that is increased over the previous session or comes on earlier in the exercise session.
3. Increased swelling, warmth, or redness in the injury area.
4. Decreased ability to use the part.

If this occurs report to the medical advisor.

General Red Flags to watch for

- Radiating pain
- Numbness and tingling
- Chest pain and shortness of breath
- Loss of range of motion
- Loss of function
- Swelling
- Open Wounds
- Night pain (indicative of a serious organ disorder in the torso)

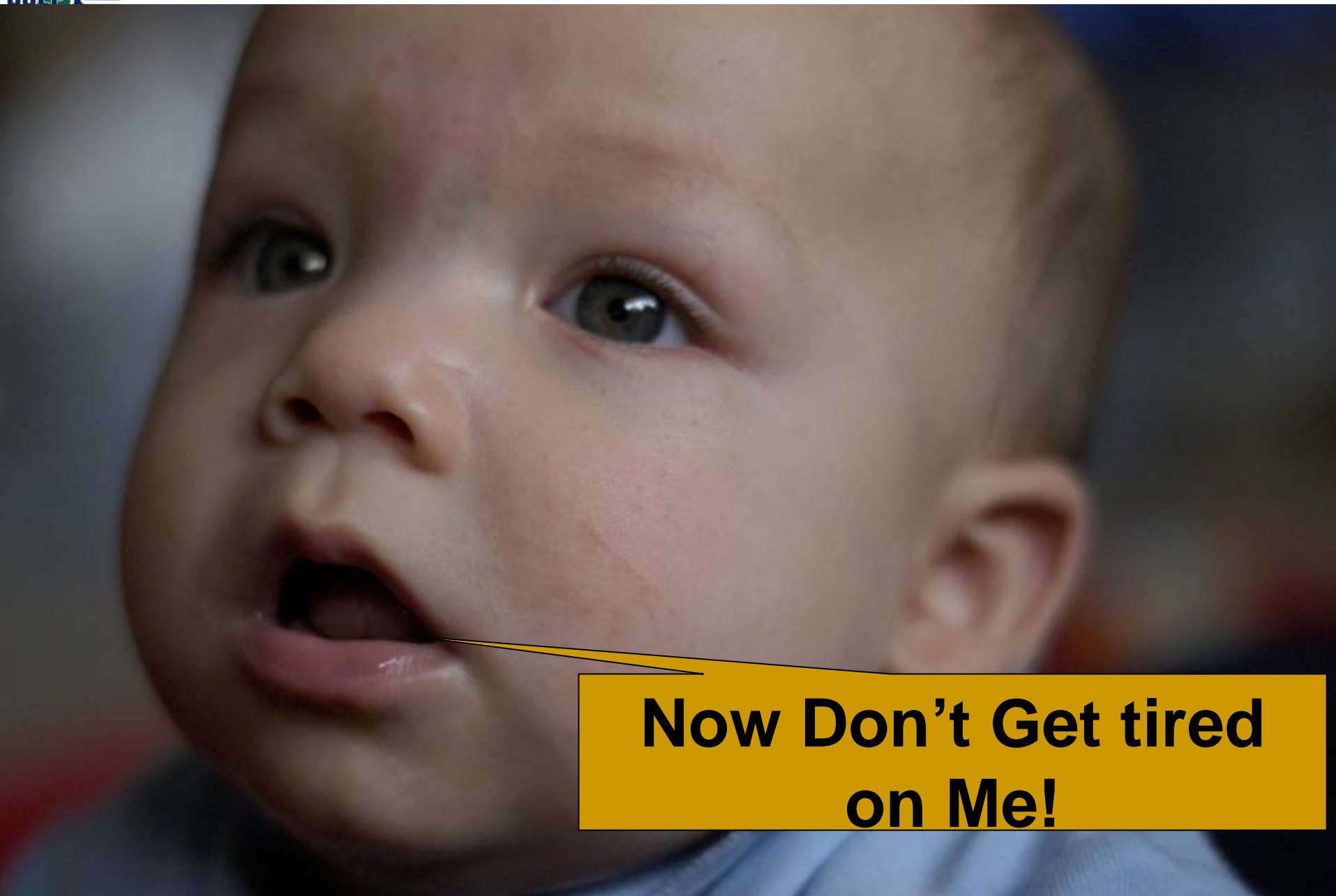
If any of these signs are present, send your client to their medical professional.

Watch out for the following scenarios

1. Client that has stopped rehab too early because as they say, “ I am fine ”.
 2. Client that has stopped rehab due to insurance issues.
 3. Clients with injuries that have not been assessed by a rehabilitation professional.
 4. Clients that refuse to see a medical professional after you suggest it.
 5. Clients who have been discharged from rehab but show up with undisclosed secondary conditions.
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Kinesiological Model of Movement Impairments (Sahrmann, 2002)

1. **Base** – Muscular and skeletal system (structural issues – i.e. scapular position, body proportions, Q-angle, supinated rigid foot etc.)
 2. **Modulator** – Nervous system (is there improper recruitment, synergistic dominance, improper sequencing of movement?)
 3. **Biomechanical** – static and dynamic (postural position, force generation characteristics, maintaining axis of rotation of joints during movement)
 4. **Support** – Cardiac, pulmonary, and metabolic systems (provides the substrates and metabolic support for movement to occur)
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**Now Don't Get tired
on Me!**

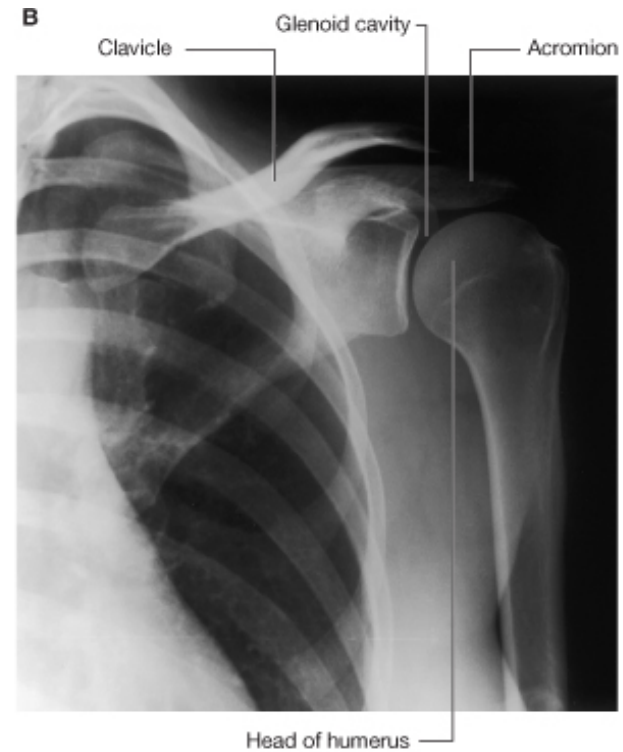
Exercise Applications for Impingement Syndrome

Impingement Syndrome:

This condition is characterized by the client having pain moving the arms overhead. The pain occurs most commonly from 70-120 degrees of abduction. This happens because the greater tubercle is playing bumper cars with the acromion process. The structures that get damaged are the sub-acromial bursa and the supraspinatus tendon.

Criteria to meet for training with you:

Clearance from a Physician, PT/DC, full shoulder ROM, fair overhead shoulder strength, minimal pain with overhead activities, and no presence of radiating pain.



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Impingement Syndrome

- Initially avoid overhead pressing, upright rowing, lateral raises above 70 degrees, and chest press (esp. if they present with a upper crossed syndrome).
- Perform a fitness assessment being sensitive to the post-injured area.
- As part of your postural assessment, common findings associated with impingement syndrome are: **FHP, thoracic kyphosis, abducted and downwardly rotated scapula, winging scapulae, and an anterior humeral head in the glenoid fossa.**
- **Initial exercises (Weeks 1 and 2) –**
 - Pendulum Exercise to increase joint space.
 - Stretching the deltoids, lats, pectorals, and levator scapulae.
 - Internal/External rotator strengthening exercises to increase isolated strength of the rotator cuff (progressing from 10 deg. to 70 deg. of abduction)
 - Posterior shoulder girdle strengthening (nothing above 90 degrees of shoulder abduction. (0 – 70/90 deg. retractions – depends on response)
 - Seated Vertical Push-ups
 - Maintain cardio fitness, leg strength, and core strength.

Medical advice may change above plans.

Exercise Applications for Patellofemoral Pain Syndrome

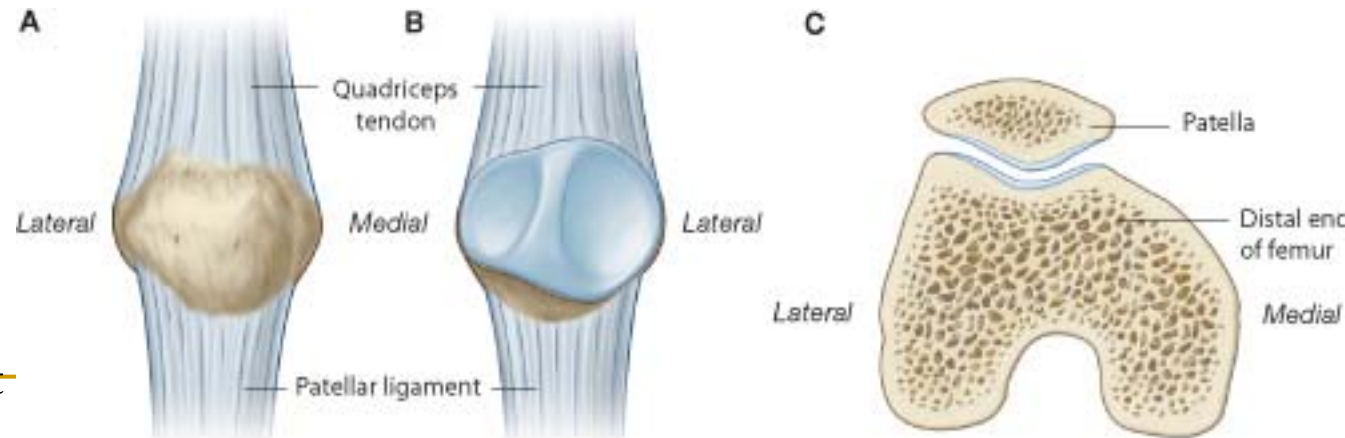
Patellofemoral Syndrome does not have a clear definition in the literature. Terms such as anterior knee pain, chondromalacia patella, patellar pain etc. are often used interchangeably (similar to when people say shin splints for lower leg pain!).

Contributing Factors to PFPS:

1. Imbalance between the medial and lateral quadriceps.
2. Tightness of the IT band.
3. Hip and/or ankle imbalances
4. Overuse.
5. Leg length discrepancy or small patella (structural issues)

End Result:

Improper patella tracking leading to abnormal stresses on the joint surfaces with the resultant cartilage changes.



Exercise Applications for Patellofemoral Pain Syndrome

Signs and Symptoms:

- Pain with sitting at 90 degree knee bend
 - Pain behind the knee cap
 - Increased pain after sitting for prolonged periods (Theater Sign)
 - Pain going downstairs or down hills
 - Painful or painless clicking or crackling
 - May progress to degenerative joint disease (osteoarthritis)
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Exercise Applications for Patellofemoral Pain Syndrome

- Post-rehab criterion for participation:
 1. Minimal swelling. (monitor throughout)
 2. Full ROM
 3. Medical Clearance.

Goals: Improve quadriceps strength (particularly vastus medialis recruitment), improve ROM, improve Glute strength/control & increase functional capacity.

Exercise Applications for Patellofemoral Pain Syndrome

Weeks 1-4 Exercise applications (situation varies with what you will use)

- SMR and static stretching of quadriceps, hamstrings, Tensor fasciae latae/IT Band
 - Standing Terminal Extensions (3 x 25)
 - Squats (1/4 to 1/2 range as tolerable)
 - Partial ROM lunges
 - Floor bridges and Glute Medius Progression
 - Full incline backward walking on treadmill (as tolerable to a maximum of 5 minutes)
 - Upper/Core/Cardio activities (no stepper) as appropriate
 - Progress to activity-specific activities
 - **Anything that causes anterior knee pain is contraindicated.**
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Osteoarthritis

Osteoarthritis is a degenerative joint disease localized to the affected joint or joints and appears first as deficits in articular cartilage.

Commonly affected joints: Hands, spine, hips, and knees.

Symptoms related to exercise: Joint pain, stiffness, osteophytes (from remodeling of subchondral bone and formation of new bony spur), and cartilage destruction.

Medical Management: Analgesic drugs, Physical Therapy, Exercise (this eventually leads to supervised fitness programming from a CEP).

Osteoarthritis

Program Goals:

1. Increase or maintain functional capacity (cardio, strength, end.). = improvement in ADL's.
2. Improve joint stability and alignment.
3. Increase or maintain ROM.
4. Avoid increasing pain (use a 1-10 scale).
5. Monitor swelling.
6. Provide ample recovery time.

Program Precautions:

1. Avoid high impact activities.
 2. Avoid stretching into extreme ROM.
 3. Do not exercise painful or swollen joints.
 4. Measure painful response 2 hours post-exercise and the next day.
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Osteoarthritis

Exercise Testing Ideas:

Aerobic: Submaximal symptom limited treadmill tests (no faster than 3mph) and cycling ergometer tests are well tolerated.

Flexibility: Goniometric measurements – assess asymmetry.

Neuromuscular: Balance and Gait analysis (8ft up and go – agility, gait, and dynamic balance or multi-directional reach test (Rose 2003)).

Functional: Senior Fitness Test (Rikli and Jones, 2001).

Strength: Method depends on specific joint involvement and pain (medical consult)

When your test battery has been formulated have it approved by the supervising Medical Practitioner.

Osteoarthritis

Exercise Programming applications:

Aerobic: walking, cycling, rowing, swimming, water aerobics, and dance (obviously not River Dance hee hee!). 40-60% V02 max. (varies on initial fitness level). Emphasize progression of duration (build to 30 minutes/session) over intensity. Consider discontinuous exercise as an option for some clients. 3-5 days per week

Strength: Use pain tolerance to set intensity. Depending on pain start with 2-3 reps building to 10-12 reps. Emphasize exercise that has a functional carryover reward. 2-3 days per week. Consider functional isometric exercises along with ROM appropriate dynamic movements. **Movement control is key! Choose exercises wisely as they not be capable of doing many so make them count.**

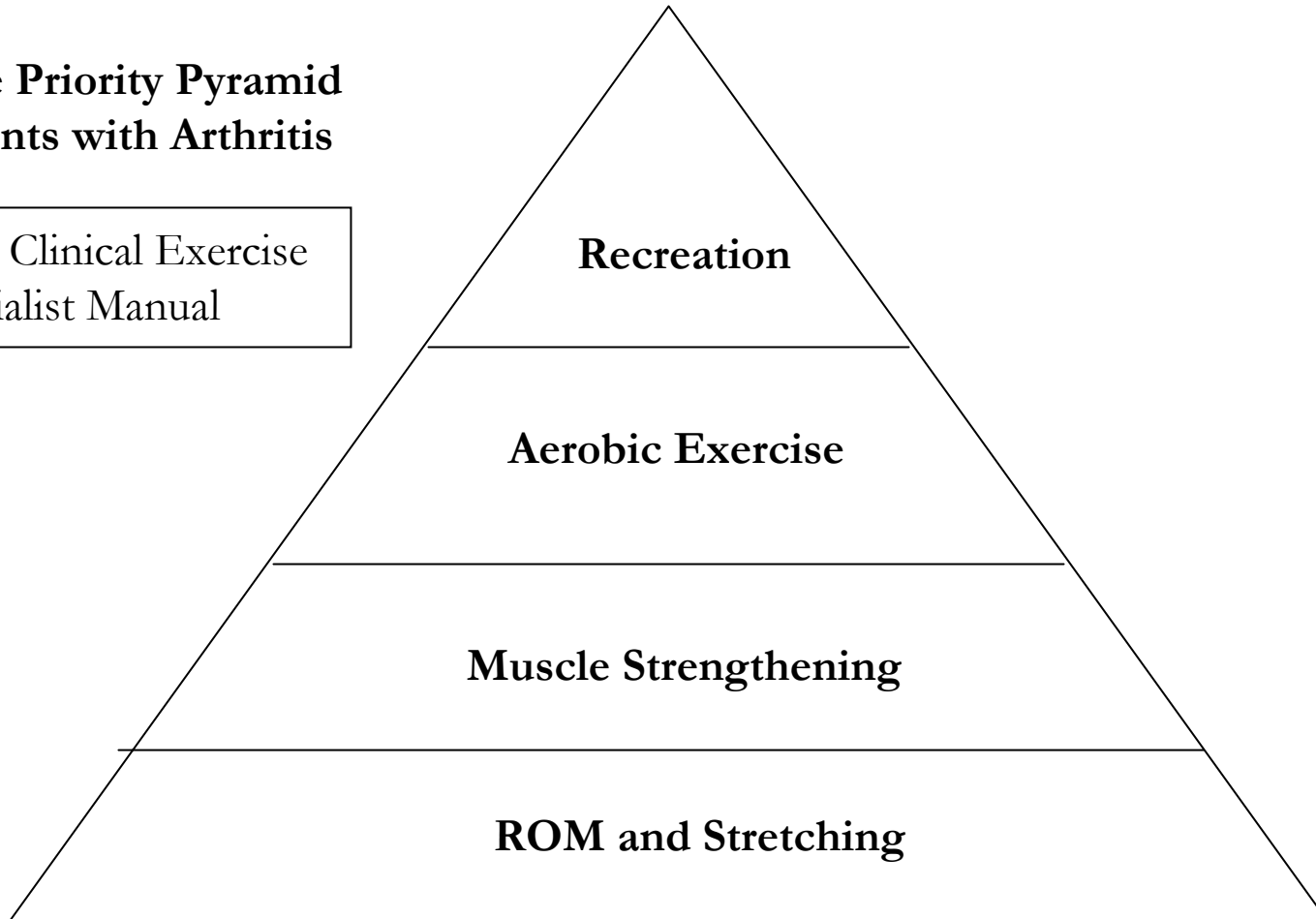
Flexibility: Restore muscle balance and improve ROM. 1-2 sessions per day. Avoid overstretching unstable joints. If joint acutely inflamed, gentle range of motion exercises should be utilized.

Gait Activities: Walking drills through agility ladders.

Osteoarthritis

Exercise Priority Pyramid For Clients with Arthritis

Ref: ACE Clinical Exercise
Specialist Manual



General Protocol for Dealing with Post-Rehabilitation Clients

These are only general guidelines!
Inter-individual differences will dictate

PAR-Q
PAR-Med-x/ **Medical Release Form**
ACSM Risk Stratification

Cardiovascular, Neural and Muscular Fitness Assessment
Body Composition
Core Function Evaluation
Basic Nutrition and Hydration Assessment
Muscle Balance/Posture Assessment and Movement Screening
Tender Point Evaluation

Phase 1 – Post- Rehab (4-6 weeks – varies)

Reduce cardiac risk factors by cardiovascular conditioning implementation

Condition Specific Exercise as advised by PT/DC/Physician

Flexibility (SMR, Static, and active)

Stability (Core, Total Body Stability)

Introduce Foundational Movements (within scope of the injury)

Increase overall functional capacity

Phase 2a – Post-Rehab (Time period varies)

Cardiovascular and Energy System Development (ESD)

Maintain flexibility (increase complexity)

Work on Absolute and Functional Strength Integration

Develop Foundational Movement Patterns (↑ complexity)

Proprioceptive Activities (where applicable)



Phase 2b – Post-Rehab (Time period varies)

Various ESD Activities

Increase proprioceptive challenge

Work specific Conditioning

Sport Conditioning

Expand on Foundational Movement (complexes/power conditioning)



Phase 3 – Post-Rehab

Keep having Fun!! Progress as you see fit.

Re-assess at each of your designated phases.

Watch for Residual Dysfunction !!

Practical Activity – Overhead Squat Evaluation

- This part of the seminar will encompass the work of Gray Cook MSPT and the NASM.
 - The overhead squat provides a quantitative and qualitative approach to movement evaluation.
 - It tells you where the potential problems may exist.
 - Work in groups of 3 and perform an overhead squat evaluation on each other
 - Not all encompassing, but is helpful in directing further analysis and muscle testing.
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Test Set up

- Stand with a shoulder width stance. Toes facing forward.
 - Place a dowel rod on your head. Your shoulder and elbows should be at 90 degrees.
 - Press the dowel overhead.
 - Descend slowly into a squat position.
 - This movement should be done with heels on the floor, head, and chest facing forward and dowel maximally pressed overhead.
 - Shin angle, trunk angle, arm angle should line up.
 - If the criteria for a score of 3 is not achieved, the athlete is then asked to perform the test with a 2 x 6 board under the heels (this is automatically a 2).
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Scoring Criteria

3 is a perfect Score.

2 – Criterion is the same as 3 but with a board under the heels

1 – If any of the criterion are present it is a 1

Reference:

Functional Movement Screen

Manual (Gray Cook)

Deep Squat Testing Procedure

III

- Upper torso is parallel with tibia or toward vertical
- Femur below horizontal
- Knees are aligned over feet
- Dowel aligned over feet



II

- Upper torso is parallel with tibia or toward vertical
- Femur is below horizontal
- Knees are aligned over feet
- Dowel is aligned over feet



I

- Tibia and upper torso are not parallel
- Femur is not below horizontal
- Knees are not aligned over feet
- Lumbar flexion is noted



0 - The athlete will receive a score of zero if pain is associated with any portion of this test. A medical professional should perform a thorough evaluation of the painful area.



**We're
Done!
Any
Questions?**