Physiotherapy intervention in OA Knee

Leonard Ong Yao Jian, Physiotherapist
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Contact: 96961433
Email: leonardphysio@gmail.com
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   - Manual therapy
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     • Heat, cold, ultrasound, laser, tens
   - Agility and perturbation training

3. Aerobic fitness/non impact exercises

4. Joint protective measures
If you are thinking about giving out brochures and videos on exercises as part of your management...

Please don’t take away my job.
Physiotherapy interventions

Exercise, Modalities

Specific strengthening, stretches
Neuromuscular exercises
Gait re-training
Taping
Manual Therapy
Education, Cognitive behavioral therapy
Agility and Perturbation training

IceBerg
Issues commonly encountered by Physio

1. Muscular tightness/weakness
   • Fat pad, Pes anserinus, Saphenous Neuritis
2. VMO activity
3. Patellar tracking
4. Pain relief
• On a whole, level 1 evidence that Physiotherapy referral is recommended 1-6
Fat Pad

• Highly pain sensitive structure in the knee \textsuperscript{Clockaerts}\textsubscript{2010}

• Often a potential source of pain in knee OA \textsuperscript{Clockaerts}\textsubscript{2010}

• Physiotherapy
  – Taping \textsuperscript{Rana}\textsubscript{2003} Level 1 evidence
  – TENS/Ultrasound/Cryotherapy
  – Selective strengthening and stretching
Muscular tightness/weakness

- Weakness of quads/glutes
- overactive pes ans/adductor/ITB

  - Pes anserinus
  - Tenderness on touch of pes ans
  - Pes Ans Bursitis or pes ans muscle strain
    - Degenerative changes
    - Pronation of foot $\rightarrow$ inward rotation of tibia $\rightarrow$ strains tendon
    - Sudden change in walking pattern
    - Tight quads/weak hamstring (cocontraction causing weakness unproven) $\rightarrow$ overload
    - Weak quads/tight hamstring $\rightarrow$ Bursitis
Muscular tightness/weakness

– Saphenous neuritis *Morganti 2002*
  • painful condition which can imitate other pathology around the knee
  • caused by either irritation or compression at the adductor canal
  • Palpation of add canal will reveal pain/tightness

– ITB/Lateral retinaculum tightness→ patellar maltracking
Muscular weakness/tightness

- Pain relief
- Myofascial release
- Selective stretching and strengthening
  - Glute medius, glute maximus, pes anserinus, adductors, ITB/TFL
- Taping
- Postural correction

Improve gluts strength correlated with decrease progression of OA
PFOA vs TFOA

• Increase lateral muscle co-contraction helps to decrease medial knee load (KIM BENNAL’S IMAGE)

• Management of PFOA and TFOA can be very different

• Challenge:: most patients have both PFOA and TFOA
Strengthening

- Quads strengthening for patients with symptomatic OA knee
- Level II evidence, Grade B recommendation AAOS 2009

- What if it’s too painful?
  - Isometrics and exercises in non painful ROM still have carryover effects to improving function and strength Marks 1994

- What of the VMO?
  - VMO observed to be atrophied by many clinicians
  - There is no preferential delay in VMO activation in OA Dixon 2007
    - Rehabilitation programmes for OA knee patients should not therefore be aimed at altering the timing of VMO activation relative to VL
  - VMO found to be active for longer durations throughout the day than VL in OA knee subjects as compared to controls Dixon 2007
What of those subgroups with severe OA?

Quadriceps training shown to be less effective for these patients than those with mild-mod OA

• Exercises that encourage more valgus directing forces to the knee

• Neuromuscular training Ageberg2011
  • sensorimotor control
  • compensatory functional stability
Benefits of exercise

• Physical benefits
  – Improved strength
  – Improved mobility
  – Better sleep
  – Reduced bodyweight
  – Cardiovascular fitness and chronic disease risk factors

• Mental benefits
  – Self confidence
  – Stress buster
  – Reduce pain
Taping

• Level II evidence with Grade B recommendation in reducing pain and improving function AAOS Guidelines 2009

• Patellar tape may reduce malalignment and pain associated with patellofemoral joint OA
  Medial patella glide and tilt Rana 2003

• Unload pes anserinus or fat pad
Manual therapy

• Manual therapy = accessory joint movements, muscle stretching, and soft-tissue mobilization

• Both PFJ and TFJ
  – stretches the joint capsule
  – gently mobilises any restriction to normal movement
  – loosens adhesions
  – local and widespread hypoalgesic effects (Level 1 evidence Mossa2007)
    1. Local mechanical disturbance may modify the chemical environment and thereby alter concentrations of inflammatory mediators
    2. trigger segmental inhibitory mechanisms
    3. activate descending pain inhibitory systems, mediated supraspinally
Manual therapy

- Reduces pain
- Improve function
- May delay or even prevent need for surgical intervention

MT vs. NSAIDS
- MT
- MT + exercise
- V.S.
- home exercise program
- Placebo ultrasound
- equally effective
  - Tucker2003
  - Level 2 evidence
  - Deyle2000
  - Level 1 evidence
  - Deyle2000

- Best to combine manual therapy with exercise
Education

Combat Obesity!

• Every 1 kg increase in weight leads to 4 kg increase in knee load
• Every reduction in 1 point of BMI → reduce TKR by 6%
• 8% Aussies report trying to lose weight as part of OA rx!

—Behavioral instruction (CBT), relaxation training, biofeedback, Problem-solving strategies, Energy conservation behaviors, Pain coping skills training e.g. walk instead of running, alternative activities
Tens

• Level 2 evidence Cochrane 2010
• Pain $\rightarrow$ quads inhibition
  – Cortical and spinal reflex mechanisms
• Quads inhibition $\rightarrow$ decreased shock attenuation and increased joint surface wear and tear
• TENS $\rightarrow$ disinhibit quads motor neuron pool excitability
• Exercises to be done during TENS application
Cold

- Numb the pain, decrease swelling, constrict blood vessels and block nerve impulses to the joint
- Using ice packs and ice massage
- More beneficial than no treatment (Level II evidence)
Ultrasound and Heat

• Ultrasound
  – No benefit (Level 1 evidence)

• Heat pack/Shortwave Diathermy
  – improving circulation and relaxing muscles
  – No good quality studies done to support or refute the use
Agility and perturbation training

- Agility training
  - side stepping, crossover etc

- Perturbation
  - Balance foam, rollerboards etc

- Level 1 evidence that agility and perturbation in addition to a exercise physiotherapy program did not offer additional benefits Fitzgerald 2011
Gait re-training Kemp 2008

• Holding cane in opposite hand had a 10% decrease in knee load

• Dose response effect
  – Therapist teaching and supervision
  – Patient technique critical
    • the right time to exert weight on the cane to offload the knee is often too early

• Unproven techniques
  • toe-out gait
  • medial thrust gait
  • increased lateral trunk lean
  • nordic walking poles
Lower load: Soft, flexible soles

Higher load: Stiff, bulky, heel heights

Barefoot vs shoes?
Shoes shown to increase medial knee load by 7.4%
Aerobic fitness/non impact exercises

• Aerobic v.s. strengthening: equal reduction in pain and disability Roddy 2005 (Level 2 evidence)
• Hydrotherapy v.s. strengthening: equal strength and functional gains Foley 2003 (Level 2 evidence)
• Taichi v.s. strengthening: inconclusive evidence

BUT Strengthening ≠ Physiotherapy !!

1 study underway to investigate Taichi vs PT
• Why choose PT over aerobic/non impact?

  – Taping, manual therapy, modalities, education which has good evidence not addressed
Joint protective measures \textsuperscript{AAOS 2009}

- **Rationale:** to reduce valgus or varus forces on knee
- **Laterally wedged shoes for medial knee OA**
  - no benefit over normal shoes (Level II evidence)
  - Grade B recommendation NOT to use it
- **Valgus force directing knee brace for medial OA**
  - No evidence to support use (Level II evidence)
- **Varus force directing knee brace for lateral OA**
  - No studies done
Summary

1. Physiotherapy interventions
   - Strengthening exercises
   - Neuromuscular exercises
   - Taping
   - Manual therapy
   - Education/lifestyle changes
   - Modalities
     - Heat, ultrasound
     - Cold, Laser, TENS
   - Agility and perturbation training
   - Gait retraining

2. Aerobic fitness/non impact exercises

3. Joint protective measures
Limitations

• Studies do not distinguish grades of OA knees, only symptomatic vs non-symptomatic
  – most studies included participants of all grades
• Studies on modalities still limited, no standardization on dosage, application time, etc
When should you refer?

• Mixed message to patients
• Severe lack of cooperation between health care providers
• Think “combination”, not “most effective” treatment method
• Work together, DO NOT “refer”
Take home message

Patient: “I tried acupuncture, physiotherapy, but nothing seems to help!”

Me: “How long ago did you do physiotherapy?”

Patient: “Few years back, forgot already”

Me: “So have you been doing the exercises the physiotherapist taught you?”

• Send the message home to your patients: “Keep moving!”
• Intermittent “booster sessions” to encourage continued active lifestyle
• Patients resistant to surgery or prefer trying conservative management
Take home message

A collaborative effort is important for combating the disease!
How to contact me?

If you have any questions or you wish to work together with me for any musculoskeletal physiotherapy, feel free to contact me at

hp: 96961433
email: leonardphysio@gmail.com

Leonard Ong Yao Jian
Physiotherapist
NUH Rehabilitation Department
Ba.App.Sc (Physiotherapy)
Certified Strength & Conditioning Specialist (CSCS)
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If you have any questions or you wish to work together with me for any musculoskeletal physiotherapy, feel free to contact me at

hp: 96961433
email: leonardphysio@gmail.com

Leonard Ong Yao Jian
Physiotherapist
NUH Rehabilitation Department
Ba.App.Sc (Physiotherapy)
Certified Strength & Conditioning Specialist (CSCS)
Thank you for your attention