Physical Therapy for Knee OA: What is the Evidence?

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Evidence Based Recommendations

  - Strengthening and aerobic exercises

  - Exercise is the core treatment
  - Include strengthening, general aerobic fitness, and manual therapy
  - Weight loss

- **AAOS** (American Academy of Orthopaedic Surgeons) Guidelines
  - Self management programs, strengthening, low-impact aerobic exercises, and neuromuscular education; and engage in physical activity
  - Weight loss >= 25 BMI
Evidence Based Recommendations

- **ACR (America College of Rheumatology) Guidelines (2012):**
  - Exercise is the core treatment
  - Include strengthening, general aerobic fitness, and manual therapy
  - Weight loss

- **OARSI (OA Research Society International) Guidelines (2014):**
  - Land-based exercise
  - Weight management
  - Strength training
  - Water-based exercises
  - Self-management and education
Evidence Based Recommendations

**OARSI:** Land-Based

- Level of Evidence: Systematic Review and Meta-Analysis
- Quality of Evidence – GOOD

1. Aerobic Activity
2. Active ROM
3. Strength Training
Evidence Based Recommendations

OARSI: Land-Based

1. Mixed physical therapy: (education, strengthening, balance)
   1. Escape-knee pain program: 15-20 min discussion of coping strategies
   2. 30-45 minutes strengthening and balance training
   3. 2 x per week for 6 week
   4. Discharge to HEP

2. At 6 weeks
   1. Physical function (WOMAC) significantly better in exercise group vs usual care control

3. At 30 months
   1. General decline in initial gains but better WOMAC compared to control

Hurley et al, 2012 Arthritis Care Res
Exercise
Land-based

• 2008: Cochrane Review (Fransen M and McConnell S)
• 2009: Meta-analysis of RCT (Fransen and McConnells S)
  – 32 RCT, 3800 individual
  – Land-based vs. no exercise
  – Self report benefit in knee pain (SMD 0.40, 95% CI 0.30 to 0.50) and physical function
• 2012: Systematic Review (Roddy E etal)
  – Aerobic walking(3) vs home-based quadriceps strengthening(9) and Combined(1)
  – Both reduced pain vs Usual care
  – Neither is better than the other
Exercise

Aerobic Programs

• 1997: **FAST** (The Fitness Arthritis and Senior Trial)
  – 365 Participant
  – Aerobic vs Resistance vs Control (health education)
  – 3 x/wk for 12 wks -> 15 month walking program
  – Aerobic Group better in:
    • Less knee pain
    • Faster 6MW and the “Time Lift to Carry”
    • Faster Stair Climb Test and Car Transfer Time
Evidence
Strength Training

- **OARSI** Strength Training
  - Good Evidence
  - Decrease pain and improved function

- 2004 Meta-analysis RCT (Pelland et al)

- 2009 Cochrane Database SR of PRT (Latham and Liu)
  - Decrease pain
  - Improved function
  - Improved quadriceps strength

- 2011 Meta-Analysis RCT and Systematic Review:
  - Recommend LE strength, specifically quadriceps
  - Both body weight and non body weight
  - Group and individualized programs
Aquatherapy: The Evidence

• 2007: Cochrane Review (Bartels et al.)
  – 6 studies: non very robust
  – Knee and / or Hip Osteoarthritis (1 study for knee OA was included)
  – Small to moderate effect on function and quality of life

• 2011: Systematic Review and Meta-Analysis (Batterham et al.)
  – Aquatic a good alternative when people have difficulty with land based exercises (biking, walking, jumping, strengthening)
Exercise: Type

- **Quadricep weakness** -> function and disability
  - High intensity (>70%-1RM) more effective
  - High vs low speed(power) -> no difference
  - Dynamic vs isometric-> no difference
  - Vibration -> same as control
  - Weight bearing versus Non Weight bearing =Both

- **Specific:**
  - First priority on lower extremity exercises
  - Second stretching, ROM, balance
Exercise: Dosage

  - **Aerobic**
    - 3-5 days/week; 50-60% HR max; 20-30 min
  - **Strength training**
    - 8-10 exercises (major muscle groups)
    - 6-15 reps
  - **Flexibility**
    - 3-5 days/ weeks
Manual Therapy and Exercise: The evidence

• 2000: Effectiveness of Manual Physical Therapy and Exercise in Osteoarthritis of the Knee (Deyle et. al.) Annal of Internal Med.
  – 83 individual; 42 MT + Exercise, 41 Placebo
  – Significant improvement in MTE group in WOMAC, 6MW at 8 wk
  – Significantly few surgeries in MTE at 1 yr (5% vs. 20%)
Manual Therapy and Exercise: The Evidence

  Physical Therapy

  - 120 individuals (60 MTE, 60 HEP)
  - Significant improvement in both groups WOMAC at 4 weeks
    - (52% MTE vs. 26% HEP)
  - Significant improvement in both groups 6MW at 4 weeks
  - Improved over baseline with exercise program at 1 yr
Manual Therapy and Exercise: The Evidence

• **2013:** MOA (Management of Osteoarthritis) Trial, RCT Osteoarthritis and Cartilage (Abbot, et al)
  – Manual Therapy vs. Exercise Therapy vs. Combination vs. Usual Care
  – Take Home Message:
    • All Physical Therapy groups superior to Usual Care, effects lasted to 1 yr.
    • Manual Therapy superior to Ex or Combo for knee OA

• **2015:** The Incremental Effects of Manual Therapy or Booster Sessions in Additions to Exercise Therapy for Knee OA, RCT JOSPT (Abott, et al)
  – Booster sessions over a year better; then 12 in a row
  – Addition of MT + exercise better than just exercise for knee OA
Manual Therapy: The evidence

  - 43 subjects
  - 3 x/wk for 2 wks
  - Decrease in pain and improved subjective function after 2 wks of treatment

- **2018: Systematic Review and Meta-analysis (Anwer S, Etal)**
  - Knee OA only
  - 11 RCT, 494 subjects
  - **MT vs Exercise** significantly better in VAS, WOMAC Pain, WOMAC function
  - Significantly better in negotiating stairs
Weight Loss: The evidence Strongly Recommended

OARSI:
– Level of Evidence Systematic Review
– Quality : good

1. Improved disability with >5.1% weight reduction
2. Most effective combine calorie restriction, increase physical activity, behavior reinforcement, support from groups and physician
Evidence Based
Maybe Recommended

OARSI:

- Level of Evidence: Systematic Review of RCT
- Quality of Evidence – FAIR

1. Knee braces/sleeves or foot orthoses
2. Cane (walking stick)
Evidence Based
Not recommended

OARSI:

Level of Evidence: SR and Meta-analysis
Quality of Evidence – Fair to low to very low

1. Electrotherapy/NMES  Maybe evidence weak
2. Transcutaneous electrical nerve stimulation (TENS) short term???
3. Ultrasound Maybe short term??
4. Low Level Laser Therapy -> decrease pain compared to controls 1 study
5. Short Wave Diathermy
6. Heat/cold
Physical Therapy: Conclusion

• Exercise (aerobic and strengthening) are the KEYS in the management of Knee OA

• Exercise adherence is important to success

• > 12 supervised visits may improve success

• Aqua therapy may be beneficial for those who can not exercise on land

• Manual Therapy techniques may augment exercise therapy

• Weight Loss if possible
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