THE EFFECTS OF LOWER EXTREMITY OSTEOARTHRITIS ON GAIT
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KNEE OSTEOARTHRITIS
Prevalence and Incidence

- Using prevalence estimates from the Framingham OA Study, it has been estimated in 2005, that 9.3 million (4.9%) of US adults (£ 26 years old) had symptomatic knee OA. Jordan JM et al. Prevalence of knee symptoms on radiographic and symptomatic knee osteoarthritis in African Americans and Caucasians: The Johnston County Project. J Rheumatol. 2007;34:170-180
- Nearly 1 in 2 people may develop symptomatic Knee OA by age of 85 years
- 2 in 3 people who are obese may develop symptomatic knee OA in their lifetime Murphy et al. Lifetime risk of symptomatic knee osteoarthritis. Arthritis Rheum. 2008;59:1207-1213

Gait Characteristics

- When compared to healthy controls, subjects with knee and hip OA showed significant gait changes:
  - Cadence, step length, walking base of support, and time in double support.
  - Highest speed obtained was 2.0 km per hour, while remaining in good control and pain free Bejek et al. Knee Surg Sports Traumatol Arthrosc. 2006;14:612-622
- Biomechanical study on patients with knee OA demonstrated:
  - Decreased walking speed
  - Decreased walking speed
  - Healthy: 1.17 m/sec
  - OA: 0.55 m/sec
  - Prolonged stance phase
  - When compared to healthy controls
  - Study concluded that gait deviations were due to instability of the knee joint in OA Al-Zahrani, Bakheit. Disabil Rehabil. 2002;24: 275- 280

When compared to healthy control group, Patients with Phase 3 knee OA demonstrated a significant Decrease in:
- Cadence, gait velocity, stride length, and step length
- And an Increase in:
  - Stride time, double support time, single support time, and stance phase length

Gait Changes With Knee OA and Reported Instability

- Investigative study in lower extremity OA, compared patients with and without self-reported knee instability.
  - Gait analysis
  - WOMAC
- Knee instability was associated with 6-fold increase in odds of severe gait-related pain.
  - Walked with > knee flexion excursion
  - Reduced hip extension and ankle PF
  - Reports of knee instability and OA, expect alterations in hip, knee, and ankle during stance phase.
  - Need for external support?


- Another study compared unstable and healthy knee population and found:
  - Unstable knee had less joint stiffness
  - Smaller heel strike knee flexion angles
  - Unstable knee had a slower self-selected gait velocity
  - Unstable knee gait speed 1.20 m/s
  - Single knee gait speed 1.31 m/s
  - Decreased WOMAC scores


Gait Speed and Osteoarthritis

- Study looked at walking speed and severity of knee OA and symptoms
- Found that people had a 8.9 odds ratio risk of being in a fast decline in gait speed compared to those without pain or radiographic OA


Study looked at anxiety response to pain with patients having lower extremity osteoarthritis
- Anxiety-related responses to pain correlated with decreased gait speeds


KNEE OSTEOARTHRITIS: Functional Risks Influencing Outcomes

Functional Decline Risks
- Study looked at risk factors with WOMAC scores at baseline, 3-months, and 18-months
  - Factors that decreased WOMAC scores: baseline
  - Better mental scores
  - Higher aerobic exercise minutes
  - Better social support
  - Higher self-efficacy
  - Higher function scores


Other risk factors for functional decline as:
- Physical impairments
- Pain
- Knee joint laxity
- Poor balance
- Impaired proprioception
- Obesity
- Psych / anxiety

OSTEOPATHY: Effect on the Patient

- Observational longitudinal study found there was a 63.2% frequency in falling in patients over 65 years old with severe knee osteoarthritis
  - Cause of Fall:
    - Walking 89.23%
    - Stumbling 41.54%


- Qualitative study looked at effect of OA on adults age 35-65 years old
  - Disruption in physical, emotional and social life
  - Reported they had a “new awareness of their knee, and they no longer ‘trusted their knee’

Mackay C et al. A qualitative study of the consequences of knee symptoms: ‘It’s like you’re an athlete and you go to a couch potato’ BMJ 2014

Functional Performance Testing: Knee Osteoarthritis

- Systematic review of performance-based measures to assess physical function on patients with knee osteoarthritis found:
  - Best walking test:
    - 40 m self-paced test
  - Best sit to stand test:
    - 30 second chair stand test and Timed Up and Go (TUG)
  - Best multi-activity tests:
    - Stratford battery, Physical Activity Restrictions and Functional Assessment Systems


Conclusion

How Can the PT Ensure Safe Gait with the Patient with Osteoarthritis

- Reassurance / Patient education
  - Yoga
  - Relaxation
  - Breathing
  - Exercise
    - Graded exercise
    - Movement
    - Unloaded to Loaded
  - Balance training
  - Structural Stability
  - Strengthening
  - Bracing
Thank you

• OPTA Conference Committee
  • Scientific Symposium
  • 2017 Annual Conference
    • April 13-14th

• OPTA Staff
  • It takes a team