Rehabilitation of a Total Knee Arthroplasty

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Objectives

- Review a Physical Therapists role in assisting pts recovery s/p TKA
- Understand other factors that may influence TKA recovery
- PT Clinical Assessment
- Review current PT interventions and guidelines to recover faster after a TKA
- Review Functional Outcomes frequently used
- Efficacy of CPM use
- Review Rehab timeline for TKA
Prevalence

- American Academy of Orthopedic Surgeons (AAOOS) symposium 2010, 4.7 million Americans s/p TKA
- Women 3 million > Men 1.7 million
- Increases with Age
- 80-89 years of age, 10% TKA
- California, Texas and Florida most TKAs in the US
- 1.5 times more people live in the US with TKAs/THAs as there are people living with Heart Failure
- Indication: Osteoarthritis, failed injections, physical therapy
PT Role

Acute/Inpatient

- To maximize function, indep, safety
  - Optimize bed mobility indep
  - Optimize transfer ability
  - Optimize knee ROM/strength
  - Maintain clean wound
  - Improve gait pattern/safety
  - Decrease edema
  - Coordinate Pain management with MD and Nursing
PT Role

Outpt/ Homehealth

- Optimize ADLs, indep, safety
  - Maximize joint function
    - Flex/ext
    - Patella mobility
    - Scar/ soft tissue mobilization
      - Maintaining skin integrity
  - Improve hip/ knee/ core strength
  - Improve Balance/proprioception
  - Improve Gait pattern
  - Optimize Functional activities
Factors that influence Recovery

- PLOF
  - PT prior to TKA?
- Preexisting weakness
- Preexisting contractures
- Comorbidities (ie, DM, HTN, cardio/pulmonary issues, pain threshold, drug abuse, morbid obesity)
- Neuromotor control
- Motivation for consistency with HEP; Family support
Clinical Assessment

- Systems review (Risk Factors?)
  - Musculoskeletal
  - Neuromuscular
  - Cardiopulmonary
  - Integumentary
  - Endocrine/metabolic
  - Genitourinary
  - Multiple systems
Clinical Assessment\textsuperscript{2,3,4}

- **Tests/ Measures cont.**
  - Pain
  - Posture
    - Biomechanics
  - ROM (Muscle length)
  - Integumentary integrity
  - Joint integrity/mobility
  - Muscle Performance (strength, endurance, power)
- **Motor Function (control/learning)**
- **Aerobic capacity/ Endurance**
- **Gait, Locomotion, Balance**
- **Orthotics**
  - Supportive devices
- **ADLs**
Interventions$^{2,3,4}$

- **Therapeutic exercise**
  - ROM
  - Sit↔ stands
  - Heel/Knee raises
  - Stretches
  - Supine/ sitting/Stand isometrics
  - Cycling
  - leg lifts
  - Stand closed chain strengthening activities
  - Step overs
  - Quarter squats
  - Wall sits
Interventions

- **Functional training**
  - Gait symmetry
  - In and out car
  - Getting in and out of WC<> plinth/bed
  - Chair Rise
  - Stair training
  - Progressed Kneeling/ into quadruped
  - Endurance exercises
Interventions cont. 2,3,4

- Neuromuscular Reeducation
  - Balance retraining
    - Agility/perturbation
  - Proprioception
  - Static Dynamic Postural Control
  - WiiFit gaming for multidirectional balance

- Manual Therapy
  - Soft/Scar tissue mobilization
  - Hypofunctioning patella
  - Edema Control

- Hydrotherapy
  - Fwd,bkwr, sidestep walking
  - Step ups
  - light jogging/jumping
  - kicking
  - Knee ROM
  - Lunges
  - Combined squats
  - UE exercises

- Modalities
  - Ice (acute)
  - Moist Heat (subacute)
Functional Outcomes

ROM
- Knee Edema
- Sit to stand test
- Stair ascent/descent
- VAS (Visual analog scale)
- NRS (Numerical Rating scale)
- 6min walk
- Balance tests (Romberg, SLS, tandem, semitandem)

Tinetti Balance
- LEFS Lower Extremity Functional Scale
- WOMAC (western Ontario and McMaster Universities Index)
- KOOS (Knee Injury &OA Outcome Score)
- OKS (Oxford Knee Score)
- SF-36 (short form survey)
- 10M walk test

Peak Leg ext Power
Recovery$^{2,3,4}$

- 4-12wks- most gains
  - Individualized Programs/ Results
  - Can cont 6-12months, cont HEP
  - ROM, MMT, Balance, Posture, Functional Activities
    - Benchmarks for ROM
      - 95 deg flexion N ADL function
      - 105 deg flexion to ride a bicycle
      - 110 deg ascend descend a step
  - Gait progression, least restrictive device
  - Progression of lumbopelvic stabilization, gluteus strengthening
Purpose of the studies:
- Establish whether there were additional long term benefits from continuous CPM use s/p hospital DC.
- Effective acute setting (5-10 days) for ROM flexion
- Short term use of CPM lead to short term ROM
- Prolonged use CPM has short term effects on ROM
- Standard implementation should be reconsidered since neither long term effects nor improved transfer of function were conclusive.
Conclusion 2,3,4

- Patient assessment and therapy are individualized although trends of dysfunction and recovery exist.
- Focus: pain relief, knee flex/ext, gait reeducation, home function adaptations, reduction of swelling and soft tissue mobilization
- No differences outpt vs home based function/pain outcomes.
- Short term benefit favoring home based exercises for flexion ROM only.
- No difference in outcomes comparing hydrotherapy or additional balancing or cycling
- Further research to target long term functional pain and performance outcomes.


5. Lessen Ton AF, Van Steyn Mike JA. Craijns Yvonne HF. Effectiveness of prolonged use of continuous passive motion (CPM), as an adjunct to physiotherapy, after total knee arthroplasty. BMC Musculoskeletal Disorders 2008, 9:60doi

6. Herbold, Janet A. et al. Randomized Controlled Trial of the Effectiveness of Continuous Passive Motion After Total Knee Replacement Archives of Physical Medicine and Rehabilitation, Volume 95 ,Issue 7 , 1240 - 1245