

Exercises to Prevent Joint Stiffness from Occurring

- Non-weight bearing quadriceps strengthening series
 - Quad Sets in a heel prop
 - Straight Leg Raise (hip flexed vs. hip extended)
 - Short Arc Quad (10° to 0° vs. 30° to 0°)
 - Long Arc Quad (90° to 60°)
 - Quadriceps Isometric Matrix
 - Prone TKE
- Knee flexion exercises
 - Heel slides with transitions (AROM to over-pressure vs. PROM to over-pressure)
 - Wall slides
- Muscle Stretching
 - Hamstrings as a knee flexor
 - Hamstrings as a hip extensor
 - Quadriceps in general
 - Rectus femoris specific

Joint Mobilizations to Alleviate Joint Stiffness

- To improve extension:
 - Superior PFJ glides
 - Medial PFJ glides, medial tilt
 - Supine anterior tibial glides with tibial ER to promote screw home mechanism
 - Prone anterior tibial glides +/- tibial ER
 - Standing anterior tibial glides +/- tibial ER with towel
- To improve flexion
 - Inferior PFJ glides combined with posterior tibial glides
 - Medial PFJ glides in flexion
 - Informedial PFJ glides in flexion
 - Posterior in 90° (+/- tibial rotation) (+/- distraction)
- Patellofemoral glides for quad tendon and patellar tendon pain
- Soft tissue mobilization for quad tendon and patellar tendon pain

Gait Interventions to Promote Normal Motion

- Terminal Knee Extension in Dorsiflexion
- Exaggerated Gait Mechanics
- Repetitive initial contact in knee extension
- Repetitive transition from mid-stance to TKE

Quadriceps Strengthening Progressions

- Squat Progressions:
 - Sit to Stand
 - Box Squats -> Preferential Box Squat
 - Wall Sits -> Preferential Wall Sits
 - Goblet Squats
 - Single Leg Squat
- Lunge Progression:
 - Reverse slide lunge
 - Split Squat
 - Lunge

Hamstrings Strengthening Progressions

- Hamstrings as Knee Flexors:
 - Standing Knee Flexion & Prone Knee Flexion with Cuff Weights
 - Seated Hamstring Curl
 - Prone Hamstring Curl
 - Manual Resistance Knee Flexion (Concentric and Eccentric)
 - Exercise Ball Hamstring Curl
 - Nordic Hamstring Curl
- Hamstrings as Hip Extensors
 - Bridge Progression
 - Bridge -> Marching Bridge -> Single Leg Bridge -> Exercise Ball Bridge
 - Manual Resistance
 - ½ Range
 - Full Range (Pump Handle)
 - Single Leg Romanian Dead Lift
 - Foam Roller
 - Weighted
 - Kettle bell dead lift
 - Kettle bell swing
 - Roman Chair
 - Razor Curls
- Hamstrings on a Cable Column:
 - Max Hip Flexion:
 - Concentric knee flexion
 - Isolated eccentric knee extension
 - Max Knee Extension:

- Concentric hip extension
- Isolated eccentric hip flexion

Motor Control Assessment

- Step Down Assessment
- Step & Hold Assessment
- Single Leg Squat Assessment
- Drop Vertical Jump

Assessment Progression when Dynamic Valgus is noted:

- If pronation of the foot is noted:
 - Assess ankle dorsiflexion in non-weight bearing and weight bearing
 - Assess gastrocnemius length
 - Assess supine hip ER drop (medial soleus restrictions)
 - Assess posterior tibialis strength
 - If foot is excessively flat, assess performance when foot is propped into neutral
- Assess Glut Med MMT
- Assess Glut Max MMT for extension
- Assess Glut Max MMT for ER

Posterior Tibialis Strengthening

- Manual Resistance
- Elastic Resistance
- Heel raises with calcaneal inversion (raise to first toe; elastic resistance pulling into calcaneal eversion)

Foot Intrinsic Strengthening

- Doming Exercises
- Piano Key Exercises
- Abductor Hallucis Strengthening

Gluteus Medius Strengthening Progression:

- Clamshells
- Side-lying abduction
- Side stepping
- Isometric abduction
- Lateral lunge
- Lateral slider

Hip External Rotator Strengthening Progression

- Supine Hip ER (Elastic Resistance)
- Supine Hip ER (Unilateral isometric)
- Sport Cord Progression