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Patella Instability/Malalignment Rehabilitation

This rehabilitation protocol is designed for patients who have undergone tibial tubercle osteotomy to correct patella malalignment/maltracking and related procedures. The intensity allowed and the time frame required for the rehabilitation process is dependent upon the surgical procedure and the clinical assessment. The protocol is divided into phases. Each phase is adaptable based on the individual patient and special circumstances.

The **overall goals** of the surgical procedure and rehabilitation are to:

- Control pain, swelling, and hemarthrosis
- Regain normal knee range of motion
- Regain a normal gait pattern and neuromuscular stability for ambulation
- Regain normal lower extremity strength
- Regain normal proprioception, balance, and coordination for daily activities
- Optimize core strength
- Achieve the level of function based on the orthopedic and patient goals

Ideally the physical therapy should be initiated within 3 to 5 days post-op. It is extremely important for the supervised rehabilitation to be supplemented by a home fitness program where the patient performs the given exercises at home or at a gym facility. **Important post-op signs** to monitor:

- Swelling of the knee or surrounding soft tissue
- Abnormal pain response, hypersensitivity
- Abnormal gait pattern, with or without assistive device
- Limited range of motion
- Weakness in the lower extremity musculature (quadriceps, hamstring)
- Insufficient lower extremity flexibility
- Core weakness and subtle postural instability

Return to activity requires both time and clinical evaluation. To safely and most efficiently return to normal or high level functional activity, the patient requires adequate strength, flexibility, and endurance. Isokinetic testing and functional evaluation are methods of evaluating a patient's readiness to return to activity. Return to intense activities following a knee scope may increase the risk of an overuse injury or the possibility of compounding prior articular cartilage damages and symptoms such as pain, swelling, or instability should be closely monitored by the patient. Specific exercises can be modified, substituted, or added at the discretion of an experienced sports physical therapist or athletic trainer who has expertise in sports surgery rehabilitation.

PHASE 1: WEEK 1-2

PRECAUTIONS

AMBULATION: TTWB (20%) using B axillary crutches and hinged brace; brace to remain locked at 0 during ambulation and sleep to protect repair

ROM: 0-90° PROM/AAROM

ROM/FLEXIBILITY

- Limit flexion to 90°
- Heel slides
- Seated gastroc stretch with towel
- Seated or supine hamstring stretch
- Prone hang if needed to gain full extension

STRENGTH

- Quad sets with biofeedback/NMES to VMO
- SLR (in brace until can perform without extensor lag)
- Ankle pumps or PF with theraband
- Add/Abd/Ext leg raises
- Seated hip flexion

MODALITIES

- Ice PRN and following exercise
- E-stim/Biofeedback to quad

GOALS OF PHASE 1

- ROM 0-90°
- Adequate quad/VMO contraction
- Independent in HEP
- Control pain, inflammation, and effusion
- TTWB

PHASE 2: WEEK 2-6

The MPFL does act as a check rein to patella motion but should not be stressed during ROM so significant motion limitations are not necessary.

ROM/FLEXIBILITY

- Continue previous
- Heel slides: 120° by week 4; 135° by week 6
- Begin patella mobilization, focus on sup/inf/medial, only very gentle if perform lateral glide
- Flexionator/extensionator if necessary to improve flexion/extension

STRENGTH

- Quad sets with biofeedback
- SLR in 4 planes
- Multi-hip machine in 4 planes
- HS curls 0-90
- At 4 weeks can begin multi-angle submaximal isometrics: 0,30,60,90
- Standing calf raises
- Total gym/shuttle/leg press: focus on even weight distribution; limit closed chain flexion to 90°

GAIT

- TTWB TO PWB (week 2-4) TO WBAT by week 6 using B axillary crutches in hinged brace
- May unlock brace for gait when good quad control achieved, lock in extension for sleep
- Cone walking

AEROBIC

- BICYCLE
 - Initiate when 110° flexion is reached
- DO NOT use bike to increase flexion
 - Work to maintain 60RPM with no symptoms then can work to increase resistance

BALANCE/PROPRIOCEPTION

- Weight shifting side to side
- Single leg balance stable surface

MODALITIES

- Ice 15-20 minutes
- Ultrasound if needed

GOALS OF PHASE 2

- ROM 0-135°
- Adequate quad/VMO control
- Control pain, inflammation, and effusion
- N gait
- Increase lower extremity strength and endurance

PHASE 3: WEEK 6-12

ROM

- Work to achieve full active and passive ROM 0-135+
- Continue prior stretching, increase intensity: HS/Gastroc/Soleus, ITB/Quad
- Patella mobs as necessary

STRENGTH

- Continue above increasing I as able
- Leg Press-single leg eccentric
- Partial wall-sits
- Knee extension (45-0°) with resistance
- Lateral/Forward step-up/downs
- Reverse lunges-knee not to migrate over toe
- Hamstring curls with resistance (0-90°)
- Multi-hip machine in 4 planes
- Mini-squats with resistance (0-45°)
- Straight leg deadlift
- May initiate light open chain activities week 10

GAIT

- Cone walking until N gait is achieved; d/c brace

BALANCE TRAINING

- SLB stable and unstable surfaces
- Biodex SD balance system
- Two-legged balance board with plyotoss
- Wobble board – double limb balance and squats

AEROBIC CONDITIONING

- Bicycle with resistance
- EFX/StairMaster
- Walking program
- May initiate swimming with kick exercises after week 8
- Jog progression (1-2min jog, 1 min walk x 5) at week 12

DYNAMIC WARMUP

- Week 10 in preparation for jogging

MODALITIES

- Ice 15-20 minutes as needed

GOALS OF PHASE:

- ROM 0-135°
- Full weight bearing with quad control
- Increase strength and endurance
- Increase core strength and stability
- Control pain and swelling
- Ready to initiate jogging

PHASE 4: WEEK 12-24+

ROM

- Continue all stretching from previous phases

STRENGTH

- Continue all strengthening activities from previous phases increasing weight and repetitions
- Advanced closed chain exercises
- Emphasize single leg strength and core/balance/proprioception
- Initiate light/basic plyometric training at week 16

BALANCE/PROPRIOCEPTION

- Continue previous adding perturbation or removing vision to increase difficulty level
- Y balance: goal is <4cm difference involved vs uninvolved in anterior direction

AEROBIC

- Initiate/progress jogging progression on TM or soft surface such as track; no running on asphalt
- Continue bike – single and double limb
- Swimming
- Golf

FUNCTIONAL TRAINING

- Slide board
- Ladder drills
- Initiate shuffles, carioca, figure 8 at submax speeds
- Initiate Part 1 of FIFA11+ http://www.f-marc.com/downloads/posters_generic/english.pdf

GOALS OF PHASE:

- Increase and maximize function
- Maximize strength and endurance
- Maximize core strength and stability
- Return to previous activity level
- Return to sport specific functional level