Campbell Clinic ORTHOPAEDICS

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Patellofemoral Pain Rehab Protocol

Phase	Precautions	Treatment Recommendations	Emphasize
Phase 1: Activity Modification *Criteria for Advancement:* *-Active quadriceps contraction* *-No gross effusion* *-No or minimal pain at rest* *-Pain controlled with ambulation on level surfaces with appropriate assistive device* *-If while following recommendations fails to demonstrate improvement in 4 visits or 2 weeks, refer to MD*	▪ Be mindful of yellow flags such as effusion and red flags such as multi-joint symptoms ▪ Avoid exercises and activities that are painful and/or exacerbate symptoms ▪ Significant gait deviations	▪ Patient education o Understanding PF loads o Improved neuromuscular control/muscle activation o Standing posture o Deficits identified and plan of care including goals o Activity modification to decrease or eliminate pain o Movement strategies (importance of hip strategy versus knee strategy) o Management of pain and effusion ▪ Modalities o Pain, swelling: e.g. ice, compression, TENS o Strength: Russian stimulation, biofeedback o Consider Blood Flow Restriction (BFR) for muscle activation/strengthening ▪ Lower extremity (LE) soft tissue and joint mobility ▪ Knee P/AA/AROM without increasing irritability ▪ Knee isometric strengthening as tolerated ▪ Core stabilization ▪ Proximal and distal strengthening ▪ Proximal and distal stretching as tolerated ▪ Cardiovascular exercise (see Appendix 1- Cardiovascular exercises) ▪ External supports, as needed (bracing or taping) ▪ Gait training with appropriate assistive device if needed	▪ Patient understanding of condition/PF loading ▪ Control pain and effusion/inflammation ▪ Pain-free exercise and activities ▪ Normalize gait with appropriate assistive device ▪ Active quadriceps contraction
Phase 2: Addressing Impairments/Improving Strength *Criteria for Advancement:* *_ Pain free with modified activities and ADLs* *_ Able to stand on 1 leg with good alignment and control* *_ Able to demonstrate a hip strategy* *_ Able to perform pain free 6" step up* *_ Intermittent pain* *_ Normalized gait on level surfaces (continued)* **Phase 2: Addressing Impairments/Improving Strength (continued)**	▪ Sign/symptom provocation: pain during or after activity, joint effusion, active ▪ inflammation, quadriceps shutdown ▪ Avoid activities that cause pain /inflammation	▪ Patient education o Progress to performance of modified function (0/10 pain with ADLs and non-PT specific exercise e.g. cardiovascular) o Reinforce compliance with updated HEP o Movement strategy ▪ Continued external supports (bracing, taping, shoe inserts) ▪ Address flexibility and ROM deficits o Massage therapy o Soft tissue mobilization o Foam rolling o Stretching o Joint mobilization, as needed (patella, ankle, hip) ▪ Neuromuscular control, bilateral progressing to single limb balance ▪ Proximal muscle activation and limb alignment in single limb (see Appendix 3) ▪ Knee control and distal alignment in single limb ▪ Hip strategy during functional movements ▪ Strengthening (see Appendix 3) o Core o Hip and gluteal o Quadriceps o Ankle and foot ▪ Cardiovascular training (see Appendix 2)Forward step ups starting at 2" and progressing as tolerated ▪ Gait training, weaning off assistive device if indicated	▪ Progress home exercise program ▪ Compliance with activity modification ▪ Effusion, inflammation and pain control ▪ Good neuromuscular control/alignment with single limb support ▪ Monitor onset of new pain/symptoms ▪ Continue work on soft tissue self-mobilization

Phase 3: Restoration of Function *Criteria for Discharge (or advancement if returning to sport):* *-Independent control of symptoms* *-Pain free with modified activities and ADLs* *-Able to demonstrate bilateral body weight squat with proper alignment and control* *-Able to descend a 6-8" step with good control and alignment (depending upon patient's height)* *-Discharge to long term HEP and modified activity or progress to Phase 4 if patient wants to return to dynamic activities or sport*	▪ Too much, too soon: Monitor volume and load ▪ Avoid compensatory movement strategies ▪ Monitor movement strategies during fatigue situations ▪ Avoid inadequate rest and recovery ▪ Avoid inadequate strength to meet demands of activity level ▪ Ensure that underlying pathology is conducive to long term loading and will optimize joint preservation	▪ Patient education o Functional progression o Adequate rest and recovery ▪ Functional strength o Squat progression o Eccentric progression ▪ Progression of body weight exercise o Double leg to single leg exercise o Deadlift to single leg deadlift ▪ Neuromuscular control ▪ Cardiovascular training via low/non-impact activities such as elliptical, bike etc. ▪ Hydrotherapy if available (see Appendices 2, 4 and 5-hydrotherapy) ▪ Evaluation based strengthening progression o Core o Gluteals o Quadriceps (closed chain in pain free arc) ▪ Flexibility/mobility	▪ Progression of pain free PF loading ▪ Eccentric quadriceps control ▪ Quality with functional activities
Phase 4: Return to Sport (if applicable) *Criteria for Advancement:* *-Minimal to no swelling and pain* *-Movement patterns, (continued)* **Phase 4: Return to Sport (continued)** *strength, flexibility and motion to meet demands of sport* *-Independent home exercise program*	▪ Too much, too soon: monitor volume and load ▪ Avoid compensatory movement strategies ▪ Monitor movement strategies during fatigue situations ▪ Avoid inadequate rest and recovery ▪ Avoid inadequate strength to meet demands of activity level ▪ Ensure that underlying pathology is conducive to long term loading and will optimize joint preservation	▪ Patient education regarding returning to sport ▪ Sport-specific activities and movement patterns, e.g.: o For golf- hip and trunk rotation and single leg exercises/activities (for ball placement) o For tennis- deceleration activities ▪ Soft tissue mobilization as needed ▪ Dynamic single leg balance activities ▪ Progressive cardiovascular endurance training ▪ Increase volume and PF load to mimic load necessary for return to activity ▪ Introduce movement patterns specific to patient's desired sport or activity ▪ Introduction of light agility work (see Appendix 5) ▪ Increase cardiovascular load to match that of desired activity ▪ Consider collaboration with ATC, performance coach/strength and conditioning coach, skills coach and or personal trainer for complex sports specific movements if available	▪ Progression of pain free PF loading ▪ Eccentric quadriceps control ▪ Quality with functional activities

Protocol adapted from Hospital for Special Surgery Rehabilitation patellofemoral guidelines