UNICOMPARTMENTAL KNEE ARTHROPLASTY POST-OPERATIVE GUIDELINES

The following Unicompartmental Knee Arthroplasty guidelines were developed by HSS Rehabilitation. Progression is both criteria-based and patient specific. Phases and time frames are designed to give the clinician a general sense of progression. Following unicompartmental knee arthroplasty, progression through the phases is typically more rapid than following total knee arthroplasty, as many of these patients expect to return to prior function, including sports. Progression, however, should not be prioritized over pain and edema control. The rehabilitation program emphasizes early, controlled motion to prevent knee stiffness and to avoid disuse atrophy of musculature. The program should balance the aspects of tissue healing and appropriate interventions to maximize flexibility, strength, and pain-free performance of functional activities. This model should not replace clinical judgement.

FOLLOW SURGEON’S MODIFICATIONS AS PRESCRIBED
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Pre-Operative Phase

PRECAUTIONS

• Avoid prolonged sitting or standing if painful
• Avoid severe pain with walking, particularly if there is a limp or other compensatory movement
• Maintain knee range of motion (ROM) and perform strengthening exercises, if tolerable
• Modify or minimize activities that increase pain

ASSESSMENT

• Lower Extremity Functional Scale (LEFS)
• Knee disability and Osteoarthritis Outcome Survey, Junior (KOOS JR)
• Numeric Pain Rating Scale (NPRS)
• Edema
• Lower extremity (LE) active range of motion (AROM) and passive range of motion (PROM)
  o Note specific deficits to involved knee
• Home environment – define barriers and available resources.
• Pre-operative gait quality, distance and use of assistive device.

TREATMENT RECOMMENDATIONS

• Patient Education:
  o Familiarize with post-operative plan of care, mobility and treatment progressions
• Optimize knee function prior to surgery, including balance, strengthening and flexibility
• Issue a home exercise program (HEP) that addresses primary impairments
• Low impact cardiovascular conditioning

CRITERIA FOR ADVANCEMENT

• Patient able to verbalize post-operative plan of care

EMPHASIZE

• Optimize muscular strength and flexibility
• Familiarize with post-operative plan of care
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Acute Care Phase (Post-op Days 0-7)

PRECAUTIONS

- Avoid prolonged sitting, standing, and walking
- Avoid severe pain with strengthening and ROM exercises
- DO NOT put a pillow under the knee – keep extended when resting
- Surgeon’s guidelines will take precedence over these guidelines:
  - Some surgeons may initially limit knee flexion to 90° for the first week
- Monitor for excessive swelling, as this can delay the timeline.

ASSESSMENT

- Mental status (person, place, time), as well as fear avoidance behaviors.
- NPRS
- Wound status
- Edema (circumferential measurements; pitting)
- Post-anesthesia sensory motor screening
- AROM/PROM of knee
- Functional status: bed mobility, transfers, gait and stair mobility
- Assess for compromised cardiovascular status/deep vein thrombosis (DVT)

TREATMENT RECOMMENDATIONS

- Patient education to above precautions, edema management, and safety with mobility
- Transfer training: supine to/from sit, sit to/from stand from bed, chair, toilet
- Gait training with appropriate device on level surfaces and stairs, emphasizing knee flexion in swing phase.
- Therapeutic exercise with focus on improving knee ROM, quadriceps contraction, and muscle pumping (e.g. quad sets and ankle pumps)
- Promotion of knee extension activities (e.g. towel roll under heel for passive knee extension stretch)
- Activities of Daily Living (ADL) training
- Cryotherapy and elevation of lower extremity to manage edema
- Initiate and emphasize importance of HEP
CRITERIA FOR ADVANCEMENT
- Active flexion ~80° in sitting and extension < 10 ° in supine
- Good pain control
- Independent with transfers
- Ambulates safely with appropriate assistive device on level surfaces and stairs.
- Independent with HEP

EMPHASIZE
- Importance of self-regulation concerning pain and edema with pain medication, modalities and activity modification
- Independent transfers
- Household ambulation with appropriate assistive device
- HEP compliance
- Importance of restoring full knee extension ROM
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Post-Operative Phase 1 (Weeks 1-5)

PRECAUTIONS
• If ROM plateaus with hard or empty end feel contact the surgeon
• Assess swelling and other signs of venous compromise
• Limit volume of household activities that increase pain or edema
• Encourage pain-free ambulation without any deviation, particularly knee flexion in stance, and knee extension in swing
• Encourage modulation of pain with activities, rest and modalities.
• Avoid prolonged sitting, and DO NOT place pillow under knee at rest.
• Delay reciprocal stair negotiation until strength and control of the operated limb is restored.

ASSESSMENT
• LEFS
• KOOS JR
• NPRS Scale
• Wound assessment/observations
• Edema assessment (circumferential measurements)
• LE AROM/PROM with focus on knee flexion/extension
• Strength Assessment: manual muscle testing (MMT)
• Single Leg Stance (SLS)
• Timed Up and Go (TUG)
• 5x sit to stand
• ADL ability
• Gait and stair ability
TREATMENT RECOMMENDATIONS

- Manual Therapy
  - Soft tissue mobilization: for edema control and pain modulation, to facilitate movement.
  - Patella mobilization when incision is stable

- ROM/Stretching
  - PROM/AAROM knee extension and flexion exercises
  - Ankle dorsiflexion ROM as necessary
  - Stretching of necessary muscle groups (e.g. calf, hamstring)

- Strengthening
  - Terminal Knee Extension (TKE):
    - supine or long sitting heel prop/quad sets
    - standing terminal knee extension
    - prone active extension
  - Straight leg raises (SLR) in all planes (when TKE achieved); prioritize quadriceps, hip, hamstring strength

- Functional strengthening
  - Forward and lateral step up and step-down progression, starting with 2-4 inch (”) step

- Balance training progression from bilateral to unilateral

- Gait training with/without cane with emphasis on active knee flexion and extension, heel strike, reciprocal pattern, symmetrical weight bearing

- ADL training: continue sit to stand, in/out of tub/shower, car transfer

- Cardiovascular:
  - Cycle ergometer: Short crank if > 90°, normal crank if > 110° knee flexion ROM
  - Backward pedaling may be tolerated prior to forward pedaling

- Modalities
  - Cryotherapy/elevation/modalities may be used to help control swelling and pain
  - Electrical stimulation or biofeedback may be used for quadriceps reeducation
  - Compression garments (e.g. compression wrap, or tubigrip) may be used, with surgeon permission

- HEP progression

MINIMUM CRITERIA FOR ADVANCEMENT

- Edema and pain controlled
- AROM > 110° of knee flexion, 0° of extension
- No quadriceps lag with SLR flexion
- Ambulate on level surface with/without assistive device with normal gait pattern
- Ascend 4”-8” steps with good control
- Sit to stand transfers independent with symmetrical weight bearing through bilateral lower extremities
- Independent with necessary ADLs
- Independent with HEP
EMPHASIZE

- Decrease edema
- Increase flexibility
- Active quadriceps contraction through to terminal knee extension
- Restore strength
- Normalize gait pattern.
- Stair negotiation
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Post-Operative Phase 2 (Weeks 6-11)

PRECAUTIONS

- Avoid reciprocal stair negotiation if severe pain or gait deviation present
- Avoid high impact activities such as running, jumping, plyometric activity and vibration platforms

ASSESSMENT

- LEFS
- KOOS JR
- NPRS Scale
- Swelling assessment (circumferential measurements)
- LE ROM of hip, knee and ankle
- Strength Assessment: MMT or hand held dynamometry (HHD) of all hip, knee and ankle muscles, particularly hip abductors and quadriceps
- SLS
- TUG
- 5x sit to stand
- ADL ability
- Gait and stair ability

TREATMENT RECOMMENDATIONS

- Continuation of phase 1 manual/exercise treatments as needed, especially as HEP.
- Strengthening:
  - Continue progression of quad strengthening
    - closed chain (e.g. squats, step downs, leg press)
    - open chain (e.g. banded knee extension, knee extension machine)
    - progress from bilateral exercise to eccentric control, then to unilateral exercise
  - Proximal LE and core strength
  - Progress functional stair training
- Balance/proprioception training
  - Progress bilateral to unilateral stance
  - Progress static to dynamic activities
  - Progress stable to unstable surfaces
- Transfer training from floor to stand
- Gait training on incline/decline and uneven surfaces
• Cardiovascular conditioning (low impact) e.g. retro treadmill, forward treadmill, elliptical, cycle ergometer
• Review patient’s preferred exercise routine for safety/modifications
• Aquatic exercise if accessible when incision healed and cleared by surgeon

DISCHARGE CRITERIA (OR ADVANCEMENT TO PHASE 3 IF RETURNING TO SPORT)
• Active knee flexion > 120° in supine, >90° in prone, active knee extension = 0°
• Ankle dorsiflexion > 40° (as measured in closed kinetic change)
• Functional test measurements within age appropriate parameters - including symmetrical squat at chair height
• Ability to transfer to and from floor
• Independent with lower extremity ADLs such as tying shoelaces and donning/doffing socks
• Independent ambulation with normal gait pattern on indoor and outdoor surfaces
• Negotiate steps with reciprocal pattern with minimal pain or deviation
• Lower extremity strength 4+/5 MMT, control, and flexibility for high level ADL activities
• Functional, pain-free 8” step down, as a measure of quadriceps and gluteal control.
• Independent with full HEP of appropriate exercises
• **Discharge OR move onto Phase 3 if the goal is to return to sport or advanced functional activities (as cleared by surgeon)**

EMPHASIZE
• Optimize strength and ROM
• Resume uninhibited ADLs
• Encourage maintaining highest level of physical activity
• Encourage HEP compliance for up to 1 year, or surgeon’s recommendation
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Post-Operative Phase 3 (Weeks 12-52)
Begin only if returning to sport with surgeon clearance

PRECAUTIONS

• Note that expert opinion varies widely on allowable sports – consult with surgeon
• As per 2022 review, people were able to return to the following sports:
  o Walking
  o Jogging
  o Swimming
  o Cycling
  o Downhill Skiing
• As per the same review, return to sports rates for people with unilateral knee replacements are as follows:
  o 48.1% returned at 3 months, post-operatively
  o 76.5% returned at 6 months, post-operatively
  o 92.7% returned at 48 months, post-operatively

ASSESSMENT

• LEFS
• KOOS JR
• ROM and flexibility, in particular for specific sport demands
• Strength/functional capacity assessment
• Star excursion balance test
• Assess sport specific movements
• Functional movement assessments

TREATMENT RECOMMENDATIONS

• Sports specific warm up and activities
• Activity specific training
• Endurance training, e.g. elliptical, power walking
• Low impact agility drills
• Dynamic balance activities
• Consider consultation with sports specific professional
CRITERIA FOR DISCHARGE

- No increase in pain or swelling with activity
- Strength, ROM, flexibility throughout the kinetic chain to meet sports specific demands
- Independent with full HEP
- Transition plan from rehabilitation to sports activities, e.g. personal trainer, performance coach, gym

EMPHASIZE

- Progressive return to sport/recreational activity
- Neuromuscular patterning
- Gradual increase of loads to meet sports specific demands, not exceeding capacity.
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References


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