# Thunder Basin Orthopaedics: ACL Reconstruction Protocol

## Post Injury

**Goals:**
• Physically prepare patient for surgery
• Quantify physiological baselines
• Reduce Edema
• Regain ROM of involved knee
• Mentally prepare patient for surgery
• Identify special needs
• Identify potential problems

**Clinical Evaluations:**
• General patient history and observation
• Pain scale: location, quality and duration
• Edema: degree, location and character of swelling
• Patella: position, mobility, condition
• ROM (involved): active and passive

**Treatment Options:**
• Rehab process education
• Psychological preparation for rehab
• Reduce edema/manage pain
• P.R.I.C.E.
• Crutch use instruction
• Brace fitting
• Ambulation training
• Instruction on use of crutches
• PROM, AROM and AAROM QUAD/HAM
• Strengthening: Quad/Ham
- SLR four planes
- Wall squats with isometric adduction
• Cardiovascular training

**Supervised Program:**
• P.R.I.C.E.
• Reduce edema/manage pain
• Cardiovascular training
• EMS
• Muscle re-education

**Home Program:**
• Reduce edema/manage pain
• PROM/AROM
• Patella mobs
• Practice normal gait
• Strengthening:
- SLR four planes
- Quad sets
- Hamstring curls with resistance

## Phase I: Post-Surgical/Reduction of Acute Symptoms

**Goals:**
• Protect the graft
• Allow wound healing
• Avoid contractures
• Ambulation with 2 crutches, Increase WB as tolerated
• Increase patellar mobility
• Reduce pain, effusion and inflammation
• Perform quad set
• Full passive extension
• AROM: 20-70 deg (minimum)
• PROM: 0 > 90 deg

**Clinical Evaluations:**
• Verify home program compliance
• Pain scale: location, quality and duration
• Quantify and describe hemarthrosis/edema
• Palpate soft tissue in contracture-prone areas
• Patella: position, mobility and condition

• ROM: AROM and PROM limits
• Quad: Quality of contraction

**Treatment Options:**
• Reduce spasm, pain and edema
• ES for pain
• Patellar mobilization
• WB ambulation
• PROM
• Quad strengthening (atrophy treatment)
- Muscle re-education: ES with Quad sets
- SLRs
• Hip/knee strengthening

**Supervised Program:**
• Reduce spasm / pain / edema
• Cardiovascular training
• Muscle re-education
• Quad sets/SLR

**Home Program:**
• Pain / edema control
• P.R.I.C.E.
• Patellar mobilization
• PROM exercises
• Quad sets/SLR
• NWB muscle control and strengthening

# Phase II: Range of Motion and Initial Strengthening

**Goals:**
• Protect the graft
• Ambulation with one crutch and progress to FWB
• Wound healing
• Pain: controlled without narcotics
• AROM: 0-90 (minimum)
• PROM: 0-115
• Control edema
• Isometric strength: Quad < 60% deficit
HS < 25% deficit

**Clinical Evaluation:**
• Verify home program compliance
• Pain scale: location, quality and duration
• Hemarthrosis / Edema: quantify and describe
• Palpate soft tissue in contracture-prone areas
• Patella: position, mobility and condition
• ROM: AROM and PROM limits
• Quality of Quad muscle contraction

**Treatment Options:**
• Pain management
• P.R.I.C.E.
• Patella mobilization
• Full WB ambulation
• ROM: active and active assisted knee and hip ROM
• AAROM
• PROM
• Quad Strengthening:
- Quad sets with ES for muscle re-education
- SLR (4 planes)
• HS Strengthening:
- Standing leg curls with ankle weights
• WB Proprioception
• Gait: Normalize gait *
• Cardiovascular training *
* Note: To be done when WB > 60%

**Supervised Program:**
• Reduce spasm / pain / edema / swelling
• Cardiovascular training
• Strengthening and flexibility of hip, lower leg and knee

**Home Program:**
• Pain / edema control
• PROM & Patellar mobilization exercises
• Muscle control

• Non-WB strengthening of hip, lower leg and knee
• Flexibility training

# Phase III: Initial Weight-bearing and Intermediate Strengthening

**Goals:**
• Protect the graft
• ADLs: pain-free
• Effusion: none
• WB 100%
• Ambulation: unassisted
• Strength:
QUAD < 40% deficit
HAM < 20% deficit
QUAD/HAM ratio > 80%

**Clinical Evaluation:**
• Verify home program compliance
• Pain scale: location, quality and duration
• Hemarthrosis / Edema: quantify and describe
• Palpate soft tissue in contracture-prone areas
• Patella: position, mobility and condition
• ROM: AROM and PROM limits
• Quality of Quad muscle contraction

**Treatment Options:**
• Control pain / edema / inflammation
• P.R.I.C.E.
• Patellar mobilization
• PROM
• WB ambulation without crutch
• AAROM: until AROM is pain-free
• Gait
• Non-WB proprioception
• WB proprioception
• Quad strengthening:
  - Lateral Step-ups (LSU)
  - Wall squat w/ isometric AD
• HS strengthening:
- Isotonic PREs

**Supervised Program:**
• Manage pain / edema
• Cardiovascular training
• Strengthening of hip, knee and ankle musculature

**Home Program:**
• Pain / edema control
• PROM & Patellar mobilization exercises
• Muscle control
• WB and NWB strengthening of hip, knee and ankle
• Flexibility training

# Phase IV: Progressed Weight-bearing & Strengthening

**Goals:**
• Protect the graft
• Maintain pain free ADLs
• Maintain FWB
• Maintain full AROM and PROM
• Strength:
QUAD < 35% deficit
HAM < 6% deficit
QUAD/HAM ratio > 85%

**Clinical Evaluation:**
• Pain scale: location, quality and duration
• Hemarthrosis / Edema: quantify and describe
• Patella: position, mobility and condition
• ROM: AROM and PROM limits
• Verify home program compliance

**Treatment Options:**
• Control edema / inflammation
• Pain management

• Patellar mobilization
• AAROM: until AROM is pain-free
• WB and Non-WB proprioception
• Quad strengthening: isotonic PRE
- LSU
• HS strengthening
- Retrograde stair climbing
• Co-Contractions
- Fitter or Slideboard
- Vertical squat 0-40 degrees

**Supervised Program:**
• Manage pain / edema
• Cardiovascular training: LBC/UBC
• WB and Non-WB Strengthening: Hip and ankle musculature
• Gain Training

**Home Program:**
• Pain / edema control
• Patellar mobilization
• Strengthening of hip, knee and ankle
• Flexibility training
• Cardiovascular training

# Phase V: Advanced Strengthening

**Goals:**
• Maintain pain free ADLs
• Maintain FWB
• Maintain full AROM and PROM
• Strength:
QUAD < 30% deficit
HAM < 4% deficit
QUAD/HAM ratio > 85%

**Clinical Evaluation:**
• Pain scale: location, quality and duration
• Effusion: quantify and describe
• Patella: position, mobility and condition
• ROM: AROM and PROM limits
• Verify home program compliance

**Treatment Options:**
• Control edema / inflammation
• Pain management
• WB Proprioception
• Non-WB Proprioception
• QU strengthening: isotonic PRE
- Leg presses 0-40 degrees
• HS strengthening
- Retrograde stair climbing
- Front lunges
• Co-Contractions
-Vertical squat 0-60 degrees
- Lateral lunges
- Single leg squats
• Plyometric training

**Supervised Program:**
• Manage pain / edema
• Cardiovascular training LBC/SRC
• Strengthening: Hip and ankle musculature
• Plyometrics

**Home Program:**
• Pain / edema control
• Patella mobilization
• WB Strengthening of hip, knee and ankle
• Flexibility training
• Cardiovascular training
• Functional activity program

# Phase VI: Return to Activity

**Goals:**
• Maintain pain free ADLs
• ROM 100%
• Strength:
QUAD < 10% deficit
HAM < 0% deficit

**Clinical Evaluations:**
• Effusion: quantify and describe
• Patella: position, mobility and condition
• ROM: AROM and PROM limits

• Verify home program compliance

**Treatment options:**
• Control pain / edema / inflammation
• CKC Proprioception
• OKC Proprioception
• Quad strengthening:
- Leg presses 0 - 45 degrees
• HS strengthening
- Front lunges
• Co-Contractions
-Vertical squat 0-90 degrees
- Lateral lunges
- Single leg squats
• Plyometric training

**Supervised Program:**
• Manage pain / edema / swelling
• Cardiovascular training LBC/SRC
• Strengthening: Hip and ankle musculature

**Home Program:**
• Pain / edema control
• WB Strengthening of hip, knee and ankle
• Flexibility training
• Cardiovascular training