Founder Director's Foreword

MGM Allied Health Science Institute is bringing out MAHSI Physiotherapy protocol pocket book which is very much needed for streamlined Physiotherapy practice and optimum outcome in the different elements. I hope this pocket book will be of great use in the patient care and wish great success to the publishing team and professionals.

Dr. D. K. Taneja
Founder Director, MAHSI

MAHSI Physiotherapy Protocols
Principal's Foreword

MGM Allied Health Sciences Institute (MAHSI) MGM Medical College, Indore is the biggest and most renowned centre of physiotherapy for various kind of physiotherapy and Rehabilitation services in Central India since the year 1997, which is providing physiotherapy therapy services for more than 250 patients per day as well as bedside Physiotherapy to the patient admitted in various hospital of M G M Medical College i.e. Maharaja Yashwant Rao Hospital Indore, CNBC, Government Cancer Hospital, MGM Super Specialty Hospital, MTH Hospital, Indore Chest centre and MRTB Hospital etc

The institute is running physiotherapy and occupational therapy courses along with PG courses in Physiotherapy Orthopaedics, Sports, Obst. & Gynae, Geriatric, Cardiopulmonary and Neurology. More than 1000 qualified Physiotherapy professional from the institute are serving and providing patient care in the various part of country and as well as abroad. It is being observed that different qualified professionals and student are not adhere to definite intervention protocol and different elements of patient care so the outcome and intervention duration varies in the intervention and patient referral are not in a defined manner. Therefore need of defined intervention protocol felt and by constituting a committee of qualified professionals in the leadership of Professor Vijay Kaushik the pocket book of MAHSI Physiotherapy

protocol is hereby constituted to streamline the different elements of Physiotherapy intervention with the help of various cited protocol referral book etc. The institute is thankful to them for providing required valuable support. Hopefully the pocket book will be useful for working professional as well as for the young physiotherapy students who will keep with them and use it for intervention as and when required. Wishing great success to all the physiotherapists in remaking well defined protocol based physiotherapy to needy patients.

Dr. Ramhari Meena
Principal, MAHSI

MAHSI PROTOCOLS

1. Post-operative Rehabilitation Protocol Achilles Tendon Repair.
2. Accelerated Rehabilitation After Reconstruction of the Anterior Cruciate Ligament With a Patellar Tendon Graft.
3. Adductor Strain Post-injury Protocol.
4. Rehabilitation Protocol After Arthroscopic Anterior Bankart Repair.
5. Criteria-Based Postoperative ACL Reconstruction Rehabilitation Protocol.
6. Anterior Open Capsular Shift Rehabilitation Protocol.
7. Guidelines for management of complex regional pain syndrome .
8. Dynamic hip screw protocol.
9. Epicondylitis Rehabilitation Program.
10. Extensor tendon repair protocol.
11. Evidence based protocol for flexor tendon repair.
12. Postfracture/period of immobilization management Guidelines.

13. Hamstring Strain Rehabilitation Protocol.
14. Rehabilitation Protocol After Nonoperative Treatment of Subacromial Impingement.
15. Lumbar Discectomy Physical Therapy Prescription.
16. Lumbar Fusion Protocol.
17. Lumbar Laminectomy Physical Therapy Prescription.
18. Post-operative Rehabilitation Protocol Meniscal Repair.
19. Arthroscopic partial medial or lateral meniscectomy protocol.
20. Post-operative Rehabilitation Protocol MPFL reconstruction with or without Tibial Tubercle Osteotomy.
21. Arthritis management guidelines.
22. Rehabilitation Protocol After Open Anterior Bankart Repair.
23. Proximal femoral nail Hip protocol.
24. Recovery from peripheral nerve injury management guidelines.
25. Rehabilitation Following Arthroscopic Repair of

Medium to Large Rotator Cuff Tears.

26. Protocol for total hip replacement.
27. General Outline of Physical Therapy Schedule for Total Knee Replacement (TKR).
28. Tibial Plateau Fracture Protocol.
29. Spinal Cord Injury.
30. Proximal Humerus Fracture / Greater Tuberosity ORIF Rehab.

Theses guidelines are an educational tool to guide through a series of treatment decisions as effort to improve quality and efficiency and reduce unwarranted variation of care. The intention of the recommendations is to provide evidence based guidance in managing the health care of individuals. Physical therapy students and qualified therapist should interpret the guidelines in the context of their specific clinical practice, individual situation, and clinical judgment, as well as the potential for harm.

Post-operative Rehabilitation Protocol Achilles Tendon Repair

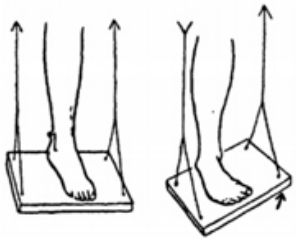
Patient will be in a plantar flexed splint until 2 weeks post op.

Phase I

2 weeks post op

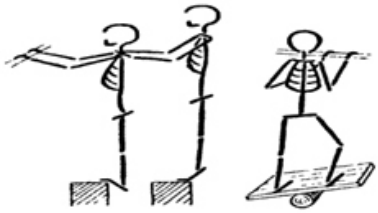
- Walking boot with heel lift insert Weight bearing as tolerated
- Inversion/eversion exercises, tubing, manual resistance, etc.
- Active dorsiflexion exercises to increase ROM
- Passive dorsiflexion to neutral only
- Modalities as needed
- Warm whirlpool
- No resisted plantar flexion (active and passive plantar flexion motion ok)
- Talocrural joint mobs as needed

Phase II



6 weeks post op

- Remove walking boot - WBAT
- PRE's for gastroc/soleus strengthening as tolerated (prevent Achilles tendonitis)
- Work to increase full gastroc/soleus ROM
- Proprioception exercises - single leg stands, stable and unstable surfaces
- Normalize gait



Phase III

12-16 weeks post op

- Full ROM
- Normal gait
- Near full strengthable
  to stand on toes of affected side in full plantar flexion, or able to do 4x25 single foot heel raises.
- Start jogging program if strength acceptable, no limp with gait, and ROM is full

Accelerated Rehabilitation After Reconstruction of the Anterior Cruciate Ligament With a Patellar Tendon Graft

I. Immediate Postoperative Phase (Days 1-7)

Goals :

1. Restore full passive knee extension
2. Diminish joint swelling and pain
3. Restore patellar mobility
4. Gradually improve knee flexion
5. Reestablish quadriceps control
6. Restore independent ambulation

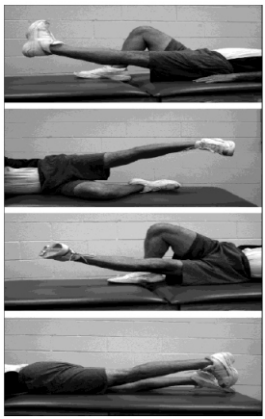
Postoperative Day 1

- *Brace* - Brace/immobilizer applied to the knee locked in full extension during ambulation and sleeping; unlock the brace while sitting, etc.
- *Weight Bearing* - Two crutches, weight bearing as tolerated.

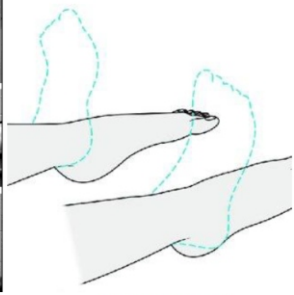
Exercises *:*

- Ankle pumps,Overpressure into full, passive knee

extension, Active and passive knee flexion (90° by day 5),Straight leg raises (flexion, abduction, adduction), Quad sets, Hamstring stretches, Closed kinetic chain exercises: minisquats, weight shifts.



STRAIGHT LEG RAISE



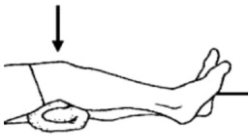
ANKLE PUMPS

- *Continuous Passive Motion* - As needed, 0° to 45°/50°
- *Ice and Evaluation* - Apply ice 20 min/hr and elevate the leg with the knee in full extension.

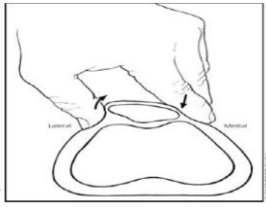
Postoperative Days 2-3

- *Brace* - Brace/immobilizer locked at 0° degrees extension for ambulation and unlocked for sitting, etc.

- *Weight Bearing* - Two crutches, weight bearing as tolerated
- *Range of Motion* - Remove the brace and perform ROM exercises 4-6 times per day.
- *Exercises* - Multi angle isometrics at 90° and 60° (knee extension),Knee extension 90-40° Overpressure into extension (knee extension should be at least 0° to slight hyperextension), Patellar mobilization, Ankle pumps, Straight leg raises (three directions), Minisquats and weight shifts, Quad sets.



QUAD SETS



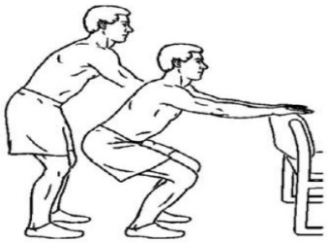
PATELLAR MOBILISATION

- *Continuous Passive Motion* - 0° to 90°, as needed.
- *Ice and Evaluation* - Apply ice 20 min/hr and elevate the leg with the knee in full extension.

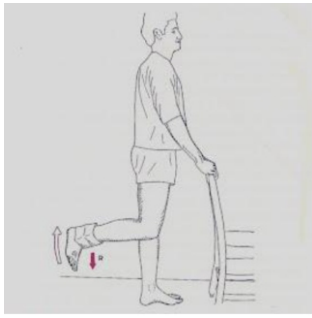
Postoperative Days 4-7

- *Brace* - Brace/immobilizer locked at 0° extension for ambulation and unlocked for sitting, etc.

- *Weight Bearing* - Two-crutch weight bearing as tolerated
- *Range of Motion* - Remove the brace to perform ROM exercises 4-6 times per day, knee flexion to 90° by day 5 and approximately 100° by day 7.
- *Exercises* - Multiangle isometrics at 90° and 60° (knee extension),Knee extension 90°-40° Overpressure into extension (full extension 0° to 5°/7° hyperextension), Patellar mobilization (5-8 times daily), Ankle pumps, Straight leg raises (three directions), Minisquats and weight shifts, Standing hamstring curls, Quad sets Proprioception and balance activities.



MINI SQUATS

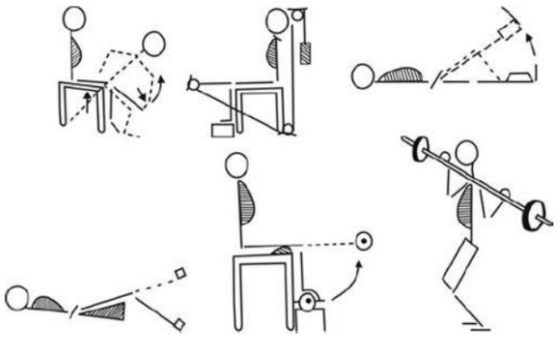


STANDING HAMSTRING CURLS

II. Early Rehabilitation Phase (Weeks 2-3)

Week 2

- *Brace* - Continue locked brace for ambulation and sleeping
- *Weight Bearing* - As tolerated (goal is to discontinue crutches 10-14 days postoperatively)
- *Passive Range of Motion* - Self-ROM stretching (4-5 times daily) with emphasis on maintaining full PROM, Restore patient's symmetric extension.
- *Exercises* - Muscle stimulation superimposed on quadriceps exercises, Isometric quadriceps sets,SLR (4 planes), Leg press (0°-60°), Knee extension 90°-40°, Half squats (0°-40°), Weight shifts, Front and side lunges, Hamstring curls standing (AROM), Bicycle (if ROM allows), Proprioception training, Overpressure



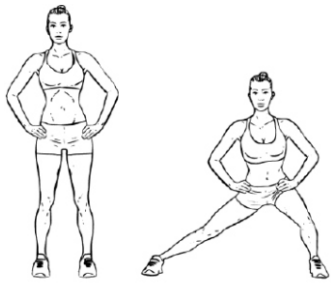
PROGRESSIVE RESISTANCE EXTENSION EXERCISES

into extension, PROM 0°-100°, Patellar mobilization, Well-leg exercises, Progressive resistance extension programstart with 1 lb and advance 1 lb/wk.

- *Swelling Control* - Ice, compression, elevation

Week 3

- *Brace:* Discontinue locked brace (some patients use AROM brace for ambulation) If the patient continues to use a brace, unlock for ambulation
- *Passive Range of Motion* - Continue ROM stretching and overpressure into extension (ROM should be 0°-100°/105°) Restore patient's symmetric extension.
- *Exercises* - Continue all exercises as in week 2, PROM 0°-105°, Bicycle for ROM stimulus and endurance, Pool walking program (if incision is closed), Eccentric quadriceps program 40°-100° (isotonic only), Lateral lunges (straight plane)



LATERAL LUNGES

Front step-downs, Lateral step-overs (cones), Stair Stepper machine,Advance proprioception drills, neuromuscular control drills, Continue passive/active reposition drills (CKC, OKC).

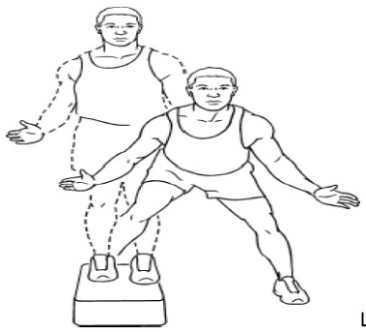
III. Progressive Strengthening/Neuromuscular Control Phase (Weeks 4-10)

- *Brace* - No immobilizer or brace, may use knee sleeve to control swelling/support
- *Range of Motion* - Self-ROM (4-5 times daily using the other leg to provide ROM) with emphasis on maintaining 0° of passive extension PROM 0°-125° at 4 weeks

Week 4-8

- *Exercises* - Advance isometric strengthening program, Leg press 0°-100°, Knee extension 90°-40°, Hamstring curls (isotonics), Hip abduction and adduction, Hip flexion and extension,Lateral step-overs, Lateral lunges (straight plane and multiplane drills) Lateral step-ups, Front step-downs, Wall squats, Vertical squats, Standing toe/calf raises, Seated toe/calf raises, Biodex stability system (balance, squats, etc.) Proprioception drills , Bicycle, Stair Stepper machine, Pool program (backward running, hip and leg exercises)

- *Proprioception/Neuromuscular Drills* - Tilt board squats (perturbation), Passive/active OKC repositioning, CKC repositioning on tilt board.



LATERAL STEP-UPS

Week 8-10

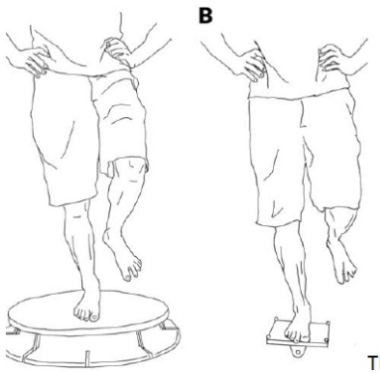
- ***Exercises*** **-** Continue all exercises listed in weeks 4-8,Plyometric training drills, Continue stretching drills, Progress strengthening exercises and neuromuscular Training

IV. Advanced Activity Phase

Weeks 11-16

- *Exercises* - May initiate running program (weeks 10-12) (physician's decision), May initiate light sport program (golf) (physician's decision), Continue all strengthening

drills Leg press, Wall squats, Hip abduction/adduction, Hip flexion/extension, Knee extension 90°-40°, Hamstring curls, Standing toe/calf raises, Seated toe/calf raise Step down, Lateral step-ups, Lateral lunges, Neuromuscular training, Lateral step-overs (cones), Lateral lunges, Tilt board drills, Sports RAC



TILT BOARD DRILLS

repositioning on tilt board.

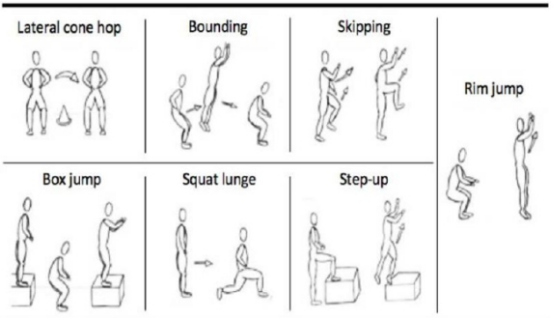
Weeks 14-16

- Advance program, Continue all drills above, May initiate lateral agility drills, Backward running

V. Return-to-sport Phase (weeks 17-22)

- *Exercises* - Continue strengthening exercises, Continue

neuromuscular control drills, Continue plyometric drills, Advance running and agility program,Advance sport-specific training, Running/cutting/agility drills, Gradual return to sport drills.



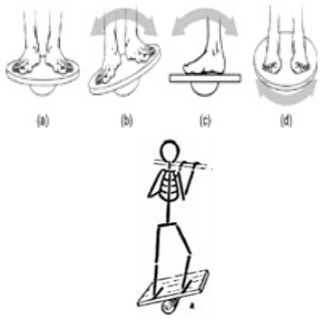
AGILITY DRILLS

Adductor Strain Postinjury Protocol

Phase I (Acute)

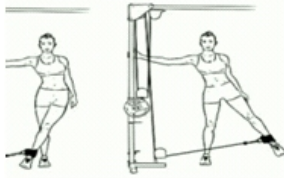
- RICE (rest, ice, compression, and elevation) for approximately the first 48 hours after injury.
- Massage
- Transcutaneous electrical nerve stimulation
- Ultrasound
- Submaximal isometric adduction with the knees bent and knees straight progressing to maximal isometric adduction, pain free Hip passive range of motion in the pain-free range, Nonweight-bearing hip progressive resistive exercises without weight in an antigravity position (all except abduction).Pain-free, low-load, high-repetition exercise.

  Upper body and trunk strengthening,Contralateral lower extremity strengthening, Flexibility program for noninvolved muscles, Bilateral balance board.
- *Clinical Milestone* : Concentric adduction against gravity without pain.

Isometrics of Adductors with knee bent (fig 1) 	Isometrics of Adductors with knee straight (fig 2) 
Passive Hip range of motion (fig 3) 	Balance Board (fig 4) 

Phase II (Subacute)

- Bicycling/swimming, Sumo squats, Single-limb stance, Concentric adduction with weight against gravity, Standing with the involved foot on a sliding board moving in the frontal plane, Adduction while standing on a cable column or elastic tubing, Bilateral adduction on a sliding board moving in the frontal plane (i.e., bilateral adduction simultaneously) Unilateral lunges

Sumo Squats (fig 5) 	Single limb stance (fig 6) 
Concentric adduction against gravity (fig 7) 	Adduction while standing on a cable column or elastic tubing (fig 8) 
Unilateral Lunges (fig 9) 	Multiplane trunk tilting (fig 10) 

(sagittal) with reciprocal arm movements, Multiplane trunk tilting Balance board squats with throwbacks,General flexibility program.

- *Clinical Milestone* : Involved lower extremity passive range of motion equal to that on the uninvolved side and involved adductor strength at least 75% that of the ipsilateral abductors.

Phase III (Sport-Specific Training)

- Phase II exercises with an increase in load, intensity, speed, and volume Standing resisted stride lengths on a cable column to simulate skating, Slide board Lunges (in all planes), Correct or modify ice-skating technique.

Skating (fig 11)

- *Clinical Milestone* : Adduction strength at least 90% to 100% of the abduction strength and involved muscle strength on the contralateral side.

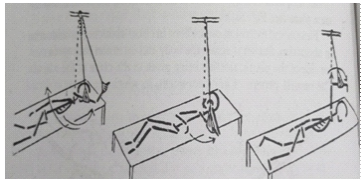
Rehabilitation Protocol After Arthroscopic Anterior Bankart Repair

Phase I : Immediate Postoperative Phase - Restricted-Motion Phase (Weeks 1-6)

- ***Goals :***

1. Protect the anatomic repair
2. Prevent the negative effects of immobilization
3. Promote dynamic stability and proprioception
4. Diminish pain and inflammation

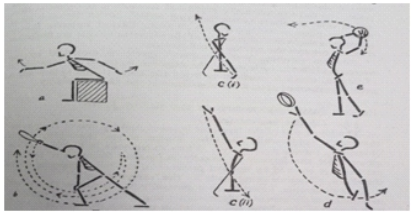
Weeks 1-2



- Sling for 23 weeks, Sleep in an immobilizer for 4 weeks, Elbow/hand range of motion, Hand-gripping exercises, Passive and gentle active assisted range of motion exercises, Flexion to 70° week 1, Flexion to 90° week 2, External/internal rotation with the arm in 30° of abduction-External rotation to 5° to 10°, Internal rotation to 45°

- *No active external rotation or extension or abduction*
  Submaximal isometrics for the shoulder musculature
- Rhythmic stabilization drills : external/internal rotation, Proprioception drills, Cryotherapy, other modalities as indicated

Weeks 3-4



Discontinue use of the sling, Use an immobilizer for sleep (physician decision), Continue gentle range-of-motion exercises (passive range of motion and active assisted range of motion)- Flexion to 90°, Abduction to 90°, External/internal rotation at 45° of abduction in the scapular plane, External rotation in the scapular plane to 15° to 20°, Internal rotation in the scapular plane to 55° to 60°

Note: *Rate of progression based on evaluation of the patient*

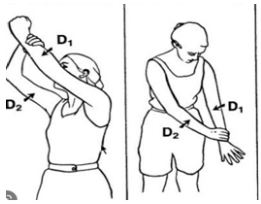
No excessive external rotation, extension, or elevation,Continue isometrics and rhythmic stabilization (submaximal), Core stabilization program, Initiate scapular strengthening program, Continue use of cryotherapy

Weeks 5-6

- Gradually improve range of motion-Flexion to 145°, External rotation at 45° of abduction: 55° to 50°, Internal rotation at 45° abduction : 55° to 60°,May initiate stretching exercises, Initiate exercise tubing external/internal rotation (arm at side), Scapular strengthening, Proprioceptive neuromuscular facilitation against manual resistance.

Phase II: Intermediate PhaseModerate-

Protection Phase (Weeks 6-13)



- ***Goals :***

1. Gradually restore full range of motion (week 10)
2. Preserve integrity of the surgical repair
3. Restore muscular strength and balance
4. Enhance neuromuscular control

Weeks 7-9

Gradually advance range of motion, Flexion to 160°, Initiate external/internal rotation at 90° of abduction, External rotation at 90° of abduction: 70° to 80° at week 7, External rotation to 90° at weeks 8-9, Internal rotation at 90° of abduction: 70° to 75°,Continue to advance isotonic

strengthening program, Continue proprioceptive neuromuscular facilitation strengthening.

Weeks 10-13

- May initiate slightly more aggressive strengthening, Advance isotonic strengthening exercises

Continue all stretching exercises

- *Advance Range of Motion to Functional Demands (i.e., Overhead Activity)*

Progress to isotonic strengthening (light and restricted range of motion)

Phase III: Minimal-Protection Phase (Weeks 14-20)

Goals :

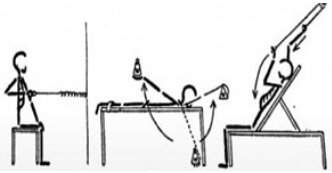
1. Maintain full range of motion
2. Improve muscular strength, power, and endurance
3. Gradually initiate functional activities

Criteria to Enter Phase III:

1. Full nonpainful range of motion
2. Satisfactory stability
3. Muscular strength (good grade or better)

4. No pain or tenderness

Weeks 15-18



- Continue all stretching exercises (capsular stretches), Continue strengthening exercises: Throwers' Ten Exercise Program or fundamental exercises, Proprioceptive neuromuscular facilitation against manual resistance, Endurance training, Restricted sport activities (light swimming, half golf swings)

Initiate interval sport program (weeks 16-18)

Weeks 18-21

- Continue all exercises listed above,Advance interval sport program (throwing, etc.)

Phase IV: Advanced Strengthening Phase (Weeks 22-26)

- ***Goals :***

1. Enhance muscular strength, power, and endurance
2. Advance functional activities
3. Maintain shoulder mobility

Criteria to Enter Phase IV:

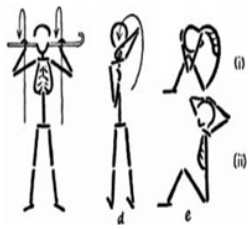
1. Full nonpainful range of motion

2. Satisfactory static stability
3. Muscular strength 75% to 80% of contralateral side
4. No pain or tenderness

Weeks 22-26

- Continue flexibility exercises,Continue isotonic strengthening program, Neuromuscular control drills, Plyometric strengthening, Advance interval sport programs

Phase V: Return-to-sport Phase (Months 7-9)



- ***Goals :***

1. Gradual return-to-activities
2. Maintain strength, mobility, and stability

- *Criteria to Enter Phase V:*

1. Full functional range of motion
2. Satisfactory isokinetic test that fulfills criteria
3. Satisfactory shoulder stability
4. No pain or tenderness

- *Exercises*: Gradually advance sport activities to unrestricted participation,Continue stretching and strengthening program.

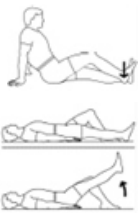
Criteria-Based Postoperative ACL Reconstruction Rehabilitation Protocol

Phase I (Days 1-7)

Weight bearing status

Two crutches, locked knee brace, weightbearing as tolerated.

- Exercises : Heel slides/wall slides/sitting assisted knee flexion, Ankle pumps, Isometric quad sets in full extension with and without, neuromuscular electrical stimulation (NMES) or biofeedback, Hamstring sets (not for hamstring autograft), Gluteal sets, Straight leg raise (SLR) flexion, abduction, extension with brace locked in full extension, Prone hangs or heel propped in supine for passive knee extension, Weight shifting in standing for weight bearing tolerance (anteroposterior and side to side), Continuous passive motion, increasing 5-10



degrees/day, Gait training with crutches and brace, level ground and stairs, Cryotherapy to reduce edema

Manual Therapy

- Patellar mobilizations, Soft tissue mobilizations to hamstrings for spasm control.

Goals

1. Active range of motion (AROM) 0-90 degrees within 10 days
2. Good, active quadriceps contraction
3. Full weight bearing (FWB) with crutches and brace
4. Edema control
5. Graft protection
6. Wound healing

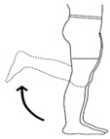
Criteria to Progress to Phase II

- SLR with or without lag in brace, Clean and dry wound, Progressing range of motion (ROM) Able to bear weight on involved limb.

Phase II (Days 8-14)

Weight bearing Status

- Weight bearing as tolerated Two crutches to single crutch Brace unlocked gradually as quad control improves (SLR without lag before unlocking brace beyond 30 degrees)



- **Exercises**

  Stationary bike for ROM (from rocking to full revolutions), Isometric quad sets in full extension and at 90 degrees with and without NMES or biofeedback, Single-leg stance in brace, Balance board anteroposterior in bilateral stance, Continue ROM exercises, Gait training Begin partial weight mini-squats (0-30 deg), Heel raises, Continue SLR, all four directions Terminal knee extension in standing with band, Prone knee bridges, Active standing hamstring curls (do not perform for

postoperative hamstring autograft reconstruction)

Manual Therapy

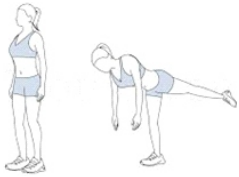
- Continue patellar mobs as indicated

Goals

1. AROM 0-120 degrees within 3 weeks
2. SLR without quad lag
3. Normal gait pattern with single crutch and unlocked brace

Criteria to Progress to Phase III

- AROM 0-90 degrees
- SLR with minimal quad lag
- Normal gait with least restrictive assistive device
- Single-leg stance on involved limb with hand-assist



Phase III (Weeks 2-4)

Weightbearing Status

FWB, normal gait without

assistive device or brace by 3 weeks

Exercises : Stationary bike with gradual progressive resistance for endurance, Isometric quad sets in full extension and at 90 to 60 degrees flexion with and without NMES or biofeedback until equal, quad contraction bilaterally, Closed kinetic chain squat/leg press 0 to 60 degrees, gradual progressive resistance, Balance board bilateral in multiple planes, Single-leg balance eyes open/closed, variable surfaces, Sport cord or treadmill walking forward and backward, Standing SLRs, each LE and with resistance

Manual Therapy

- Continue patellar mobilizations as indicated
- Initiate scar mobilizations as needed
- Manual extension or flexion ROM as needed

Goals

1. Full AROM, equal to nonsurgical knee
2. Normal gait without assistive device
3. Independent activities of daily living (downstairs may still be difficult)

Criteria for Progression to Phase IV

- Equal bilateral knee AROM
- Normal gait without assistive device
- Understanding of precautions regarding state of graft
- Single-leg standing without assistance

Phase IV (Weeks 4-8)

Precautions

- **State of graft at its weakest during this postoperative period**. No impact activities such as running, jumping, pivoting, or cutting, and no deep squatting (limits remain 0-60 degrees) Pay attention to scar mobility; use manual soft tissue mobilizations as indicated

Exercises

- Stationary bike: increase resistance and some light intervals,Squats/leg press: bilateral to unilateral (0-60 degrees) with,progressive resistance,Lunges (0-60 degrees)
- Stairs: concentric and eccentric (not to exceed 60 degrees of knee flexion)
- Calf raises: bilateral to unilateral
- Contrakicks (steamboats) : progress from anteroposterior to side to side, then circles/random
- Rotational stability exercises: static lunge with lateral pulley repetitions. Sport cord resisted walking all four directions,Treadmill walking all four directions
- Balance board: multiple planes, bilateral stance,Ball toss to mini-tramp or wall in single-leg stance
- Single-leg deadlifts : wait for 6-8 weeks if hamstring autograft
- Core strengthening: supine and prone bridging, standing with pulleys

- Gait activities: cone obstacle courses at walking speeds in multiple planes

Criteria for Progression to Phase V

- Bilateral squat to 60 degrees (no more) with equal weight distribution
- Quiet knee (minimal pain and effusion and no giving way)
- Quad girth within 1 to 2 cm of nonsurgical thigh at 10 cm proximal to superior patella
- Single-leg balance on involved limb >30 seconds with minimal movement

Phase V (Weeks 8-12)

Things to Watch Out for

Patellar tendinitis

Exercises

- Squats/leg press: bilateral to unilateral (0-60 degrees), progressive resistance, Lunges (0-60 degrees), Calf raises: bilateral to unilateral, Advance hamstring strengthening Core strengthening, Combine strength and balance (e.g.,

ball toss to trampoline on balance board, mini-squat on balance board, Sport Cord cone weaves, contrakicks), Advanced balance exercises (e.g., single-leg stance while reaching to cones on floor with hands or opposite foot, single leg stance while pulling band laterally)

Goals

- Equal quad girth (average gain of 1 cm per month after first month with good strength program) Single-leg squat to 60 degrees with good form

Criteria for Progression to Phase VI

- Nearly equal quad girth (within 1cm)
- Single-leg squat to 60 degrees
- Single-leg balance up to 60 seconds
- Minimal, if any, edema with activity

Phase VI (Week 12-16)

Exercises

- Elliptical trainer: forward and backward,Perturbation training : balance board, roller board, roller board with platform, Shuttle

jumping: bilateral to alternating to unilateral, emphasis on landing form, Mini-tramp bouncing: bilateral to alternating to unilateral, emphasis on landing form, Jogging in place with sport cord: pulling from variable directions, Movement speed increases for all exercises, Slide board exercises, Aqua jogging

Criteria to Progress to Phase VII

- Single-leg squat, 20 repetitions to 60 degrees of knee flexion
- Single-leg stance at least 60 seconds
- Single-leg calf raise 30 repetitions
- Good landing form with bilateral vertical and horizontal jumping

Phase VII (Weeks 16-24)

Exercises

- Progressive running program, Hop testing and training,Vertical, horizontal jumping from double to single leg, Progressive plyometrics (e.g., box jumps, bounding, standing jumps, jumps in place, depth jumps, squat jumps, scissor jumps, jumping

over barriers, skipping) Speed and agility drills (e.g., T-test, line drills) (make these similar in movement to specific sport of athlete). Cutting drills begin week 20, Progress to sport-specific drills week 20.

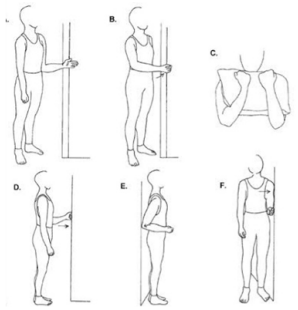
Anterior Open Capsular Shift Rehabilitation Protocol

Phase I: Protection Phase (Weeks 1-6)

- **Goals:**

1. Allow healing of the sutured capsule
2. Begin early protected range of motion
3. Retard muscular atrophy
4. Decrease pain/inflammation

Weeks 1-2



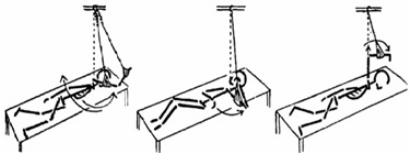
- Precautions :

1. Sleep in an immobilizer for 2 weeks
2. No overhead activities for 4 weeks
3. Wean from the immobilizer and into a sling as soon as possible (orthopedist or clinician will tell the athlete when), usually 2 weeks

- Exercises:Wrist/hand range of motion and gripping,

Elbow flexion/extension and pronation/supination, Pendulum exercises (nonweighted), Rope-and-pulley active assisted exercises- Shoulder flexion to 90°,Shoulder abduction to 60°, T - bar exercises- External rotation to 15° to 20° with the arm in the scapular plane, Internal rotation to 25° with arm abduction at 40°, Shoulder flexion to 90°, Active range of motion of the cervical spine Isometrics- Flexion, extension, external rotation, internal rotation, abduction, Rhythmic stabilization drills

Weeks 2-4

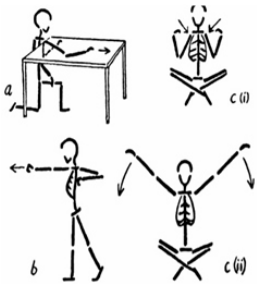


- **Goals :**

1. Gradual increase in range of motion
2. Normalize arthrokinematics
3. Improve strength
4. Decrease pain/inflammation
5. Range-of-Motion Exercises:- L - bar active assisted exercises,External rotation at 45° of abduction to 45°, Internal rotation at 45° abduction to 45°, Shoulder flexion to tolerance, Shoulder abduction to tolerance, Rope-and-pulley flexion, Pendulum exercises

6. All Exercises Performed to Tolerance:Take to point of pain and/or resistance and hold, Gentle selfcapsular stretches
7. Gentle Joint Mobilization to Reestablish Normal Arthrokinematics in: Scapulothoracic joint, Glenohumeral joint, Sternoclavicular joint
8. Strengthening Exercises:
9. Active range of motion week 3, May initiate tubing for external/internal rotation at 0° on week 3, Dynamic stabilization drills,Conditioning Program for:Trunk, Lower extremities, Cardiovascular system
10. Decrease Pain/Inflammation:Ice, nonsteroidal anti inflammatory drugs, modalities

Weeks 4-5



- Active assisted range of flexion motion to tolerance (145°)
- External/internal rotation at 90° of abduction to tolerance
- External rotation at 90°, abduction 60°
- Internal rotation at 90°, abduction 45° to 50°

- Initiate isotonic (light weight) strengthening
- Gentle joint mobilization (grade III)

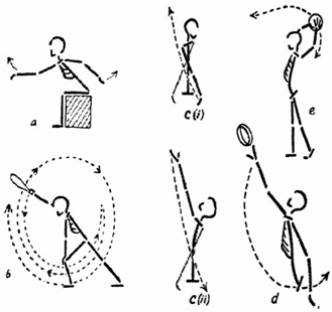
Week 6

- Active assisted range of motion; continue all stretching exercises
- Advance external/internal rotation at 90° of abduction
- External rotation at 90°, abduction 75°
- Internal rotation at 90°, abduction 65°
- Advance shoulder flexion to 165° to 170°
- Progress to Thrower's Ten Exercise Program

Phase II: Intermediate Phase (Weeks 7-12)

Goals:

1. Full nonpainful range of motion at week 8
2. Normalize arthrokinematics
3. Increase strength
4. Improve neuromuscular control



Weeks 7-10

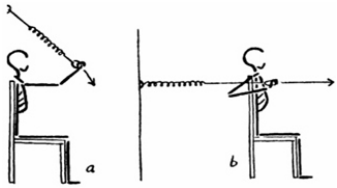
- Range-of-Motion Exercises: Shoulder flexion to 180°, External rotation at 90°, abduction 90° Internal rotation at 90°, abduction 65°,Horizontal adduction/abduction motion

L - bar active assisted exercises, Continue all exercises listed above, Gradually increase range of motion to full range of motion week 8, External rotation at 90°, abduction 85° to 90°,Internal rotation at 90°, abduction 70° to 75°, Continue selfcapsular stretches, Continue joint mobilization, Strengthening Exercises:, Throwers' Ten Exercise Program, Continue dynamic stabilization, Closed kinetic chain exercises, Core stabilization drills, Initiate Neuromuscular Control Exercises for Scapulothoracic Joint : Scapular muscular training.

Weeks 10-12

- Continue all exercises listed above
- Continue all stretching exercises-Advance range of motion to thrower's motion, External rotation to 110° to 115°, Flexion to 180°
- Continue strengthening exercises
- Initiate progressive resistance exercise weight training

Phase III: Dynamic (Advanced) Strengthening Phase (Weeks 12-20)



Weeks 12-16

Goals:

1. Improve strength, power, and endurance
2. Improve neuromuscular control
3. Maintain shoulder mobility
4. Prepare the athlete to begin to throw

Criteria to Enter Phase III:

1. Full nonpainful range of motion
2. No pain or tenderness
3. Strength 70% or better than that on the contralateral side

- Exercises: Continue all stretching and range-of-motion exercises, Continue all strengthening-Throwers' Ten Exercise Program, Initiate plyometrics:, Two-hand drills (week 12), One-hand drills (weeks 13-14) Continue core stabilization drills

Weeks 16-20

- Continue all exercises above

- Continue stretching and range-of-motion exercises
- Initiate interval sport program (week 16)

Phase IV: Functional Activity Phase

(Weeks 21-26)

Goal:

1. Progressively increase activities to prepare patient for full functional return

- **Criteria to Progress to Phase IV:**

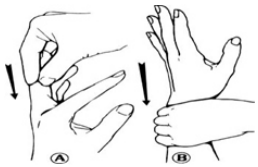
1. Full range of motion
2. No pain or tenderness
3. Isokinetic test that fulfills criteria to throw
4. Satisfactory clinical examination

- Exercises: Continue interval sport program, Continue Throwers' Ten Exercise Program, Continue plyometric five exercises
- Interval Throwing Program:

1. Long-toss program (phase I) (week 16)
2. Off-the-mound program (phase I) (week 22)

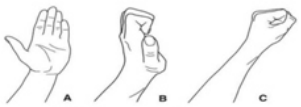
GUIDELINES FOR MANAGEMENT OF COMPLEX REGIONAL PAIN SYNDROME TYPE I (RSD)

Stage I (early intervention) ***Relieve pain and control edema***



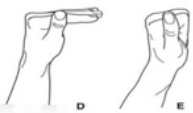
- Modalities
- Retrograde massage
- Elevate, elastic compression

Increase mobility (specific to involved tissues)



- Tendon gliding in the hand
- Nerve mobilization

Improve muscle performance



- Stress loading in quadruped position
- Distraction

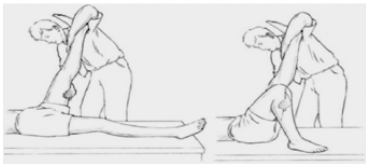
Improve total body circulation

- Low impact aerobic exercise

Desensitize the area

- Desensitization techniques for brief periods 5×/day

Educate the patient



- Teach interventions that deal with variable vasomotor responses; when to use heat, cold, gentle exercises

Stages II and III

Manage pain

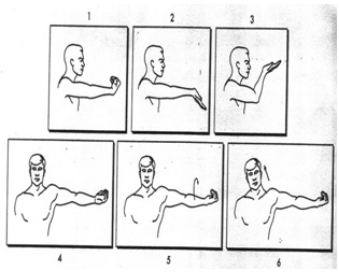
- Modalities prior to or in conjunction with exercise. Desensitize the area
- Progress desensitization techniques to increase tolerance of various textures

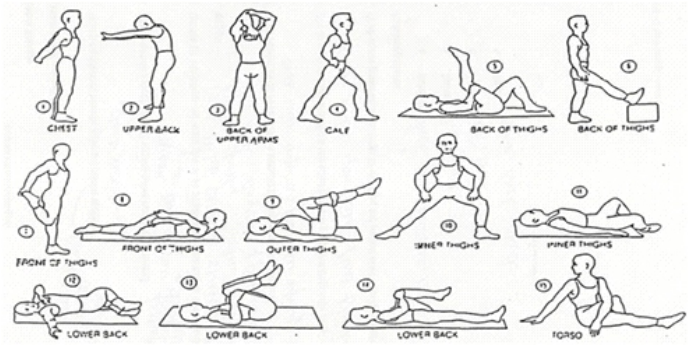
Increase mobility (specific to involved tissues)

- Joint and soft tissue manipulation (with caution due to osteoporosis)
- Neuromobilizaiton
- Passive and self-stretching techniques

Improve functional performance

- Carefully monitor and progress strength, endurance, and functional exercises.



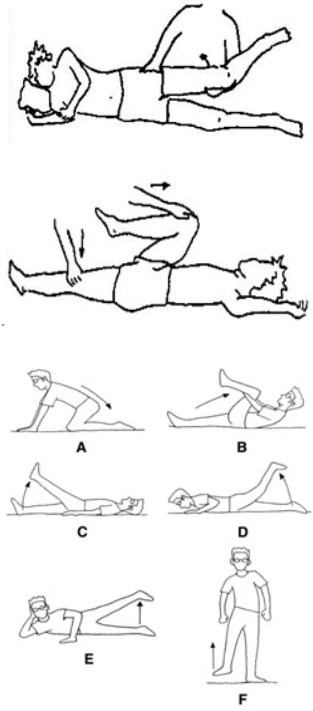


DYNAMIC HIP SCREW PROTOCOL

In-hospital management

Phase 1 (0 to 1 week) :

- Passive range of motion should be avoided during the first week.
- Hip and knee flexion, extension, and abduction exercises are gentle active range-of-motion exercises.
- To strengthen the gluteus maximus, vastus medialis, and quadriceps, do isometric workouts.
- To reduce hip flexion, utilize an elevated toilet seat.



Phase 2 (2 to 3 weeks):

- The hip and knee are provided active range of motion.

- Isometrics exercises to quadriceps, glutei and hamstrings to strengthen muscles.

- Advice to avoid standing on affected leg without support and to avoid passive range of motion.
- Non weight bearing with walker.

Phase 3 (4 to 7 weeks):

- Avoid twisting at the fracture site.
- Active, active-assistive range of motion to hip and knee is given.
- Isometric exercises to glutei, quadriceps, and hamstrings are performed.

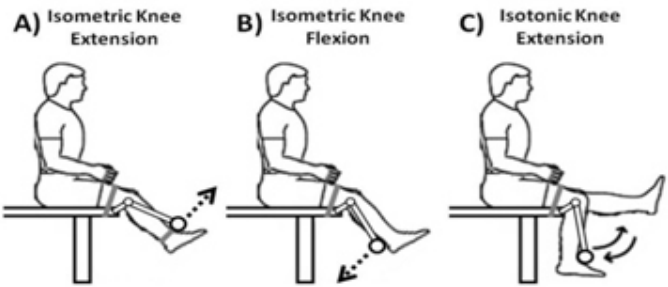
- Active resistive exercises to quadriceps, glutei, and hamstrings (if motion is well tolerated).
- Weight bearing as tolerated on the affected extremity during transfers.

- Ambulation with walker is started.
- Weight bearing, as tolerated for stable fractures.
- Partial to non-weight bearing to toetouch for unstable fractures.

Phase 4 (8 to 12 weeks):

- Active and active-assistive range of motion is continued. stretching to hip and knee is given.
- Progressive resistive exercises to hip and knee are started.
- The patient uses involved extremity with weight bearing as tolerated or full weight bearing

  during transfers and ambulation.
- In gait training includes walking withwalker by three-point gait method is initiated. Cycling is also initiated.



Epicondylitis Rehabilitation Program

PHASE I : ACUTE PHASE

Goals:

1. Decrease inflammation
2. Promote tissue healing
3. Retard muscular atrophy

- Cryotherapy
- Whirlpool
- Stretching to increase flexibility, wrist extension/flexion, elbow extension/flexion, forearm supination/pronation
- Isometrics to increase wrist extension/flexion, elbow extension/ flexion, forearm supination/pronation
- High-voltage galvanic stimulation
- Phonophoresis
- Friction massage
- Iontophoresis (with antiinflammatory agent, e.g., dexamethasone)

- Avoidance of painful movements (e.g., gripping)

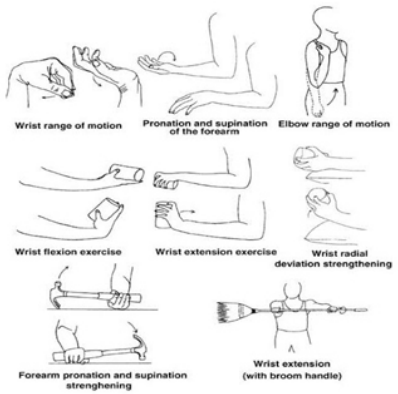
PHASE II: SUBACUTE PHASE

- ***Goals:***

1. Improve flexibility
2. Increase muscular strength/endurance
3. Increase functional activities/return to function

- **Exercises:** Emphasize concentric/eccentric strengthening, Concentration on involved muscle group, Wrist extension/flexion, Forearm pronation/supination, Elbow flexion/extension, Initiate shoulder strengthening (if deficiencies noted), Continue flexibility exercises,

May use counter-force brace, Continue use of cryotherapy after exercise/function, Gradual return to stressful activities, Gradually reinitiate once painful movements



PHASE III: CHRONIC PHASE

Goals:

1. Improve muscular strength and endurance
2. Maintain/enhance flexibility
3. Gradual return-to-sport/high-level activities

Exercises:

- Continue strengthening exercises (emphasize eccentric/ concentric)
- Continue to emphasize deficiencies in shoulder and elbow strength
- Continue flexibility exercises
- Gradually decrease use of counterforce brace
- Use of cryotherapy as needed
- Gradual return to sport activity

Equipment modification (grip size, string tension, playing surface), Emphasize maintenance program

EXTENSOR TENDON REPAIR PROTOCOL

Treatment and Rehabilitation of Chronic Extensor Tendon Injuries in Zones 1 and 2

0-2 Weeks

The postoperative dressing maintains the PIP joint at 45 degrees of flexion and the DIP joint at 0 degrees.

2-4 Weeks

- Allow active DIP joint extension and flexion.
- Allow full extension of the PIP joint from 45 degrees of flexion.

4 Weeks

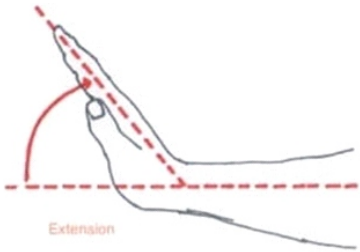
- Begin full finger motion exercises.

After Surgical Repair of Extensor Tendon Injuries in Zones 4, 5, and 6

0-2 Weeks

- Allow active and passive PIP joint exercises, and keep

the MCP joint in full extension and the wrist in 40 degrees of extension.

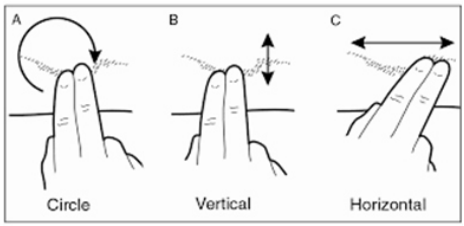


2 Weeks

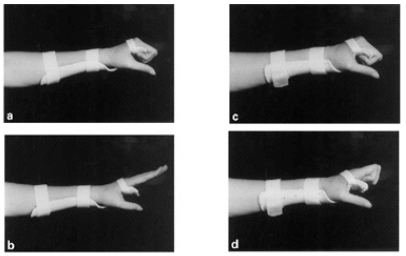
- Remove the sutures and fit the patient with a removable splint.
- Keep the MCP joints in full extension and the wrist in neutral position.
- Continue PIP joint exercises and remove the splint for scar massage and hygienic purposes only.

4-6 Weeks

- Begin MCP and wrist joint active flexion exercises with interval and night splinting with the wrist in neutral position.
- Over the next 2 weeks, begin active-assisted and gentle passive flexion exercises.



6 Weeks

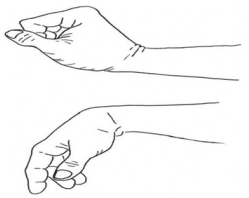


- Discontinue splinting unless an extensor lag develops at the MCP joint.
- Use passive wrist flexion exercises as necessary.

After Surgical Repair of Extensor Tendon Injuries in Zones 7 and 8

0-2 Weeks

- Maintain the wrist in 30 to 40 degrees of extension with postoperative splint.
- Encourage hand elevation and full PIP and DIP joint motion to reduce swelling and edema.
- Treat any significant swelling by loosening the dressing and elevating the extremity.



2-4 Weeks

- At 2 weeks remove the

postoperative dressing and sutures.

- Fashion a volar splint to keep the wrist in 20 degrees of extension and the MCP joints of the affected finger(s) in full extension.
- Continue full PIP and DIP joint motion exercises and initiate scar massage to improve skin-tendon glide during the next.

4-6 Weeks

- Begin hourly wrist and MCP joint exercises, with interval and nightly splinting over the next 2 weeks.
- From week 4 to 5, hold the wrist in extension during the MCP joint flexion exercises and extend the MCP joints during the wrist flexion exercises.
- Composite wrist and finger flexion from the fifth week forward. An MCP joint extension lag of more than 10 to 20 degrees requires interval daily splinting.
- Splinting program can be discontinued at 6 weeks.

6-7 Weeks

- Begin gentle passive ROM.
- Begin resistive extension exercises.

Special Considerations for Exercise After Extensor Tendon Repair & Extended Immobilization

Zones I and II

- Tendon injuries in these zones are typically managed nonoperatively.
- PIP and MCP AROM while the DIP is continuously immobilized in extension for at least 4 weeks but more often 6 to 8 weeks.
- When splint can be removed for exercise, perform active DIP extension and very gentle active flexion with the MCP and PIP joints stabilized in neutral. Briefly hold the extended position with each repetition.
- Emphasize active extension more than flexion to avoid an extensor lag.
- After initiating exercises, splint between exercise sessions an additional 2 weeks or longer if an extensor lag develops.
- **PRECAUTION :** Increase active flexion of the DIP joint very gradually, initially limiting flexion to 20° to

25° during the first week of exercise. The strong FDP can easily place excessive stress on the terminal extensor tendon and cause gapping or rupture of the repair. Progress active flexion by about 10° per week. Do not attempt full DIP flexion for about 3 months.

Zones III and IV

- If the lateral bands were intact, begin DIP AROM 1 week postoperatively while the PIP joint is immobilized in extension in a volar splint or cylinder cast. Early DIP motion prevents adherence and loss of extensibility of the lateral bands and oblique retinacular ligaments and loss of mobility of the DIP joint.
- If the lateral bands were damaged and repaired, postpone DIP ROM until 4 to 6 weeks postoperatively.
- At a minimum of 3 to 4 weeks but more often at 6 weeks, the volar splint is removed for active ROM of the PIP joints with the MCP joints stabilized. Emphasize active extension more than flexion.

PRECAUTIONS :

- Progress PIP flexion in very gradual increments; limit PIP flexion to 30° the first week of PIP ROM exercises. Increase an additional 10° per week if no extensor lag.
- If the wrist and MCP joints have been immobilized

postoperatively, include active ROM of the wrist with the MCP and PIP joints stabilized and active MCP ROM with the wrist and PIP joints stabilized in extension.

Zones V and VI

- When the volar splint can be removed for exercise (between 3 and 4 weeks or as late as 6 weeks postoperatively), begin active or assisted MCP extension and passive flexion with the wrist and IP joints stabilized in neutral and the forearm pronated. Actively hold the extended position for a few seconds with each repetition. Let the extensors relax to flex the MCP joints.
- Add carefully controlled active MCP flexion within a protected range with the wrist stabilized in extension.
- Emphasize active MCP extension more than flexion to prevent an extensor lag.

PRECAUTION :

- Initially limit active MCP flexion to 30° in the index and middle fingers and 35° to 40° in the ring and small fingers.
- During active IP flexion and extension exercises, stabilize the MCP joints in neutral and the wrist in slight extension. Encourage full-range DIP motion.

- Combine active MCP extension with active PIP flexion (hook fist position) and PIP extension (straight hand position).
- Incrementally progress to full fist position over several weeks if no extensor lag develops.

Zone VII

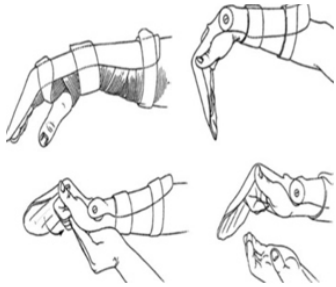
- If the wrist extensors are intact and only extrinsic finger extensors have been repaired, follow the guidelines for zone V/VI repairs.
- If the wrist extensors were repaired, begin active wrist extension from neutral to full extension in a gravity-eliminated position (forearm in mid-position) at 3 to 4 weeks.
- Incrementally increase wrist flexion beyond neutral between 5 and 8 weeks postoperatively.
- Perform radial and ulnar deviation with the wrist in neutral.

EVIDENCE BASED PROTOCOL FOR FLEXOR TENDON REPAIR

TREATMENT PROTOCOL FOR ZONE 1 FLEXOR TENDON REPAIR

Phase I : Weeks 0-3

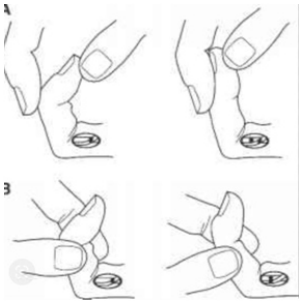
- Splint: Forearm-based dorsal block splint with wrist at 30° flexion, MP's 30° flexion, and IP's fully extended. A separate finger splint of repaired digits is applied with DIP in 45° flexion
- Precautions: No active DIP flexion, wrist flexion, or passive finger extension
- Exercises: Passive DIP flexion to 75°, actively extend PIP with MP in full flexion, place/hold repaired finger in PIP flexion for FDS gliding, passive wrist flexion, active wrist extension, passive wrist flexion with passive hook fist



Phase II : Weeks 3

- Splint: Wrist to neutral in dorsal blocking splint, remove

DIP flexion splint



- Precautions: No resistive exercises, no functional use of hand
- Exercises: Place/hold and gliding in all fist positions

Phase III : Week 4

- Splint: Convert from dorsal forearm to dorsal hand splint
- Precautions: Minimal tension during ROM, avoid resistance exercises
- Exercises: Active tendon gliding in all fist positions, FDP gliding exercises

Phase IV : Weeks 5

- Splint: Discard splint
- Precautions: Avoid resistive exercises
- Exercises: Progress exercises by increasing reps

Phase V : Week 6-7

- Precautions: Avoid resistive exercises prior to week 7
- Exercises: Gentle passive DIP extension, begin resistive exercises

Phase VI : Week 8

- Exercises: Progress resistive exercises

TREATMENT PROTOCOL FOR ZONE 2-5 FLEXOR TENDON REPAIR

Phase I : Weeks 0-3

- Splint : Dorsal blocking splint w/ wrist in neutral, MCP's at 50° flexion, IP's in full extension
- Precautions : No active flexion of involved digits, passive wrist extension, or passive finger extension unless cleared, no functional use of involved hand
- Exercises : Passive DIP extension w/ MCP and PIP in flexion, passive DIP/PIP flexion and active extension, passive wrist flexion and active wrist extension, block MCP in full flexion and active extension of IP's, isolated FDS glide of uninvolved digits, edema control and scar massage

Phase II: Week 3

- Splint: Serial static PIP extension splint at night if needed
- Precautions : Same as above, place/hold exercises under slight tension and avoiding co-contraction
- Exercises : Place/hold for hook, full, and straight fist with wrist extended, place/hold for isolated FDS glide of involved digits

Phase III: Week 4

- Splint : Switch to hand-based dorsal block splint
- Exercises : Begin active, non-resisted digital flexion/extension in hook, full, and straight fist positions with wrist extended

Phase IV: Week 5

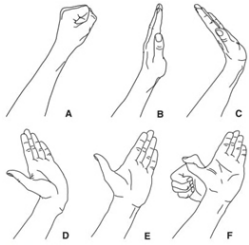
- Splint : Discharge splint
- Exercises : Add gentle blocking exercises for PIP/DIP flexion is appropriate

Phase V: Weeks 6-8

- Splint : Can initiate dynamic PIP extension splint if appropriate
- Exercises : Gradually add resistive exercises

Outcome Measures

- VAS SCALE
- Pyramid of progressive force exercise



A Sequence of Exercises for Early Active Motion with Progressive Tendon Loading after Flexor Tendon Repair

Warm-up

Warm-up exercises (passive finger motions within protected ranges precedes each exercise session.

Progressive Levels of Exercise*

Level 1 - place-and-hold finger flexion

Level 2 - active composite finger flexion

Level 3 - hook and straight fist finger flexion

Level 4 - isolated finger joint motion

Level 5 - continuation of levels 14 of exercise and discontinuation of protective splinting with introduction of gradually increasing use of the hand for functional activities

Level 6 - resisted composite finger flexion

Level 7 - resisted hook and straight fist exercises

Level 8 - resisted isolated joint motion.

**Note:* Exercise sequence is from least to greatest tendon loading. Repetitions are highest at the lowest level of loading and least at the highest level of loading. Progression to next level occurs when specific criteria are met.

POSTFRACTURE/PERIOD OF IMMOBILIZATION MANAGEMENT

GUIDELINES :

1. Educate the patient - Teach functional adaptations. Teach safe ambulation, bed mobility.
2. Decrease effects of inflammation during acute period - Ice, elevation
3. Decrease effects of immobilization - Intermittent muscle setting. Active ROM to joints above and below immobilized region
4. If patient is confined to bed, maintain strength and ROM in major muscle groups - Resistive exercises to major muscle groups not immobilized, especially in preparation for future ambulation.

POST FRACTURE / POST IMMOBILIZATION MANAGEMENT GUIDELINES -

1. Educate the patient - Inform patient of limitations until fracture site is radiologically healed. Teach home exercises that reinforce interventions.
2. Provide protection until radiologically healed - Use partial weight bearing in lower extremity and nonstressful activities in the upper extremity.

3. Initiate active exercises - Active ROM, gentle multiangle isometrics
4. Increase joint and soft tissue mobility - Initiate joint play stretching techniques (using grades III & IV) with the force applied proximal to the healing fracture site. For muscle stretching, apply the force proximal to the healing fracture site until radiologically healed.
5. Increase strength and muscle endurance - As the ROM increases and the bone heals, initiate resistive and repetitive exercises
6. Improve cardiorespiratory fitness - Initiate safe aerobic exercises that do not stress the fracture site until it is healed.

PRECAUTIONS : No stretch or resistive forces distal to the fracture site until the bone is radiologically healed. No excessive joint compression or shear for several weeks after the period of immobilization. Use protected weight bearing until the site is radiologically healed.

Hamstring Strain Rehabilitation Protocol

Immediate management (First 24 hours)

Protection, rest, cryotherapy (ice), compression, elevation Crutches if injury severe

Acute stage (inflammatory response) 1-3 days

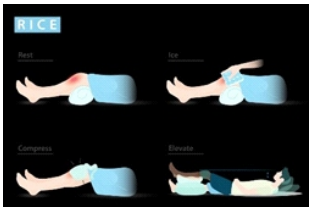
Cryotherapy,Electrical stimulation, Gentle ROM exercises, (e.g., passive hip and knee ROM, hamstring stretch [long sitting] , hamstring stretch [supine],standing quadriceps stretch), Isometric exercises

Subacute stage (repair and healing phase) 3-27 days

ROM and flexibility exercises, Progressive resistance exercises: Hamstring curls Prone straight leg raise Leg press, shuttle, or Total Gym (double and single leg) ,Total body strengthening: address lower kinetic chain muscular weakness, Stationary bicycle,Elliptical machine

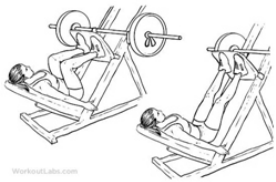
Chronic stage (maturation and remodeling phase) 27 days and on

Cardiovascular fitness: stationary bicycle, Elliptical machine, Stairmaster Return to running program,Endurance training: continue progressive


RICE
Rest
Ice
Compress
Elevate


Flexion
Extension
Hyperextension

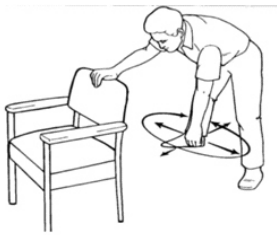

Abduction
Adduction
Lateral rotation
Medial rotation


WorkoutLabs.com

resistance exercises as necessary Strength training: eccentric hamstring exercises (e.g., good mornings, dead lifts, squats, lunges, step-downs, knee extensions [machine]) Total body strengthening: address lower kinetic chain muscular weakness Plyometrics Agility drills Sport-specific training

Rehabilitation Protocol After Nonoperative Treatment of Subacromial Impingement

This four-phase program can be used for conservative management of impingement.



Maximal Protection - Acute Phase

- **Goals :**

1. Relieve pain and inflammation
2. Normalize range of motion 3. Reestablish muscular balance 4. Educate the patient and improve posture

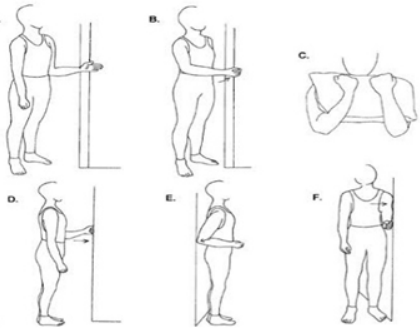
- **Avoidance :**

Elimination of any activity that causes an increase in symptoms

- **Range of Motion :**

L bar,Flexion, Elevation in the scapular plane,External and internal rotation in the scapular plane at 45° of abduction,Progress to 90° of abduction, Horizontal abduction/adduction, Pendulum exercises, Active assisted

range of motionlimited symptom-free available range of motion, Rope and pulley(Flexion).

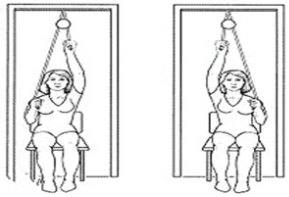


- **Joint Mobilization :**

Emphasize inferior and posterior glides in the scapular plane. Goal is to establish balance in the glenohumeral joint capsule.

- **Modalities:**

Cryotherapy, Iontophoresis



- **Strengthening Exercises:**

Rhythmic stabilization exercises for external/internal rotation, Rhythmic stabilization drills: flexion/extension, External rotation strengthening,Submaximal isometrics (external rotation, internal rotation, abduction) Scapular strengthening, Retractors, Depressors, Protractors

- **Patient Education**:

Activity level, activities, Pathologic condition of avoidance of overhead reaching and lifting activities, Correct seating posture (consider a lumbar roll),Seated posture with shoulder retraction

- **Guideline for Progression** :

1. Decreased pain and/or symptoms

2. Normal range of motion

3. Elimination of painful arc 4. Muscular balance

- **Intermediate Phase**

- **Goals** :

1. Reestablish non painful range of motion

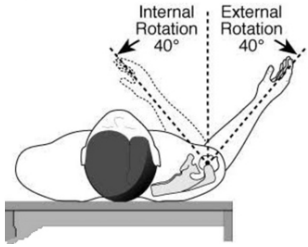
2. Normalize at hrokinematics of shoulder complex

3. Normalize muscular strength

4. Maintain reduced inflammation and pain

- **Range of Motion :**

L bar,Flexion,External rotation at 90° of abduction, Internal rotation at 90° of abduction, Horizontal



abduction/adduction at 90°, Rope and pulley,Flexion,Abduction (symptom-free motion)

- **Joint Mobilization :**

Continue joint mobilization techniques for the tight aspect of the shoulder (especially the inferior), Initiate selfcapsular stretching,Grade II/III/IV,Inferior, anterior, and posterior glides,Combined glides as required

- **Modalities (As Needed) :**

Cryotherapy, Ultrasound/phonophoresis, Iontophoresis

- **Strengthening Exercises** :

Progress to complete shoulder exercise program, Emphasize rotator cuff and scapular muscular training,External rotation tubing,Side-lying external rotation, Full can, Shoulder abduction, Prone horizontal abduction, Prone rowing, Prone horizontal abduction with external rotation, Biceps/triceps, Standing lower trapezius muscular strengthening

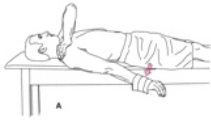
- **Functional Activities :**

Gradually allow increase in functional activities,No prolonged overhead activities, No lifting activities overhead

- **Advanced Strengthening Phase**

- **Goals :**

1. Improve muscular strength and endurance 2. Maintain flexibility and range of motion 3. Gradual increase in functional activity level



- **Flexibility and Stretching** :

Continue all stretching and range-of-motion exercises, L - bar external/internal rotation at 90° of abduction, Continue capsular stretch, Maintain/increase posterior/inferior flexibility

- **Strengthening Exercises :**

Start fundamental shoulder exercises:Tubing external/internal rotation, Lateral raises to 90° with dumbbell, Full can with dumbbell, Side-lying external rotation, Prone horizontal abduction, Prone extension,

Push-ups,Biceps/triceps

- **Guideline for Progression** :

1. Full nonpainful range of motion 2. No pain or tenderness 3. Strength test fulfills criteria 4. Satisfactory clinical examination

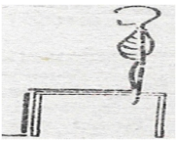
- **Return-to-sport Phase**
- **Goal:**

1. Unrestricted symptom-free activity

- **Initiate Interval Sport Program** : Throwing,Tennis,Golf
- **Maintenance Exercise Program** : Flexibility exercises, L bar, Flexion, External rotation and internal rotation at 90° of abduction, Self capsular stretches, Isotonic exercises, Fundamental shoulder exercises, Perform 3 times per week.

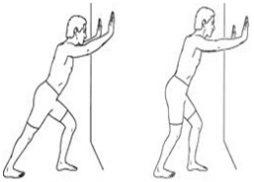
Lumbar Discectomy
Physical Therapy Prescription

Phase I (0 to 2 Weeks): Protective Phase



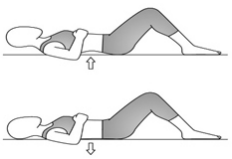
Precautions :

- Avoid bending and twisting, lifting, pushing and pulling **20 pounds or more for two weeks**.
- Limit sitting, including the car, to no more than 30 minutes at a time (standing/walk breaks).



Goals :

- Diminish pain/inflammation and minimize lower extremity radiating symptoms (ice, modalities as needed).
- Learn correct body mechanics, transfers, positioning.
- Achieve proper muscle firing for transverse abdominis, multifidi and glutes.
- Focus on walking program,



increasing tolerance to 10 minutes or less, two times a day.

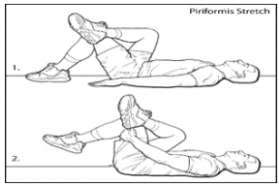
Education :

- **Postural Education:** Upright sitting posture with lumbar roll at all times, frequent changes in positions and sleeping positions.

- **Body Mechanics:** Lifting, transfers (include log rolling), positioning, etc.

Exercises :

- **Walking Program:** Begin one to two times a day for ten minutes, progress as tolerated



- **Transverse Abdominis Bracing:** 10" isometrics with normal breathing (without pelvic tilt)
- **Multifidi:** 10" isometrics with normal breathing in prone (if able to tolerate)

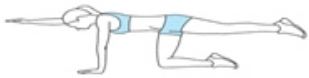
- **Glute Sets:** 10" isometrics with emphasis on proper glute firing (not hamstring)

- **Light Stretching:** Hip flexors, quads, hamstring, gastrocs

Phase II (2 to 6 Weeks) : Initial Strengthening Phase

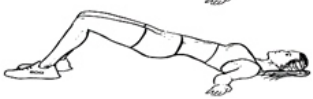
Therapy :

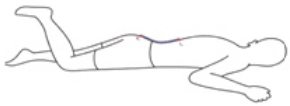
- Starting at week two, one to two times a week, for four or more weeks



Precautions :

- Keep spine in neutral for strengthening with a focus on proper neuromuscular control, do not progress without good control.
- **Lifting Restrictions:** Begin at 20 pounds and slowly increase to no restrictions at week six.





Goals :

- Complete light strengthening with a neutral spine and correct firing of stabilization muscles

- Able to tolerate at least 30 minutes of cardio a day
- Release soft tissue restrictions, muscle spasm and/or scar
- Independent with body and lifting mechanics

Cardio :

- **Walking Progression:** At least 30 minutes or less
- **Stationary Bike Recumbent:** Can initiate at two weeks
- **Stationary Bike Upright:** Can initiate at four weeks (no resistance), six weeks (resistance)

Strength :

Only initiate these once patient can complete Phase I exercises. Then begin with light resistance and slowly progress. Emphasize good posture during each exercise and correct muscle firing of transverse abdominis. (This is ***not*** *a complete list.)*

- **Transverse Abdominis/Multifidi Progression** *(maintain neutral spine)*
- Start at table (supine, prone, quadruped) 10" isometrics
- Progress with upper extremity/lower extremity movements (eg. marches, straight leg raises, upper extremity lift and lowers, planks, etc.)

- **Continue with Proper Glute Activation Exercises**
- Eg.: prone hip extensions, bridges, side lying clams, side lying 90/90 leg lifts, side lying abduction, quadruped hip extension, bird dog
- **Upper Extremity/Lower Extremity Strength Training** *(once proper transverse abdominis and glut firing achieved)*
- Step ups, leg press, wall squats, squats, etc.
- **Balance** *(with transverse abdominis bracing)***:** Single leg stance, tandem, foam, etc.
- Upper extremity light resistive exercises (machines, Theraband, free weights)

Flexibility :

- **Lumbar Spine:** Four weeks or less to improve lumbar extension range of motion (prone lying, prone on elbows, press ups, then stand extension (if no periphalization)
- **Stretching:** Hamstrings, gastroc/soleus, quadriceps, hip flexors, piriformis, etc.
- **Neural Mobilization:** Performed as needed, gentle with caution not to flare up nerve roots Aquatic Physical Therapy *(less than three weeks if available once incision has healed)*
- No rotation and transverse abdominis bracing during all exercises

- Walking all directions, balance, upper extremity/lower extremity strengthening

Strength :

- Advanced core strength and stabilization exercises:
- Progress to weight bearing, balance, Swiss Ball, reformer, etc.
- Progress to multi-planar exercises with lower extremity and upper extremity
- Progress lower extremity/upper extremity strengthening
- Begin running, agility and plyometrics for return to sport at 8 to 12 weeks

Phase III (6 to 8 Weeks): Progression to Advanced Strengthening

Therapy :

- One to two times a week (as needed for return to sport or work)

Goals :

- Independent home exercise program for advanced strengthening, return to sport and work.
- Increase lower quarter flexibility and strength with focus on proper transverse abdominis and glute activation.
- Will typically be released to full activities without

restrictions at six to eight weeks

- Possible referral to work reconditioning program.

Education :

- Explain to patient that once they have a lower back pain episode, they are predisposed to future episodes, so monitor warning signs.
- First sign of an exacerbation is **stiffness**. As soon as a patient notices stiffness, resume repeated movement exercise every two hours in proper direction as initially prescribed on day one.
- Continue use of lumbar roll long term preventatively.
- Explain the risk of prolonged static positions (such as sitting on plane, car) and repeated bending/lifting all day long.

Cardio :

- Time frames may vary per patient
- Emphasize correct form and equipment setup (eg.: elliptical, bike, walking terrain, etc.).
- Preference of Pilates over yoga. If returning to yoga, ensure it with an experienced instructor.
- When initiating running and sports below, slowly increase in the 8 to 12 week time frame.

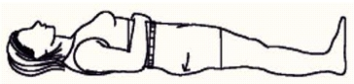
Lumbar Fusion Protocol

Inititate home walking program. Increase distance by 1-2 miles by six week check-up. All exercises are fully supported and neutral spine is strictly maintained. Gentle neural mobilization is included for the lower extremities to avoid adherent nerve root. Progress spine stabilization from fully supported to upright exercise and then to involve balance. Progress walking program in intensity or duration to achieve at least 3 miles/day by 12 weeks. Continue with neural mobilization and attention to lower mobilization extremity mobilization.

1-6 weeks :

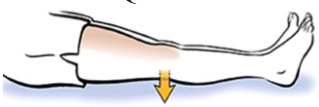
Therapeutic Exercise : Include isometric abdominal contraction with all exercises.

Isometric Abdominals



Supine march

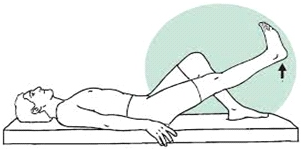
Quad Sets



Glut Sets

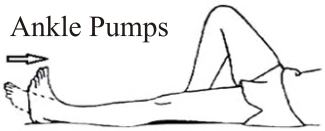
Supine Arms Overhead

Straight Leg Raises

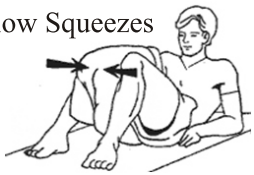


Short Arc Quad

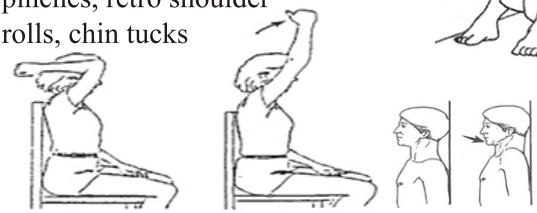
Ankle Pumps



Pillow Squeezes



pinches, retro shoulder rolls, chin tucks

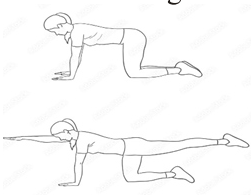


No bike. Begin treadmill

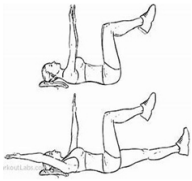
6-9 weeks :

Therapeutic Exercise: Include isometric abdominal contraction with all exercises. Continue with all previous exercises

Bird Dog

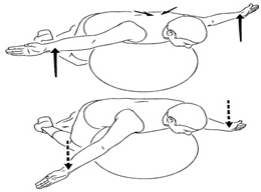


Dead Bug

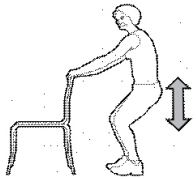


T-Ball Exercise Progression

- Ball sitting with narrow base of support eyes opened then closed
- Ball sitting with arm movement eyes opened then closed



- Ball sitting with knee movement (knee extension)
- Ball marching
- Ball bouncing

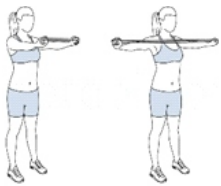


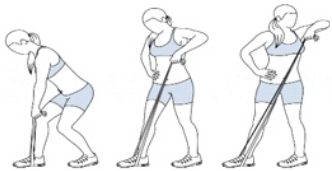
- Mini-squats
- Balance Progressions
- Single leg standing
- Single leg standing with eyes closed
- Single leg standing with arm movement

- Steam boats

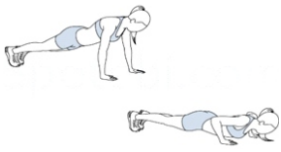
- Clam Shells & Reverse Clam Shells

- T-band exercise : Rows, lat pulls

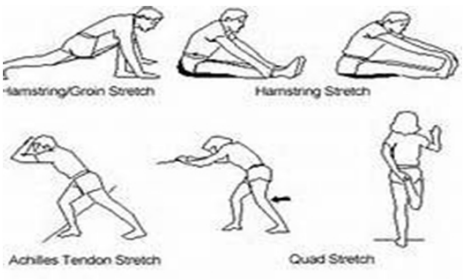




- Push Up Progression: wall, table, floor

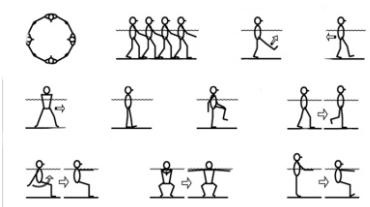


- Stretching: Hamstrings, quad, gastroc/soleus, hip flexors



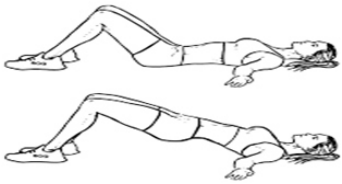
- Aquatic Therapy

9-12 weeks :



Therapeutic exercise: Include isometric abdominal contraction with all exercises. Continue all previous exercises.

- Bridge



- Add to T-band shoulder flex/ext pulses
- Wallsits
- Weighted UE elevation exercises (seated progress to standing)

12 weeks :

Work on specific stretching to maximize function. Continue spine stabilization exercises, emphasizing more upright posture and balance challenges. Progress functional lifting and cardiovascular conditioning.

Therapeutic Exercise: Include isometric abdominal contraction with all exercises.

- Modified plank
- T-band exercise
- PNF
- Spinal Rotation
- Advanced Bridge
- Bridge with arms raised to 90°
- Bridge with one knee extended (arms at 90°)
- Bridge with legs on ball
- Side Bridge

Lumbar Laminectomy
Physical Therapy Prescription

Phase I (0 to 2 Weeks): Protective Phase

Therapy :

- First visit at two weeks post-op (outpatient)

Precautions :

- Avoid bending and twisting, lifting, pushing and pulling **20 pounds or more for two weeks**.

Fig 1. Upright sitting positions

Fig 2. Lifting and transfers

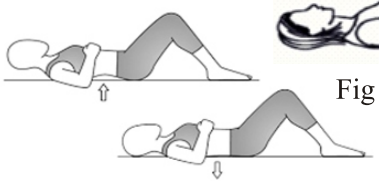


Fig 3. TA Bracing

Fig 4. Gluteus Isometric

- Limit sitting, including the car, to no more than 30 minutes at a time (standing/walk breaks).
- No extension range of motion, nor rotation exercises for eight weeks.

Goals :

- Diminish pain/inflammation and minimize lower extremity radiating symptoms (ice, modalities as needed).
- Learn correct body mechanics, transfers, positioning.

Fig 5. Lower limb stretching exercise

Fig 6. Stationary bike

Fig 7.

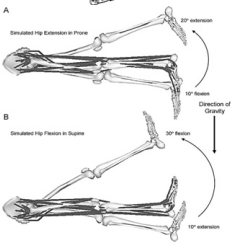


Fig 8. Prone leg raise (A) Straight leg raise (B)

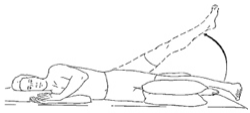


Fig 9. Side leg clams

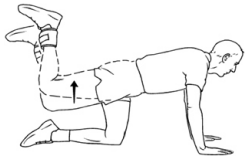


Fig 10. Quadruped Hip extension

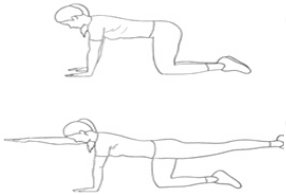


Fig 11. Bird dog exercise

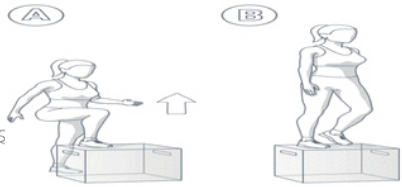


Fig 12. Step ups exercise

- Achieve proper muscle firing for transverse abdominis, multifidi and glutes.
- Focus on walking program, increasing tolerance to at least 10 minutes, two times a day.

Education :

- **Postural Education:** Upright sitting posture with lumbar roll at all times, frequent changes in positions and sleeping positions
- **Body Mechanics:** Lifting, transfers (include log rolling), positioning, etc.

Exercises :

- **Walking Program:** Begin one to two times a day for ten minutes. Progress as tolerated.
- **TA Bracing:** 10" isometrics with normal breathing (without pelvic tilt)
- **Multifidi:** 10" isometrics with normal breathing in prone (if able to tolerate)
- **Glute Sets:** 10" isometrics with emphasis on proper glute firing (not hamstring)
- **Light Stretching:** Hip flexors, quads, hamstring, gastrocs

Phase II (2 to 6 Weeks): Initial Strengthening Phase

Therapy :

- One to two times a week, for four or more weeks

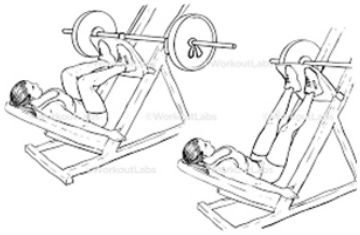


Fig 13. Leg press

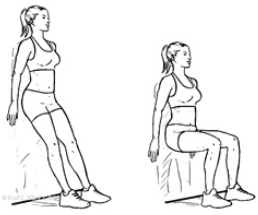


Fig 14. Wall squats

Precautions :

- Keep spine in neutral for strengthening with a focus on proper neuromuscular control, do not progress without good control.
- **Lifting Restrictions:** Begin at 20 pounds and slowly increase to no restrictions at week six.
- No extension range of motion, no rotation exercises for eight weeks.

Goals :

- Complete light strengthening with a neutral spine and correct firing of stabilization muscles
- Able to tolerate at least 30 minutes of cardio a day
- Release soft tissue restrictions/muscle spasm (monitor incision region)
- Independent with body and lifting mechanics

Cardio :

- **Walking Progression:** At least 30 minutes or more
- **Stationary Bike Recumbent:** Can initiate at two weeks

Strength :

Only initiate these once patient can complete Phase I

exercises. Then begin with light resistance and slowly progress. Emphasize good posture during each exercise and correct muscle firing of transverse abdominis. (This is ***not*** *a complete list.)*

- **Transverse Abdominis/Multifidi Progression** *(maintain neutral spine)*
- Start at table (supine, prone, quadruped) 10" isometrics
- Progress with upper extremity/lower extremity movements (eg. marches, straight leg raises, upper extremity lift and lowers, planks, etc.)
- **Continue with Proper Glute Activation Exercises**

Eg.: prone hip extensions, bridges, side lying clams, side lying 90/90 leg lifts, side lying abduction, quadruped hip extension, bird dog

- **Upper Extremity/Lower Extremity Strength Training** *(once proper transverse abdominis and glute firing achieved)*
- Step ups, leg press, wall squats, squats, etc.
- Balance (with transverse abdominis bracing): single leg stance, tandem, foam, etc.
- Upper extremity light resistive exercises (machines, theraband, free weights)

Flexibility :

- **Stretching:** Hamstrings, gastroc/soleus, quadriceps, hip flexors, piriformis, etc.
- **Neural mobilization:** Performed as needed, gentle with caution not to flare up nerve roots

Aquatic Physical Therapy *(more than three weeks if available once incision has healed)*

- No rotation and transverse abdominis bracing during all exercises
- Walking all directions, balance, upper extremity/lower extremity strengthening3

Phase III (6 to 8 Weeks): Progression to Advanced Strengthening

Therapy :

- One to two times a week (as needed for return to sport or work)

Precautions :

- No extension range of motion, no rotation exercises for eight weeks

Goals :

- Independent home exercise program for advanced

strengthening, return to sport and work.

- Increase lower quarter flexibility and strength with focus on proper transversus abdominis and glute activation.
- Typically released to full activities without restrictions at six to eight weeks

Strength :

- Advanced core strength and stabilization exercises:
- Progress to weight bearing, balance, Swiss Ball, Reformer, etc.
- Progress to multi-planar exercises with upper extremity/lower extremity
- Progress upper extremity/lower extremity strengthening
- Begin running, agility and plyometrics for return to sport after 8 to 12 weeks
- Possible referral to work reconditioning program

Flexibility :

- **Lumbar Spine:** More than eight weeks to improve lumbar extension range of motion, but avoid end-range
- Eg.: prone lying, prone on elbows, press-ups, and/or

standing extensions (if no periphalization)

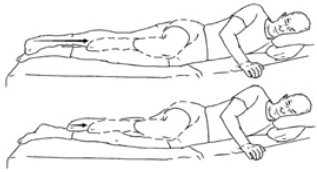
Cardio :

- Time frames may vary per patien.
- Emphasize correct form and equipment setup (eg. elliptical, bike, walking terrain, etc.).
- Preference of Pilates over yoga. Once returning to Yoga, ensure it with an experienced instructor.
- When initiating running and sports below, slowly increase in the 8 to 12 week time frame.

Post-operative Meniscus Repair Rehabilitation Protocol

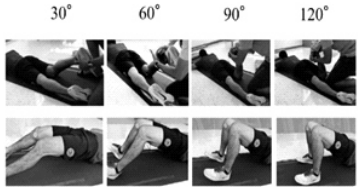
Meniscal Repair

- Brace 0-90° for 6 weeks post op
- 50% weight bearing for 6 weeks post op



TDWB for 6 weeks if meniscus root repair

- Use of crutches for 6 weeks post op
- Pain/edema reduction
- Enhance quad recruitment



0-2 weeks post op

- Pain/edema control
- Quad recruitment with Time Modulated AC (aka Russian Stim)
- Quad Sets/Hamstring co-contractions

at multiple angles 10x10, 2-3 times daily

- SLR in brace at 0° until quad can maintain knee locked
- Heel slides in brace
- Patella mobilizations if necessary
- Obtain full extension if lacking

2 weeks post op

- Continue as above
- Aquatic therapy-after post op visit with doctor, perform functional ROM in waist deep water or deeper, forward and retro-walking, marching, lateral stepping
- Stationary bicycle with seat high, lower to normal seat height as tolerated
- Leg press with 50% BW max
- Leg extensions within ROM restrictions, use high volume and light weight
- Leg curls within ROM restrictions, use high volume and light weight

6 weeks post op

- Full WB
- No pivoting, twisting, hopping, jumping, running
- Encourage full ROM as tolerated
- Normalize gait mechanics
- Progress PREs open/closed chain as tolerated
- Isokinetic exercises 180, 150, 120, 90, 60°/sec, 8-10 reps up and down each speed
- Treadmill forward and retro-walking
- Cable column exercises
- Single leg stands for proprioception
- Cardiovascular equipment of choice
- Slide board-start with short distance and increase as tolerated
- Be aware of PTF signs and symptoms and manage accordingly

8 weeks post op

- Continue as above
- Full ROM
- All exercised on affected leg only
- Increase PREs for strength, high intensity low volume
- Single leg squats

10 weeks post op

- Continue as above
- Plyometrics-with both feet, move to single leg ASAP
- Assess light jogging on treadmill

12 weeks post op

- Continue as tolerated
- Sport specific drills
- Plyometrics for speed and power
- Work quad to within 15% or less difference

5 months post op

- Full return to sport involving pivoting, squatting, twisting, running

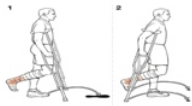
ARTHROSCOPIC PARTIAL MEDIAL OR LATERAL MENISCECTOMY PROTOCOL

Phase 1: Acute Phase

Goals

- Diminish inflammation and swelling.
- Restore range of motion (ROM).
- Re-establish quadriceps muscle activity.

Days 1-3



- Cryotherapy.
- Quadriceps sets.
- Straight leg raise (SLR).
- Electrical muscle stimulation to quadriceps.
- Hip adduction and abduction.
- Knee extension.

- 30-degree mini-squats.
- Active-assisted ROM stretching, emphasizing full knee extension (flexion to tolerance).
- Weightbearing as tolerated (two crutches).
- Light compression wrap.

Days 4-7

- Cryotherapy.
- Electrical muscle stimulation to quadriceps.
- Quadriceps sets.
- Knee extension 90 to 40 degrees.
- SLR.
- Hip adduction and abduction.
- 30 degree mini-squats.
- Balance/proprioceptive drills.
- Active-assisted and passive ROM exercises.
- ROM 0 to 115 degrees (minimal).
- Stretching (hamstrings, gastrosoleus, quadriceps).
- Weightbearing as tolerated (one crutch).

- Continued use of compression wrap or brace.
- High-voltage galvanic stimulation/cryotherapy.

Days 7-10

- Continue all exercises.
- Leg press (light weight).
- Toe raises.
- Hamstring curls.
- Bicycle (when ROM is 0-100 degrees with no swelling and able to make a full revolution).

Phase 2

Goals

- Restore and improve muscular strength and endurance.
- Re-establish full nonpainful ROM.
- Gradual return to functional activities.

Days 10-17

- Bicycle for motion and endurance.
- Lateral lunges.
- Front lunges.
- Half squats.
- Leg press.
- Lateral step-ups.
- Knee extension 90 to 40 degrees.
- Hamstring curls.
- Hip abduction and adduction.
- Hip flexion and extension.
- Toe raises.
- Proprioceptive and balance training.
- Stretching exercises.
- Active-assisted and passive ROM knee flexion (if necessary).
- Elliptical trainer.

Day 17 - Week 4

- Continue all exercises.

- Pool program (deep-water running and leg exercises).
- Compression brace may be used during activities.

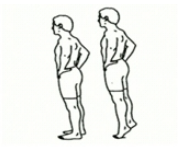
Phase 3: Advanced Activity Phase Weeks 4-7

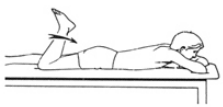
Criteria for Progression to Phase 3

- Full, nonpainful ROM.
- No pain or tenderness.
- Satisfactory isokinetic test.
- Satisfactory clinical examination (minimal effusion).

Goals

- Enhance muscular strength and endurance.
- Maintain full ROM.
- Return to sport/functional activities.





Exercises

- Continue to emphasize closed kinetic chain exercises.
- May begin plyometrics.
- Begin running program and agility drills.

Accelerated Rehabilitation After Meniscal Repair

Phase 1: Weeks 0-2

Goals

- Full motion.
- No effusion.
- Full weightbearing.

Weightbearing

- As tolerated.

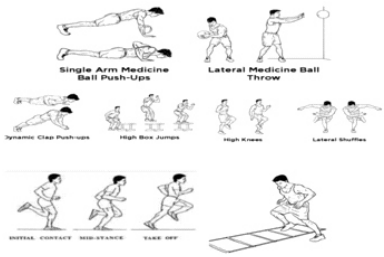
Treatment

- ROM as tolerated (0-90 degrees).
- Cryotherapy.
- Electrical stimulation as needed.
- Isometric quadriceps sets.
- Straight leg raise (SLR).

Phase 2: Weeks 2-4

Criteria for Progression to Phase 2

- Full motion.
- No effusion.
- Full weightbearing.



Goals

- Improved quadriceps strength.
- Normal gait.

Therapeutic Exercises

- Closed kinetic chain resistance exercises 0 to 90 degrees.
- Bike and swim as tolerated.
- Early-phase functional training.

Phase 3: Weeks 4-8

Criteria for Progression to Phase 3

- Normal gait.
- Sufficient strength and proprioception for advanced functional training.

Goals

- Strength and functional testing at least 85% of contralateral side.

- Discharge from physical therapy to full activity.

Therapeutic Exercises

- Strength work as needed.
- Sport-specific functional progression.
- Advanced-phase functional training.
- **Week 1-Begin FWB without crutches**

  Pain management,Control of effusion/ edema,Quadriceps recruitment,ROM exercises , Flexibility exercises

- **Weeks 2-3- Advance strengthening exercises**

  Effusion/edema reduction,Strengthening exercises,Endurance exercises,Proprioception exercises,Flexibility exercises

- **Weeks 4-8- Return to sport**

  Strengthening exercises,Endurance exercises,Sport-specific drills

Rehabilitation Protocol for Meniscus Repair

- **Weeks 1-3-**Begin partial to full WB with a brace locked in full extension

Control of pain,Control of effusion/edema,Patellar mobility, AROM, Quadriceps recruitment with biofeedback/ electrical stimulation, Passive extension, FWB in a brace locked at 0°.

- **Weeks 4-11 -**Begin full WB without a brace

  AROM/PROM, Quadriceps recruitment/strengthening, General strengthening,Advance closed chain exercises (no flexion greater than 60°) Endurance exercise ,Proprioception exercises

- **Weeks 12-15 -** Begin jogging

  Strengthening exercises, Endurance exercises, Proprioception exercise

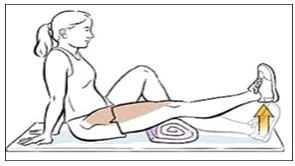
- **Weeks 16-24 -** Begin cutting and jumping activities

  Strengthening exercises,Endurance exercises,Sport-specific drills

Post-operative Rehabilitation Protocol MPFL reconstruction with or without Tibial Tubercle Osteotomy

Phase I Acute Phase: 0-2 Weeks

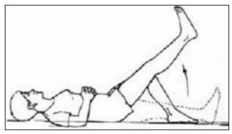
Goals:



- Diminish pain, edema
- Brace locked in extension
- Reestablish quadriceps muscle activity/re-education (goal of no quad lag during SLR)

- May perform quad work out of brace

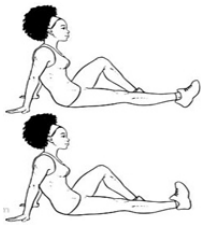
- Educate the patient regarding weight bearing as tolerated, use of crutches, icing, elevation and the rehabilitation process



Weight bearing:

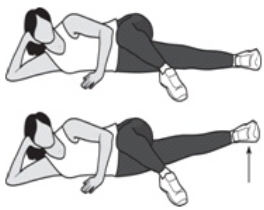
- Weight bearing as tolerated.

Discontinue crutch use as swelling and quadriceps recruitment indictates



Modalities:

- Cryotherapy for 15 min 4 times a day
- Electrical stimulation to quadriceps for functional retraining as appropriate
- Electrical stimulation for edema control- high volt galvanic or interferential stimulation as needed



Therapeutic Exercise:

- Quadriceps sets
- SLR
- Hip adduction, abduction and extension
- Ankle pumps
- Gluteal sets
- Heel slides
- Hamstring and gastroc/soleus and quadriceps stretches

Phase II: 2-6 weeks

Goals:

- Restore and improve muscular strength and endurance
- ROM 0-90
- Open brace to 0-90 degrees
- Work toward normal gait
- Improve balance and proprioception

Weight bearing status:

- Patients may progress to full weight bearing as tolerated. Patients may require one crutch or cane to normalize gait before ambulating without assistive device.

Therapeutic exercise:

- Continue all exercises as needed from phase one
- Lateral step ups, step downs, and front step ups
- Closed kinetic chain exercise terminal knee extension
- Four way hip exercise in standing
- Proprioceptive and balance training
- Stretching exercises- as above, may need to add ITB and/or hip flexor stretches

Phase III 6-12 weeks

Goals:

- Discontinue brace
- Enhance muscular strength and endurance
- Full ROM
- Improve quad control and strength

Therapeutic Exercise:

- Continue to emphasize closed-kinetic chain exercises
- Advance quad and hamstring strengthening
- Core control and kinetic chain exercises

Phase IV 3-6 months

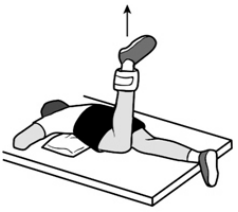
Goals:

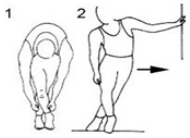
- Enhance muscular strength and endurance
- Core control
- Advance to full activity

Therapeutic Exercise:

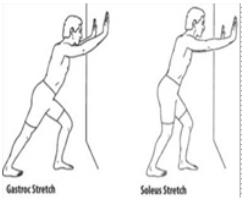
- Continue to emphasize closed-kinetic chain exercises
- Begin running and sports specific drills
- Advance to agility drills

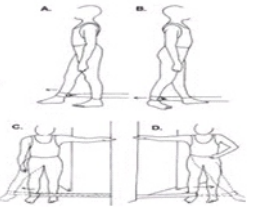
- Continue Core control and kinetic chain exercises





ILIOTIBIAL
BAND STRETCHES

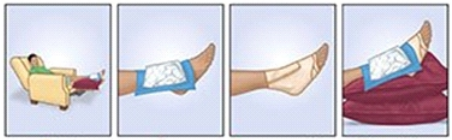




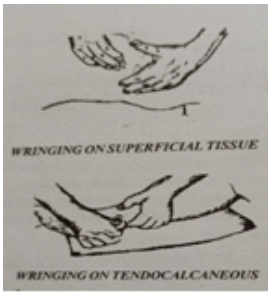
Rheumatoid Arthritis/Active Disease Period

1. Educate the patient - Inform the patient on importance of rest, joint protection, energy conservation, and performance of ROM. Teach home exercise program and activity modifications that conserve energy and minimize stress to vulnerable joints.

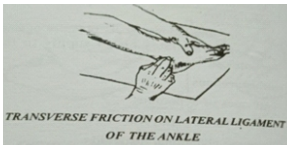
R.I.C.E.

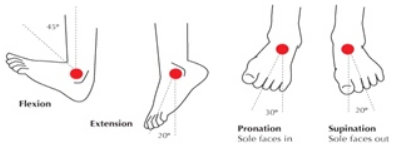


2. Relieve pain and muscle guarding and promote relaxation Modalities,Gentle massage,Immobilize in splint,Relaxation techniques



3. Minimize joint stiffness and maintain available motion - Passive or active-assistive





ROM within limits of pain, gradual progression as tolerated. Gentle joint techniques using grade I or II oscillations.

4. Minimize muscle atrophy - Gentle isometrics in pain-free positions, progression to ROM when tolerated.

5. Prevent deformity and protect the joint structures - Use of supportive and assistive equipment for all pathologically active joints. Good bed positioning while resting. Avoidance of activities that stress the joints.

PRECAUTIONS: Respect fatigue and increased pain; do not overstress osteoporotic bone or lax ligaments.

CONTRAINDICATIONS: Do not stretch swollen joints or apply heavy resistance exercise that cause joint stress.

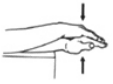
Forearm/Wrist Isometric - Home Exercise Program

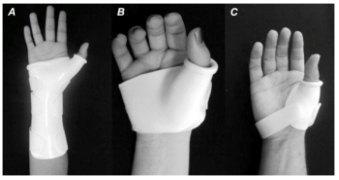
1. Isometric Wrist Extension

2. Wrist Flexion

3. Radial Deviation

4. Finger Extension





OSTEOARTHRITIS MANAGEMENT GUIDELINES

1. Educate the patient - Teach about deforming forces and prevention.Teach home exercise program to reinforce interventions and minimize symptoms.
2. Decrease effects of stiffness - Active ROM,Joint-play mobilization techniques
3. Decrease pain from mechanical stress and prevent deforming forces - Splinting and/or assistive equipment to minimize stress or to correct faulty biomechanics, strengthen supporting muscles.Alternate activity with periods of rest.
4. Increase ROM - Stretch muscle, joint, or soft tissue restrictions with specific techniques.
5. Improve neuromuscular control, strength, and muscle endurance- Low-intensity resistance exercises and muscle repetitions.
6. Improve balance - Balance training activities
7. Improve physical conditioning - Nonimpact or low-

impact aerobic exercise

PRECAUTIONS: When strengthening supporting muscles, increased pain in the joint during or following resistive exercises probably means that too great a weight is being used or stress is being placed at an inappropriate part of the ROM. Analyze the joint mechanics and at what point during the range the greatest compressive forces are occurring. Maximum resistance exercise should not be performed through that ROM.

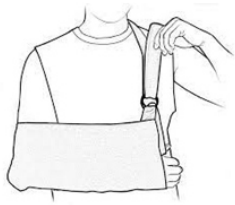
Rehabilitation Protocol After Open Anterior Bankart Repair

Phase I: Immediate Postoperative Phase

- ***Goals***:

1. Protect the surgical site
2. Minimize the effects of immobilization
3. Diminish pain and inflammation
4. Establish baseline proprioception and dynamic stabilization

- **Weeks 1-2**



Use a sling for comfort (1 week)

May wear an immobilizer during sleep (2 weeks) (physician decision)

Elbow/hand range of motion

Gripping exercises

Passive range of motion and active assistive range of motion(L - bar),Flexion to tolerance: 0° to 90° week 1, 0° to 100° week 2,External/internal rotation at 45° of abduction in the scapular plane

Submaximal isometrics

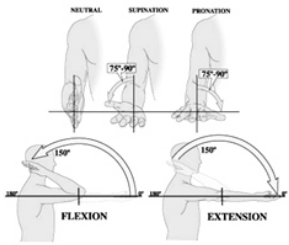
No internal rotation strengthening for 2-3 weeks

Rhythmic stabilization

External/internal rotation proprioception drills

Cryotherapy modalities as needed

- **Weeks 3-4**



Gradually advance range of motion - Flexion to 120° to 140°,External rotation at 45° of abduction in the scapular plane to 35° to 45°,Internal rotation at 45° of abduction in the scapular plane to 45° to 60°,

Initiate light isotonics for shoulder musculature - Tubing for external/internal rotation, Abduction, full can, side-lying external rotation, prone rowing, biceps

Dynamic stabilization exercises, proprioceptive neuromuscular facilitation

Initiate selfcapsular stretching

Core stabilization program

- **Weeks 5-6**

Advance range of motion as tolerated- Flexion to 160°

(tolerance) External/internal rotation at 90° of abduction:, Internal rotation to 75°, External rotation to 70° to 75°

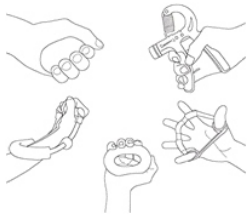
Joint mobilization as necessary

Continue selfcapsular stretching

Advance all strengthening exercises

Continue proprioceptive neuromuscular facilitation diagonal patterns

Throwers' Ten Exercise Program



Continue isotonic strengthening

Dynamic stabilization exercises

Initiate internal rotation strengthening

Closed kinetic chain exercises

Push-up on ball

Wall stabilization

Advance range of motion : External rotation at 90° of abduction: 80° to 85, Internal rotation at 90° of abduction: 70° to 75°, Flexion: 165° to 175°

Phase II: Intermediate Phase

- ***Goals:***

1. Reestablish full range of motion

2. Normalize arthrokinematics

3. Improve muscular strength

4. Enhance neuromuscular control

- **Weeks 8-10**

Progress to full range of motion (weeks 7-8)flexion to 180°, external rotation at 90° to 100°, internal rotation to 75°

Continue all stretching exercises

Joint mobilization, capsular stretching, passive and active stretching, In overhead-throwing athletes, maintain 90° to 100° external rotation, Continue strengthening exercises

Throwers' Ten Exercise Program (for overhead-throwing athletes)

Isotonic strengthening for the entire shoulder complex

Proprioceptive neuromuscular facilitation against manual resistance

Neuromuscular control drills

Isokinetic strengthening

- **Weeks 10-14**

Continue all flexibility exercises

Continue all strengthening exercises, Two-hand plyometrics (week 10),Chest pass

Overhead, Side to side, One-hand plyometrics (week 12), 90/90 position, Dribble May initiate light isotonic machine weight training(weeks 12-14)

Phase III: Advanced Strengthening Phase (Months 4-6)

• ***Goals:***

1. Enhance muscular strength, power, and endurance
2. Improve muscular endurance
3. Maintain mobility

***Criteria to Enter Phase III*:**

1. Full range of motion
2. No pain or tenderness
3. Satisfactory stability
4. Strength 70% to 80% of contralateral side

• **Weeks 16-20**

Continue all flexibility exercises

Perform selfcapsular stretches (anterior, posterior, and inferior)

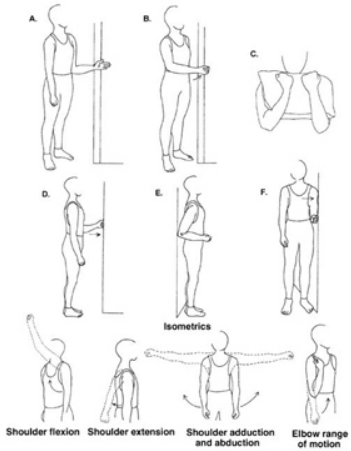
Maintain external rotation flexibility

Continue isotonic strengthening program

Emphasize muscular balance (external/internal rotation)

Continue proprioceptive neuromuscular facilitation against manual resistance

May continue plyometrics



Initiate interval sport program (physician approval necessary) (week 16)

- **Weeks 20-24**

Continue all exercise listed above

Continue and advance all interval sport program (throwing off mound)

IV. Phase IV: Return-to-SPORT Phase (AFTER MONTH 6)

***Goals*:**

1. Gradual return-to-sport activities

2. Maintain strength and mobility of shoulder

***Criteria to Enter Phase IV*:**

1. Full nonpainful range of motion
2. Satisfactory stability
3. Satisfactory strength (isokinetics)
4. No pain or tenderness

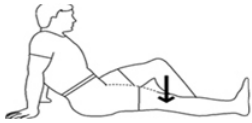
Exercises:

- Continue capsular stretching to maintain mobility
- Continue strengthening program
- Either Throwers' Ten Exercise Program or a fundamental shoulder exercise program
- Return to sport participation (unrestricted)
- For contact sports, consider shoulder brace

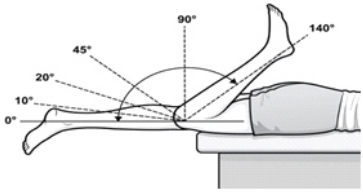
PROXIMAL FEMORAL NAIL PROTOCOL

Postoperative Care:

Phase 1 (Protect Repair, Optimize mobility, Minimize Deconditioning):

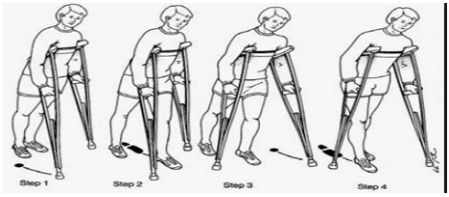


- Foot flat weight bearing (Weight of leg on ground) If patient unable to adhere to/ comprehend limitations, then bed- chair transfers only.



- Isometric quadricep strengthening, VMO emphasis.
- Up with assistance only. Progress to independent mobility as tolerated. Bedside commode.
- Fall prevention and gait training with assistive device.
- AROM/ PROM of knee while sitting on side of bed.
- ADLs

1st follow-up POD 10-14 Outpatient vs. home health therapy (Phase 2):



- Gait training with assistive device.
- Isometric quadricep and abductor exercise.
- AROM/ PROM of knee while sitting at side of bed.
- Fall prevention.
- Advance to independent program when patient able to do all exercises reliably without pain.

2nd follow-up at 8 weeks after surgery **Phase 3 Therapy (Regain Ambulatory Status)**

- Abductor/ adductor stretching and strengthening.
- Quadriceps strengthening, VMO emphasis.
- Wean from assistive devices as tolerated
- For working age patients, advance to work conditioning program when patient is able towalk without assistance or pain.
- HEP. Transition to pure HEP when pt.can perform all exercises with 80% contralateralstrength, no substitution patterns, and no pain.

3rd follow-up at 3 months
Continue Phase 2 therapy. Advance to work conditioning if appropriate

RECOVERY FROM PERIPHERAL NERVE INJURY MANAGEMENT GUIDELINES -

***Acute phase*: immediately after injury or surgery**

- *Immobilization*: time dictated by surgeon
- *Movement*: amount and intensity dictated by type of injury and surgical repair
- *Splinting or bracing*: may be necessary to prevent deformities
- *Patient education*: protection of the part

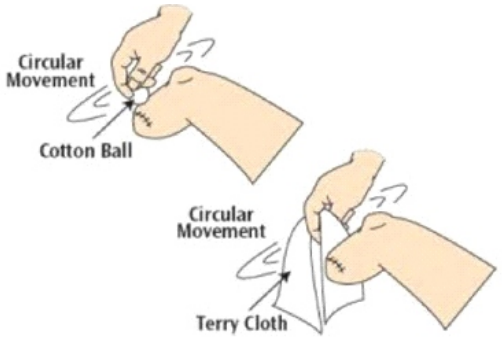
***Recovery phase*: signs of reinnervation (muscle contraction, increased sensitivity)**

- *Motor retraining*: muscle "hold" in the shortened position
- *Desensitization*: multiple textures for sensory stimulation; vibration

- *Discriminative sensory reeducation*: identification of objects with, then without, visual cues

***Chronic phase*: reinnervation potential peaked with minimal or no signs of neurological recovery**

- *Compensatory function*: compensatory function is minimized during the recovery phase but is emphasized when full neurological recovery does not occur
- *Preventive care*: emphasis on lifelong care to involved region



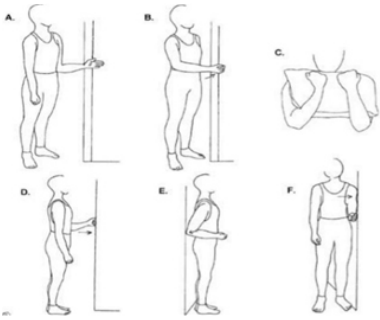
Rehabilitation Following Arthroscopic Repair of Medium to Large Rotator Cuff Tears

Phase I: Immediate Postsurgical Phase (Days 1-10)

***Goals*:**

Maintain integrity of the repair, Gradually increase PROM,Diminish pain and inflammation, Prevent muscular inhibition

Days 1-6



Abduction pillow brace,

Pendulum exercises,

AAROM exercise (L - bar), ER/IR in scapular plane at 45° of abduction (pain-free ROM),

PROM, Flexion to tolerance (painful ROM), ER/IR in scapular plane at 45° of abduction (pain-free ROM),

Elbow/hand gripping and ROM exercises,Submaximal pain-free isometrics (initiate on days 4-5),Flexion with elbow bent to 90°, ER,IR, Elbow flexors

Cryotherapy for pain and inflammation,Ice 15-20 minutes every hour

Sleep in a pillow brace

Days 7-14

Continue use of the pillow brace

Pendulum exercises

Advance PROM to tolerance, Flexion to at least 115°,ER in scapular plane at 45° of abduction to 20° to 25°,IR in scapular plane at 45° of abduction to 30° to 35°

AAROM exercises (L - bar),ER/IR in scapular plane at 45° of abduction, Flexion to tolerance (therapist provides assistance with supporting arm, especially with arm lowering)

Continue elbow/hand ROM and gripping exercises

Continue isometrics (submaximal and subpainful), Flexion with bent elbow, Extension with bent elbow, Abduction with bent elbow, ER/IR with arm in scapular plane, Elbow flexion

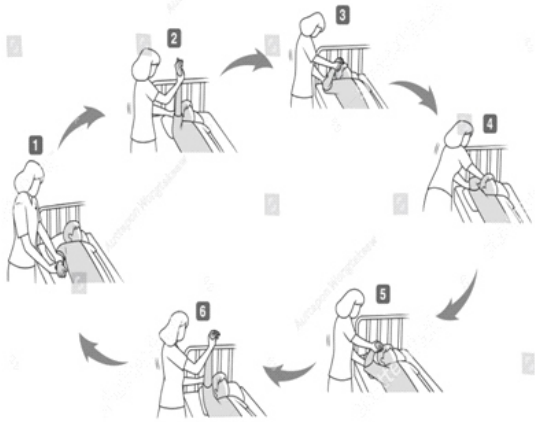
Initiate rhythmic stabilization ER/IR at 45° of abduction

Continue use of ice for pain control, Use ice at least 6-7 times daily

Continue sleeping in brace until physician instructs

Precautions:

1. No lifting of objects
2. No excessive shoulder extension
3. No excessive stretching or sudden movements
4. No supporting of body weight by hands
5. Keep incision clean and dry



Phase II: Protection Phase (Day 15 to Week 6)

Goals:

Allow healing of soft tissue, Do not overstress healing tissue,Gradually restore full PROM (weeks 4-5),Reestablish dynamic shoulder stability,Decrease pain and inflammation

Days 15-21

Continue use of sling or brace (physician or therapist will determine when to discontinue)

PROM to tolerance,Flexion to 140° to 155°,ER at 90° of abduction to at least 45° IR at 90° of abduction to at least 45°

AAROM to tolerance,Flexion (continue use of arm support),ER/IR in scapular plane at 45° of abduction, ER/IR at 90° of abduction

Dynamic stabilization drills

Rhythmic stabilization drills, ER/IR in scapular plane,Flexion/extension at 100° of flexion and 25°of horizontal abduction

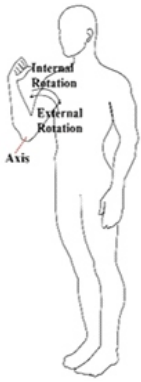
Continue all isometric contractions

Initiate scapular isometrics

Continue use of cryotherapy as needed

Continue all precautions,No lifting,No excessive motion

Weeks 4-5



Patient should exhibit full PROM by week 4,

Continue all exercises listed above

Initiate ER/IR strengthening with exercise tubing at 0° of abduction (use a towel roll)

Initiate manual resistance ER supine in scapular plane (light resistance)

Initiate prone rowing to neutral arm position

Initiate prone shoulder extension

Initiate ER strengthening exercises

Initiate isotonic elbow flexion

Continue use of ice as needed

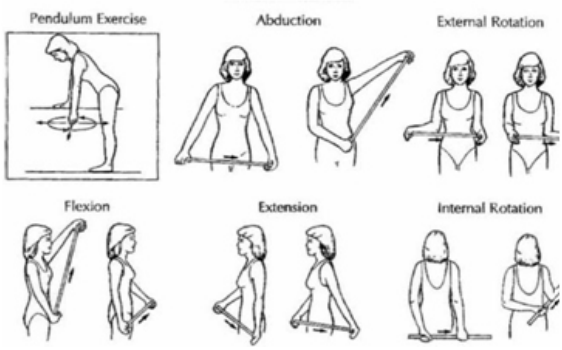
May use heat before ROM exercises

May use pool for light AROM exercises

Rhythmic stabilization exercises (flexion of 45°, 90°, 125°) (ER/IR)

Weeks 5-6

May use heat before exercises



Continue AAROM and stretching exercises Especially for movements that are not full- Shoulder flexion, ER at 90° of abduction

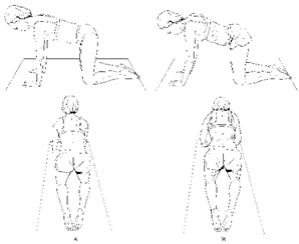
Initiate AROM exercises, Shoulder flexion in scapular plane, Shoulder abduction

Advance isotonic strengthening exercise program(ER tubing,Side-lying IR, Prone rowing, Prone horizontal abduction (bent elbow), Biceps curls (isotonics)

Precautions:

1. No heavy lifting of objects
2. No excessive behind-the-back movements
3. No supporting of body weight with hands and arms
4. No sudden jerking motions

Phase III: Intermediate Phase (Weeks 7-14)



Goals:

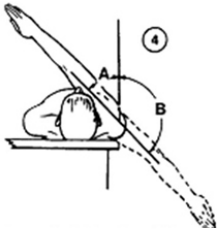
Full AROM (weeks 810)

Maintain full PROM

Dynamic shoulder stability

Gradual restoration of shoulder strength

Gradual return to functional activities

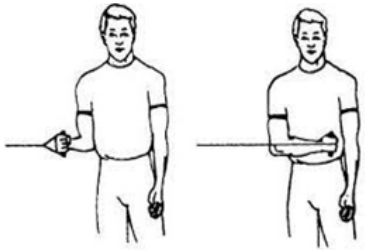


Week 7

Continue stretching and PROM (as needed to maintain full ROM)

Continue dynamic stabilization drills

Advance strengthening program, ER/IR tubing,Side-lying ER, Lateral raises*,Full can in scapular plane*, Prone rowing,Prone horizontal abduction, Prone extension, Elbow extension

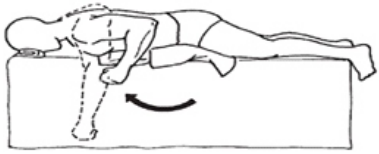


Week 8

Continue all exercise listed above

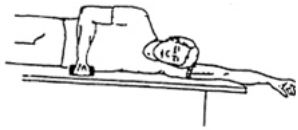
If physician permits, may initiate *light* functional activities

Week 10



Continue all exercise listed above

Progress to fundamental shoulder exercises



Clinician may initiate isotonic resistance (1-lb weight) during flexion and abduction (if nonpainful normal motion is exhibited!)

Weeks 11-14

Advance all exercises, Continue ROM and flexibility exercises

Advance strengthening program (increase 1 lb/10 days if nonpainful)

Phase IV: Advanced Strengthening Phase

(Weeks 15-22)

Goals:

Maintain full nonpainful ROM

Enhance functional use of the upper extremity

Improve muscular strength and power

Gradual return to functional activities

Week 15

Continue ROM and stretching to maintain full ROM

Selfcapsular stretches

Advance shoulder-strengthening exercises

Fundamental shoulder exercises

Initiate interval golf program (if appropriate)

Weeks 20-22

Continue all exercises listed above

Advance golf program to playing golf (if appropriate)

Initiate interval tennis program (if appropriate)

May initiate swimming

Phase V: Return-to-sport Phase

(Weeks 23-36)

Goals:

1. Gradual return to strenuous work activities

2. Gradual return to recreational sport activities

Week 23

Continue fundamental shoulder exercise program (at least 4 times weekly) Continue stretching, if motion is tight, Continue progression to sport participation.

PROTOCOL FOR TOTAL HIP REPLACEMENT (THR)

Phase 1: Post-op Phase (Day 0- Hospital Discharge)

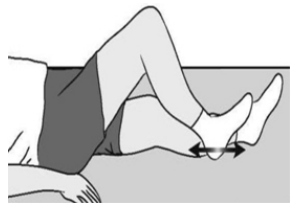
Goals

Precautions

- Dislocation precautions
- WBAT with crutches or walker unless otherwise ordered\
- Screen for sensory/motor deficits
- Screen for DVT, symptomatic orthostatic hypotension, symptomatic low hematocrit

Recommended Exercises

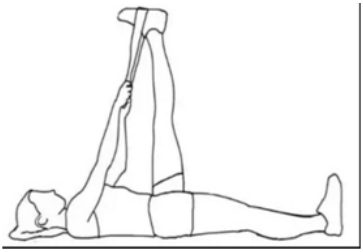
(All exercises performed within the patient's dislocation precautions)



<u>Range of Motion</u>

- Heel slides,Ankle pumps

Strength



- Quad sets,Glut sets,Hamstring sets,Supine hip abduction,Long arc quads (LAQ)
- Short arc quads

Functional Mobility

- Bed mobility,Transfer training,Gait training on level surfaces,Stair training,ADL's with adaptive equipment as needed

Positioning (when in bed)

Quadriceps Stretch

- *Posterior Precautions*: ensure the foot of the bed is locked in a flat position
- Use a trochanter roll to maintain hip in neutral rotation and promote knee extension,Never place anything under the operated knee for posterior precautions.
- Use of abduction wedge when in bed at all times unless otherwise ordered

- Use of hip chair (posterior approach) when appropriate

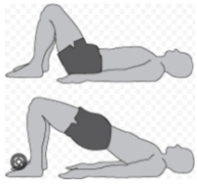
Guidelines

Perform 10 repetitions of all exercises 3-5 times a day. Use ice after exercising for 10-20 minutes.

Post Op Day 2-Discharge

Progression of Therapeutic Exercise and Functional Mobility

Continued ADL Training



Phase 2: Mobility Phase (Hospital Discharge-6 Weeks)

Goal

Precautions

- WBAT with crutches or walker, progressing to cane unless otherwise ordered
- Monitor for proper wound healing
- Monitor for signs of infection
- Monitor for increased swelling

Recommended Exercises

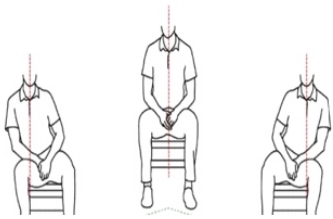
(All exercises performed within the patient's dislocation precautions)

Range of Motion

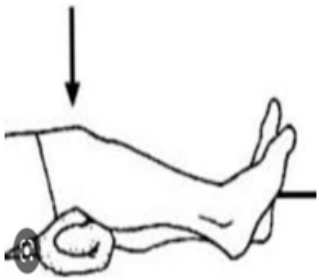
- Continue with all phase 1 ROM ex
- Stretching
- Initiate gentle hamstring, gastroc/soleus, and quadriceps stretching

Strengthening

- Continue quad sets, glut sets, hamstring sets
- Continue LAQ and seated hip flexion
- Bridging
- Standing hip flexion/ abduction/ adduction/ extension
- Progress to straight leg raises (SLR), hip abduction/ adduction/



extension against gravity towards the end of this phase



- Progress to closed chain exercises including terminal knee extensions, mini-squats, step ups, and mini-lunges by the end of this phase

Proprioception

- Weight shifting activities
- Single leg stan Functional Mobility
- Gait training with appropriate device emphasizing normal gait pattern
- Stair training

Endurance

- Initiate stationary biking with minimal to no resistance 3-4 weeks post-op

Guidelines

Perform 10-20 repetitions of all ROM, strengthening, and strengthening exercises 3x/day. Hold stretches for 30

seconds and perform 2-3 repetitions of each. Bike daily for 5-10 minutes if able.

Phase 3: Strengthening Phase (6-12 Weeks)

Goals

Precautions

Dislocation precautions

Avoid high impact activities

Avoid activities that require repeated pivoting/twisting

Recommended Exercises

(All exercises performed within the patient's dislocation precautions)

Range of Motion and Stretching

- Continue ROM exercises from phase 1 and 2 until ROM normalized Strengthening
- Continue with phase 2 exercises adding and increasing resistance as tolerated
- Add resistance machines as appropriate including leg press, hamstring curl, and 4-way hip machine
- Emphasize eccentric control of quadriceps and hip abductors with closed chain exercises

Proprioception

- Single leg stance
- Static balance on Bosu/wobble board/foam/etc
- Add gentle agility exercises (i.e. tandem walk, side stepping, backwards walking)
- Endurance
- Continue biking, adding mild to moderate resistance as tolerated
- Begin walking program

Guidelines

- Perform ROM and stretching exercises once a day. Hold stretches for 30 seconds and perform 2-3 repetitions of each.
- Perform strengthening exercises 3-5 times a week. Do 2-3 sets of 15-20 Reps.
- Progress to biking/walking for at 20-30 minutes 3x/week for endurance.

Phase 4: Advanced Phase (12 Weeks and Beyond)

Precautions

- Dislocation precautions according to surgeon's orders

- Avoid high impact and contact sports
- Avoid repetitive heavy lifting

Recommended Exercises

(All exercises performed within the patient's dislocation precautions)

ROM and Flexibility

Continue daily ROM and stretching Strengthening

Continue with all strengthening exercises increasing resistance and decreasing repetition

Proprioception

Continue with all phase 3 exercises, increasing difficulty as tolerated.

Endurance

Continue with walking, biking, elliptical machine programs **Functional Progression**

Activity/sport-specific training exercises

Guidelines

Perform ROM and flexibility exercises daily.

Perform strengthening and proprioception exercises 3-5x/ week, performing 2-3 sets of 10-15 repetitions.

Continue endurance sprogram 30-45 minutes 3x/ week.

Early Postoperative Motion Precautions After Total Hip Arthroplasty

Posterior/Posterolateral Approaches

ROM

- Avoid hip flexion > 90° and adduction and internal rotation beyond neutral.

ADL

- Transfer to the sound side from bed to chair or chair to bed.
- Do not cross the legs.
- Keep the knees slightly lower than the hips when sitting.
- Avoid sitting in low, soft chairs.
- If the bed at home is low, raise it on blocks.
- Use a raised toilet seat.
- Avoid bending the trunk over the legs when rising from or sitting down in a chair or dressing or undressing.
- When bathing, take showers, or use a shower chair in the bathtub.
- When ascending stairs, lead with the sound leg; when descending, lead with the operated leg.

- Pivot on the sound lower extremity.
- Avoid standing activities that involve rotating the body toward the operated extremity.
- Sleep in supine position with an abduction pillow; avoid sleeping or resting in a side-lying position.

Anterior/Anterolateral and Direct Lateral Approaches

ROM

- Avoid hip flexion > 90°.
- Avoid hip extension, adduction, and external rotation past neutral.
- Avoid the combined motion of hip flexion, abduction, and external rotation.
- If the gluteus medius was incised and repaired or a trochanteric osteotomy was done, do not perform active, antigravity hip abduction for at least 6 to 8 weeks or until approved by the surgeon.

ADL

- Do not cross the legs.
- During early ambulation, step to, rather than past, the

operated hip to avoid hyperextension.

- Avoid activities that involve standing on the operated extremity and rotating away from the involved side.

Transgluteal Approach (Trochanteric Osteotomy)***

ROM

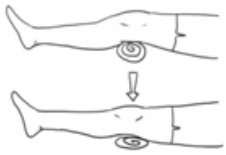
- Avoid hip adduction past neutral
- No active, antigravity hip abduction for at least 6 to 8 weeks or until approved by the surgeon
- No exercises that involve weight bearing on the operated leg

ADL

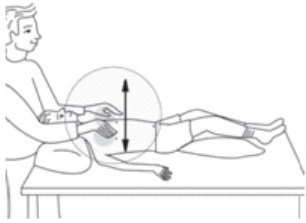
- Sleep in supine position with abduction pillow
- Do not cross legs
- Maintain weight-bearing restrictions during all ADLs.

General Outline of Physical Therapy Schedule for Total Knee Replacement (TKR)

Day 1



- Chest PT
- Vigorous toe and ankle movements
- Maintain the limb in extension (with heel or lower leg resting on a pillow)



- Static glutei by pressing the pillow below the heel
- Gentle isometrics to quadriceps
- Sit at the edge of bed with necessary assistance.

- Ambulate with standard walker with moderate assistance.

- Sit in a chair for 15 minutes.
- CPM 510 degrees daily (1 cycle per minute)

(Range of knee flexion MUST NOT EXCEED 40 degrees in 1 because transcutaneous O2 tension of the skin near the incision decreases significantly after 40 degrees of flexion)

Day 2

1. Gentle patellar mobilization
2. Rapid isometrics to quadriceps (speedy and with 10s hold)
3. Heel-assisted SLR

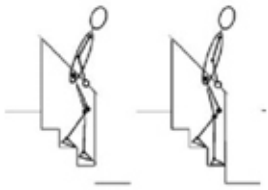
- Perform bed mobility and transfers with minimum assistance.
- Ambulate with standard walker with contact guarding.
- Ambulate to the bathroom and review toilet transfers.
- Sit in a chair for 30 minutes twice per day, in addition to all meals.
- Active or active assisted movement of knee

Day - 3

- Perform bed mobility and transfers with contact

guarding.

- Ambulate with standard walker with supervision.
- Negotiate 4 steps with necessary assistance.
- Sit in a chair for most of the day, including all meals. Limit sitting to 45 minutes in a single session.



- Use bathroom with assistance for all toileting needs.
- Active or active assisted movement of knee.

DAY 4 to 6

1. Transfers in chair
2. Self-assisted passive knee flexion

(a) Heel drag in supine (simultaneous hip and knee flexion in lying supine) position

(b) Bedside sitting, relaxed knee movements with the help of sound leg (in unilateral TKR)

(c) Sitting with feet planted on the ground, lift and push forward by raising trunk on arms

3. Begin active or active assisted exercises, if the wound is clean and dry
4. Bedside active knee flexionextension (self-assisted, if necessary)

Ambulate independently.

Week 1 -2

1. Work up towards 90 degrees knee flexion by 1014 days
2. Hamstrings strengthening
3. Active ,active assisted straight leg raise without lag
4. quad curl
3. Assisted step and stairs

PHASE II: PROGRESSIVE FUNCTION (WEEKS 2-5)

1. Progress from Walker to straight cane.
2. Improve involved lower extremity strength and proprioception.
5. Attain 0-125° active knee motion.

- Begin stationary bicycle with supervision for 5-10 minutes.
- Begin standing wall slides. DO NOT ALLOW THE KNEES TO MOVE FORWARD OF THE TOES.
- Incorporate static and dynamic balance exercises.
- AROM 0-115°.

WEEKS 3-4

- Continue as above.
- Practice with straight cane indoors.
- Increase stationary bicycle endurance to 10-12 minutes, twice per day.
- Attempt unilateral stance on the involved leg and side stepping.
- Incorporate gentle semi-squats (BODY WEIGHT ONLY) concentrating on eccentric control of the quadriceps.
- Attain AROM 0-120°.

WEEKS 4-5

- Continue as above.
- Ambulate with straight cane only.

- Increase stationary bicycle to 15 minutes, twice per day.
- Progress with gentle lateral exercises, i.e. lateral stepping, carioca.
- Attain AROM 0-125°.

PHASE III: ADVANCED FUNCTION (WEEKS 6-8)

1. Progress to ambulating without an assistive device.

3. Attain full AROM (0-135°).

4. Master functional tasks within the home environment.

- Focus exercises on strength and eccentric control of muscles. DO NOT USE CUFF WEIGHTS UNTIL CLEARANCE FROM SURGEON.
- Focus on unilateral balance activities.
- Continue aggressive AROM exercise to promote knee range of motion 0-135°

PRECAUTIONS

1.Positioning (when in bed)

- Use a towel roll under ankle to promote knee extension
- Use a trochanter roll to maintain hip in neutral rotation and promote knee extension
- Never place anything under the operated knee

2 Postpone SLRs in side-lying positions for 2 weeks after cemented arthroplasty and for 4 to 6 weeks after cementless/hybrid arthroplasty to avoid varus and valgus stresses to the operated knee.

3. If a posterior cruciate-sacrificing (posterior-stabilized) prosthesis was implanted, avoid hamstring strengthening in a sitting position to reduce the risk of posterior dislocation of the knee.

4. Tibiofemoral joint mobilization techniques to increase knee flexion or extension may or may not be appropriate, depending on the design of the prosthetic components. It is advisable to discuss the use of these techniques with the surgeon before initiating them.

5. Postpone unsupported or unassisted weight-bearing activities until strength in the quadriceps and hamstrings is sufficient to stabilize the knee.

6. Standing from a chair

- Place operated leg out in front of you.
- Push up with both hands on the arms of the chair, once balanced place hands on the frame.
- Do not use the frame to pull yourself up.

7. Stairs - Going up, you should place the un-operated leg

on the step above first, followed by your operated leg and crutch/stick. Coming downstairs you should place your operated leg together with your crutch/stick onto the step below first, followed by your un-operated leg last.

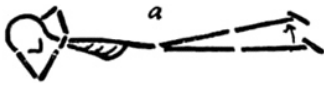
8. Do not keep the ice pack on any longer than 10 minutes. Any longer than this and the body will increase the blood flow to the area in an attempt to warm the tissues up again. This will make the swelling worse. Allow 20 minutes between applications.

Tibial Plateau Fracture Protocol

PHASE I

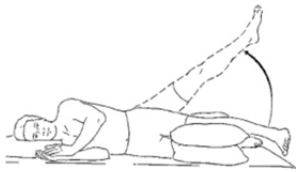
Weeks 0-1

- Ice and modalities to reduce pain and inflammation



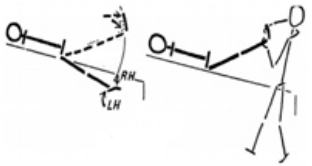
- Use crutches non-weight bearing for 6 weeks (may be allowed to TTWB for pivot transfers if indicated)

- Brace for 6 weeks in full extension
- Elevate the knee above the heart for the first 3-5 days



- Initiate patella mobility drills
- Begin full passive/active knee range of motion exercises
- Quadriceps setting focusing on VMO restoration

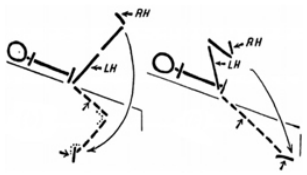
- Multi-plane open kinetic chain straight leg raising
- Gait training with crutches (NWB)

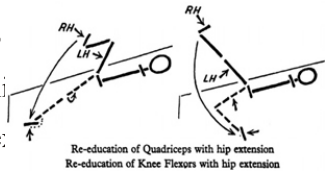


PHASE II, Progressive Stretching and Early Strengthening

Weeks 1-6

- Maintain program as outlined in week 0 to 1
- Continue with modalities to
- Initiate global lower extremi
- Implement reintegration e: stability





Re-education of Quadriceps with hip extension
Re-education of Knee Flexors with hip extension

- Closed kinetic chain multi-plane hip strengthening on uninvolved side
- Manual lower extremity PNF patterns
- Proprioception drill emphasizing neuromuscular control

- Multi-plane ankle strengthening

PHASE III, Strengthening and Proprioceptive Phase

Weeks 6-8

- Modalities as needed
- Continue with Phase 2 exercises as indicated
- Begin stationary bike and pool exercise program (when incisions healed)
- Begin partial weight bearing at 25% of body weight and increase by 25% approximately every 3 days. May progress to one crutch at 71/2 weeks as tolerated, gradually wear off of crutches by week 8-10
- Normalize gait pattern
- Advance stationary bike program; begin treadmill walking and elliptical trainer; Avoid running and impact activity
- Initiate closed kinetic chain exercises progressing bilateral to unilateral
- Initiate proprioception training

PHASE IV, Advanced Strength and Initiation of Plyometric Drills

Weeks 10-16

- Initiate gym strengthening-beginning bilateral progressing to unilateral
- Leg press, heel raises, hamstring curls, squats, lunges, knee extensions (30 to 0 degrees progressing to full range as PF arthrokinematics normalize)

Weeks 16-20

- Continue with advanced strengthening
- Begin functional cord program
- Begin pool running program progressing to land as tolerated

PHASE V, Return to Sport Functional Program

Weeks 20-24

- Follow-up examination with physician
- Implement sport specific multi-directional drills and bilateral plyometric activity progressing to unilateral as tolerated
- Continue with aggressive lower extremity strengthening, cardiovascular training, and flexibility
- Sports test for return to play

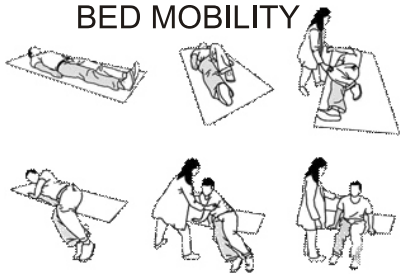
EVIDENCE BASED PROTOCOL FOR SPINAL CORD INJURY

Goals in rehabilitation

Despite the fact that most of the patients with SCI want to be able to walk again, the goals of rehabilitation are mainly focused on restoring quality of life, and these should be individualized according to the ASIA classification.

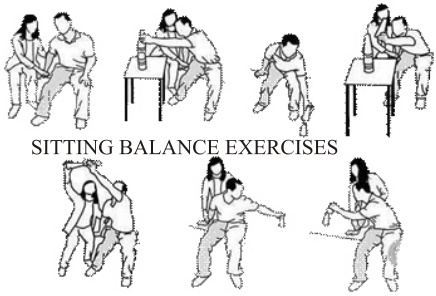
The following functional goals can be considered in the first 5 months according to the level of injury (time may vary depending on the patient ASIA classification he/she has):

1. C4: independence with a motorized wheelchair, partial or assisted ventilation, and dependence on activities of daily living.
2. C5: independence with a motorized wheelchair with hand control; may require extra respiratory care, performance of



some activities of daily living, adapted driving is possible.

3. C6: independence with a manual wheelchair, assistance in transfer with a sliding table, control of supporting points, can do certain activities of daily life; extension of the wrist is possible; adapted driving is possible.



SITTING BALANCE EXERCISES

4. C7: this is a key level for wheelchair mobility, independent transfers without sliding board support.
5. C8-L2: advanced wheelchair skills, independent daily life activities, driving with adaptations.
6. L3 and lower: home and community ambulation with aid devices, independence in daily life activities.

SCI patient rehabilitation stages

1. Acute phase : 0–6weeks

- postural adaptation exercises
- Passive exercises, bed mobility and rotation at 2–3-h

intervals

- Passive exercises for both upper and lower extremities for 2-3 times a day.
- Positioning of the joints with use of Sand bags and pillows or orthosis.
- Stretching exercises

2. Sub Acute Phase : 6-12 weeks

- Active or active-assisted exercises.
- Breathing exercises.
- Strengthening of the upper extremities by active and resistance exercises with dumbbells.
- shoulder rotation exercises and strengthening exercises.
- Electrical stimulation.
- patient's turning and rotation : every 2-3 hours.
- Supported and unsupported Sitting and balancing.
- static and dynamic balance training and pelvic stabilization.
- Wheelchairs prescription and its usage.

3. Chronic phase :

- exercises to develop motor skills such as walking,

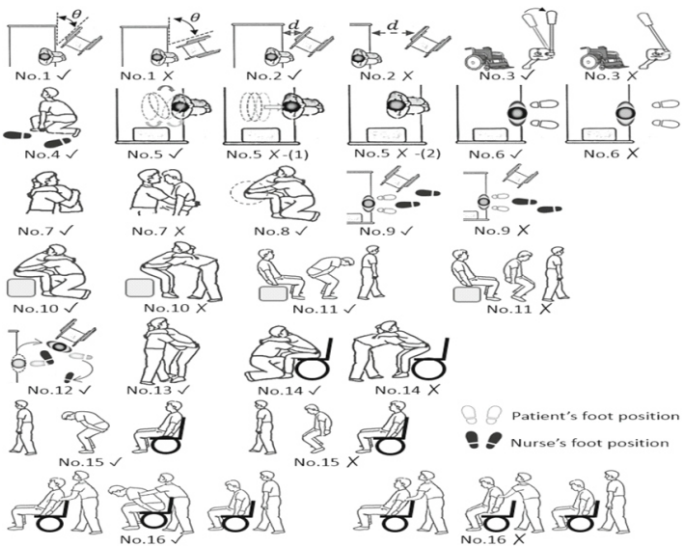
transferring using the upper limbs, and wheelchair use and restore psychological status.

- Gait training with orthosis or crutches outside the parallel bars.
- Management of autonomic dysreflexia.
- Gait training by using orthoses and walking aids such as; knee-ankle-foot and hip-knee-ankle-foot orthoses.
- Strengthening, and balancing exercises
- Cardiovascular fitness and pain management.
- house modifications.
- restoring the patient's psychological and emotional state.
- Occupational therapy.

Outcome measures

1. ASIA Impairment Scale Level
2. International Classification of Functioning, Disability, and Health Component.

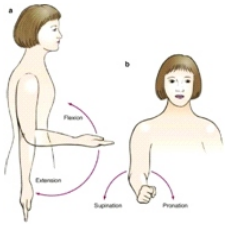
IMAGE SHOWING CORRECT AND INCORRECT TRANSFERS



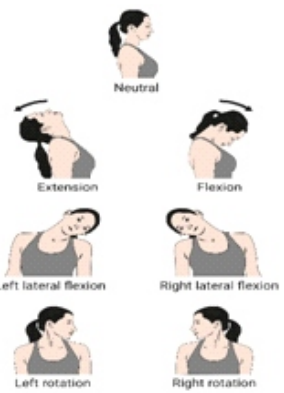
Proximal Humerus Fracture / Greater Tuberosity ORIF Rehab Protocol Prescription

Post-operative Period

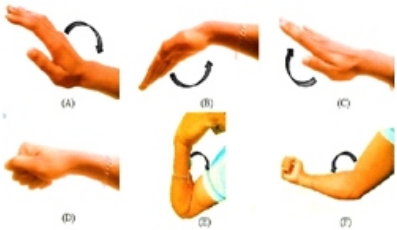
0 to 6 weeks:



1. 2 visits per week, everyday home program
2. Sling is to be worn for sleep and otherwise worn only as desired
3. Active and passive range of motion of the neck, elbow, wrist and hand should be performed 5 times/day everyday
4. Avoid any active shoulder motion for the first 4 weeks.
5. Gentle passive pendulum exercises should be started immediately to be performed 3 times a day



6. Icing program, 3 to 5 times a day, 30 minutes each after exercises
7. Gentle passive shoulder motion in all planes without restrictions



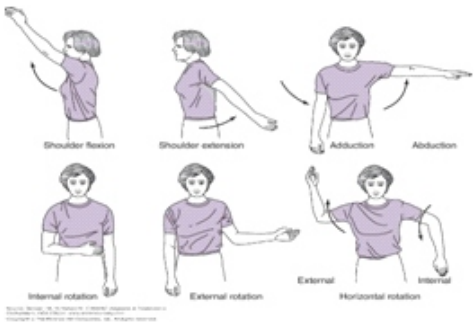
8. Please focus on normalizing scapulohumeral kinematics

6 weeks to 3 months:

1. 2 to 3 visits per week, 5 times a week home program
2. Continue all exercises in previous phase (as described above)
3. Passive and active assisted ROM exercises in all planes of shoulder motion, as tolerated
4. Periscapular strengthening and range of motion exercises should begin including shoulder shrugs and scapular retraction exercises
5. Progress to active ROM once passive motion

6. Isometric strengthening exercises can begin in this time period once active ROM adequate

3 to 6 months:



1. 1 to 2 visits per week, with a home program 5 times a week.
2. Continue exercises in previous phases (as described above)
3. A strong emphasis on periscapular strengthening and range of motion exercises should continue with scapular protraction, retraction, and elevation
4. Rotator cuff strengthening exercises (with bands and dumbbells) may begin once active range of motion is full

6 to 9 months:

1. 4 to 5 times a week home program. 1 to 2 visits per week to advance home program.
2. Continue exercises in previous phases (as described

above)

3. Active shoulder girdle, rotator cuff, and periscapular muscle strengthening exercises are the focus of this period with the emphasis to regain full strength. Strengthening exercises should be high repetition, low weights with dumbbells and bands

Discharge Criteria:

1. Maximize ROM
2. Full independent ADLs
3. Normal scapulohumeral rhythm >100 deg elevation
4. Independent HEP