

Orthopaedic Sports Specialists, P.C.

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ACL Conservative Rehabilitation

Autologous Bone-Tendon-Bone, Patella Tendon Graft

I. Immediate Post-Operative Phase

POD 1

Brace - EZ Wrap locked in zero degrees extension immediate post-op.

Weight bearing - Two crutches as tolerated

Exercises

- * Ankle pumps
- ∞ Passive knee extension to zero
- ∞ (towel roll under ankle, bridge hang for full extension)
- * Straight leg raising
- * Quad sets, glut sets
- * Hamstring stretch

Muscle Stimulation -

Muscle stimulation to quads (4 hours per day) during quad sets

CPM - Zero to 90 degrees as tolerated (only occasionally used)

Ice and Elevation - Ice 20 minutes out of every hour, elevate, knee in extension

Criteria Goals for discharge form hospital

- * *Quad control (ability to perform good quad set and straight leg raising)*
- * *Full passive knee extension*
- * *Passive range of motion 0-90 degrees*
- * *Good patellar mobility*
- * *Minimal effusion*
- * *Ambulation with crutches*

POD 2 TO 4

Brace - EZ Wrap brace locked at zero degrees

Weight Bearing - Two crutches as tolerated

Range of Motion - Patient out of brace 4-5 times daily to perform self ROM

Exercises

- * Multi-angle isometrics at 90, 60, 30 degrees (for quads)
- * Intermittent ROM exercises continued
- * Patellar mobilization
- * Ankle pumps
- * Straight leg raises (all 4 directions)
- * Standing weight shifts & mini squats [(0-30) ROM]
- * Hamstring curls
- * Continue quad sets/glut sets

Muscle Stimulation - Electrical Muscle stimulation to quads (6 hours per day) during quad sets, multi-angle isometrics and SLR's

Ice and elevation - Ice 20 minutes q hour & elevate with knee in extension

POD 5 to 7

BRACE - EZ wrap locked in zero degrees

Weight Bearing - Two crutches, prn only as tolerated

Range of motion - Patient out of brace to perform ROM 4-5 times daily.

Exercises

- * Multi-angle isometrics at 90,60,30 degrees
- * Intermittent PROM/exercises
- * Patellar mobilization
- * Ankle pumps
- * Straight leg raises (all 4 directions)
- * Standing weight shift & mini squats (0-30)
- * Passive knee extension to 0 degrees

- * Hamstrings curls
- * Active knee extension 90 degrees to 40 degrees

Muscle Stimulation - Electrical muscle stimulation

II. MAXIMUM PROTECTION PHASE (Week 2-6)

Goals: Absolute control of external forces and protect graft.
Nourish articular cartilage
Decrease fibrosis
Stimulate collagen healing
Decrease swelling prevent quad atrophy

A: Week Two

Goals: Prepare patient for ambulation without crutches

Brace - EZ Wrap locked at 0 degrees for ambulation only.

Weight bearing - As tolerated (goal to discontinue crutches 7-10 days post-op)

Exercises

- * Multi-angle isometrics at 90,60,30 degrees
- * leg raises (4 planes)
- * hamstring curls
- * Knee squats (0-40) and weight shifts
- * Passive range of motion 0-105 degrees
- * Patellar mobilization
- * Hamstring and calf stretching
- * Proprioception training
- * Well leg exercises
- * PRE program - Start with 1 lb, progress 1 lb per week

Swelling control - Ice, compression, elevation (Some with cryo Cuff)

B: Week Three-Four

Brace - EZ wrap locked at 0 degrees for ambulation only, most patients with good quad control are out of the brace, except for at risk activities.

Full weight bearing - No crutches

Exercises:

- * Same as week two
 - * Passive range of motion 0-115 degrees
 - * Bicycle for ROM stimulus & endurance
 - * Pool walking program
 - * Initiate eccentric quads 40-100 (isotonic only)
 - * Leg press (0-60)
 - * StairMaster
 - * Nordic track
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III. Controlled Ambulation Phase (Week 6-9)**Criteria to Enter Phase III**

- * AROM 0-115 degrees
- * Quad strength 60% > contralateral side (isometric test) (60 degrees knee flexion angle)
- * Unchanged KT Test (+1 or less)
- * Minimal effusion

Goals: Control forces during walking

Brace: Discontinue locked brace. Brace opened 0-125 degrees.

KT 2000 Test - (Week 6, 20, 30, & MM lb test)

Exercises

- * Same as week four
- * Passive range of motion 0-130 degrees
- * Initiate swimming program
- * Initiate step-ups (start with 2" & gradually increase)
- * Increase closed kinetic chain rehab
- * Increase proprioception training

Phase IV continued:

Goals: Protect patellofemoral joints articularcartilage
Maximal strengthening for quads,
lower extremity

KT 2000 Test - (week 12)

Isokinetic Test - (week 10-12) (when available)

Exercises

- * Emphasize eccentric quad work
 - * Continue closed chain exercises, step-ups, mini-squats, leg press
 - * Continue knee extension 90-40 degrees
 - * Hip abduction/adduction
 - * Hamstring curls & stretches
 - * Calf raises
 - * Bicycle for endurance
 - * Pool running (forward/backward)
 - * Walking program
 - * StairMaster
 - * Initiate isokinetic work 100-40 degrees
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V. Light Activity Phase (Month 3-4)**Criteria to Enter Phase *V**

- * *AROM 0-125 degrees >*
- * *Quad strength 70% of contralateral side, knee flexor/extensor rated 70-79%*
- * *No change in KT scores (2+ or less)*
- * *Minimal/no effusion*
- * *Satisfactory clinical exam*

Goals:

- ∞ Development of strength, power, & endurance
- ∞ Begin to prepare for return to functional activities.

Tests - Isokinetic test (3 months)

Exercises:

- * Continue strengthening exercises
- * Initiate plyometric program
- * Initiate running program
- * Initiate agility drills
- * Sport specific training & drills

Criteria to initiate running program

- * Satisfactory isokinetic test
- * Unchanged KT results
- * Functional test 70% > contralateral leg
- * Satisfactory clinical exam

VI. Return to Activity Phase (Month 5-6)

Criteria to return to activities

- * *Isokinetic test that fulfills criteria*
- * *KT 2000 Test unchanged*
- * *Functional test 80% > contralateral leg*
- * *Proprioceptive test 100% of contralateral leg*
- * *Satisfactory clinical exam*

Goals: Achieve maximal strength and further enhance neuromuscular coordination and endurance.

Tests - Isokinetic test prior to return, KT-2000 Test, function test

Exercises

- * Continue strengthening program
- * Continue closed chain strengthening program
- * Continue plyometric program
- * Continue running & agility program
- * Accelerate sport specific training and drills

6-MONTH FOLLOW-UP

Isokinetic test
KT 2000 test
Functional test

12 MONTH FOLLOW-UP

Isokinetic test
KT 2000 test
Functional test

ACCELERATED REHABILITATION FOLLOWING
ACL-PTG RECONSTRUCTION

I. Immediate Post-Operative Phase

POD 1

Brace - EZ wrap locked in zero degrees immediate postop

Weight bearing - Two crutches as tolerated (less 50%)

Exercises

- * Ankle pumps
- * Passive knee extension to zero
- * Straight leg raising
- * Quad sets, glut sets
- * Hamstring stretch

Muscle Stimulation - Muscle stimulation to quads
(4 hours per day) during quad sets

CPM - Zero to 90 degrees as tolerated

Ice and Elevation - Ice 20 minutes out of every hour
and elevate with knee in extension

POD 2 to 4

Brace - EZ wrap brace locked at zero degrees

Weight bearing - Two crutches as tolerated

Range of motion - Patient out of brace 4-5 times
daily to perform self ROM

Exercises

- * Multi-angle isometrics at 90,60,30 degrees
(for quads)
- * Intermittent ROM exercises continued
- * Patellar mobilization
- * Ankle pumps

- * Straight leg raises (all 4 directions)
- * Standing weight shifts & mini squats [(0-30) ROM]
- * Hamstring curls
- * Continue quad sets/glut sets

Muscle Stimulation - Electrical muscle stimulation to quads (6 hours per day) during quad sets, multi-angle isometrics and straight leg raises.

CPM - Zero to 90 degrees

Ice and Elevation - Ice 20 minutes out of every hour and elevate with knee in extension

POD 5 to 7

BRACE - EZ wrap locked in zero degrees

WEIGHT BEARING - Two crutches as tolerated

RANGE OF MOTION - Patient out of brace to perform range of motion 4-5 times daily

Exercises

- * Multi-angle isometrics at 90,60,30 degrees
- * Intermittent PROM-exercises
- * patellar mobilization
- * Ankle pumps
- * Straight leg raises (all 4 directions)
- * Standing weight shift and mini squats (0-30)
- * Passive knee extension to 0 degrees
- * Hamstrings curls
- * Active knee extension 90 degrees to 40 degrees

Muscle Stimulation - Electrical muscle stimulation (continue 6 hours daily)

CPM - Zero to 90 degrees

Criteria for discharge from hospital

- * Quad control (ability to perform good quad set and straight leg raise)
- * Full passive knee extension
- * Passive range of motion 0-90 degrees
- * Good patellar mobility

- * Minimal effusion
- * Ambulation with crutches

II. Maximum Protection Phase (Week 2-3)

Goals: Absolute control of external forces & protect graft
Nourish articular cartilage
Stimulate collagen healing
Decrease swelling. Prevent quad atrophy.

A. Week Two

Goals: Prepare patient for ambulation without crutches

Brace - EZ wrap locked at 0 degrees for ambulation only, unlocked for self ROM (4-5 times daily)

Weight bearing - As tolerated (goal to discontinue crutches 7-10 days post-op)

KT 2000 Test - (15 lb test only)

Week 2 continued:

Exercises:

- * Multi-angle isometrics at 90,60,30 degrees
- * Leg raises (4 planes)
- * Hamstring curls
- * Knee extension 90-40 degrees
- * Mini squats (0-40) and weight shifts
- * Passive range of motion 0-105 degrees
- * Patellar mobilization
- * Hamstring and calf stretching
- * Proprioception training
- * Well leg exercises
- * PRE Program - start with 1 lb, progress 1 lb per week

Swelling control - Ice, compression, elevation

B: Week Three

Brace - EZ Wrap locked at 0 degrees for ambulation only, unlocked for self ROM (4-5 times daily)

Full weight bearing - no crutches

Exercises

- * Same as week two
- * PROM-0-115 degrees
- * Bicycle for ROM stimulus and endurance
- * Pool walking program
- * Initiate eccentric quads 40-100 (isotonic only)
- * Leg press (0-60)
- * StairMaster
- * Nordic track

III. Controlled Ambulation Phase (Week 4-7)

Criteria to Enter Phase III

- * AROM 0-115 degrees
- * Quad strength 60% > contralateral side (isometric test) (60 degrees knee flexion angle)
- * Unchanged KT Test (+1 or less)
- * Minimal effusion

Goals: Control forces during walking

Brace: Discontinue locked brace. Brace opened 0-125 degrees

KT 2000 Test - (Week 4, 20 lb test only)
(Week 6, 20 and 30 lb test)

Phase III continued:

Exercises

- * Same as week three
- * Passive range of motion 0-130 degrees
- * Initiate swimming program
- * Initiate step-ups (start with 2" and gradually increase)
- * Increase closed kinetic chain rehab
- * Increase proprioception training

IV. Moderate Protection Phase (Week 7-12)

Criteria to Enter Phase IV

- * AROM 0-125 degrees

- * Quad strength 60% of contralateral leg (isokinetic test)
- * No change in KT scores (+2 or less)
- * Minimal effusion
- * No patellofemoral complaints
- * Satisfactory clinical exam

Goals: Protect patellofemoral joints articular cartilage
Maximal strengthening for quads, lower extremity

KT 2000 Test - (Week 10)

Isokinetic Test - (Week 10)

Exercises

- * Emphasize eccentric quad work
- * Continue closed chain exercises, step-ups, mini-squats
leg press
- * Continue knee extension 90-40 degrees
- * Hip abduction/adduction
- * Hamstring curls & stretches
- * Calf raises
- * Bicycle for endurance
- * Pool running (forward/backward)
- * Walking program
- * StairMaster
- * Initiate isokinetic work 100-40 degrees

V- Light Activity Phase (Month 2-1/2 to 3-1/2)

Criteria to Enter Phase V-

- * AROM 0-125 degrees >
- * Quad strength 70% of contralateral side, knee flexor/extensor rated 70-79%
- * No change in KT scores (+2 or less)
- * Minimal/no effusion
- * Satisfactory clinical exam

Phase V-continued

Goals: Development of strength, power, and endurance
Begin to prepare for return to functional activities

Tests - Isokinetic test (week 10-12 and 16-18)

Exercises

- * Continue strengthening exercises
- * Initiate plyometric program
 - * Initiate running program
 - * Initiate agility drills
 - * Sport specific training and drills

Criteria to initiate running program

- * Satisfactory isokinetic test
- * Unchanged KT results
- * Functional test 70% > contralateral leg
- * Satisfactory clinical exam

VI. Return to Activity Phase (Month 3-1/2 to 4-1/2)

Criteria to return to activities

- * Isokinetic test that fulfills criteria
- * KT 2000 Test unchanged
- * Functional test 80% > contralateral leg
- * Proprioceptive test 100% of contralateral leg
- * Satisfactory clinical exam

Goals: Achieve maximal strength & further enhance neuromuscular coordination and endurance.

Tests - Isokinetic test prior to return, KT 2000 Test, functional test

Exercises

- * Continue strengthening program
- * Continue closed chain strengthening program
- * Continue plyometric program
- * Continue running and agility program
- * Accelerate sport specific training & drills

6 MONTH FOLLOW-UP

Isokinetic test
KT 2000 test
Functional test

12 MONTH FOLLOW-UP

Isokinetic test
KT 2000 test
Functional test