



Dr. Duke Knee Procedures

Knee Procedures

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ACL Reconstruction

Postop	Goals	Precautions	Exercises
Weeks 0-4 PT 1x/week HEP daily	Full passive extension Minimum 90° knee flexion Patella mobility Edema and pain control Promote independence Protect graft and graft fixation (weight bearing dependent on meniscal repair) Avoid hyperextension Educate patient on rehab progressions and limitations Restore normal gait pattern	PWB (50%) Brace locked at 0° for ambulation Brace locked at 0° for sleeping Do not perform SLR without assist	Passive extension A/AA knee flexion Short crank ergometry Patella mobilization Quad re-education and SLR Bilateral leg press 5-70° Hip/Core training Quad sets Weight shifts Biking when able (not to be used for gaining ROM)
Weeks 4-8 PT 2-3x/week HEP daily	Full passive extension ROM 0-125° Normalize patella mobility Improve quad control Normalize gait pattern Ascend 8" step with control	WBAT Open brace 0-40°, ambulate with crutches until adequate quad DC crutches when non-antalgic gait Brace locked at 0° for sleep x 4wks Avoid active knee extension 40→0° Avoid reciprocal stairs until adequate quad control	AAROM knee flexion/extension Emphasize full passive extension Standard ergometry (ROM>115°) Patella mobilization Mini-squats Initiate step-up program Proprioceptive training Bilateral leg press 0-80° Hip/Core training Single leg squat Wall sits, step ups, pool dips, lunges Single leg balance and proprioceptive training
Weeks 8-16 PT 1-2x/week HEP daily	Full ROM Descend 8" step with control Improve ADL endurance Protect patellofemoral Increase proprioception on various surfaces Impact activities may be initiated when no swelling is present, full knee extension achieved, single leg press 45- 60 deg with appropriate posturing. Improve hamstring strength No patellofemoral pain Progressive resistance for hamstring strengthening Strength approximately 70% of non-operative lower	WBAT DC brace when adequate quad Avoid painful activities No running	Progress squat/leg press Initiate step-down program Quad isotonic 90-40° arc Advance proprioceptive training Elliptical Retrograde treadmill Prevent deconditioning Slide board Kin-com may be started at 12 weeks Functional testing- operative vs. non- operative Measure thigh circumference

<p>Weeks 16-26 PT 1-2x/week HEP daily</p>	<p>Symptom free running and normalized running pattern Maximize strength/flexibility Hop Test >75% limb symmetry Progress to single leg impact control Progress stop/start movements with appropriate technique and timing</p>	<p>WBAT Avoid painful activities Must have 80% of opposite leg with isokinetic testing or leg press to clear for straight line running</p>	<p>Initiate forward running program when 8" step-down satisfactory Advance agility program Plyometrics when adequate strength Lateral bounding Sprints and decelerations Progression from lazy 8s to tight 8s Advanced jumping drills Focal ACL injury prevention training</p>
<p>Weeks 26+ PT 1x/week HEP daily</p>	<p>No apprehension with sport specific movements Maximize strength and flexibility to meet sporting demands Hop Test >85% limb symmetry</p>	<p>WBAT Avoid painful activities No return to sport until MD clearance</p>	<p>Advance flexibility/agility/plyometrics Sport specific training</p>

MILESTONES TO RETURN TO SPORT, WORK, HOBBIES:

- Clearance from surgeon and therapist
- Minimal to no complaints of pain
- Restoration of sufficient ROM for task completion
- Adequate hip and quadricep endurance/ strength for desired activity, generally 90% of contralateral limb.
- Regular completion of an independent strengthening program at least 3 days per week.

Meniscectomy

<u>Postop</u>	<u>Goals</u>	<u>Precautions</u>	<u>Exercises</u>
Acute Phase	Safe ambulation with crutches, walker or cane on level surfaces Demonstrate appropriate up/down stairs protecting operative lower extremity Independent transfers ROM 0-90 degrees Control post-op edema Educate patient on rehab progressions and limitations Good quadriceps contraction		Heel slides Quad sets Gluteal sets Ankle pumps Hip abduction, extension, SLR Partial squats (30-deg) Extension/ flexion focused ROM activities within parameters
Progressive phase	ROM 0-120 degrees Normal gait pattern		Leg press- ROM Hamstring curls Standing TKE, hip abduction, hip flexion, hip extension Bridges Prone hang Short arc quads to long arc quads Biking and other cardio equipment Lunges
Advanced Activity phase	Independent with ADLs Independent with HEP Meet return to work/ sporting requirements		Squats (increased depth/ weight acceptance) Double and single leg balance activities Pool dips (progression in 2 inch increments) May begin plyometrics/ jumping tasks Begin running program Sport specific drills

DISCHARGE RECOMMENDATIONS:

- Safe normalized gait pattern
- LE strength 80% of contralateral limb
- Independent with HEP
- Normal ADL function

Meniscus Repair

<u>Postop</u>	<u>Goals</u>	<u>Precautions</u>	<u>Exercises</u>
Weeks 0-4 PT 1-2x/week HEP daily	Full passive extension ROM 0-90° Patella mobility Edema and pain control SLR without lag Promote independence	PWB (50%) Limit knee flexion: 0-90° Brace at 0° for ambulation & sleep Avoid active knee flexion Observe for signs and symptoms of DVT	A/AA/PROM emphasize extension Short crank ergometry Patella mobilization Quad re-education and SLR Hip/Core training
Weeks 4-8 PT 2-3x/week HEP daily	Full passive extension ROM 0-125° Normalize patella mobility Edema and pain control Improve quad control Promote independence Normalize gait Ascend 8" step with control	Progress PWB-WBAT by 8 weeks Brace open 0-60° for ambulation with crutches abiding with WB restrictions Brace locked at 0° for sleep Limit knee flexion to 125°	AAROM knee flexion/extension Standard ergometry (ROM>115°) Patella mobilization Quad re-education Proprioceptive training Hip/Core training Bilateral leg press 0-60°
Weeks 8-14 PT 1-2x/week HEP daily	Full ROM Descend 8" step with control Improve endurance Protect patellofemoral	WBAT DC brace/crutches when adequate quad and non-antalgic gait No running	Progress squat/leg press Forward step-up/down program Advance proprioceptive training Elliptical, retrograde treadmill
Weeks 14-20 PT 1-2x/week HEP daily	Symptom free running Improve strength/flexibility Hop Test >85% limb symmetry	Avoid painful activities	Forward running program at 16 weeks (when 8" step down OK) Progress squat program <90° flexion Advance agility program Plyometrics when sufficient base
Weeks 20+ PT 1x/week HEP daily	No apprehension with sport specific movements Strength and flexibility to meet sporting demands	Avoid painful activities No sport until MD clearance	Advance flexibility/agility/plyometrics Sport specific training

MILESTONES TO RETURN TO FULL SPORT, WORK, HOBBIES:

- Clearance from surgeon and therapist
- Minimal to no complaints of pain
- Restoration of sufficient ROM for task completion
- Regular completion of an independent strengthening program at least 3 days per week

MPFL Reconstruction

<u>Postop</u>	<u>Goals</u>	<u>Precautions</u>	<u>Exercises</u>
Weeks 0-6 PT 2-3x/week HEP daily	ROM 0-90° Edema and pain control Limit quadriceps inhibition SLR without lag Promote independence	WBAT, brace locked at 0° Brace at 0° for ambulation & sleep Observe for signs and symptoms of DVT Weeks 0-4: Limit knee flexion: 0-60° Weeks 4-6: Limit knee flexion: 0-90° Avoid lateralization of patella (lateral patella glides, SLR for hip flexion, active knee extension exercises)	A/AAROM flexion PROM extension Quad re-education Patella mobilization (avoid lateral) Hip/Core training CPM: Weeks 0-4: 0-60° Weeks 4-6: 0-90°
Weeks 6-12 PT 2-3x/week HEP daily	ROM 0-130° Minimize effusion & pain Improve quad control Promote independence Normalize gait Ascend 8" step with control	Weeks 6-8: ROM 0-110° Brace open 0-60° for ambulation Weeks 8-10: ROM 0-120° DC brace when adequate quad Weeks 10-12: ROM 0-130° Avoid lateralization of patella No running	Gait training Closed chain quad strengthening Bilateral leg press 0-60° Short crank - standard (ROM>115°) Forward step-up program Advance proprioceptive training Proximal strengthening & Core
Weeks 12-18 PT 1-2x/week HEP daily	Full ROM Normal gait Step-up/down 8" with control Adequate Core	Avoid painful activities Avoid too much too soon	Progress quad strengthening Progress squat program <90° flexion Forward step-down program Elliptical, retrograde treadmill Endurance training
Weeks 18-24 PT 1x/week HEP daily	Symptom free running Strength and flexibility to meet sporting demands Hop Test >75% contralateral	Avoid painful activities No sport until MD clearance	Forward running program weeks (when 8" step down OK) Advance agility program Advance core strengthening Plyometrics when sufficient base Sport specific training
Weeks 24+ PT 1x/week HEP daily	No limitations No apprehension with sport specific movements Hop Test >85% contralateral	Avoid painful activities No sport until MD clearance	Advance flexibility/agility/plyometrics Sport specific training

MILESTONES TO RETURN TO FULL SPORT, WORK, HOBBIES:

- Clearance from surgeon and therapist
- Minimal to no complaints of pain
- Restoration of sufficient ROM for task completion
- Regular completion of an independent strengthening program at least 3 days per week

OC Allograft Femoral Condyle

<u>Postop</u>	<u>Goals</u>	<u>Precautions</u>	<u>Exercises</u>
Weeks 0-2 HEP daily	Full passive extension Edema and pain control Promote independence	TTWB (20%) Brace locked at 0° except for approved exercises Observe for signs and symptoms of DVT	Quad sets/SLR Calf pumps Passive leg hangs to 90° Stretches: hamstring and gastroc
Weeks 2-6 PT 1-2x/week HEP daily	Full passive extension 120° knee flexion Prevent quad inhibition Edema and pain control Promote independence	TTWB (20%) Brace locked at 0° except for approved exercises	AA/PROM pain free Towel extension Patella mobilization Quad re-education SLR in all planes Hip/Core resisted exercises LE flexibility exercises
Weeks 6-12 PT 2-3x/week HEP daily	Full ROM Normal gait pattern Ascend 8" step with control Normal patella mobility Improve ADL endurance	Progress WB 25% per week until full DC brace when adequate quad Avoid descending stairs reciprocally Avoid painful activities No running	Continue above exercises Gait training Closed chain activities: wall sits, minisquats, toe raises, stationary bike, leg press 0-60° Proprioception training Initiate step-up program
Weeks 12-20 PT 2-3x/week HEP daily	Return to normal ADLs Improve endurance Descend 8" step with control 85% limb symmetry Improve strength/flexibility	WBAT Avoid painful activities No running Forward step down test at 4 months Isokinetic testing at 4 months	Continue and advance above Progress squat program Leg press (emphasize eccentrics) Retrograde treadmill Initiate step down program Advance to elliptical, bike, pool Open chain extension to 40°
Weeks 20+ PT 1x/week HEP daily	No apprehension with sport specific movements Maximize strength and flexibility to meet sporting demands	Avoid painful activities No running until: Strength >70% contralateral No agility training until: Strength >90% contralateral No RTP until: Passes RTP evaluation MD clearance	Continue and advance above Begin forward running Begin plyometric program

Quadriceps/ Patellar Tendon Repair

<u>Postop</u>	<u>Goals</u>	<u>Precautions</u>	<u>Exercises</u>
Weeks 0-6 PT 2-3x/week HEP daily	Edema and pain control Protect surgical repair Maintain full extension Limit quad inhibition ROM 0-60°	Brace locked in extension when not performing exercises (includes ambulation and sleep) PWB (50%) x4 weeks then advance to WBAT No active knee extension Avoid prolonged standing/walking Observe for signs and symptoms of DVT Knee flexion progression: Weeks 0-2: 0-45° Weeks 2-4: 0-60° Weeks 4-6: 0-90°	Brace education CPM (MD directed) Seated A/AA knee flexion within limits Passive knee extension Quadriceps re-education & isometrics SLR brace locked in extension Scar mobilization Patella mobilization Gait training
Weeks 6-12 PT 2-3x/week HEP daily	ROM 0-125° No extensor lag Normalize gait Ascend 8" step	WBAT Brace locked ambulation & sleep Unlock 0-60° ambulation (week 8) No WB with flexion >90° Notify MD if knee flexion <90° by 8 weeks <110° by 10 weeks	Gait training with flexion stop at 60° once patient demonstrates good quad control A/AA knee flexion Pool ambulation (if wound OK) Patellar mobilizations Short crank □ regular bike (flexion >110°) Leg press (bilateral 0-90°) Initiate forward step-up program Initiate squat program (wall slide) Proprioceptive exercises Retro-ambulation
Weeks 12-18 PT 2-3x/week HEP daily	Full ROM Descend 8" step Return to normal ADLs	WBAT DC brace Avoid aggravating activities Avoid reciprocal stair decent No running or sport Swimming OK at 12 weeks	Continue flexion ROM Incorporate quadriceps flexibility exercises Advance closed chain exercise Initiate step-down program Progress squat program Isokinetic/isotonic knee extension Advanced proprioceptive training Agility training Elliptical
Weeks 18-26 PT 1-2x/week HEP daily	No apprehension with sport specific movements Maximize strength Improve endurance Gradual return to activity	WBAT Avoid aggravating activities Return to sport (MD directed) Running/jumping at 20 weeks	Advance agility program/sport specific Plyometric program Forward running

Total Knee Replacement

<u>Postop</u>	<u>Goals</u>	<u>Precautions</u>	<u>Exercises</u>
Post-op to week 6	<p>Safe ambulation with crutches, walker or cane on level surfaces</p> <p>Demonstrate appropriate up/down stairs protecting operative lower extremity</p> <p>Independent transfers</p> <p>ROM 0-90 degrees</p> <p>Control post-op edema</p> <p>Educate patient on rehab progressions and limitations</p> <p>Good quadriceps contraction</p>	<p>No Quad sets</p> <p>No Partial squats</p> <p>Observe for signs and symptoms of DVT</p>	<p>Heel slides</p> <p>Gluteal sets</p> <p>Ankle pumps</p> <p>Hip abduction, extension SLR</p> <p>Extension/ flexion focused ROM activities within parameters</p> <p>Patellar mobilizations</p>
Week 6-10	<p>ROM 0-120 degrees</p> <p>Normal gait pattern with assistive device</p> <p>Scar management</p>	<p>No Quad sets</p> <p>No Partial squats</p>	<p>Leg press- ROM</p> <p>Hamstring curls</p> <p>Standing TKE, hip abduction, hip flexion, hip extension</p> <p>Bridges</p> <p>Prone hang</p> <p>Short arc quads</p> <p>Biking</p> <p>Pool walking</p>
Week 10+	<p>Independent with ADLs</p> <p>Safe ambulation on uneven surfaces with/ without assistive device</p> <p>Normalized gait pattern without assistive device</p> <p>Independent with HEP</p> <p>Meet return to work requirements</p> <p>Increase quadricep strength</p>		<p>Squats (increased depth/ weight acceptance)</p> <p>Double and single leg balance activities</p> <p>Pool dips (progression in 2 inch increments)</p> <p>Forward/ lateral step ups (progression in 2 inch increments)</p> <p>Leg press- low weight x high reps</p> <p>progression Long arc quads</p>

DISCHARGE RECOMMENDATIONS:

- Safe normalized gait pattern without assistive device
- Ascend and descend stairs in reciprocal pattern
- No extension lag
- Normal ADL function

Tibial Tubercle Osteotomy

<u>Postop</u>	<u>Goals</u>	<u>Precautions</u>	<u>Exercises</u>
Weeks 0-6 PT 2-3x/week HEP daily	ROM 0-90° Edema and pain control Limit quadriceps inhibition SLR without lag Promote independence	WBAT, brace locked at 0° Brace at 0° for ambulation & sleep Observe for signs and symptoms of DVT Weeks 0-4: Limit knee flexion: 0-60° Weeks 4-6: Limit knee flexion: 0-90° Avoid lateralization of patella (lateral patella glides, SLR for hip flexion, active knee extension exercises)	A/AAROM flexion PROM extension Quad re-education Patella mobilization (avoid lateral) Hip/Core training CPM: Weeks 0-4: 0-60° Weeks 4-6: 0-90°
Weeks 6-12 PT 2-3x/week HEP daily	ROM 0-130° Minimize effusion & pain Improve quad control Promote independence Normalize gait Ascend 8" step with control	Weeks 6-8: ROM 0-110° Brace open 0-60° for ambulation Weeks 8-10: ROM 0-120° DC brace when adequate quad Weeks 10-12: ROM 0-130° Avoid lateralization of patella No running	Gait training Closed chain quad strengthening Bilateral leg press 0-60° Short crank - standard (ROM>115°) Forward step-up program Advance proprioceptive training Proximal strengthening & Core
Weeks 12-18 PT 1-2x/week HEP daily	Full ROM Normal gait Step-up/down 8" with control Adequate Core	Avoid painful activities Avoid too much too soon	Progress quad strengthening Progress squat program <90° flexion Forward step-down program Elliptical, retrograde treadmill Endurance training
Weeks 18-24 PT 1x/week HEP daily	Symptom free running Strength and flexibility to meet sporting demands Hop Test >75% contralateral	Avoid painful activities No sport until MD clearance	Forward running program weeks (when 8" step down OK) Advance agility program Advance core strengthening Plyometrics when sufficient base Sport specific training
Weeks 24+ PT 1x/week HEP daily	No limitations No apprehension with sport specific movements Hop Test >85% contralateral	Avoid painful activities No sport until MD clearance	Advance flexibility/agility/plyometrics Sport specific training

MILESTONES TO RETURN TO FULL SPORT, WORK, HOBBIES:

- Clearance from surgeon and therapist
- Minimal to no complaints of pain
- Restoration of sufficient ROM for task completion
- Regular completion of an independent strengthening program at least 3 days per week