

**AUTOLOGOUS CHONDROCYTE TRANSPLANTATION PT PROTOCOL
Stage 1 – Proliferative Phase (0–6 weeks)****Patellar and/or Trochlear Defect**

PRIMARY GOALS

DO NOT OVERLOAD GRAFT
INCREASE TIBIOFEMORAL AND PATELLOFEMORAL MOBILITY
RESTORE QUADRICEPS CONTROL

BRACE	<ul style="list-style-type: none">* DonJoy Hinge knee brace for ambulation (locked) and at night.* Out of brace for CPM.* No brace, but towel/pillow behind heel when lying down.
PRECAUTIONS	<ul style="list-style-type: none">* If tubercle osteotomy: touch-down weightbearing (locked brace).* If no osteotomy: Full weightbearing in full extension (locked brace).
ROM	<ul style="list-style-type: none">* Gentle AROM flexion as tolerated 3x/day. Only PROM extension allowed.* Dangle knee over edge of bed 5x/day to achieve 90°.* CPM >= 6–8 hours daily. 0–40° only, do not advance.* Minimum 90° flexion by 3 weeks, 110° by 6 weeks, and full ROM by 12 weeks post-op.
THEREX	<ul style="list-style-type: none">* Quad sets, leg curl/heel slides, hip abduction. SLR with brace locked if no osteotomy.* Stationary bicycle with no resistance once 90° knee flexion obtained (>4 weeks).
THERAPY	<ul style="list-style-type: none">* Gentle multi-directional patella mobilization immediately after surgery.* Cryotherapy and compression stockings/TEDS for swelling and pain control.* E-stim for VMO/quadriceps muscle re-education/ biofeedback encouraged early after surgery if needed.* Gentle massage/deep friction to hamstring insertions, suprapatellar quadriceps, medial/lateral gutters, and infrapatellar fat pad region at 2–3 weeks post-op.* Pool therapy recommended at 2–3 weeks post-op to enhance motion.

COMMENTS

- * Avoid active open-chain extension and repetitive knee flexion 40–70° due to increased patellofemoral contact forces.
- * Contact MD if ROM is not achieved within 20° of goal.
- * No progression of this protocol until cleared by MD at 6 weeks post-op.
- * No leg presses/squats.

AUTOLOGOUS CHONDROCYTE TRANSPLANTATION PT PROTOCOL
Stage 2 – Transitional Phase (7–12 weeks)

Patellar and/or Trochlear Defect

PRIMARY GOALS

DO NOT OVERLOAD GRAFT
INCREASE TIBIOFEMORAL AND PATELLOFEMORAL MOBILITY
RESTORE QUADRICEPS CONTROL

BRACE	<ul style="list-style-type: none">* Hinged knee brace may be discontinued once independent SLR achieved.
GAIT	<ul style="list-style-type: none">* Full weightbearing as tolerated.
ROM	<ul style="list-style-type: none">* Gentle A/AAROM flexion and extension permitted.* Progress towards full ROM by 12 weeks.
THEREX	<ul style="list-style-type: none">* Stationary bicycling without resistance for short intervals (5 min 2–3x/day) as tolerated.* Strengthening of quadriceps, hamstrings, and hip abductors/extensors using elastic band isometrics and closed-chain terminal knee extension 0–40° only.* Backward treadmill walking with safety bars recommended for reduced patellofemoral compressive forces.* Pool exercise using kickboard allowed–flutter/straight leg scissor kick only (no whip kick).* <u>No</u> open-chain strengthening permitted until 6 months after surgery.* <u>No</u> closed-chain leg press or squatting.
THERAPY	<ul style="list-style-type: none">* Gentle multi-directional patella mobilization.* Cryotherapy and compression stockings/TEDS for swelling and pain control.* E-stim for VMO/quadriceps muscle re-education/ biofeedback encouraged.* Gentle massage/deep friction to hamstring insertions, suprapatellar quadriceps, medial/lateral gutters, and infrapatellar fat pad region.* Pool therapy recommended to enhance motion.
COMMENTS	<ul style="list-style-type: none">* Activity level should be modified if increased pain, catching, or swelling occurs.* Progression of activity may resume once comfort level returns.* No progression of this protocol until by MD at 12 weeks post-op.

AUTOLOGOUS CHONDROCYTE TRANSPLANTATION PT PROTOCOL
Stage 3 – Remodeling Phase (13+ weeks)

Patellar and/or Trochlear Defect

PRIMARY GOALS

DO NOT OVERLOAD GRAFT
INCREASE TIBIOFEMORAL AND PATELLOFEMORAL MOBILITY
RESTORE QUADRICEPS CONTROL

BRACE	* None.
GAIT	* Full weightbearing as tolerated.
ROM	* Progress towards full ROM equal to contralateral side.
THEREX	* Stationary bicycling with very slow resistance as tolerated. * Treadmill forward/retro-walking, Nordic Track and elliptical machine. * Pool exercise – flutter/straight leg scissor kick and running in water permitted. * Continue gentle closed-chain LE strengthening through functional range – terminal knee extension 0–40° and 120–70° extension from flexed position. * Full active flexion with resistance permitted. * Open-chain terminal extension with resistance <u>not</u> permitted.
THERAPY	* Multi-directional patella mobilization as needed. * Cryotherapy and compression stockings/TEDS as needed. * E-stim for VMO/quadriceps muscle re-education/ biofeedback as needed.
COMMENTS	* Activity level should be modified if increased pain, catching, or swelling occurs. * Avoid activity/exercises with excessive patellofemoral compressive forces. * Swelling is common in patella transplants up to 9 months after transplantation. * No running or jumping permitted until 9–12 months after surgery. * Continued improvement in comfort occurs 2–3 years before maximal outcome is achieved.