

Hospital for Special Surgery
HSS-Main Campus
523 East 72nd St Ground Fl.
New York, NY 10021



Hospital for Special Surgery
HSS-Brooklyn
148 39th St, 7th Fl.
Brooklyn, NY 11232

DR. GABRIELLA ODE

Sports Medicine & Shoulder Surgery

www.GOsportsmed.com

Tel: 212.606.1403

Fax: 917.260.4903

PHYSICAL THERAPY PROTOCOL
CARTILAGE REPAIR

<p>Procedure</p>	<p>Date of Surgery: _____ <u>Surgery Type:</u> <input type="checkbox"/> Osteochondral Allograft <input type="checkbox"/> Osteochondral Autograft <input type="checkbox"/> Surface Based Cartilage Repair (MACI, DeNovo, Cartiform, BioCartilage)</p> <p><u>Location:</u> <input type="checkbox"/> MFC <input type="checkbox"/> LFC <input type="checkbox"/> Trochlea <input type="checkbox"/> Patella <input type="checkbox"/> MTP <input type="checkbox"/> LTP Brace use: ___ weeks</p> <p><input type="checkbox"/> TTWB <input type="checkbox"/> PWB x ___ weeks <input type="checkbox"/> WBAT</p> <p>Notes:</p>	<p style="text-align: center;">PLAN</p> <p style="text-align: center;">Physical Therapy for R L B/L Lower Extremity 2-3x Per Week x 12 Weeks</p>
<p>General Guidelines</p>	<p>The following osteochondral autograft guidelines were developed by HSS Rehabilitation and modified for specific considerations for Dr. Ode. Please read and follow guidelines below. Progression is both criteria-based and patient specific. Phases and time frames are designed to give the clinician a general sense of progression. Phases and time frames are designed to give the clinician a general sense of progression. Concomitant injuries such as degenerative joint disease may alter the guidelines. Follow physician's modifications as prescribed. <i>Modifications from the HSS protocol are noted.</i></p>	

Hospital for Special Surgery
HSS-Main Campus
523 East 72nd St Ground Fl.
New York, NY 10021



Hospital for Special Surgery
HSS-Brooklyn
148 39th St, 7th Fl.
Brooklyn, NY 11232

DR. GABRIELLA ODE

Sports Medicine & Shoulder Surgery

www.GOsportsmed.com

Tel: 212.606.1403

Fax: 917.260.4903

<p>PHASE I (Weeks 0-2)</p>	<p>TREATMENT RECOMMENDATIONS</p> <ul style="list-style-type: none"> ▪ ROM/Soft Tissue <ul style="list-style-type: none"> ○ Immediate ROM after surgery - Do not force ROM ○ Emphasize full knee extension immediately <ul style="list-style-type: none"> ▪ Heel prop multiple times per day ▪ LE stretching (hamstring/gastrocnemius/soleus) ○ Patellar mobilization as indicated (all planes) ▪ Prevent Quadriceps inhibition ▪ Restore normal gait ▪ Normalize proximal musculature muscle strength ▪ Independence in home therapeutic exercise program <p>Dr. Ode's Modifications</p> <ul style="list-style-type: none"> ▪ Progressive weight bearing with crutches after wk 1 <ul style="list-style-type: none"> ○ <i>In general, start patient with TTWB with 2 crutches for first week then progress to WBAT with 1 crutch (in opposite arm) x 1 week and then discontinue crutches at end of week 2 if gait and quad function allow.</i> ▪ Postoperative bracing for 3-5 weeks postoperatively, then can D/C and transition to lower profile brace. <p>EMPHASIZE</p> <ul style="list-style-type: none"> ▪ Ambulation with brace locked in extension and 20% FFWB ▪ Improving quadriceps activation ▪ Full knee extension ▪ Controlling pain/effusion ▪ Improving patellar mobility 	<p>PRECAUTIONS</p> <ul style="list-style-type: none"> ▪ Range of motion (DO NOT FORCE ROM) <ul style="list-style-type: none"> ○ 0-90 (over first 2 weeks) then progress as tolerated ▪ Brace Guidelines <ul style="list-style-type: none"> ○ Ambulation with brace locked and axillary crutches (1-2) for 2 weeks ○ Sleep with brace locked in extension for 1 week ▪ Avoid pillow under knee to prevent knee flexion contracture ▪ Control post- operative swelling <p>ASSESSMENT</p> <ul style="list-style-type: none"> • Lower Extremity Functional Scale (LEFS) • Numeric pain rating scale (NPRS) • Patellar mobility • Swelling (girth and description) • Inspection of incision • Quality of quadriceps contraction • Lower extremity (LE) flexibility • LE active ROM (AROM) & passive ROM (PROM) • Gait assessment
---------------------------------------	--	--

Hospital for Special Surgery
HSS-Main Campus
523 East 72nd St Ground Fl.
New York, NY 10021



Hospital for Special Surgery
HSS-Brooklyn
148 39th St, 7th Fl.
Brooklyn, NY 11232

DR. GABRIELLA ODE

Sports Medicine & Shoulder Surgery

www.GOsportsmed.com

Tel: 212.606.1403

Fax: 917.260.4903

<p>PHASE I (Weeks 0-2) Cont'd</p>		<p>CRITERIA FOR ADVANCEMENT</p> <ul style="list-style-type: none"> • Maintain knee ROM: 0°-90° • Control post-operative pain/swelling • SLR flexion without extensor lag • Adherence to post-operative restrictions • Independent with HEP
<p>PHASE II (Week 2-6)</p>	<p>TREATMENT RECOMMENDATIONS</p> <ul style="list-style-type: none"> ▪ ROM/Soft Tissue - ROM goals (USE AS A GUIDELINE) <ul style="list-style-type: none"> ○ Week 3- 0-105° ○ Week 4- 0-115/120° ○ Week 6- 0-130° (progressing to full ROM) ▪ Continue exercises from phase 1 <ul style="list-style-type: none"> ○ Heel slides against wall should there be difficulty gaining ROM ○ Step knee flexion stretch ○ Supine hip flexor stretch when tolerated ○ Maintain passive knee extension ○ Maintain patellar mobility ○ Continue LE soft tissue treatment as needed ○ Continue LE stretching per phase 1 ▪ Strengthening <ul style="list-style-type: none"> ○ Continue Quadriceps re-education with NMES as needed ○ Continue blood flow restriction (BFR) program if cleared by MD ○ Bilateral Leg Press <ul style="list-style-type: none"> ▪ 60°→ 0° arc (week 2-4) ▪ 90°→ 0° arc (week 4-6) *depending on ROM gains* 	<p>PRECAUTIONS</p> <ul style="list-style-type: none"> ▪ Progress ROM as tolerated: do not force motion ▪ Adhere to weightbearing restrictions per Dr. Ode's modifications: <ul style="list-style-type: none"> ▪ Week 3+: Weight bearing as tolerated w/o crutches w/ brace ▪ Brace Guidelines <ul style="list-style-type: none"> ▪ Weeks 2-3: Locked in extension for ambulation ▪ Weeks 3-5: Unlock brace when proper quad control is established ▪ Discharge brace after week 5 (may use knee sleeve or unloader brace at this point if needed) ▪ Avoid pillow under knee to prevent knee flexion contracture ▪ Control post-operative swelling

Hospital for Special Surgery
HSS-Main Campus
523 East 72nd St Ground Fl.
New York, NY 10021



Hospital for Special Surgery
HSS-Brooklyn
148 39th St, 7th Fl.
Brooklyn, NY 11232

DR. GABRIELLA ODE

Sports Medicine & Shoulder Surgery

www.GOsportsmed.com

Tel: 212.606.1403

Fax: 917.260.4903

- Initiate core stabilization/Kinetic linking program
- Standing bilateral heel raises-Week 2-3
- Short crank bicycle progressing to upright bike with adequate ROM (110-115° of ROM)
- Multiplanar gluteal/core/hip strengthening
 - Bridges with elastic band
 - Side lying clamshells
 - Standing clamshells
- **Weight shift exercises with upper extremity (UE) support**
- **Bilateral weight bearing proprioception exercises**
 - Single leg (SL)balance/proprioceptive activities after proper quad control obtained
- **Hydrotherapy** when incisions are healed for gait, proximal strengthening, functional movements, balance and edema control- week 4-6
- **Underwater treadmill/ anti-gravity treadmill** gait training if gait pattern continues to be abnormal

EMPHASIZE

- Proper gait pattern
- Continued full knee extension
- Controlling pain and effusion

ASSESSMENT

- LEFS
- NPRS
- Patellar mobility
- Swelling (girth and description)
- Inspection of incision
- Quality of quadriceps contraction
- LE flexibility
- LE AROM and PROM
- Gait assessment

CRITERIA FOR ADVANCEMENT

- Full weight bearing with crutches, discharge brace
- Demonstrate a normal gait pattern without deviations
- Progressing toward full ROM
- Normal patellar mobility (all planes)
- Proximal strength > 4/5
- Minimal edema
- Well controlled pain
- Independent with HEP

Hospital for Special Surgery
HSS-Main Campus
523 East 72nd St Ground Fl.
New York, NY 10021



Hospital for Special Surgery
HSS-Brooklyn
148 39th St, 7th Fl.
Brooklyn, NY 11232

DR. GABRIELLA ODE

Sports Medicine & Shoulder Surgery

www.GOsportsmed.com

Tel: 212.606.1403

Fax: 917.260.4903

<p>PHASE III (Weeks 6-12)</p>	<p>GOALS</p> <ul style="list-style-type: none"> ▪ Demonstrate ability to descend 8" stairs with good leg control without pain ▪ 85% limb symmetry on Isokinetic testing & Forward Step Down Test ▪ Return to normal ADL ▪ Improve lower extremity flexibility <p>TREATMENT RECOMMENDATIONS</p> <ul style="list-style-type: none"> ▪ ROM/Soft Tissue <ul style="list-style-type: none"> ○ Gradual increase of ROM to full <ul style="list-style-type: none"> ▪ Continue ROM exercises from Phase 2 ▪ Prone knee flexion stretch ○ Maintain full passive knee extension ○ Continue patellar mobilization as needed ○ Continue with LE soft tissue program as needed ○ Continue with LE stretching program (hip, hamstring, gastrocnemius/soleus) <ul style="list-style-type: none"> ▪ Add hip flexor and quad stretching ○ Initiate foam rolling program ○ Progress to elliptical ○ Single leg pawing → retrograde treadmill ○ Multiplanar gluteal/core/hip strengthening <ul style="list-style-type: none"> ▪ Continue exercises from phase II ▪ Three point step/hip clocks ▪ Lateral/monster walks 	<p>PRECAUTIONS:</p> <ul style="list-style-type: none"> ▪ Avoid pain with therapeutic exercise & functional activities ▪ Avoid running until adequate strength development and MD clearance. <p>ASSESSMENT</p> <ul style="list-style-type: none"> ▪ LEFS ▪ NPRS ▪ Patellar mobility ▪ Swelling (girth and description) ▪ Inspection of incision ▪ Quality of quadriceps contraction ▪ LE flexibility ▪ LE AROM and PROM ▪ Gait assessment ▪ Movement assessment

Hospital for Special Surgery
HSS-Main Campus
523 East 72nd St Ground Fl.
New York, NY 10021



Hospital for Special Surgery
HSS-Brooklyn
148 39th St, 7th Fl.
Brooklyn, NY 11232

DR. GABRIELLA ODE

Sports Medicine & Shoulder Surgery

www.GOsportsmed.com

Tel: 212.606.1403

Fax: 917.260.4903

PHASE III (Weeks 6-12) Cont'd

- Romanian Dead Lift (RDL): double leg → single leg
 - Initiate open kinetic chain (OKC) knee extension (multiple angle isometrics, avoid lesion)
 - Progressing to isotonic (PRE)
- **Progress to eccentric leg press (2 up/1 down)**
 - Emphasis on SLOW ECCENTRIC LOWERING and good alignment
- **Suspension training squats**
- **Chair/Box Squats**
 - Band around knees to promote gluteal activation and avoid valgus breakdown
 - Promote movement through hips and proper form.
 - Progressively lower seat height per strength gains
 - Progress to adding weights as appropriate (PREs)
- **Introduce step-up progression (week 6-8)**
 - Start with 4" step → 6" step → 8" step
 - Emphasize proper movement pattern (no hip drop, no valgus breakdown)
 - Progress to adding weights as appropriate (PREs)
 - Emphasize good control
- **Front lunges → traveling lunges (DON'T PUSH ROM)**
- **Progressive gluteal/hip strengthening**
 - Continue phase 2 exercises
 - SL wall push
 - Windmills
 - Clamshells in modified side plank
 - Bridge progression
- **Progress balance/proprioception**

Hospital for Special Surgery
HSS-Main Campus
523 East 72nd St Ground Fl.
New York, NY 10021



Hospital for Special Surgery
HSS-Brooklyn
148 39th St, 7th Fl.
Brooklyn, NY 11232

DR. GABRIELLA ODE

Sports Medicine & Shoulder Surgery

www.GOsportsmed.com

Tel: 212.606.1403

Fax: 917.260.4903

**PHASE III
(Weeks 6-12)
Cont'd**

- Rockerboard
- SL rebounder (Progress to foam pad/ 1/2 foam roller)
- Sports specific balance
- **Core/kinetic linking progression**
- **Progress BFR program to more weight bearing activities** (i.e. squats, leg press)
- Introduce eccentric step down program (week 8-12)
 - Start with 4" step →6" step→8" step (assisted with railing if necessary)
 - Emphasize proper movement pattern (no hip drop, no valgus breakdown)
 - Emphasize good control
 - Progress to adding weights as appropriate (PREs).

EMPHASIZE

- Minimal swelling
- Control volume and load with functional activities
- Emphasis on proper movement strategy/quality of movement

CRITERIA FOR ADVANCEMENT:

- 85% limb symmetry on Isokinetic testing & Forward Step Down Test
- Full pain-free ROM
- Chair/box squats with proper form and without complaints of pain
- SL stance > 30 sec with proper form and control
- Demonstrate ability to ascend 8" step with proper form, no pain
- Descend 6" step with good eccentric control, no pain
- Independent with HEP

Hospital for Special Surgery
HSS-Main Campus
523 East 72nd St Ground Fl.
New York, NY 10021



Hospital for Special Surgery
HSS-Brooklyn
148 39th St, 7th Fl.
Brooklyn, NY 11232

DR. GABRIELLA ODE

Sports Medicine & Shoulder Surgery

www.GOsportsmed.com

Tel: 212.606.1403

Fax: 917.260.4903

<p>PHASE IV (Weeks 12-20)</p>	<p>GOALS</p> <ul style="list-style-type: none"> ▪ Lack of apprehension with sport specific movements ▪ Maximize strength and flexibility as to meet demands of individual's sport activity ▪ Isokinetic & Hop Testing > 85% limb symmetry <p>TREATMENT RECOMMENDATIONS</p> <ul style="list-style-type: none"> ▪ Strengthening **EMPHASIZE ECCENTRIC STRENGTH AND CONTROL** <ul style="list-style-type: none"> ○ Continue to progress with squat program (PREs) ○ Continue to progress with eccentric leg press ○ Progress with suspension system squats <ul style="list-style-type: none"> ▪ Eccentric double leg squats ▪ Single leg squats focusing on control and technique ○ Progress step-ups/downs by increasing height/adding weights (intrinsic load) ○ Advanced proprioception training (perturbations) ○ Continue to progress with aquatic program if available ○ Stair machine/stair climber ○ Continue with core/kinetic linking progression ○ Continue with LE stretching ○ Progress isotonic knee extension OKC – progress to isokinetics at high to moderate speeds ▪ Initiate running progression with anti-gravity treadmill or pool running (wks 16-18) ▪ Must have good eccentric control with 8" step down ▪ Monitor for swelling 	<p>PRECAUTIONS</p> <ul style="list-style-type: none"> ▪ Avoid pain with therapeutic exercises and functional activities ▪ Control post-operative edema ▪ Monitor overall load and volume
		<p>ASSESSMENT</p> <ul style="list-style-type: none"> ▪ LEFS ▪ NPRS ▪ Patellar mobility ▪ Swelling (girth and description) ▪ Quality of quadriceps contraction ▪ LE flexibility ▪ Strength assessment: isokinetic testing, hand-held dynamometry ▪ Movement assessment
		<p>CRITERIA FOR DISCHARGE</p> <ul style="list-style-type: none"> ▪ Isokinetic & Hop Testing > 85% limb symmetry ▪ Lack of apprehension with sport specific movements ▪ Flexibility to accepted levels of sport performance ▪ Independence with gym program for maintenance and progression of therapeutic exercise program at discharge

Hospital for Special Surgery
HSS-Main Campus
523 East 72nd St Ground Fl.
New York, NY 10021



Hospital for Special Surgery
HSS-Brooklyn
148 39th St, 7th Fl.
Brooklyn, NY 11232

DR. GABRIELLA ODE

Sports Medicine & Shoulder Surgery

www.GOsportsmed.com

Tel: 212.606.1403

Fax: 917.260.4903