

## **DR. BUTKOVICH ACL RECONSTRUCTION REHABILITATION PROTOCOL**

### **GENERAL GUIDELINES**

- FOCUS ON PROTECTION OF GRAFT DURING PRIMARY RE-VASCULARIZATION (8 WEEKS) AND GRAFT FIXATION (8-12 WEEKS)
  - BONE-TENDON-BONE AUTOGRAFT: WBAT
  - HAMSTRING GRAFT: 2 WEEKS TTWB THEN PROGRESS TO WBAT
- BRACE/RANGE OF MOTION: WEEKS 0-6: BRACE LOCKED IN FULL EXTENSION WHEN UP, OTHERWISE 0-90 (REMOVE FOR PT/HYGIENE)
- THE PHYSICIAN MAY ALTER TIME FRAMES FOR USE OF BRACE AND CRUTCHES
- SUPERVISED PHYSICAL THERAPY TAKES PLACE FOR 4-7 MONTHS
- USE CAUTION WITH HAMSTRING STRETCHING AND STRENGTHENING BASED ON THE DONOR SITE MORBIDITY

### **PROGRESSION OF ACTIVITIES OF DAILY LIVING**

- SLEEP WITH BRACE LOCKED IN EXTENSION FOR 1 WEEK OR AS DIRECTED BY PT/MD FOR MAINTENANCE OF FULL EXTENSION
- DRIVING: 1 WEEK FOR AUTOMATIC CARS, LEFT LEG SURGERY, 2-4 WEEKS FOR STANDARD CARS OR RIGHT LEG SURGERY
- POST-OP BRACE LOCKED IN FULL EXTENSION FOR (0-1 WEEK) FOR AMBULATION & SLEEPING. (1-3 WEEKS) UNLOCK BRACE <90 DEGREES AS QUAD CONTROL ALLOWS. AFTER 4 WEEKS PATIENT MAY WEAN OUT OF BRACE WITH DEMONSTRATION OF GOOD QUAD CONTROL AND NORMAL GAIT MECHANICS
- USE OF CRUTCHES/BRACE FOR AMBULATION FOR 4 WEEKS
- WEIGHT BEARING: (0-1 WEEK) PARTIAL WEIGHT BEARING WITH CRUTCHES AND BRACE
- RETURN TO WORK AS DIRECTED BY PT/MD BASED ON WORK DEMANDS

### **REHABILITATION PROGRESSION**

- FREQUENCY OF PHYSICAL THERAPY VISITS SHOULD BE DETERMINED BASED ON INDIVIDUAL PATIENT STATUS AND PROGRESSION

**STAGE I: IMMEDIATE POST SURGICAL/ EARLY MOTION & MUSCLE RE-EDUCATION****GOALS:**

- PROTECT HEALING GRAFT AND GRAFT FIXATION
- MINIMIZE EFFECTS OF IMMOBILIZATION
- CONTROL INFLAMMATION AND SWELLING
- FULL ACTIVE AND PASSIVE EXTENSION/HYPEREXTENSION RANGE OF MOTION (AVOID HYPER EXTENSION >10 DEGREES)
- EDUCATE PATIENT ON REHABILITATION PROGRESSION
- FLEXION TO **90 DEGREES ONLY** IN ORDER TO PROTECT GRAFT FIXATION
- RESTORE NORMAL GAIT ON LEVEL SURFACE

**WEEKS 0-4:****PATIENT INSTRUCTIONS:**

1. KEEP INCISIONS CLEAN & DRY
2. CRYOTHERAPY AT HOME FOR PAIN & INFLAMMATION

**BRACE**

1. 0-1 WEEK POST-OP BRACE LOCKED IN FULL EXTENSION FOR AMBULATION AND SLEEPING
2. 1-3 WEEKS UNLOCK BRACE (<90 DEGREES) AS QUAD CONTROL ALLOWS
3. 3-4 WEEKS WEAN OUT OF BRACE AS PATIENT DEMONSTRATES GOOD QUAD CONTROL AND NORMAL GAIT MECHANICS
4. 4-8 WEEKS PATIENT SHOULD ONLY USE BRACE IN VULNERABLE SITUATIONS (I.E. CROWDS, UNEVEN SURFACES, ETC.)

**WEIGHT BEARING STATUS**

1. 0-1 WEEK PARTIAL WEIGHT BEARING WITH TWO CRUTCHES TO ASSIST WITH BALANCE
2. 1-4 WEEKS PARTIAL WEIGHT BEARING PROGRESSING TO FULL WEIGHT BEARING WITH NORMAL GAIT MECHANICS
3. WEAN BRACE WITH AMBULATION AT 4 WEEKS AS PATIENT DEMONSTRATES NORMAL GAIT MECHANICS AND GOOD QUAD CONTROL

**TREATMENT:**

1. ACTIVE-ASSISTED LEG CURLS 0-1 WEEK. PROGRESS TO ACTIVE AND RESISTANCE AS TOLERATED AFTER 1 WEEK
2. HEEL SLIDES TO 90 DEGREES
3. QUAD SETS (CONSIDER NMES FOR POOR QUAD CONTROL)
4. GASTROC/SOLEUS STRETCHING
5. 4-WAY STRAIGHT LEG RAISE (WITH BRACE IN FULL EXTENSION UNTIL QUAD STRENGTH IS SUFFICIENT TO PREVENT EXTENSION LAG. ADD WEIGHT AS TOLERATED)
6. QUADRICEPS ISOMETRICS AT 60 AND 90 DEGREES
7. AQUATIC THERAPY (ONCE SUTURES REMOVED) FOR NORMALIZING GAIT, WEIGHT BEARING STRENGTHENING, DEEP-WATER AQUA JOGGING FOR RANGE OF MOTION AND SWELLING

CRITERIA TO PROGRESS TO PHASE II

1. FULL EXTENSION/HYPEREXTENSION
2. GOOD QUAD SET, STRAIGHT LEG RAISE WITHOUT EXTENSION LAG
3. FLEXION TO 90 DEGREES
4. MINIMAL SWELLING/INFLAMMATION
5. NORMAL GAIT ON LEVEL SURFACE

**STAGE II: BALANCE & EARLY STRENGTHENING****GOALS:**

- PROTECT GRAFT AND GRAFT FIXATION
- RESTORE NORMAL GAIT WITH STAIRCLIMBING
- MAINTAIN FULL EXTENSION, PROGRESS TOWARD FULL FLEXION RANGE OF MOTION
- INCREASE HIP, QUADRICEPS, HAMSTRINGS, AND CALF STRENGTH
- INCREASE PROPRIOCEPTION

**WEEKS 4-12:****TREATMENT:**

1. CONTINUE WITH RANGE OF MOTION/FLEXIBILITY EXERCISES AS APPROPRIATE FOR THE PATIENT
2. INITIATE CLOSED KINETIC CHAIN QUAD STRENGTHENING AND PROGRESS AS TOLERATED (WALL SITS, STEP-UPS, MINI-SQUATS, LEG PRESS 90-30 DEGREES, LUNGES)
3. PROGRESSIVE HIP, HAMSTRING, CALF STRENGTHENING (GRADUALLY ADD RESISTANCE TO OPEN CHAIN HAMSTRING EXERCISES)
4. CONTINUE WITH STRETCHING PROGRAM
5. STAIRMASTER (BEGIN WITH SHORT STEPS, AVOID HYPEREXTENSION)
6. STATIONARY BIKING (PROGRESSIVE TIME AND RESISTANCE)
7. ELLIPTICAL MACHINE FOR CONDITIONING
8. SINGLE LEG BALANCE/PROPRIOCEPTION WORK (BALL TOSS, MINI-TRAMP, AIREX ETC.)
9. BEGIN RUNNING IN THE POOL (WAIST DEEP), OR ON AN UNWEIGHTED TREADMILL AT 10-12 WEEKS

CRITERIA TO PROGRESS TO PHASE III

1. NO PATELLOFEMORAL PAIN
2. MINIMUM OF 120 DEGREES OF KNEE FLEXION
3. SUFFICIENT STRENGTH AND PROPRIOCEPTION TO INITIATE RUNNING (UNWEIGHTED OR IN POOL)
4. MINIMAL SWELLING/INFLAMMATION

**STAGE III: ADVANCED STRENGTHENING AND LINEAR RUNNING****GOALS:**

- FULL RANGE OF MOTION
- IMPROVE STRENGTH, ENDURANCE, AND PROPRIOCEPTION OF THE LOWER EXTREMITY TO PREPARE FOR SPORT ACTIVITIES
- AVOID OVERSTRETCHING THE GRAFT
- PROTECT THE PATELLOFEMORAL JOINT
- NORMALIZING RUNNING MECHANICS
- STRENGTH APPROXIMATELY 70% OF THE UNINVOLVED LOWER EXTREMITY PER ISOKINETIC EVALUATION

**WEEKS 12- 20****TREATMENT:**

1. CONTINUE FLEXIBILITY AND RANGE OF MOTION EXERCISES AS APPROPRIATE FOR PATIENT
2. INITIATE OPEN KINETIC CHAIN LEG EXTENSION (90-30 DEGREES), PROGRESS TO ECCENTRICS AS TOLERATED
3. ISOKINETICS (WITH ANTI-SHEAR DEVICE) BEGIN WITH MID RANGE SPEEDS (120°/SEC-240°/SEC)
4. PROGRESS TOWARD FULL WEIGHT BEARING LINEAR RUNNING AT 16 WEEKS
5. RECOMMEND ISOKINETIC TESTING WITH ANTI-SHEAR DEVICE AT 14-16 WEEKS TO GUIDE CONTINUED STRENGTHENING
6. PROGRESSIVE HIP, QUAD, HAMSTRINGS, CALF STRENGTHENING
7. CARDIOVASCULAR/ENDURANCE TRAINING VIA STAIRMASTER, ELLIPTICAL, BIKE
8. ADVANCED PROPRIOCEPTIVE ACTIVITIES

**CRITERIA TO PROGRESS TO PHASE IV**

1. NO SIGNIFICANT SWELLING/INFLAMMATION
2. FULL, PAIN-FREE RANGE OF MOTION
3. NO EVIDENCE OF PATELLOFEMORAL JOINT IRRITATION
4. STRENGTH APPROXIMATELY 70% OF UNINVOLVED LOWER EXTREMITY PER ISOKINETIC EVALUATION
5. NORMAL LINEAR RUNNING GAIT

**STAGE IV: MULTI-DIRECTIONAL RUNNING & COORDINATION****GOALS:**

- SYMMETRIC PERFORMANCE OF BASIC AND SPORT SPECIFIC AGILITY DRILLS
- SINGLE HOP AND THREE HOP TESTS 85% OF UNINVOLVED LEG
- QUADRICEPS AND HAMSTRING STRENGTH AT LEAST 85% OF UNINVOLVED LOWER EXTREMITY PER ISOKINETIC STRENGTH TEST

**5 MONTHS- 6-7 MONTHS****TREATMENT:**

1. CONTINUE TO PROGRESS FLEXIBILITY AND STRENGTHENING PROGRAM BASED ON INDIVIDUAL NEEDS AND DEFICITS
2. INITIATE PLYOMETRICS PROGRAM AS APPROPRIATE FOR PATIENTS ATHLETIC GOALS
3. AGILITY PROGRESSION INCLUDING BUT NOT LIMITED TO:
  - a. SIDE STEPS
  - b. CROSSOVER
  - c. FIGURE 8 RUNNING
  - d. SHUTTLE RUNS
  - e. SINGLE AND DOUBLE LEG JUMPS
  - f. CUTTING
  - g. ACCELERATION/DECELERATION/SPRINGS
  - h. AGILITY LADDER DRILLS
4. CONTINUE PROGRESSION OF RUNNING DISTANCE BASED ON PATIENT NEEDS
5. INITIATE SPORT-SPECIFIC DRILLS AS APPROPRIATE FOR PATIENT

**CRITERIA TO PROGRESS TO PHASE V**

1. NO PATELLOFEMORAL PAIN OR SOFT TISSUE COMPLAINTS
2. FULL PAIN FREE RANGE OF MOTION, STRENGTH, ENDURANCE, AND PROPRIOCEPTION TO SAFELY RETURN TO WORK OR ATHLETICS
3. PHYSICIAN CLEARANCE TO RESUME TO PARTIAL OR FULL ACTIVITY

**STAGE V: RETURN TO SPORT/FULL ACTIVITY****GOALS:**

- SAFE RETURN TO ATHLETICS/WORK
- MAINTENANCE OF STRENGTH, ENDURANCE, PROPRIOCEPTION
- PATIENT EDUCATION WITH REGARDS TO ANY POSSIBLE LIMITATIONS

**6-7 MONTHS+****TREATMENT:**

1. GRADUAL RETURN TO SPORT PARTICIPATION
2. MAINTENANCE PROGRAM FOR STRENGTH AND ENDURANCE

**BRACING:** FUNCTIONAL BRACING TYPICALLY NOT USED, BUT MAY BE RECOMMENDED BY THE PHYSICIAN ON AN INDIVIDUAL BASIS