RUTGERS
North Jersey Orthopaedic Institute
NEW JERSEY MEDICAL SCHOOL

North Jersey Orthopaedic Institute
Rutgers, The State University of New Jersey
140 Bergen Street, D1610
Newark, NJ 07101
973-972-2150

South Orange Ambulatory Center
Hackensack Medical Plaza
Overlook Medical Arts Center
Saint Barnabas Medical Center

Division of Pediatric Orthopaedics

Sanjeev Sabharwal, MD
Flo Edobor-Osula, MD
Emily McClemens, PA-C Michele Gilliland, PA-C
Phone: (973) 972-0246
(adapted from: www.theuniversityhospital.com/limblength)
PEDSORTHO@NJMS.RUTGERS.EDU

Physical Therapy Protocol : Femur Lengthening (Ilizarov Method)

Phase 1 Inpatient PT, post-op day 1 through post op day 5

Frequency of PT daily.

Goals of PT:

1) Independent ambulation on level surface and stairs with lateral supports. Partial weight bearing.

2) Instruct patient and family correct positioning of the leg.

3) Instruct in submaximal quadriceps sets, gluteal sets, abductor sets and ankle pumps.

4) Instruct and perform range of motion exercises for knee and hip.

5) Adjust and teach patient use of dynamic splint.

Treatment:

1) Ambulation training on level surface and stairs with bilateral supports (crutches) partial weight bearing. Patients in this stage will guard during ambulation. Weight bearing is not critical at this stage.

2) Correct position: knee fully extended. Elevation of the operated extremity for controlling post-op edema.

3) Submaximal isometric exercises of quads, hamstrings, glutei and hip abductors. Emphasis on patient performing these every couple of hours.

4) Active exercises of knee and active hip flexion and abduction in supine position.

5) Dynamic splint: knee extension by dynasplint at this stage is given as a prophylactic measure. Instruct patient and family adjustments on splint and emphasize on using for at least 10 hours a day.

Phase 2 Lengthening or Adjustment Phase (Out Patient PT Program)

Frequency of PT 5 times a week, later may be cut down to 3 times a week.

Goals of PT and Treatment

1) Maintain full extension.

2) Encourage more weight bearing through the operated leg. Continue using two lateral supports. Achieve reciprocal ambulation with equal step length.

3) Progress from submaximal to maximal isometric sets of quads, hamstrings, glutei and hip abductors. Use EMG biofeedback or electrical stimulation for augmenting muscle contraction.

4) Incorporate functional loading activities in therapeutic regime.

5) Active exercises of knee, TKE (Terminal Knee Extension) and hamstring curls in prone position. Active exercises for hip abduction in supine position.

6) Adjust dynamic splint to correct tension. Do not increase tension unless patient can wear splint for 10 hours at previous tension level.

7) Pain relieving modalities such as ice, heat and TENS may be used. Heat is preferably used prior to stretching. Precaution: do not stretch vigorously after heat as this may cause micro rupture of dense connective tissue.

Common problems during Lengthening Phase

1) Hamstring contracture resulting in knee flexion contracture.

2) Posterior Subluxation of proximal tibia.

3) Decreased appetite and weight loss.

4) Pin site infections.

5) Loss of knee flexion.

Role of physical therapy is preventative in lengthening phase. Focus is on prevention of knee flexion contracture and Subluxation, maintaining knee range of motion and improving strength via maximal isometric sets and encouraging functional loading activities.

Phase 3 Consolidation Phase

In this phase all lengthening adjustments are over and the external fixator is on till bone mineralization is complete and bone is ready for removal of the fixator.

Goals of PT and Treatment

Frequency of treatment 2-3 times a week

1) Vigorous stretching to achieve and maintain full knee extension.

2) Progressively reduce lateral supports for ambulation. Encourage full weight bearing ambulation initially with cane and later without cane.
3) Ambulation training to ensure that patient maintains equal step length while reducing lateral supports.

4) Continue maximal isometric and active exercises of the leg.

5) Resistive closed kinetic chain exercises.

6) Progress in functional loading activities.

7) Ambulation training to ensure that patient maintains equal step length while reducing lateral supports.

8) Continue maximal isometric and active exercises of the leg.

9) Progress in resistive exercises for muscle strengthening. Include closed kinetic chain exercises.

10) Progress in functional loading activities.

Phase 4 Protection Phase

Patient out of external fixator, in cast or brace. No PT during this phase.

Phase 5 Out of cast or brace

Goals of PT and treatment

1) Progressive resistive exercises to quads, hamstrings, ankle muscles and hip abductors.

2) Progressive resistive exercises in closed kinetic chain and later in open chain.

3) Achieve full ROM at knee, ankle, subtalar joint and toes.

4) Gradual return to functional activities.

5) Ambulation training to ensure no limp and equal step length (No assistive device).

Common Problems Phase 5

1) Refracture, gradual axial deviation or buckling of bone.

2) Joint stiffness, as a result of persistent muscle contracture.

Physical Therapy in this stage is restorative. Adequate precautions like good stabilization technique and placement of weight above the level of osteotomy for strengthening exercises will reduce the risk of refracture.