AQUATIC/LAND CLINICAL PROTOCOL FOR
LOWER EXTREMITY EXTERNAL FIXATOR

FREQUENCY: 2-3 times per week.

DURATION: Average estimate of formal treatment 2-3 times per week X approximately 1-3 months based on Physical Therapy evaluation findings. Continued formal treatment beyond meeting Self-Management Criteria will be allowed when:
1. Patient out of work or to hasten return to work full duty.

DOCUMENTATION: Progress Note to physician at each follow-up appointment. Follow treatment calendar for daily requirements. Discharge Summary within 1 week of discharge.

POST-OPERATIVE EVALUATION (6 WEEKS POST-OP)

GOALS:
1. Evaluation to assess: Pain/Inflammation, active/passive range of motion, strength, patellar mobility, incisional integrity, gait pattern.
3. Review edema reduction techniques.
4. Orient to pool program, issue information packet, have patient sign Pool Release Form.

- Initiate a course of formal rehabilitation 2-3 times per week until SELF-MANAGEMENT CRITERIA has been met. Frequency of weekly appointments will depend on patient's availability, working status, and choice/interest.
- When patient meets the following SELF-MANAGEMENT CRITERIA:
  - Symmetrical hip and ankle active range of motion.
  - Ankle range of motion within 5° as compared to contralateral side.
  - Good voluntary contraction of quadriceps complex particularly that of the vastus medialis oblique.
  - Normal gait pattern.
  - Trace to 1+ effusion.
  - Incisions healing well and mobile; no signs of infection.

then patient can be instructed in either home exercise program or program to be performed at a local health club with follow-up appointments every month until discharge criteria has been met. Please refer to handout for home exercise program instructions/exercises.
DISCHARGE CRITERIA

- Symmetrical hip/knee/ankle active range of motion.
- No effusion (or less than 1 cm of swelling, as long as consistent decrease in swelling is noted).
- Minimal to no pain.
- Normal gait pattern.
- 4+/5 strength of hip/knee musculature; 5/5 strength of ankle musculature.
- Symmetrical balance/proprionception as seen with single leg standing.
- Good understanding and performance of home exercise program.
- Return to work/previous functional level. (The patient may not necessarily return to work while in clinical therapy.)
- Failure to progress.
- Failure to comply.
- Met or progressing toward expected functional/objective outcomes.

-- TREATMENT GUIDELINES --

GOALS:
1) Increase range of motion
2) Increase strength.
3) Prevent contracture formation.
4) Normalize gait.
5) Reduce edema.
6) Increase general overall conditioning.
7) Improve balance/proprionception.

Protocol level is dependent upon weight bearing status as determined by physician at time of initial evaluation.

NON-WEIGHT BEARING LEVEL

WATER COMPONENT

DEEP WATER:
- Deep water walking forward/sideways/backward using barbells or wet vest or ski belt.
- Initiate lower extremity flexibility/stretching of psoas, quadriceps, and hamstring muscle groups.
- Initiate lower extremity strengthening of hip/knee/ankle/trunk musculature. Exercises to include cross country, jumping jacks, single/double knee to chest, knee flexion/extension, dorsiflexion/plantar flexion, inversion/eversion.
- Initiate cardiovascular conditioning program performing bicycling and progressing to flutter kicking.

LAND COMPONENT:
- Ultrasound for fracture healing. (Please refer to Fracture Healing Protocol guidelines for appropriate intensity, frequency, and duration.)
- Gentle stretching of gastroc/soleus complex, hamstring, and quadriceps complex.
- Manual patellar mobilization as indicated.
- Stationary bicycle initially 5-10 minutes with low resistance.
- Incisional mobilization/desensitization techniques.
- Patient education regarding signs of infection and proper pin site care.
- Home exercise program for lower extremity stretching and strengthening. Please refer to Lower Extremity Flexibility/Strengthening Program Protocols for more information.
MINIMAL WEIGHT BEARING LEVEL
(Determined by physician)

WATER COMPONENT

NECK DEEP WATER:
- Initiate gait training with emphasis on equal weight bearing. The patient can hold barbell for assistance.
- Initiate lower extremity flexibility/strengthening program for lower extremity musculature by performing gentle stretching for gastroc/soleus complex.
- Initiate closed chain strengthening. Can initiate partial squats, toe raises, and lower extremity therapeutic exercise.

DEEP WATER:
- Continue lower extremity strengthening.
- Continue cardiovascular conditioning.

LAND COMPONENT:
- Continue ultrasound for fracture healing.
- Continue manual stretching of gastroc/soleus complex, hamstrings, quadriceps complex.
- Continue patellar mobilization if indicated.
- Continue with stationary bicycle, increasing duration and resistance if indicated.
- Initiate strengthening program utilizing Theraband and weighted machines if cleared by physician.

After cleared by physician, the patient will be transitioned to full land based program for proper gait training, strengthening, stretching, balance/proprioception activities.