Achilles Tendon Rupture

Anatomy: The Achilles tendon connects the calf muscles to the heel. The calf is formed by two muscles: the underlying soleus muscle and the thick outer gastrocnemius muscle. When they contract, they pull on the Achilles tendon so that the foot points down (plantar flexion) helping you raise up on your toes.

Degeneration and Tendinosis: Degeneration due to wear and tear occurs with aging and overuse. Degeneration means that the individual strands of the tendon become jumbled and lose their strength and some may even break. The healing process causes scar tissue to form such that a nodule forms within the tendon. This condition is called tendinosis.

Rupture: Spontaneous rupture of the Achilles tendon can also occur (commonly in men during sporting activities such as tennis, squash or basketball). When the Achilles tendon ruptures, the person may hear a "pop" or "snap" and feels a sudden pain which then subsequently subsides. However, there is weakness when trying to stand on tiptoes and a gap in the Achilles tendon may also be felt.

Treatment: Treatment can be non-surgical or surgical. Non-surgical treatment involves immobilizing the foot and ankle in a cast for 8 weeks with the toes pointing down. However, re-rupture may occur and when compared with surgical repair, pushing-off strength and endurance is lower. Surgical treatment involves sewing together of the Achilles tendon ruptured ends. Sometimes local tissue can be used such as tendon grafts/fascia to reinforce a repair. Rehabilitation after the surgery involves wearing a cast for two week and a cast-boot for 12 weeks.
Rehabilitation Protocol

**Initial Phase: Week 1: Cast/crutches:** You will be discharged with a cast on your leg and foot. Keep your foot elevated (higher than heart level) and move your toes to control the swelling. Do not walk on your operated leg and use the crutches provided. Remember to consult Dr. Sulaiman one week after surgery.

**Rehabilitation Phase A: Week 2-8:** Therapy goals for this phase of treatment are to protect the repaired tendon, decrease swelling, commence early gentle range of motion exercises and to begin weight bearing by walking with the cast-boot. This is achieved through the use of:

a) **Achilles Boot/Brace:** Full weight can be borne on the operated leg as long as the brace is worn. Weight should be borne through the heel, not toes. The brace can be removed for bathing.

b) **Crutches:** Crutches can be discontinued in weeks 2 to 3. Start initially from using two crutches to one on the side opposite the surgery.

c) **Swelling:** Elevation of the legs higher than the heart is important to reduce/control swelling and elastic stockings can be used to reduce leg swelling.

d) **Exercises:** It is important to remember that gentle motion can promote healing but aggressive movement can interfere with surgical repair.

   i. **Ankle flexion-extension:** Without brace. Gently move the foot in an up and down motion. Move the foot up and down through the range of motion that is pain free. Repeat 20 times, three times a day.

   ii. **Ankle circles:** Without brace. Move the foot so that you are making a circular motion. Make 10 circles to the left and 10 circles to the right, three times a day.

   iii. **Straight leg lift:** With the brace on, tighten the quadriceps muscles so that the knee is flat, straight and fully extended. Try to raise the entire leg up off the floor or bed with the knee straight, to about 45 degrees, pause one second and then lower slowly. Repeat 20 times, twice a day.
iv. **Hip Abduction:** With brace on, lie on the un-operated side (side lying). Keep the knee fully extended, raise the operated limb upward to a 45° angle. Hold one second, lower slowly. Repeat 20 times, twice a day.

v. **Standing Hamstring curl:** With brace on, face a table for balance and support. Stand on the un-operated leg, bend the knee of the operated side and raise the heel toward the buttock. Hold this flexed position for one second. Slowly lower the foot back to the floor. Keep the thighs aligned. Repeat 20 times.

vi. **Stationary Cycle:** With brace on, ride a stationary bicycle for 10 to 20 minutes a day.

**Rehabilitation Phase B: Week 8-12:** Therapy goals are to protect the repaired tendon, decrease swelling, start strengthening exercises and continue full weight bearing using the brace when walking. This is achieved through the use of:

a) **Achilles Boot/Brace:** Continue to wear the brace, but the heel lift that keeps your foot in a toe-down position can be lowered. Same as above.

b) **Swelling:** Same as above.

c) **Exercises:** Add the following Theraband exercises to the existing routine: (start with yellow and proceed to red band, without brace)

i. **Ankle eversion:** With tubing anchored around uninvolved foot, slowly turn injured foot outward. Repeat 30 times.

ii. **Ankle Plantar Flexion:** With tubing around foot, press foot down. Repeat 30 times. This is the most important of the exercises

iii. **Ankle Dorsiflexion:** With tubing anchored on solid object, pull foot toward you knee. Repeat 30 times

iv. **Ankle Inversion:** Cross legs with the operated foot underneath. With tubing anchored around uninvolved foot, slowly turn injured foot inward. Repeat 30 times.

Please ensure that you consult with Dr Sulaiman upon completion of phase B of rehabilitation i.e. 3 months after surgery.
Rehabilitation Phase C: Week 12-24: Therapy goals are to protect the repaired tendon, add strengthening exercises, use a heel lift when walking and begin walking normally. This is achieved through the use of:

a) Discontinuing the Achilles Boot/Brace: Insert a rubber wedge from inside the brace into the shoe to elevate the heel. After using it for one month, this may be removed if gait is normal (without a limp).

b) Exercises: Theraband exercises should be done every other day (red for one month, blue thereafter). The exercises from Phase A can be done every other day with ankle weights. The following exercises can be added every other day as well:

i. Calf stretch: Keeping the rear (injured) leg straight, with the heel and foot flat on the floor, lean into wall until a stretch is felt in the calf. Do not stretch excessively. Hold 15 to 20 seconds. Repeat 3 to 5 times.

ii. Dorsiflexion Stretch: Standing with both knees bent and the injured foot forward, gently lean forward, bending the injured knee over the ankle while keeping the heel and foot flat on the floor. Do not over-stretch. Hold 15 to 20 seconds, Repeat 3 to 5 times.

iii. Toe raises: Stand facing a table, for support and balance. Keep the knees extended straight. While holding the knees fully straight, raise up on 'tip-toes' while maintaining the knees in full extension. Hold for one second, then lower slowly to the starting position. Repeat 20 to 30 times. After one month, you can raise up on both legs, and lower down on only the operated side. At five or six months after surgery, build strength so that you can raise up and down on just the injured leg.

iv. Single leg balancing: Attempt to balance on the operated leg while holding the unoperated foot in the air. Attempt to balance with eyes closed, or while someone throws a ball. Practice this exercise for 5 minutes.

Please ensure that you consult with Dr Sulaiman upon completion of phase C of rehabilitation i.e. 6 months after surgery.