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## Tendon Transfer for Foot Drop

Common peroneal nerve palsy leading to foot drop is difficult to manage and has historically been treated with extended bracing with expectant waiting for return of nerve function. Peroneal nerve exploration has traditionally been avoided except in cases of known traumatic or iatrogenic injury, with tendon transfers being performed in a delayed fashion after exhausting conservative treatment. We have published on a more aggressive treatment strategy that combines tendon transfers in addition to nerve surgery (performed by our plastic surgery colleagues) to improve on the prior outcomes that have been traditionally published for this condition, that have not been overly favorable. The traditional concept of waiting two years for recovery results in muscle atrophy and does not allow for associated nerve surgery, as nerve reconstruction or release is not performed after 12 months from the injury. Therefore, we do not advocate a wait and see approach in patients who have documented dysfunction of the peroneal nerve that shows no significant improvement after 3 months based on nerve study findings. If improvement is noted that is significant and associated with clinical improvement, we do prefer a non-surgical approach as this group of patients will do well. In our published series for this condition where persistent dysfunction of the nerve is noted without any improvement after 3 months, patients with both nerve repair and tendon transfer had superior functional results with active dorsiflexion in all patients, compared to dorsiflexion in 20% of patients treated with tendon transfers alone. Additionally, 57% of patients treated with nerve repair and tendon transfer were able to achieve enough function to return to running, compared to 20% in patients with tendon transfer alone. No patient had full return of native motor function resulting in excessive dorsiflexion strength. The results of our limited case series for this rare condition indicate that simultaneous nerve repair and tendon transfer showed no detrimental results, and may provide improved function over tendon transfer alone. In patients that presented 12 months after the injury, we still discuss the option of nerve surgery in addition to a tendon transfer, with the plastic surgery team, however, in most cases, nerve surgery is not performed given the minimal benefit at this time point.

Surgery cannot return the foot to normal and the function is highly dependent on the what muscles are still functional and the strength of those muscles. In complex situations, we have been able to use dual tendon transfers, or use novel tendon transfers to improve the condition of the patient. The main goal of the surgery is to eliminate the use of the brace for non-impact activities. Active motion of the ankle is possible in most patients, however, depends on the amount of scarring of function of the muscle that we are able to transfer. Although we have been able to return some patients to sporting activity, this is not a common outcome in this difficult injury.

The most common tendon transfer is to take the tendon that pulls the foot in – called the posterior tibial tendon and use a 4 incision technique to transfer the tendon from the back and inside of the foot (posteromedial) to the front and center aspect of the foot (anterior). The calf muscle lining or the Achilles tendon itself may require lengthening to balance the forces of the foot. The tendon is taken under the skin (subcutaneously) to improve the power of the transferred tendon. This leads to a slight prominence under

the skin, however, is crucial to improve the chance that the tendon is able to have sufficient power to pull the foot up (dorsiflex).

After the surgery, the patient is kept nonweight-bearing in a splint for 2 weeks, after which they are switched to a weight bearing cast for 4 weeks. At 6 weeks postoperatively, they are transitioned to a CAM boot and physical therapy is begun without passive plantarflexion. At 3 months, activity is advanced as tolerated with the exception of impact activities, which begin at 6 months. Patients are kept in an AFO at night for the first 3 months.