

ANKLE STABILIZATION PROCEDURE

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Split Peroneus Brevis Lateral Ankle Stabilization (S.P.B.L.A.S.)

The SPBLAS was developed over a decade ago at Doctors Hospital. The procedure evolved from the Chrisman-Snook procedure to become a proven, dependable method of ankle stabilization. The SPBLAS is reserved for the patient with chronic inversion ankle instability and weakness or when the intraoperative decision dictates that the remnant ligamentous structures are insufficient for a primary repair. The tendon transfer of the split peroneus brevis attempts to recreate the calcaneofibular and anterior talofibular ligaments.

Procedure

The peroneus brevis tendon is split from above the ankle mortice proximally to the base of the fifth metatarsal distally. The tendon will be rerouted through the fibula from anterior to posterior and inserted into the calcaneus.

The patient is placed in the lateral position with both knees bent. Care is taken to cushion the neck of the fibula and the lateral malleolus of the opposite extremity. A thigh tourniquet is used to maintain hemostasis and decrease the exposure time of the patient. As in any procedure the relevant anatomic landmarks are identified and labeled with a skin scribe.

The insertion of the peroneus brevis tendon is identified at the base of the fifth metatarsal. The anterior and posterior margins of the distal fibula are marked where the split peroneus brevis tendon will be passed through. The lateral wall of the calcaneus, posterior to the posterior facet of the subtalar joint is marked where the trephine plug will be removed for implantation of the split tendon. The course of the peroneus brevis and longus tendons is palpated posterior to the lateral malleolus and proximally above the ankle mortice.

With the foot held perpendicular to the leg a piece of umbilical tape is then used to measure the length of split tendon needed. One end of the tape is held at the fifth metatarsal base. This end represents the insertion of the

peroneus brevis tendon and this insertion will be maintained throughout the procedure. The tape is used to simulate the split tendon and is positioned on the skin at the anterior and posterior margins of the fibula. The tape is aligned from the posterior margin of the fibula to the point marked on the skin representing the trephine location in the lateral wall of the calcaneus. Two centimeters is added to this length and the umbilical tape is marked. This will be the length of tendon taken for the transfer and we will measure this distance again after we have prepared the trephination holes.

As in any surgical procedure the skin incision is crucial. The landmarks already marked will help to visualize the surgical exposure needed. At Doctors Hospital we have used the single lateral incision following the course of the peroneus brevis tendon. The incision begins approximately 12 cm proximal to the lateral malleolus at the skin scribe marking measured with the umbilical tape. The four points of reference that need to be visualized are the base of the fifth metatarsal distally, the appropriate length of tendon proximally, the anterior margin of the fibula and the lateral wall of the calcaneus. It should be remembered that it will be easier to retract the convex aspect of the incision anteriorly than to retract the concave aspect posteriorly.

The curvilinear hockey stick incision is carried through skin and superficial fascia utilizing the concepts of anatomic dissection (Fig 1). Superficial vessels are identified and ligated. Care is taken to preserve the sural nerve throughout the procedure and especially at closure. The four points of reference are identified with retraction of the superficial fascia. The integrity of the deep fascia is maintained whenever possible. The course of the split tendon is exposed prior to harvesting of the tendon. The deep fascia and periosteum anterior and posterior to the distal fibula is incised and retracted.

A small trephine hole is made from the anterior margin of the fibula just proximal to the origin of the anterior talofibular ligament. The direction of the fibular trephine hole is crucial. Complications can arise from entering cartilage articulating with the talar dome or by weakening the lateral fibular cortex. The trephine is approximately perpendicular to the fibula and exits posterior at the

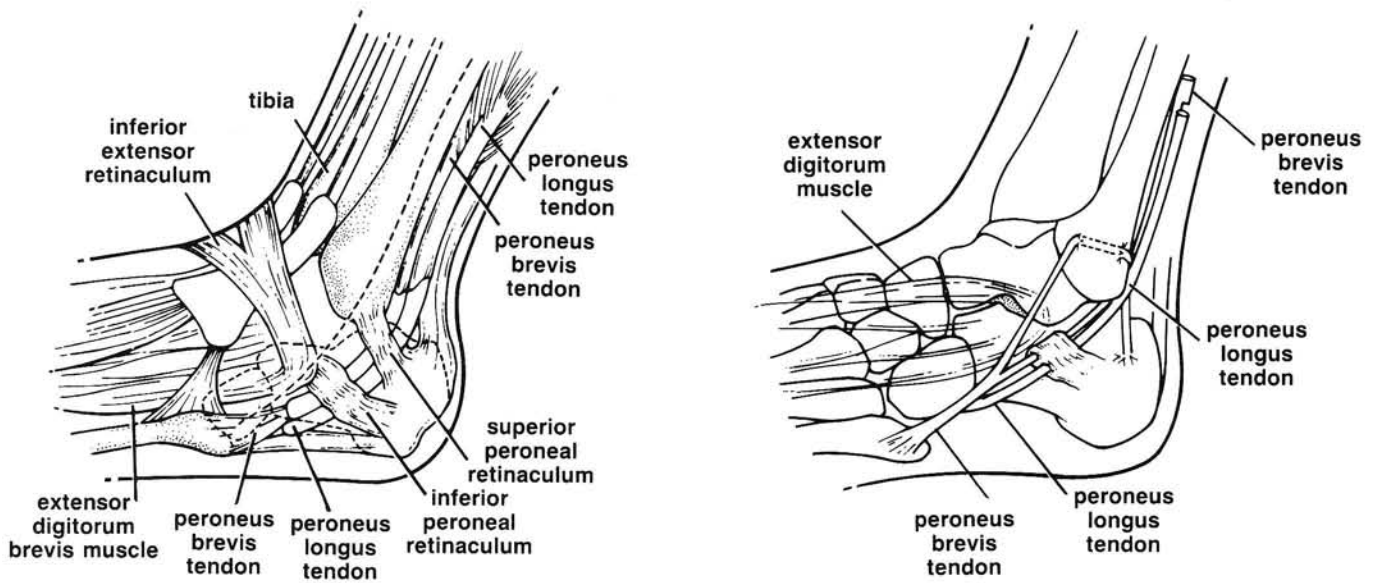


Fig. 1. Skin incision follows course of peroneus brevis tendon and allows surgical exposure to all areas of procedure.

peroneal groove. Care is taken to prevent splintering of the fibular cortex and a high torque, low pressure technique will facilitate the trephine use. The bone remains within the trephine to be replaced after transfer of the tendon.

The skin and superficial fascia is retracted posteriorly and a periosteal incision is placed over the lateral calcaneal wall. The trephine hole will be placed posteriorly and inferiorly to the subtalar joint at the approximate attachment of the previous calcaneofibular ligament. A cortical trephine bone plug approximately 2 cm deep is removed and saved.

A subperiosteal channel is created between the fifth metatarsal base and the anterior fibular trephine hole. A subperiosteal channel is also created between the posterior fibular trephine hole and the calcaneal trephine hole. The tendon is now ready to be harvested.

The umbilical tape measurement is repeated to verify the length of tendon needed. The deep fascia and tendon sheath are incised proximally over the peroneus longus and brevis. At this level the peroneus longus is superficial and retracted to expose the peroneus brevis. The tendons are isolated and functionally tested to insure identification.

At this level in the leg the peroneus brevis tendon is quite thin and broad. Approximately one half of the peroneus brevis remains muscle at this level. As we move distally the tendon thickens and the muscle mass

diminishes as it contributes tendinous fibers. The tendon is encircled proximally with 2-0 suture and the integrity of the fibers is maintained as we split the peroneus brevis distally. The tagged end of the tendon is pulled distally through its tendon sheath utilizing uterine forceps or a curved hemostat. At several points the deep fascia or peroneal retinaculum may have to be incised to allow passage of the split tendon. The wound is kept moist with irrigation throughout the procedure. Care is taken to preserve the attachments of both the harvested tendon and the intact brevis tendon at the fifth metatarsal base.

The split peroneus brevis tendon is then rerouted subperiosteally to the anterior margin of the fibula, through the fibular trephine hole, and subperiosteally to the calcaneal trephine hole. The tendon can be passed either superficial or deep from the fibula to the calcaneus (Fig 2).

If the peroneal retinaculum is damaged as a result of previous trauma the split tendon passed superficially will prevent peroneal subluxation in the future. It is very important to hold the foot at perpendicular to the leg and the subtalar joint in neutral position throughout the remainder of the procedure until a compression dressing can be applied. Proper tension on the split tendon is afforded and the trephine bone plugs are returned to the fibula and calcaneus and tightly packed. The tendon is also sutured to the anterior margin of the fibula with a non-absorbable 2-0 suture.

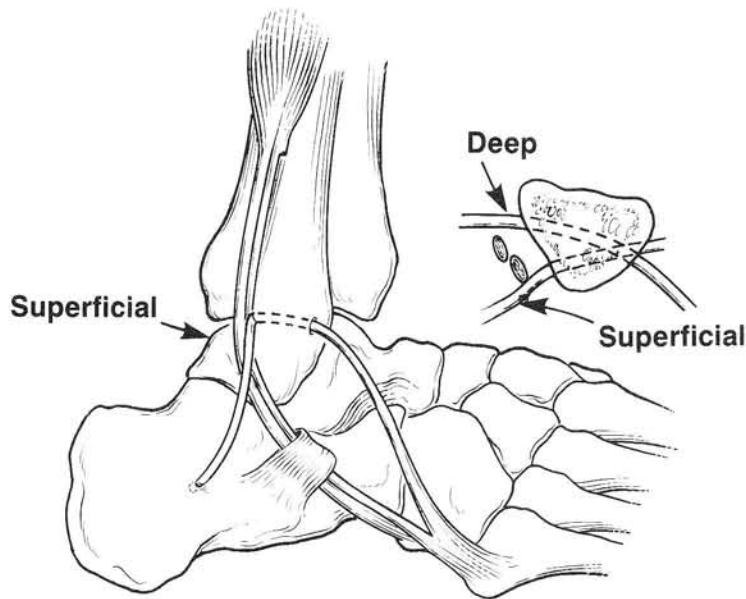


Fig. 2. Split peroneus brevis tendon can be transferred superficial or deep to peroneus longus and brevis depending on location of fibular trefphine hole and integrity of peroneal retinaculum.

The deep fascial incisions are closed with an absorbable 2-0 suture. A closed suction drain can be used and the superficial fascia is closed with 4-0 absorbable suture with care being taken to avoid the sural nerve. Skin is closed with a 5-0 or 6-0 absorbable suture and steri-strips are applied. A damp sterile saline soaked gauze is applied, followed by a dry sterile dressing and a Jones' compression dressing. Care is taken to maintain the position of the foot and leg until the complete dressing is applied. The tourniquet is released, capillary refill is seen in all digits, and the TLS closed suction drain is seen to be mildly active.

The ankle is maintained non weightbearing for four weeks and the placed in a weight-bearing cast for an additional two weeks.

Summary

An ankle sprain is a serious injury that deserves accurate diagnosis and appropriate conservative or surgical therapy. The long term disability seen with neglected inversion injuries warrants improved acute diagnosis and treatment. Where early or delayed primary repair is not possible a delayed stabilization using a split peroneus brevis tendon reinforcement is recommended and described.

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