Tibialis anterior tendon transfer (TATT) is a common procedure for recurrence in clubfoot treated with the Ponseti method.\(^1\)\(^-\)\(^3\)

Fixation usually involves passing the tendon through a drill hole in the lateral cuneiform using sutures pulled through the plantar aspect of the foot. Although the complication rate of TATT is low,\(^4\)\(^-\)\(^7\) macroscopic damage may occur during drilling of the tunnels, passing the sutures to the plantar side of the foot, and tying the fixation button. We conducted a cadaveric study to evaluate plantar nerve structures at risk during TATT.

**Purpose**

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**Methods**

TATT was performed to the lateral cuneiform in 12 random fresh frozen adult cadaveric limbs. Three feet were in each group.

- **GROUP A**: Perpendicular to the surface of the lateral cuneiform
- **GROUP B**: Perpendicular to the weight-bearing surface of the foot
- **GROUP C**: Directed medial and superficial 45° to the frontal and sagittal planes
- **GROUP D**: Aimed at the middle of the foot

A goniometer was used to aim the wire inclination before drilling. The tendon sutures were pulled through the plantar aspect using two Keith needles aimed in the same direction as the drill hole. A second plantar dissection was performed. The distance from the drill hole to the nearest nerve or nerve branch was measured. After dissection, Keith needles were passed 20 times per foot. With each pass, proximity to nerve structures was noted.

After drilling, Keith needles were passed 20 times per foot. With each pass, proximity to nerve structures was noted.

**Results**

- **GROUP A**: The drill hole was at a mean distance of 1.7 mm (±1.3 mm) to the medial plantar nerve, found more proximally at a mean distance of 5 mm (±2.9 mm).
- **GROUP B**: The drill hole was found to be close to the lateral plantar nerve branches at a mean distance of 0.3 mm (±1.1 mm) to the bifurcation of 25.3 mm (±16.9 mm).
- **GROUP C**: The drill hole in group C was at a mean distance of 1.7 mm (±3.3 mm) to the lateral plantar nerve bifurcation and at a distance of 1 mm to the lateral nerve branch in one case.
- **GROUP D**: The drill hole in group D was in proximity to the medial plantar nerve at a mean distance of 1.7 mm (1-3 mm). The bifurcation of the nerve trunk was found more proximally at a mean distance of 5 mm (2-9 mm).

**Discussion**

In TATT, the drill hole should be aimed at the middle of the plantar surface in the transverse and sagittal planes, which can be achieved by drilling the drill approximately 30° to the plantar surface of the frontal plane and at the sagittal plane. The results in this cadaveric study demonstrated that the risk of hitting a nerve structure is higher in group B than in group A.

Passing the Keith needles resulted in hitting a nerve structure 12 times in group A, 20 times in group B, 6 times in group C, and once in group D. Even relatively thin nerve branches were easily punctured by the sharp needles.

**References**