A Morphological Study of the Superior Peroneal Retinaculum, Peroneal Groove, and Associated Peroneal Tendon Pathology.

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Statement of Purpose

The superior peroneal retinaculum (SPR) and groove is the primary restraint to subluxation of the peroneal tendons. The aim of this study was to correlate SPR structure and groove shape to tendon pathology.

Methodology & Procedures

Thirty skeletally mature fresh-frozen cadaveric below-knee lower-extremities were obtained. All were unilateral and of variable laterality. The SPR origins and insertions were identified with dissection under loupe magnification. The classification set by Davis et al.[2] for the SPR was used as a guide in our dissection. Only four of the five types of SPR classified by Davis et al. were encountered, and were re-assigned alpha and numeric characters as noted in figure 1. An example of type B2 as it was encountered, figure 2.
The peroneus brevis tendons were examined for pathology and graded according to severity *(Sobel et., al).*[3,5] Grade 1, splaying out/flattening of the peroneal tendons in the fibular groove. Grade 2, partial thickness split less than 1 cm. Grade 3, full-thickness split, 1-2 cm. Grade 4, full-thickness split greater than 2 cm. Figure 3 example of a grade 4 split in the peroneus brevis tendon.
The peroneal groove was examined independently by two authors where groove shape was determined by physical exam as convex, flat, and concave. SPR types vs Groove shapes were plotted as noted in table 1.
Using SPSS version 23 Armonk New York, statistical analysis program, a Fisher's exact test was used to establish whether a nonrandom correlation was present between peroneal groove shape, SPR structure and peroneal tendon pathology. P values were calculated for statistical significance with an α chosen to be a value of ≤ 0.05.

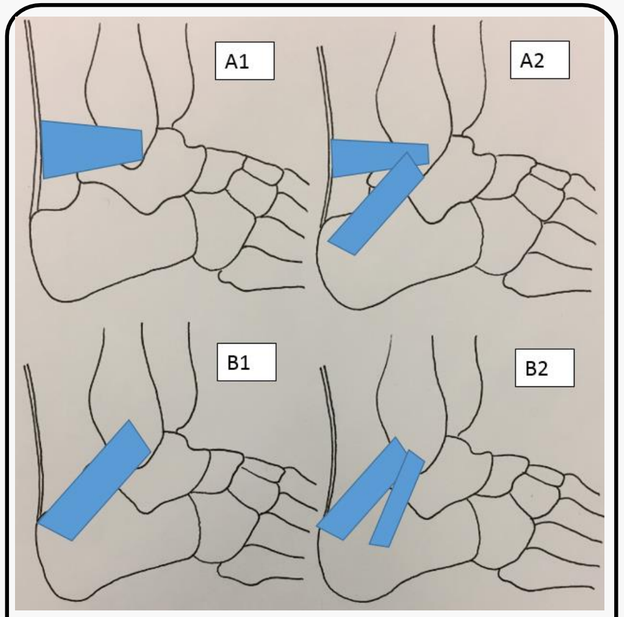

Figure 1. Showcasing the SPR structures encountered during dissection.

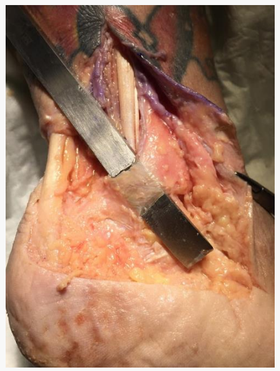

Figure 2.

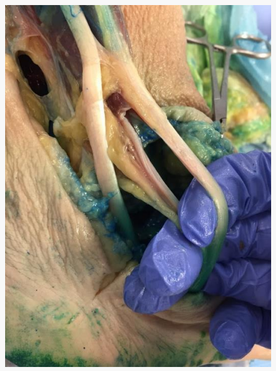

Figure 3.

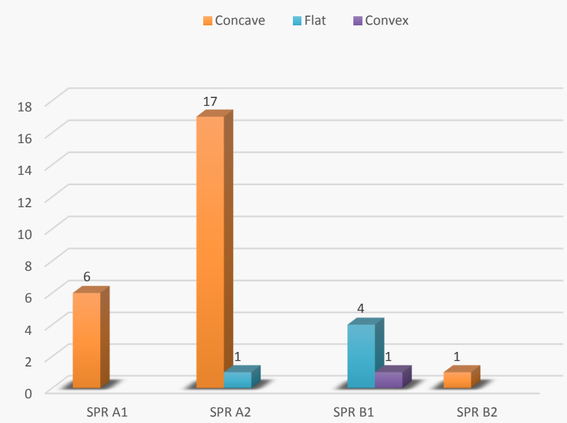

Table 1.

Results

Of the 30 limbs, 24 had a concave peroneal groove, 26 had peroneal tendon pathology of any kind, 5 tears, 3 of which were full thickness. Specimens with a B-type SPR were 11.1 times more likely ($p<0.05$) to have any form of peroneal tear compared to A-type SPR. Specimens with a non-concave peroneal groove were 11.1 ($p<0.05$) more likely than concave grooves to have any form of tear as well as 11.2 times more likely to have a full thickness tear ($p<0.05$).

Discussion

When the ankle is dorsiflexed, the fibula externally rotates and migrates proximally and posterior lateral to accommodate the wider anterior talar dome.[1] During forced dorsiflexion with the foot in an either an inverted or everted position, the peroneal muscles can contract with enough force to overcome the superior peroneal retinaculum, producing lateral translation of the tendons out of the groove, often times being culprit for peroneal tendon tears depending on groove shape and SPR structure.[1,4]

SPR structure and groove shape were shown to have an impact on peroneal tendon pathology. When reconstructing the lateral ankle complex, the SPR structure should be considered as this anatomic study showed that there's a correlation between B-type SPR and peroneal tendon tears. The current literature does not give recommendations on treatment regarding the reconstruction of the SPR for reduction in peroneal subluxation or injury. These findings suggest when reconstructing a lateral ankle, an A-type SPR repair in the presence of or with the conversion to a concave peroneal groove will provide the best structure to reduce subluxation and peroneal tendon pathology recurrence.

References

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