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Fibular Head as a Landmark for Identification of the Common Peroneal Nerve: A Cadaveric Study

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Summary:
With the knee in 90 degrees of flexion the CPN center crosses the long head of the BF tendon 45.3mm from the posterior border of the fibula where the direct arm of the BF inserts and the posterior border of the fibula 21.9mm from the tip of the fibular styloid.

Abstract:
INTRODUCTION
The common peroneal nerve (CPN) and its branches innervate the muscles in the anterior and lateral compartment of the leg allowing ankle dorsiflexion and toe extension, both necessary components of normal gait. A thorough knowledge of the anatomy of the CPN and its branches is essential for surgeons operating within and around the knee joint, particularly in the setting of injury to the posterolateral corner. The purpose of this study was to measure the distance between the palpable posterior border of the fibula to the point where the CPN crosses the long head of the biceps femoris (LHBF) tendon as this distance would be useful in efficiently and safely identifying the CPN when the zone of injury has made tissue identification more difficult.

METHODS
Sixteen cadaveric dissections were performed. The distance from the fibular head to the center of the CPN as it exits beneath the biceps femoris (BF) was measured in 0, 30, 60 and 90 degrees of flexion and was averaged on the first 8 specimens. Based on those measurements, a needle was placed on the second 8 dissections before the fascial incision was made to assess reliability. All measurements were repeated after needle removal, distances were recorded and 95% confidence interval (CI) and correlation coefficients calculated.

RESULTS
The distance from the posterior border of the fibular head to where the CPN nerve center emerges from the BF was 62.3 mm (95% confidence interval [CI], 58.2 to 66.4), 56.3 mm (95% CI, 51.9 to 60.8), 46.8 mm (95% CI, 43.6 to 50.0), and 45.3 mm (95% CI, 43.2 to 47.3) in 0, 30, 60, and 90 degrees of knee flexion, respectively. The correlation coefficient between knee flexion and measured distance was nearly linear: r= -0.97. The correlation coefficients were 0.62, 0.32, and 0.01 for height, weight, and body mass index (BMI), respectively. The CPN crossed the posterior border of the fibula 21.9 mm (95% CI, 20.2 to 23.7) from the fibular styloid at 90 degrees of flexion.

DISCUSSION
Nerve injury during posterolateral corner (PLC) reconstructions can lead to significant morbidity and foot drop. Given the abnormal anatomy secondary to the zone of injury in lateral sided knee injuries, peroneal nerve identification and neurolysis during PLC reconstruction is an important first step to avoid CPN injury. To our knowledge our study is the first to quantify the distance from the posterior border of the fibula to where the CPN crosses the LHBF tendon. These relationships allow for efficient and safe identification of the CPN proximal to the zone of injury when operating around the posterior lateral corner of the knee.

CONCLUSION

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With the knee in 90 degrees of flexion, the CPN center crosses the long head of the BF (LHBF) tendon 45.3 mm from the posterior border of the fibula, where the direct arm of the BF inserts, and the posterior border of the fibula 21.9 mm from the tip of the fibular styloid. There is a near linear correlation between knee flexion and the distance to the CPN as it exits the BF. No correlation exists between the distance to the CPN and weight or BMI, whereas a moderate correlation with height exists.