The medial branch of the medial dorsal cutaneous nerve (MDCN) is at risk of iatrogenic injury during medial column surgery despite efforts to mobilize and protect the nerve. Postoperative sensory nerve symptoms are common and can lead to patient dissatisfaction and suboptimal outcomes. The purpose of this case series is to prospectively correlate intraoperative nerve location upon direct viewing with preoperative nerve localization to assess the accuracy of a specific nerve palpation technique. A secondary goal was to determine if the location of the MDCN is consistent enough to allow nerve-centric incision design strategies for medial column procedures.

Methodology and Hypothesis

Consecutive patients undergoing elective Lapidus fusion beginning January 2015 were prospectively evaluated by a single surgeon (TB). Preoperative localization of the medial branch of the MDCN was performed using a simple nerve palpation technique (Figure 1). The nerve was marked with an indelible marker as it crossed the ankle joint, the extensor hallucis longus tendon (EHL), and extrapolated along a straight line course at the dorsomedial aspect of the first metatarsalophalangeal joint (MPJ). Intraoperative assessment of the nerve position in relation to preoperative palpating markers was assessed during EHL tendon repair (Figure 1). Markers were placed in relation to the first tarsometatarsal joint (TMTJ) and medial cuneiform was assessed during dorsal exposure. 100 consecutive patients undergoing Lapidus fusion were included in this study.

Our primary hypothesis was that the consistent nerve palpation technique would identify the MDCN and allow nerve-centric incision design strategies that avoid the nerve to mobilize the nerve when performing a variety of medial column procedures.

Literature Review

Branching of the superficial peroneal nerve (SPN) is highly variable. Although several studies have investigated the branching pattern of the SPN as it exits the popliteal fossa and crosses the ankle joint using cadaveric studies, fewer anatomic studies are available regarding the terminal branching patterns on the dorsal foot. Generally, the SPN gives rise to the first dorsal interosseous nerve as it exits the popliteal fossa (1). Of note, the medial branch of the SPN is at risk of iatrogenic injury with medial column procedures including the surgery of the hallux and midfoot. The medial branch of the SPN gives rise to the medial dorsal cutaneous nerve (MDCN) (2). A study by Botte et al. investigated the branching pattern of the SPN in a series of 229 feet (3). In 97% of the cases, the palpated nerve was “at risk” in 97% of cases; and proximal to the medial cuneiform in 3/100 cases. The point at which the nerve crosses the EHL tendon is identified as the proximal to the medial cuneiform level. The MDCN (arrows) can sometimes be visualized in patients with thiner dorsal soft tissue structures or bone prominence as with metatarsal 10.