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BACKGROUND | The objective of this cadaveric study was to identify and compare the structures at risk of damage in standard versus modified intraosseous distal mini-invasive metatarsal osteotomy (DMMO). Our hypothesis was that the modified DMMO technique may be a safer, less complex procedure that could decrease the risk of iatrogenic injuries.

METHODS | 11 thawed fresh-frozen under the knee cadaveric specimens underwent DMMO of the forefoot. The modified technique proposed by this study enters the dorsal cortex (at 45 degrees) straight through to the plantar cortex followed by cutting the lateral cortices (panels D, E, F). The standard technique enters the right cortex (at 45 degrees) then cuts sequentially the right, plantar, medial and dorsal cortices (panels A, B, C).

After completion of the procedures, the cadavers were fully dissected to identify unintentional injury to structures such as extensor digitorum longus (EDL), flexor digitorum longus (FDL), extensor digitorum brevis (EDB) and metatarsal joint capsules (MJC). The distance from the osteotomy site to these structures was also recorded.

Statistical analysis initially used descriptive tests. Numerical variables were presented by mean and standard deviation (SD), while categorical variables presented by frequencies, absolute and relative, were appropriated to the total sample size. The measurements recorded in this study were compared using non-paired t-test. Values of median, minimum and maximum were also presented.

RESULTS | The most common injury by modified DMMO approach was the EDL tendon with 27% of the specimens having a macroscopic injury compared to 18% in the standard group. However, the standard group demonstrated 27% of its specimens having injury to the MJC and 9% of its specimens having injury to EDB tendon compared to 0% injury to those structures in the modified group. There was also a statistically significant difference between the distance of the osteotomy site of 6.08 ± 3.99 mm from the dorsal metatarsal head articular surface (DMHAS) in the standard group and 9.92 ± 3.42 mm from the DMHAS in the modified group (p=0.02).