

Arthroscopic Plafond Access for Osteochondral Lesions- The Effect of Limited Ankle Range of Motion on Anterior and Posterior Arthroscopic Accessibility

Craig C. Akoh, MD, Phinit Phisitkul, MD, Chamnanni Rungprai, MD, Annunziato Amendola, MD, Bryan Den Hartog, MD, Natalie A. Glass, PhD

Category: Arthroscopy

Keywords: ankle; plafond; arthroscopy; operative approach, osteochondral lesion; laser scan

Introduction/Purpose: Osteochondral lesions of the tibial plafond (OLTs) can lead to chronic ankle pain and disability. Arthroscopic treatment has been described after failure of initial nonoperative treatment. However, the ideal appropriate approach for OLTs is controversial, and it is not known if ankle positioning or joint distraction affects the accessibility of these lesions. The purpose of this study was to determine the effects of predetermined ankle flexion angles on arthroscopic accessibility of the distal tibial articular surface through either the anterior or posterior approach. The effects of non-invasive joint distraction were also analyzed.

Methods: Fourteen below-knee cadaver specimens were subjected to pre-operative range of motion measurements. Joint distraction was measured using sizing rods with the precision of 1 mm. The accessible areas at the tibial plafond were marked using a curette at predetermined ankle positions. Arthroscopy was performed using a 30-degree 2.7 mm camera via standard anterior and posterior approaches in randomized fashion in all specimens. Following arthroscopic accessibility, each cadaveric ankle was disarticulated and arthroscopic accessibility was quantified using a surface laser scan. Statistical analyses were performed to determine the correlation between pre-operative ankle range of motion and amount of distraction on arthroscopic accessibility of the tibial plafond.

Results: The average accessibility of the tibial plafond was 56 percent and 68 percent for the anterior and posterior approaches, respectively ($p = 0.056$). There was no difference in accessibility from the anterior approach with increasing level of plantarflexion ($p > 0.05$). Increasing dorsiflexion during the posterior approach significantly reduced ankle accessibility ($p = 0.028$). There was a significant increase in accessibility through either anterior or posterior approach with increasing level of ankle distraction; (parameter estimates \pm SE): anterior= 14.2 ± 3.34 , $p < 0.01$ and posterior= 10.6 ± 3.7 , $p < 0.05$).

Conclusion: Arthroscopic accessibility for the treatment of OLTs was vastly dependent on the amount of intra-operative joint distraction achieved. Posterior approach had more joint distraction and wider plafond accessibility. Increasing ankle distraction significantly improved arthroscopic plafond accessibility for both anterior and posterior approaches while ankle joint position did not influence accessibility from either approach.

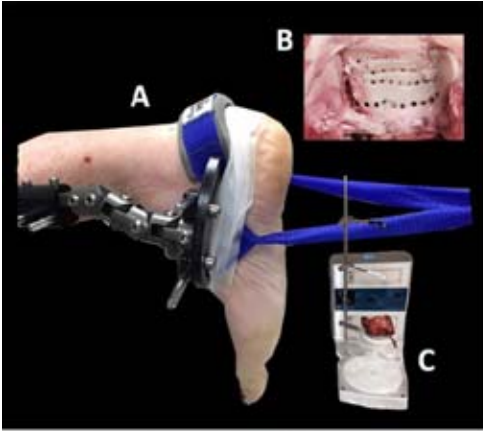


Figure 1: Experimental design: on-invasive ankle distraction for ankle arthroscopy (A); disarticulated distal tibial plafond surface with subchondral penetration of intra-articular curette marking of arthroscopic accessibility (B); and surface 3D laser scan (Next Engine 3D Scanner Ultra HD®).