Biomechanical Analysis of Cuboid Osteotomy Lateral Column Lengthening for Stage II B Adult-acquired Flatfoot Deformity: A Cadaveric Study
Yunfeng Yang, MD, Haichao Zhou, MD, Yun Zhang, MD

Category: Basic Sciences/Biologics

Keywords: adult-acquired flatfoot deformity; lateral column lengthening; cuboid osteotomy

Introduction/Purpose: To investigate the effect of cuboid osteotomy lateral column lengthening (LCL) for the correction of stage II B adult-acquired flatfoot deformity in cadaver.

Methods: Six cadaver specimens were compressively loaded to 350 N. Flatfoot models were established and each was evaluated radiographically and pedobarographically in the following conditions: (1) intact foot, (2) flatfoot, (3) cuboid osteotomy LCL (2, 3, 4, and 5 mm).

Results: Compared with the flatfoot model, the 2-, 3-, 4-, and 5-mm LCLs showed significant correction of talonavicular coverage on anteroposterior radiographs and talus-first metatarsal angle on both anteroposterior and lateral radiographs. As the graft increased in size incrementally, lateralforefoot pressure increased consistently, and medial pressure decreased significantly except for the 2-mm LCL. Compared with the intact foot, the above angles of the LCLs showed no significant difference except for the 2-mm LCL. In terms of forefoot pressure, medial pressure of the 2-mm LCL and lateral pressure of the 3-, 4- and 5-mm LCLs showed statistical differences, but lateral pressure of the 3-mm LCL was not much more than the intact foot as compared to the 4- and 5-mm LCLs, which was still less than medial pressure.

Conclusion: Cuboid osteotomy LCL procedure avoids damage to subtalar joint and has a good effect on correction of stage II B adult-acquired flatfoot deformity with a 3 mm lengthening in cadavers.

Foot & Ankle Orthopaedics, 2(3)
DOI: 10.1177/2473011417S000416
©The Author(s) 2017

This open-access article is published and distributed under the Creative Commons Attribution-NonCommercial 3.0 License (http://www.creativecommons.org/licenses/by-nc/3.0/) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access pages (https://us.sagepub.com/en-us/nam/open-access-at-sage).