ISAKOS

International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine

11th Biennial ISAKOS Congress • June 4-8, 2017 • Shanghai, China

Paper #139

Ankle and Subtalar Joint Kinematics Following Lateral Ligament Repair-Implications for Early Surgical Treatment

Hélder Miguel Duarte Pereira, MD, PORTUGAL
Pieter D'Hooghe, MD, QATAR
Nicholas Anderson, BS, UNITED STATES
Richard Fuld, BA, UNITED STATES
Judas Zed Kelley, BA, UNITED STATES
Todd H. Baldini, MS, UNITED STATES
Isakos Laf Committee, MD, UNITED STATES
Kenneth J. Hunt, MD, UNITED STATES

University of Colorado
Aurora, CO, UNITED STATES

Summary:
Repair of ATFL using suture anchors restores ankle joint kinematics and contact mechanics compared to the intact state. The addition of CFL repair does not add significantly to ATFL repair alone in resisting talar inversion or calcaneal translation, supporting the necessity for a protection period to allow sufficient ligament healing before inversion stresses following surgical repair.

Abstract:
BACKGROUND:
The current trend for chronic lateral ankle instability treatment is direct repair of the ATFL and/or CFL by open or arthroscopic-assisted technique. There is recent evidence suggesting improved success with acute ligament repair following high grade ankle sprains as well as on the impact of CFL injury on ankle and subtalar biomechanics. However, the impact of acute repair on ankle and subtalar joint kinematics and biomechanics is not well understood. The purpose of this study was to determine the impact of repairing the ATFL alone compared to repairing both the ATFL and CFL, on restoration of ankle and subtalar joint kinematics.

METHODS:
Ten matched pairs of fresh frozen human cadaveric ankles were dissected to expose intact ATFL and CFL. Ankles were mounted to an Instron at 20° plantar flexion and 15° of internal rotation. Each ankle was loaded to body weight and then inverted from 0 to 20° for three cycles; Peak pressure and contact area were recorded in the ankle joint using a calibrated Tekscan sensor system, and linear and rotational displacement of the talus and calcaneus relative to the ankle mortise was recorded using a three-dimensional motion capture system. Ankles then underwent sequential sectioning of ATFL and CFL and were randomly assigned to ATFL-only repair using two arthroscopic Broström all-soft anchors, or combined ATFL and CFL repair. Testing was repeated after repair.

RESULTS:
Motion capture showed a significant increase in inversion angle of both the calcaneus and talus after release of each ligament. There was significantly more inversion in the subtalar joint than the tibiotalar joint with weight-bearing inversion. There was a significant increased medial shift of the calcaneus relative to fibula after CFL release. Neither ATFL alone nor combined ATFL and CFL repairs restored normal talus inversion. Isolated ATFL repair restored inversion of the calcaneus and subtalar joints close to the intact state. We found no significant difference in peak pressure or contact area in the tibiotalar joint between the intact ankle and ATFL or combined repair. However, there was a 26% decrease in peak pressure following ATFL repair, and only an 11% decrease in peak pressure following a double repair compared to the uninjured ankle.

Paper #139

CONCLUSION:
Injury to CFL significantly increases the inversion rotation and medial translation of the ankle and subtalar joint compared to ATFL release alone. Repair of ATFL using suture anchors restores ankle contact mechanics and inversion of both the ankle and subtalar joints close to the intact state. However, the addition of CFL repair does not appear to provide significant improvement compared to ATFL repair alone. Neither group demonstrated restoration of normal talus inversion nor medial calcaneus translation with weight-bearing inversion, suggesting that acute repair, without a period of normal healing, is not sufficient to resist a weight-bearing inversion moment. While the CFL plays an important role in normal ankle mechanics, this data supports the necessity for a protection period to allow sufficient ligament-healing before weight-bearing inversion stresses are applied following surgical repair.