Anterolateral Ligament Injuries are Missed on Routine Magnetic Resonance Imaging in Patients with Sports-Related Anterior Cruciate Ligament Tears

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INTRODUCTION: The anterolateral ligament (ALL) provides rotational knee stability and has gained growing interest in recent years. Its existence has been known since the first reports in the 1800s, but new augmentation techniques have spurred the debate on the clinical importance. Previous studies have shown that 11-30% of patients demonstrate persistent rotational instability following anterior cruciate ligament (ACL) reconstruction. The accuracy of preoperative imaging diagnosis may impact treatment decisions. The primary goal of this study was to determine the rate of ALL reporting on routine magnetic resonance imaging (MRI) and compare the results to a secondary review by a fellowship trained musculoskeletal radiologist based on ALL visualization, and injury characterization. We hypothesized that ALL as an anatomic structure and its related injuries are underreported on routine MRI assessments.

METHODS: The study was based on a retrospective review of an institutional database with records from 2015 to 2019. Inclusion criteria included patients with sports-related ACL injuries treated with primary reconstructions, concomitant injuries in the lateral compartment, and existing preoperative pre-operative Magnetic Resonance Imaging (MRI). Exclusion Criteria were based on ACL revisions, chronic ACL injuries, non-sports related injuries. ALL visualization was defined as fully, partially or not visualized. Injury characterization was defined as Grade I: Mild or Intermediate Sprain, Grade 2: Severe Sprain or Partial Tear, Grade III: Complete Tear or Avulsion as previously described. ALL MRI reporting was assessed on primary and secondary reviews. The study was ethics approved prior to initiation.

RESULTS: Among 1544 ACL injuries, 204 met the study selection criteria. The average age was 21.2 years with 34% females 66% males. Most injuries occurred during recreational sports (n=90), followed by high school (n=83), college (n=29), and professional sports (n=2). The most frequent sports type was soccer (n=58), followed by football (n=57), basketball (n=41), and other sports (n=49). The ALL visualization rate on routine MRI reports was 0% compared to the secondary review with a rate of 99.5% (203/204). 134 ALLs were fully visualized, 69 partially, and 1 was not visualized. 138 ALL injuries were missed on routine MRI reports with 27.9% characterized as grade 1, 30.4% as grade 2, and 9.3% as grade 3. Overall, 68% of patients with sports-related ACL tears demonstrated a concomitant ALL injury which was missed on the initial MRI assessment.

DISCUSSION AND CONCLUSION: Concomitant ALL injuries are not recognized on routine MRI reports in patients with sports-related ACL tears. However, visualization and injury characterization using standard MRI protocols and grading systems can be highly accurate and provide guidance for orthopedic surgical management in active patients who are at risk of residual rotatory instability. Education and heightened awareness of the ALL as an anatomic structure may improve the diagnostic accuracy for routine MRI reporting which may have a positive impact on treating anterior cruciate ligament injuries.