Heavy Burden of “Logsplitter” Ankle Injuries: A Retrospective Review of Trans-Syndesmotic Ankle Fracture Dislocations

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INTRODUCTION:

Trans-syndesmotic ankle fracture dislocations, in which the talus is axially wedged between the distal tibiofibular joint, are commonly known as logsplitter injuries. These injuries are rare, often devastating, and are associated with high rates of post-traumatic ankle arthritis and poor functional outcomes, often mimicking those of pilon fractures. There remains a paucity of literature on logsplitter injuries. Previous studies on logsplitter ankle injuries have mainly been case series, likely due to a low incidence and recent recognition of this distinct injury pattern. The purpose of this study was to assess patient demographics, injury mechanism, treatment patterns, radiographic characteristics, outcomes, and reoperation rates in logsplitter ankle injuries.

METHODS:

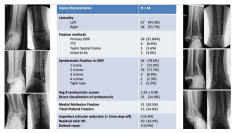
A retrospective review of all adults presenting with logsplitter ankle injuries treated at a single health system from January 2018-June 2023 was performed. Radiographs were independently reviewed by multiple orthopaedic surgeons to identify logsplitter-type injuries, defined by syndesmotic disruption with dislocation or subluxation of the talar dome proximal to the tibial plafond. Patient demographics, co-morbidities, injury characteristics, fracture patterns, radiographic data, treatment methods, and follow-up information were extracted from electronic medical record. Data were analyzed using descriptive statistics, linear and multiregression to assess fracture characteristics, surgical fixation, and factors related to reoperation and post-traumatic arthritis.

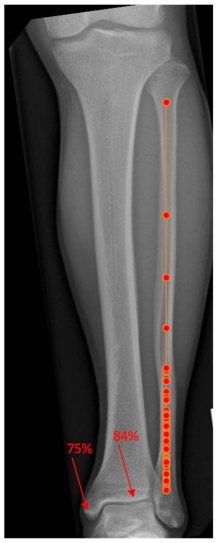
RESULTS:

Sixty-one patients were included for analysis. Twenty-four patients (39.3%) were injured in high-velocity mechanisms and 37 patients (60.7%) were involved in low-velocity mechanisms, most commonly a ground level fall. Fifteen patients (27.9%) had an open fracture. All patients were treated surgically, with 93.4% undergoing primary ORIF. 78.6% of patients had syndesmotic fixation with an average of 1.95 syndesmotic screws. Eight patients (13.1%) underwent 14 unplanned re-operations, including three patients (4.9%) who went on to known arthrodesis. Of the patients with more than one-year post-operative follow-up, 75% had radiographic evidence of post-traumatic arthritis within one year after injury and the majority of patients reported chronic ankle pain.

DISCUSSION AND CONCLUSION:

As the largest cohort of logsplitter injuries ever assessed, this serves as a guide to understanding patients affected and their associated risk factors and outcomes. In this particular cohort, logsplitter injuries were associated with low-velocity mechanisms, primarily in overweight and obese patients. Interestingly, only 24.6% of patients had tibial plafond fixation, despite 83.6% of patients having involvement of the articular surface on pre-operative imaging. Our results show post-traumatic arthritis rates greater than 70% within one year of injury, consistent with prior smaller studies and those of pilon fractures. Logsplitter ankle fracture dislocations are unique injuries with potentially poor prognosis and high rates of post-traumatic arthritis.





Injury Characteristics	N = 61
Laterality	
Left	27 (44.3%)
Right	34 (55.7%)
Mechanism	
GLF	26 (42.6%)
MVC	7 (11.5%)
FFH	6 (9.8%)
MCC	5 (8.2%)
AVP	4 (6.6%)
Sports	3 (4.9%)
Bike/scooter/skateboard	5 (8.2%)
Other	5 (8.2%)
Velocity	
High	24 (39.3%)
Low	37 (60.7%)
Polytrauma	
Yes	9 (14.8%)
No	52 (85.2%)
Closed Injury	44 (72.1%)
Open Injury (ALL wounds medial)	17 (27.9%)
Grade 1	4 (23.5% of open)
Grade 2	7 (41.1% of open)
Grade 3a	4 (23.5% of open)