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Treatment of Low Energy Lisfranc Joint Injuries in a Young Athletic Population: Primary Arthrodesis Compared with Open Reduction and Internal Fixation

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Abstract:
Objectives: Acute Lisfranc joint injuries have historically been associated with high-energy trauma, and high quality data exists describing injury patterns and recommended treatment protocols. There is a lack of comparable data investigating injuries associated with low energy mechanisms. The objective of this study is to report low energy injury patterns and to retrospectively compare primary arthrodesis with open reduction and internal fixation in a young athletic population.

Methods: All surgically managed low-energy (sustained during athletic activity, ground level twisting, or fall from less than three feet) Lisfranc injuries were identified at a single military tertiary referral center from July 2010 to June 2015. The injury pattern, time to diagnosis, and method of treatment (open reduction internal fixation (ORIF) or primary arthrodesis) were reviewed. Complication rates, secondary procedures, VAS pain score, and return to full military activity (defined as the ability to perform their primary job functions and participate in mandatory athletic activity) were reviewed.

Results: Of the thirty-three injuries identified, twenty (60.6%) were primarily ligamentous. Only one patient had evidence of lateral column instability. Average patient age was twenty-eight. Eleven injuries (33%) were initially missed, delaying diagnosis an average of thirty-four days. Primary arthrodesis was performed in fifteen patients; most were secondary to subacute or chronic presentation. ORIF was performed on the remaining eighteen patients. All fixation constructs included solid screws, dorsal plates, or a combination of both. Minor complications occurred in twelve patients and included sensory changes, superficial infection treated with antibiotics, and symptomatic hardware. Complications requiring surgery other than hardware removal were seen in two patients including one ORIF patient who underwent secondary arthrodesis. VAS pain at final evaluation averaged 1.6. Thirty-one of thirty-three (93.9%) were able to return to full military activity. There were no significant differences in demographic data, injury patterns, complication rates, VAS pain score, and return to full activity. Hardware removal was performed in thirteen ORIF and two arthrodesis patients (p<0.005). The arthrodesis group returned to full activity at an average of 4.7 months while the ORIF returned at an average of 6.7 months (P<0.05).

Conclusion: Low energy Lisfranc injuries are most commonly ligamentous, almost always spare the lateral column, and are commonly missed on initial presentation. Arthrodesis and ORIF consistently result in the ability to resume work and athletic activity with low rates of serious complication.
Predictably, hardware removal is more common with ORIF. In this study, primary arthrodesis led to earlier return to work and athletic activity by an average of two months.