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Functional and clinical outcomes following Lisfranc injuries in Togo: An 8 to 14-year follow-up study

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Abstract
Background: Lisfranc dislocations and fracture-dislocations can cause lasting disability. Data from low-resource settings remain limited.
Objective: To describe epidemiology, injury patterns, management and long-term outcomes.
Methods: Single-centre retrospective-prospective series of 27 consecutive patients treated between 1 June 2011 and 31 May 2017. Injuries were classified according to Myerson. Outcomes were assessed using the AOFAS midfoot score and a four-level satisfaction scale.
Results: Young male adults injured in road traffic crashes predominated. Myerson distribution was A N=12 (44.4%), B1 N=6 (22.2%), B2 N=6 (22.2%), and C2 N=3 (11.1%). Open injuries were present in 24/27 (88.9%) and fracture-dislocations in 22/27 (81.5%). Initial treatment consisted of open reduction and internal fixation with K-wire pinning (N=13), orthopaedic treatment (N=10), primary amputation (N=3), and primary arthrodesis (N=1). Among 17 patients with functional evaluation at the long-term horizon, the American Orthopaedic Foot and Ankle Society Score averaged 69.64 (range, 48-100), with patient satisfaction rated as 3 excellent, 5 good, 7 fair, and 2 poor. Five patients initially treated orthopaedically later underwent secondary screw arthrodesis for painful post-traumatic degeneration or instability.
Conclusion: In our context with many open injuries, K-wire pinning predominated and screw constructs were not used initially. Long-term function was moderate, and delayed screw arthrodesis was required in a subset of cases initially managed non-operatively.

Keywords: Lisfranc, tarsometatarsal joint, fracture-dislocation, open injury, K-wire pinning.

Introduction
Lisfranc dislocation and fracture-dislocations are severe midfoot injuries of the tarsometatarsal joint that combine ligamentous and osseous damage around the joint and carry a high risk of long-term disability when missed in the acute setting [1-3]. In practice, many centers historically adopted pragmatic strategies favoring reduction (open or percutaneous) with K-wire pinning when soft-tissue status or open wounds discouraged deep implants [4]. Alongside these approaches, open reduction and internal fixation with rigid constructs trans-articular screws or dorsal bridge plates has been advocated, with clinical series linking anatomic reduction and stable fixation to improved function [5, 6]. Biomechanical comparisons further indicate that dorsal plating or stiffer constructs can increase stability relative to trans-articular screws in simulated Lisfranc instability [7, 8]. Emergency-department and imaging literature emphasize diagnostic pitfalls including the plantar ecchymosis sign and the role of targeted radiographs and CT to reduce missed injuries [9-11]. Overall, contemporary clinical experience underlines the heterogeneity of patterns and the dependence of outcomes on the quality of reduction and the stability achieved [12]. Evidence from Sub-Saharan Africa remains limited and care pathways are shaped by soft-tissue priorities, delays, and implant availability. We report a single-centre series of 27 cases (2011-2017) with long-term (2025) outcomes to characterise epidemiology, injury patterns, management, and results.

Materials and Methods

Study design and setting

We conducted a retrospective-prospective descriptive study at the Department of Orthopaedics & Traumatology of CHU Sylvanus Olympio in Lomé, Togo.

Participants

We included twenty-seven patients managed for Lisfranc dislocation or fracture-dislocation between 1 June 2011 and 31 May 2017. The diagnosis was based on clinical evaluation and standard radiographs according to departmental practice.

Variables

Following demographic, clinical, and outcome characteristics of the patients were collected: Age, sex, place of residence, telephone number, and length of hospital stay; circumstances of the trauma and medical history; clinical signs; types of Lisfranc joint injuries according to the Myerson classification [1] with associated injuries.Open injuries graded according to the Gustilo-Anderson classification. Indications and management procedures were documented.

Management was categorised as orthopaedic treatment or surgery. Orthopaedic treatment consisted of immobilisation using either a posterior plaster splint or a below-knee plaster boot, tailored to the soft-tissue condition. Surgical management comprised open reduction and internal fixation with K-wire pinning, primary arthrodesis when indicated, or primary amputation for non-salvageable injuries. Time to management and complications were recorded.

Outcomes and statistical analysis

Assessment used the American Orthopaedic Foot and Ankle Society (AOFAS) score and a visual analogue scale (VAS); a four-level satisfaction scale captured subjective outcomes Patient satisfaction was categorized as Excellent (total satisfaction), Good (satisfied), Fair (measurable benefit), or Poor (no perceived benefit). Outcomes were assessed with the AOFAS midfoot score according to the original description by Kitaoka *et al.* [13]. Quantitative variables (age, time to definitive management, and length of hospital stay) are reported as mean with range (minimum-maximum). We used descriptive statistics only (counts, percentages, means with ranges) without hypothesis testing given the sample size.

Results

Demographics

Twenty-seven patients were included (21 men and 6 women; sex ratio 3.5). The mean age was 32 years (range, 23-46 years). The injuries were located on the left side in fourteen patients and on the right side in thirteen. The circumstances leading to Lisfranc fracture-dislocations were road traffic accidents in twenty-four cases and work-related accidents in three. Among the twenty-four road traffic accidents, twenty-two patients were motorcycle riders and two were pedestrians. Four cases of polytrauma were identified.

Injury patterns

Open injuries were recorded in twenty-four patients (88.9%), (Figure 1), and fracture-dislocations in twenty-two (81.5%). The distribution by Myerson classification indicated a predominance of homolateral or translational patterns, with A in twelve patients (44.4%) (Figure 2), B1 in six (22.2%), B2 in six (22.2%), and C2 in three (11.1%). Lisfranc fracture-dislocations were predominant, most commonly involving the base of the second metatarsal (N=11) and the bases of the first or third metatarsals (N=7 each). The high incidence of concomitant cuboid, cuneiform, and even systemic injuries underscores the severe, high-energy trauma mechanism in these cases, with several patients presenting in a polytraumatized state.

Management pathway and timing

Seventeen patients were managed surgically and ten with orthopaedic treatment. Surgical management was notable for five amputations (three primary and two secondary), all related to severe open type IIIC injuries complicated by gangrene. Open reduction and K-wire fixation was the most frequently used surgical technique (thirteen cases), (Figure 3). Five patients who initially received orthopaedic treatment subsequently underwent secondary screw arthrodesis. The average time to management was 36 hours (range, 6-96 hours). The mean hospital stay was 16.22 days (range, 4-38 days).

Complications

None of the patients who underwent orthopaedic treatment developed complications while in a plaster cast. Secondary postoperative complications included suppuration in seven cases and skin necrosis in two. The skin necrosis cases required coverage with sural flaps at 15 and 22 days post-trauma, respectively. Guided wound healing was implemented for all seven cases of suppuration, with vacuum-assisted closure therapy used in three.

Late complications were represented by midfoot osteoarthritis in 4 cases (Figure 4), with chronic instability in one of the osteoarthritic patients, and complex regional pain syndrome in one case.

Long-term outcomes

Patients were followed up with a mean follow-up period of 133 months (96-168). A total of seventeen patients were evaluated (four women and thirteen men). The pain assessment on the visual analog scale was on average 3.11 with extremes of 0 and 6.

The mean AOFAS score was 69.64. Surgically treated patients (N=12) had a higher mean score (72.91, range: 48-100) compared to those managed orthopaedically (N=5, mean: 62.2, range: 52-78). Of the 17 patients evaluated for subjective functional outcomes, the majority (47%) reported good to excellent results, while 41% reported fair outcomes and 12% reported poor outcomes.

Subsequent procedures: Five patients who were initially managed orthopaedically eventually underwent secondary screw arthrodesis because of persistent pain, instability, or post-traumatic degenerative changes.

Discussion

Lisfranc dislocations and fracture-dislocations are uncommon and often missed at first assessment, which delays treatment and leaves functional deficits. Large institutional series report an incidence around 0.2% of all fractures and high rates of initial misdiagnosis; our experience is similar [14].

In our cohort, high-energy road-traffic trauma predominated, producing severe soft-tissue damage and multi-fragmentary comminution. These features are associated with poorer function when intra-articular fracture lines are present [15]. Milder closed injuries are more often under-diagnosed and less likely to enter surgical inpatient care, which skewed our case mix toward open, complex lesions and explains a few unavoidable amputations [14].

Because nearly 90% of injuries were open, early management focused on debridement, contamination control, and temporary stabilization with minimal deep hardware. Percutaneous or limited-open K-wire fixation met these constraints while allowing reduction. In this setting, reduction quality likely influenced outcomes more than implant selection [16].

Practical factors: limited implant availability, variable fluoroscopy access, and out-of-pocket costs, also guided indications. Some patients therefore started with plaster immobilization under close monitoring, with conversion to fusion only if painful instability developed. Half of the initially non-operative patients ultimately required secondary screw arthrodesis for persistent pain or instability, consistent with latent midfoot instability and post-traumatic degeneration. Meta-analyses report fewer reoperations and better near to mid-term function after primary arthrodesis than after rigid screw open reduction and internal fixation (ORIF) in selected acute injuries [15, 16].

For complex fracture-dislocations, dorsal bridge plating can provide stable reduction and has reported mean mid-term AOFAS scores around 72.6; intra-articular fractures predict poorer results in those cohorts [17]. In purely ligamentous injuries, flexible fixation (e.g., suture-button) shows high patient-reported outcomes, earlier return to activity, and lower hardware removal/arthritis than rigid ORIF, with results that may approach those of primary arthrodesis in selected cases, although most studies are level III-IV [16, 18]. Where soft tissues and resources allow, pattern-specific rigid constructs or primary arthrodesis for clearly unstable injuries may limit late collapse compared with simple K-wire frames.

Our mean AOFAS score was 69.6, slightly below the mid-term outcomes reported for dorsal bridge plating series [17]. This lower overall score can be attributed to the large proportion of patients managed non-operatively or with simple K-wire stabilization. In contrast, the surgically treated group achieved a mean AOFAS of 72.91, similar to the results described for rigid fixation techniques (about 72-73) [17]. Comparative syntheses favor primary arthrodesis over rigid screw ORIF for both function and reoperation in acute cases [15]. Findings from ligamentous cohorts treated with flexible fixation are less directly comparable to our fracture-dislocation-predominant population but remain useful for pattern-based decisions [18].

Symptomatic post-traumatic osteoarthritis occurred in 4/27 patients (14.8%). This rate lies within ranges after rigid-screw ORIF (13-17%) and above rates after primary arthrodesis (0-3%) or flexible fixation in purely ligamentous injuries [15, 16, 18]. The high proportion of open, intra-articular injuries, phases of non-operative or K-wire stabilization, and repeated debridements likely contributed to alignment challenges and long-term pain. When feasible, anatomic, pattern-specific reduction under reliable imaging and standardized follow-up (weight-bearing radiographs; targeted CT for persistent pain) facilitates early detection of evolving instability [14-17].

Strengths include 8-14-year follow-up, consecutive enrollment, and detailed reporting of open-injury grades in a resource-limited setting. Limitations are the single-center design, small subgroups, selection toward severe open fracture-dislocations, and the absence of adjusted comparative analyses.

Future work should be a prospective multicenter comparison stratified by injury pattern (dislocation vs fracture-dislocation) and index strategy (non-operative, K-wire ORIF, screw/plate ORIF, primary arthrodesis, flexible fixation), with a prespecified primary outcome and 5-10-year patient-reported measures, including cost-effectiveness.

Table 1: Lesion patterns and severity (Myerson)

Type	N (%)
A	12 (44.4)
B1	6 (22.2)
B2	6 (22.2)
C2	3 (11.1)
Open injuries	24 (88.9)
Fracture-dislocations	22 (81.5)

Table 2: Open fracture severity (Gustilo-Anderson)

Gustilo-Anderson grade	N (%)
I	2(8.33)
II	11(45.83)
IIIA	5 (20.83)
IIIB	2 (8.33)
IIIC	4 (16.67)
Total open injuries	24 (100)

Table 3: Management type

Item	N (%) / Value
ORIF with K-wire pinning	13 (48.1%)
Orthopaedic treatment at index	10 (37.0%)
Posterior plaster splint	7
Below-knee plaster boot	3
Primary amputation	3 (11.1%)
Primary arthrodesis	1 (3.7%)
Secondary screw arthrodesis (after orthopaedics)	5/10 (50.0%)

Table 4: Complications

Complications	N (%)
Secondary postoperative infections	7 (25.92)
Midfoot osteoarthritis	4 (14.81)
Chronic instability with midfoot collapse	1 (3.7)
Complex Regional Pain Syndrome	1(3.7)

Fig 1: Image of a Gustilo type II open injury.

Fig 2: Radiographic image of a Myerson type A Lisfranc dislocation

Fig 3: Postoperative radiographic image after pinning.

Fig 4: Radiographic image of midfoot osteoarthritis in a female patient who received orthopedic treatment.

Conclusion

In this series dominated by high-energy open fracture-dislocations, management prioritized soft-tissue care and K-wire stabilization. Long-term function was moderate, and secondary procedures were common after initial non-operative care. Larger prospective studies comparing non-operative treatment, K-wire ORIF, rigid fixation, primary arthrodesis, and flexible fixation are needed to guide selection in similar settings.

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Conflict of Interest

None declared

Ethical Approval

This study was conducted in accordance with ethical principles and received approval from the Ethics Committee of the Sylvanus Olympio University Hospital Center, with written informed consent obtained from all participants and data confidentiality ensured.

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