

Limb Fracture Care in Patients Living with Severe Mental Illness: A Two-Year Retrospective Analysis of 22 Consecutive Cases

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Abstract

Original Research Article

Background: Severe mental illness carries a documented excess of skeletal trauma, driven by behavioural risk-taking, self-harm, psychotropic effects on bone, and heavy psychoactive substance exposure. Whether that excess persists into the surgical outcome, and how it should reshape fracture strategy, remains poorly quantified outside high-income registries. **Objective:** To characterise the injury profile, hospital trajectory and operative results of limb fractures occurring in patients with a documented psychotic, bipolar or major depressive disorder, and to derive a practical management framework. **Materials and Methods:** Twenty-two consecutive patients older than 15 years, admitted over a two-year period to a single academic trauma unit in Marrakech with a limb fracture and an established psychiatric diagnosis, were reviewed retrospectively. Records lacking follow-up or complete documentation were excluded, as were anxiety, neurodevelopmental, eating and post-traumatic stress disorders. Demographic, toxicological, injury, treatment and complication variables were abstracted. **Results:** Mean age was 35 years, with 18 men and 4 women (male-to-female ratio 4.5). Dissociative psychosis predominated (16/22; 72.7%), ahead of bipolar disorder (4/22; 18.2%) and major depression with self-harm (2/22; 9.1%). Sixteen patients (72.7%) were not taking their prescribed psychotropic regimen and six (27.3%) were homeless. Tobacco (90.9%), cannabis (86.4%) and other substances (63.6%) were near-universal. Road traffic collisions caused 13 injuries (59.1%). The lower limb was affected in 13 cases (59.1%). Nineteen patients (86.4%) underwent surgery. Behavioural disturbance (86.4%), withdrawal states (86.4%) and antipsychotic refusal (54.5%) complicated the admission. Fixation-related failure occurred in 5 of 19 operated patients (26.3%), early surgical site sepsis in 4 (21.1%) and tibial nonunion in 3 (15.8%), one of which culminated in above-knee amputation (5.3%). **Conclusion:** Complication rates in this cohort exceeded general-population benchmarks several-fold. Non-operative treatment whenever mechanically acceptable, deferral of elective fixation until psychiatric stabilisation, injectable long-acting antipsychotic cover and a formalised ortho-psychiatric pathway are proposed as the core of care.

Keywords: Limb fracture; Severe mental illness; Schizophrenia; Substance use; Surgical site infection; Nonunion; Multidisciplinary care; Homelessness.

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INTRODUCTION

A mental disorder is defined by clinically meaningful disruption of cognition, affect regulation or behaviour, ordinarily accompanied by subjective distress or impaired functioning across domains that matter to the individual. The category spans psychosocial disability and conditions associated with self-directed harm; the diagnostic vocabulary applied throughout this report follows the eleventh revision of the International Classification of Diseases [1].

The scale of the problem is substantial. Global estimates place roughly one person in eight — on the order of 970 million individuals in 2019 — as living with a mental disorder, a figure that has drifted upward since

the COVID-19 pandemic. Depressive conditions account for close to 280 million of these, bipolar disorder for approximately 40 million and schizophrenia for some 24 million [2].

Against that background, an epidemiological signal has been consistently reported: people with severe mental illness break bones more often than the general population. Pooling eight studies covering 48,384 individuals with schizophrenia against nearly four million comparators, Stubbs and colleagues calculated 5.54 fractures per 1,000 person-years versus 3.48 among controls, an incidence rate ratio of 1.72 (95% CI 1.24–2.39) [3]. National longitudinal data have since reinforced the finding at specific anatomical sites [4,5].

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Several mechanisms converge. Antipsychotic and antidepressant exposure lowers bone mineral density, first-generation agents doing so partly through prolactin elevation and secondary hypogonadism [6,7]. Sustained smoking, alcohol intake, physical deconditioning and undernutrition compound the skeletal deficit. Behaviourally, dissociative episodes, impaired hazard appraisal, self-harm and acute intoxication all raise exposure to high-energy trauma. Nociception itself may be blunted, particularly in schizophrenia, so that a fracture presents late or a compartment syndrome escapes recognition [8].

What follows the injury is at least as problematic as the injury itself. Orthopaedic teams caring for these patients contend with refusal of care, aggression, unsanctioned weight bearing, implant disruption, withdrawal states and a complication burden that departs sharply from the figures quoted to a general trauma population. Yet the operative literature on this group remains thin, dominated by administrative-database studies of elderly hip fracture, and offers little to a surgeon facing a young, agitated, polysubstance-exposed patient with an open tibia at three in the morning.

The present study was undertaken to fill part of that gap. Our objectives were to describe the demographic, psychiatric, toxicological and injury profile of limb fractures occurring in patients with severe mental illness treated at a Moroccan tertiary trauma centre; to quantify the in-hospital and postoperative complication burden; and to translate those observations into an explicit, transferable management strategy.

MATERIALS AND METHODS

Study design and setting

We performed a retrospective, descriptive, single-centre study at the Orthopedic and Trauma Surgery Department A of Mohammed VI University Hospital, Marrakech, Morocco, a tertiary referral unit serving the Marrakech-Safi region. The study window covered two consecutive years (from January 2024 to January 2026), during which 22 consecutive eligible patients were identified.

Eligibility criteria

Patients were eligible when they satisfied both of the following on admission: an upper limb fracture, a lower limb fracture, or both; and a psychiatric diagnosis documented before the injury, restricted to psychotic disorder (dissociative psychosis), bipolar affective disorder, or major depressive episode. A minimum age of 15 years was required.

Exclusion applied to patients lost to follow-up, to records with insufficient clinical or radiographic documentation, and to psychiatric diagnoses outside the three categories above — specifically isolated anxiety disorders, disruptive or dissociative behaviour disorders,

neurodevelopmental disorders, eating disorders and post-traumatic stress disorder. This restriction was deliberate: the three retained categories share a pattern of impaired insight and treatment adherence that is directly relevant to fracture management, whereas the excluded categories do not.

Data collection and variables

Variables were abstracted from hospital charts, operative notes and the radiology archive by two investigators. The dataset comprised age and sex; psychiatric diagnosis, current pharmacological regimen and adherence status; housing situation and availability of an identifiable next of kin; tobacco, cannabis and other psychoactive substance exposure; injury mechanism; fracture site, pattern and, where open, Cauchoi-Duparc grade; treatment allocation (non-operative versus operative) and the fixation construct used; documented behavioural events during admission; and short- to mid-term outcome, including implant-related failure, surgical site infection, nonunion, malunion and amputation.

Adherence was classified as poor when the chart documented interrupted or absent intake of the prescribed psychotropic regimen at the time of injury. Homelessness was recorded when the patient was brought to the emergency department without an identifiable relative, with no traceable psychiatric follow-up and no fixed address.

Statistical analysis

Given the sample size and descriptive intent, analysis was limited to counts, percentages and means. Percentages relating to postoperative events are expressed over the 19 operated patients; all other percentages use the full cohort of 22 as denominator. No inferential testing was performed and no comparison group was assembled.

Ethics

The study was conducted in accordance with the Declaration of Helsinki. Institutional approval was obtained [reference number], and the retrospective, anonymised design was reviewed accordingly. Consent for the use of anonymised clinical images was obtained from patients or, where capacity was impaired, from their legal representative.

RESULTS

Demographic and psychiatric profile

The 22 patients had a mean age of 35 years. Men accounted for 18 cases (81.8%) and women for 4 (18.2%), a male-to-female ratio of 4.5.

Dissociative psychosis was the dominant diagnosis, present in 16 patients (72.7%). Bipolar affective disorder accounted for 4 cases (18.2%) and major depressive episode complicated by a suicide attempt for the remaining 2 (9.1%).

Adherence to psychotropic treatment was poor in 16 patients (72.7%). Within that subgroup, 6 patients — 27.3% of the whole series — were homeless, brought to the emergency department by neighbours or passers-

by, with neither a documented psychiatric follow-up nor a traceable relative. This subgroup posed the greatest difficulty in obtaining history, consent and post-discharge continuity.

Table 1: Demographic, psychiatric and social profile (n = 22)

Variable	n	%
Mean age (years)	35	—
Male	18	81.8
Female	4	18.2
Male-to-female ratio	4.5	—
Dissociative psychosis	16	72.7
Bipolar affective disorder	4	18.2
Major depression with suicide attempt	2	9.1
Poor psychotropic treatment adherence	16	72.7
Homeless, no identifiable relative	6	27.3

Substance exposure and injury mechanism

Psychoactive substance exposure was close to universal and frequently combined. Chronic tobacco use was documented in 20 patients (90.9%), cannabis in 19 (86.4%) and at least one further psychoactive substance in 14 (63.6%). Polysubstance patterns were the rule rather than the exception.

Road traffic collisions were the leading mechanism, causing 13 injuries (59.1%). Falls from height accounted for 5 cases (22.7%), two of which occurred in an explicit self-harm context. In the remaining 4 patients (18.2%) the mechanism could not be established, the clinical state on arrival precluding any usable account of the event.

Table 2: Substance exposure and injury mechanism (n = 22)

Variable	n	%
Substance exposure		
Chronic tobacco use	20	90.9
Cannabis use	19	86.4
Other psychoactive substances	14	63.6
Mechanism of injury		
Road traffic collision	13	59.1
Fall from height	5	22.7
— of which self-harm context	2	9.1
Undocumented mechanism	4	18.2

Fracture pattern and distribution

The lower limb was involved in 13 patients (59.1%), the upper limb in 7 (31.8%), and 2 patients (9.1%) sustained multifocal injuries meeting polytrauma criteria.

Open tibial fractures dominated the lower limb group, with 6 Cauchoix-Duparc grade I and 2 grade II injuries. The remaining lower limb injuries comprised 2

bimalleolar fractures, 2 closed femoral fractures and one fracture of the fifth metatarsal base. Upper limb injuries consisted of 3 both-bone forearm fractures, 2 metacarpal fractures involving the fourth and fifth rays, one wrist fracture and one humeral fracture. The two polytrauma patients presented, respectively, with a combination of petrochanteric, distal humeral condylar and calcaneal fractures, and with a tibial pilon fracture associated with a metatarsal fracture and a contralateral ulnar fracture.



Figure 1: Anteroposterior and lateral radiographs of an open tibial shaft fracture, Cauchoix-Duparc grade I, in a patient with psychosis at emergency presentation



Figure 2: Soft-tissue status at admission — a small, minimally contused wound overlying the fracture focus of a Cauchoux-Duparc grade I open tibial fracture

Table 3: Anatomical distribution of fractures (n = 22)

Region	Fracture pattern	n
Lower limb (13)	Open tibia, Cauchoux-Duparc grade I	6
	Open tibia, grade II	2
	Bimalleolar	2
	Closed femoral shaft	2
	Fifth metatarsal base	1
Upper limb (7)	Both-bone forearm	3
	Metacarpal (M4 / M5)	2
	Wrist	1
	Humerus	1
Polytrauma (2)	Pertrochanteric + humeral condyle + calcaneus	1
	Tibial pilon + metatarsal + contralateral ulna	1

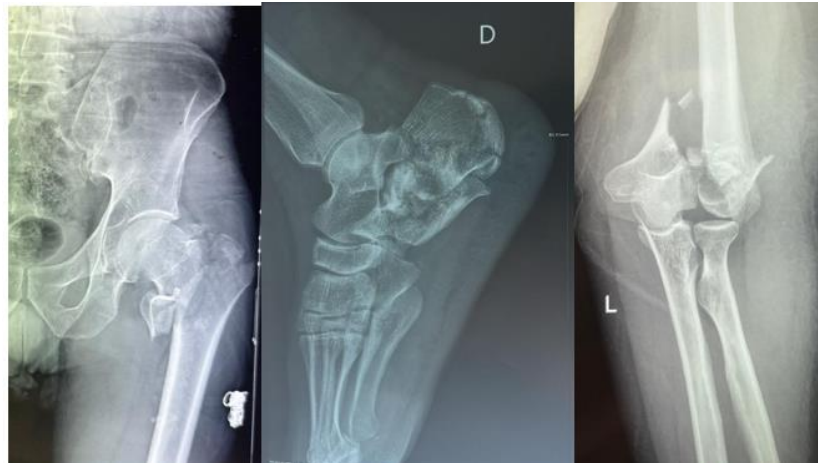


Figure 3: Radiographic assessment of a polytrauma patient showing concurrent pertrochanteric, distal humeral and calcaneal fractures

Hospital course

Difficulty in the therapeutic relationship was near-constant. Behavioural disturbance, most often aggression directed at nursing and medical staff, was recorded in 19 patients (86.4%). Twelve patients (54.5%) refused their antipsychotic medication at some point during the admission.

A withdrawal syndrome attributable to tobacco, cannabis or both developed in 19 patients (86.4%). These episodes were frequently severe and hard to control on a

ward with no substitution protocol; one patient progressed to confirmed delirium tremens.

Eleven patients (50.0% of the series) with a lower limb injury attempted to bear weight on the fractured limb before it was permitted, and physical restraint was required to prevent it. Every patient in the series was assessed by a psychiatrist during the admission, with the psychotropic regimen adjusted as the clinical picture evolved.

Table 4: Behavioural and psychiatric events during admission (n = 22)

Event	n	%
Behavioural disturbance / aggression toward staff	19	86.4
Tobacco and/or cannabis withdrawal syndrome	19	86.4
— of which delirium tremens	1	4.5
Refusal of antipsychotic medication	12	54.5
Unsanctioned weight bearing requiring restraint	11	50.0
Inpatient psychiatric assessment	22	100

Treatment allocation

Non-operative management was chosen for 3 patients (13.6%), in each case because psychiatric instability made the perioperative and postoperative period untenable rather than because the fracture pattern

was ideally suited to closed treatment. The remaining 19 patients (86.4%) underwent surgery: open or closed reduction with plate fixation, intramedullary nailing or external fixation, selected according to fracture configuration and soft-tissue condition.

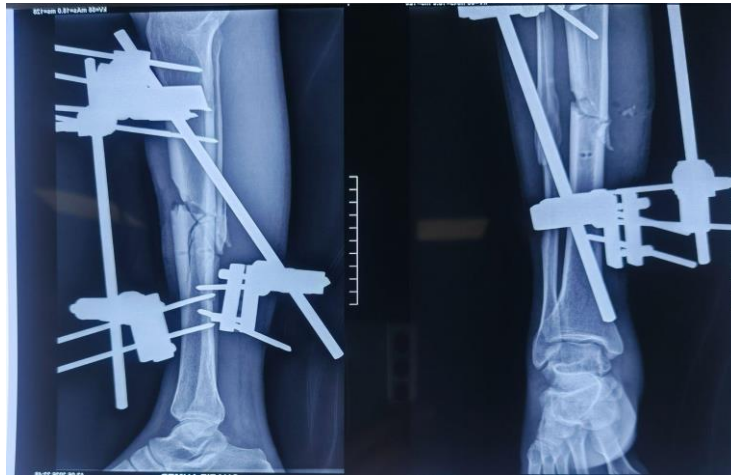


Figure 4: Postoperative radiograph following external fixation of a Cauchoix-Duparc grade II open tibial fracture

Outcomes and complications

The postoperative period was punctuated by events directly attributable to the psychiatric condition rather than to any technical shortcoming. In the immediate postoperative phase one patient extracted the

plate from the lateral malleolus, three dismantled their external fixators and a fourth removed the frame in its entirety. Each of these five episodes (5/19; 26.3%) required physical restraint, revision of the construct and urgent recalibration of the psychotropic regimen.



Figure 5: Follow-up radiograph of a humeral shaft fracture in a patient with severe mental illness, showing secondary implant failure from inappropriate mechanical loading — agitation and non-observance of postoperative immobilisation — with major secondary displacement.

Early surgical site sepsis developed in 4 operated patients (21.1%), all of whom returned to theatre for débridement and lavage.



Figure 6: Clinical appearance of early surgical site infection — purulent discharge, wound dehiscence and local inflammatory changes

Three patients (3/19; 15.8%) went on to tibial nonunion. Two were aseptic and were managed subsequently by decortication and cancellous bone grafting. The third was septic, with established pndiaphysitis; it required knee disarticulation, and after

the stump became reinfected, conversion to above-knee amputation — a single limb loss representing 5.3% of the operated group. One further patient developed a metatarsal malunion.



Figure 7: Radiograph of septic tibial nonunion with pndiaphysitis, subsequently requiring above-knee amputation



Figure 8: Above-knee amputation stump following revision for stump reinfection — skin appearance and quality of healing

Table 5: Treatment allocation and postoperative complications

Variable	n / N	%
Non-operative treatment	3 / 22	13.6
Operative treatment	19 / 22	86.4
Implant-related failure (patient-induced or mechanical)	5 / 19	26.3
Early surgical site sepsis requiring re-operation	4 / 19	21.1
Tibial nonunion (all types)	3 / 19	15.8
— aseptic, treated by decortication and grafting	2 / 19	10.5
— septic with pandiaphysitis	1 / 19	5.3
Secondary above-knee amputation	1 / 19	5.3
Metatarsal malunion	1 / 19	5.3

Table 6: Overall summary of the series (n = 22)

Parameter	Value
Number of patients	22
Study duration	2 years
Mean age	35 years
Sex distribution	18 M / 4 F (ratio 4.5)
Dominant psychiatric diagnosis	Dissociative psychosis (72.7%)
Poor treatment adherence	72.7%
Homelessness	27.3%
Tobacco / cannabis exposure	90.9% / 86.4%
Leading mechanism	Road traffic collision (59.1%)
Dominant site	Lower limb (59.1%)
Surgical treatment rate	86.4%
Implant-related failure	26.3% of operated
Early sepsis	21.1% of operated
Nonunion	15.8% of operated
Limb loss	5.3% of operated

DISCUSSION

A population at compounded risk

The vulnerability of this group to skeletal trauma arises from several mechanisms acting together: behavioural risk-taking, dissociative decompensation, deliberate self-harm, degraded hazard appraisal and both acute and chronic substance exposure. The quantitative anchor remains the comparative meta-analysis of Stubbs and colleagues, which pooled eight studies and more than 48,000 patients with schizophrenia to derive a fracture incidence of 5.54 per 1,000 person-years against 3.48 in controls, a relative risk of 1.72 (95% CI 1.24–2.39) [3].

Nationwide longitudinal data refine the picture by site. Chu and colleagues tracked 2,028 Taiwanese patients with schizophrenia across ten years and derived adjusted hazard ratios of 1.78 (95% CI 1.08–2.93) for hip fracture and 1.40 (95% CI 1.01–1.95) for vertebral fracture [4]. In a larger national cohort of 30,335 patients, the ten-year incidence of major osteoporotic fracture reached 5.53% against 3.51% in controls ($p < 0.001$), with post-fracture mortality substantially elevated (HR 1.92; 95% CI 1.63–2.26) [5].

Our cohort differs from these registry populations in a way that matters clinically. The mean age of 35 years and the predominance of road traffic

collisions place our patients in a high-energy, young-adult trauma profile rather than the low-energy fragility fracture pattern that dominates the published cohorts. The excess risk in our series therefore derives principally from behaviour and exposure, and only secondarily from bone quality — a distinction with direct consequences for prevention strategy.

Male predominance

The 81.8% male proportion in our series aligns with published observations. Hugenholtz and colleagues documented a higher fracture risk among men with schizophrenia, a pattern plausibly explained by earlier disease onset in men — by roughly five years — and hence a longer cumulative exposure to antipsychotic medication and its skeletal consequences [6]. In our setting an additional factor is likely operative: young men are over-represented among road users and among individuals living on the street, so the male skew reflects the interaction of illness with local patterns of exposure.

Tobacco, cannabis and polysubstance exposure

Ninety-one percent of our patients smoked and 86% used cannabis regularly, figures far above general Moroccan population estimates. Substance use in psychiatric illness typically serves two functions: attenuation of the anxiety generated by psychotic phenomena, and hedonic reward. Tolerance and dependence establish themselves rapidly.

Heavy cannabis exposure blunts antipsychotic efficacy and is a recognised contributor to treatment failure; alcohol, depending on the underlying disorder, deepens depressive states or amplifies aggression. Tobacco remains the leading driver of somatic morbidity and mortality in this population. Pharmacological cessation support — nicotine replacement, bupropion, varenicline — is effective here, does not aggravate psychotic symptoms, and secondarily improves antipsychotic adherence [9–11].

The orthopaedic implications are not incidental. In a meta-analysis of risk factors for nonunion after surgically managed diaphyseal fractures, Jensen and colleagues found smoking associated with an odds ratio of 1.7 (95% CI 1.2–2.4), open fracture with 2.6 (95% CI 1.8–3.9) and infection with 7.0 (95% CI 3.2–15.0) [12]. Our patients carried all three exposures simultaneously, in most cases against a background of unmanaged psychiatric illness. Viewed this way, the nonunion rate observed here is less an anomaly than an arithmetic consequence of stacked risk.

Withdrawal on an orthopaedic ward

Withdrawal was documented in 19 patients (86.4%) and is, in our experience, the single most disruptive event of the admission — particularly where no substitution protocol exists on a surgical ward. Confusional withdrawal states, delirium tremens above all, can carry psychotic features: oneiric delirium, profuse sweating and tremor. Management rests on benzodiazepine sedation, occasionally supplemented by barbiturates or propofol, alongside fluid and electrolyte correction and thiamine and pyridoxine supplementation. Longer-term prophylaxis and structured psychiatric follow-up are indispensable. We would argue that any trauma unit admitting this population needs a written withdrawal protocol agreed in advance with addiction medicine, rather than improvisation at the bedside.

Altered nociception and diagnostic delay

Quantifying pain is difficult in any setting and becomes markedly harder where relational functioning is impaired, as in schizophrenia. Multiple reports describe patients with schizophrenia sustaining fractures while reporting only trivial discomfort [13,14]. These patients seldom complain postoperatively, request few analgesics and rarely develop chronic pain [15]. The clinical hazard is not benign: hypoalgesia delays presentation and diagnosis, and can mask evolving complications, as in the compartment syndrome described by Murthy and colleagues [8]. The practical consequence for the receiving team is that absence of pain complaint carries no reassurance value in this population, and imaging thresholds should be lowered accordingly.

Bone mineral density and psychotropic exposure

Depression itself is associated with reduced bone mineral density and elevated fracture risk, through

both disease-intrinsic mechanisms and lifestyle [16]. Among antidepressants, only selective serotonin reuptake inhibitors have shown a documented reduction in bone mineral density, yet the whole class — tricyclics included — is linked to increased falls and peripheral fractures, the association being strongest for serotonin reuptake inhibitors and receding rapidly after discontinuation.

First-generation antipsychotics block dopaminergic receptors and raise prolactin, producing secondary hypogonadism. Second-generation agents act on dopaminergic and serotonergic systems and elevate prolactin to a degree that varies with dopamine receptor affinity. Under antipsychotic treatment, the loss of bone mineral density tracks the magnitude of hyperprolactinaemia, which argues for systematic screening for clinical markers of hypogonadism. Long-term antipsychotic exposure is likewise associated with falls and peripheral fracture, more markedly with first-generation agents, and the excess resolves after withdrawal [6,7]. Densitometric assessment and structured fall-risk evaluation are therefore justified in patients on prolonged treatment.

Postoperative complications: the magnitude of the excess

The complication rates recorded here — implant-related failure 26.3%, early sepsis 21.1%, nonunion 15.8% — sit far above the figures a general trauma population would be quoted. In a systematic review and meta-analysis of 111 studies and 41,429 patients, Tian and colleagues derived a pooled tibial nonunion prevalence of 6.8% [17]; deep infection after internal fixation is conventionally quoted below 1–2%. Our sepsis rate is roughly an order of magnitude higher and our nonunion rate more than double the pooled estimate.

The published literature supports the direction, if not always the magnitude, of this excess. Choi and Park reported that among severely injured patients (ISS ≥ 15), 39.2% carry a psychiatric history, and that depression triples the risk of postoperative complications including acute renal failure, multiple organ failure, sepsis, venous thromboembolism and pulmonary events [18]. Analysing an estimated 10,669,449 lower extremity fracture admissions in the National Hospital Discharge Survey, Menendez and colleagues found schizophrenia strongly associated with failure to discharge home (OR 5.6; 95% CI 5.5–5.8) and with a higher rate of in-hospital adverse events, although psychiatric comorbidity overall did not raise in-hospital mortality [19]. Gutierrez and colleagues, using propensity matching in a national arthroplasty database, likewise found higher rates of acute renal failure, blood-loss anaemia and pneumonia after total knee replacement in patients with schizophrenia, together with prolonged stay and greater cost [20].

The literature is not unanimous, and the discordance is instructive. Ng and colleagues, reporting 38 patients with schizophrenia against 170 controls within a structured geriatric-orthopaedic hip fracture pathway, found no excess of postoperative complications and comparable one-year mortality (5.7% versus 2.4%; $p = 0.29$); what differed was the functional and social trajectory, with institutionalisation in 26.3% versus 4.7% ($p < 0.001$) and a Modified Barthel Index of 76 against 90 at twelve months ($p = 0.006$) [21]. Ansari and colleagues, in an Ontario cohort of 98,126 surgically treated hip fractures of whom 3,700 had schizophrenia, identified an elevated subsequent fracture risk (sdRH 1.29; 95% CI 1.09–1.53), with men refracturing on average 50 days earlier [22].

Two readings of this discordance are worth stating. First, the populations differ: the reassuring series concern elderly, institutionally supervised, low-energy fracture patients managed on a formal care pathway, whereas ours comprises young men with open high-energy injuries, active substance use and, in a quarter of cases, no fixed address. Second — and this is the more useful inference — the Singaporean result suggests that a substantial part of the excess we observed is attributable to the care structure rather than to the diagnosis itself. Where continuous supervision, protocolised psychiatric input and a secured environment exist, the complication gap narrows. Where they do not, it widens. That is a modifiable finding, and it defines the direction of improvement for units such as ours.

Injuries sustained in a self-harm context

Two of the five falls from height in our series occurred in an explicit self-harm context, a mechanism that generates a characteristic and demanding injury pattern. In a series confined to displaced intra-articular calcaneal fractures following attempted suicide, Yorukoglu and colleagues concluded that operative treatment remains technically feasible but must be weighed against behavioural features capable of degrading the eventual functional result [23]. Duramaz and colleagues reached a comparable position for surgically treated spinal fractures in jumpers [24]. The common thread is that the decision hinges less on the fracture morphology than on the probability that the patient will observe a demanding postoperative regimen — which is precisely the variable that psychiatric stabilisation is intended to shift.

Timing of surgery

Fracture care in these patients is difficult chiefly because postoperative instructions are not followed, with infection and implant failure the recurring consequences. Trauma in a patient with severe mental illness frequently signals underlying decompensation; the patient arriving in the emergency department is often psychiatrically unstable and requires specialist assessment both to be stabilised and to have the decompensation properly characterised.

This creates a genuine dilemma. Immediate fixation secures the fracture but exposes an uncontrolled patient to the full range of construct-related disasters. Delay allows psychiatric stabilisation but accepts the costs of provisional management. Our position, formed by the outcomes reported here, is that non-operative treatment should be preferred whenever it is mechanically defensible, particularly in the least stable patients; and that where surgery cannot be avoided, it should follow psychiatric stabilisation and be preceded by an explicit multidisciplinary discussion. Open fractures and vascular compromise obviously override this sequencing, but they are a minority of presentations.

Refusal of treatment

Refusal is among the most frequent obstacles encountered. The oral route is often unworkable, which pushes practice toward intramuscular and subcutaneous administration. Long-acting injectable antipsychotics are particularly well suited to this context, since they sustain therapeutic coverage without depending on day-to-day cooperation — a decisive advantage in a patient who has just refused a morning dose and dismantled an external fixator.

Homelessness and the collapse of continuity

Homelessness affected 27.3% of our series and represents the point at which orthopaedic care most reliably fails. In the United States and the United Kingdom, between 20% and 25% of the homeless population lives with severe mental illness, against 4% to 5% in the general population. Kay and colleagues, comparing homeless and housed orthopaedic trauma patients, found significantly more emergency department attendances and significantly fewer orthopaedic clinic follow-up visits ($p < 0.001$); notably, the distribution of complication types did not differ significantly between groups ($p = 0.23$) [25]. The implication is pointed: what fails in these patients is not primarily biology but continuity of care. Effective management therefore requires cooperation with shelters, social housing and voluntary organisations, and the development of reception facilities staffed to handle both the psychiatric and the orthopaedic dimensions of the problem, with social reintegration as an explicit objective.

Toward an integrated ortho-psychiatric pathway

A satisfactory outcome — orthopaedic and psychiatric alike — depends on sustained cooperation between the two specialties, built on reciprocal commitment rather than ad hoc consultation. Training of nursing and allied staff through programmes led by psychiatrists is a durable investment. The optimal arrangement is probably admission to a setting configured for this population, in which psychiatrists prescribe and monitor throughout the perioperative period and formally authorise the operative step. Absent such a structure, care remains improvised, with the consequences documented above.

Table 7: The present series in the context of the international literature

Study (year)	Setting / design	Population	Principal findings
Stubbs <i>et al.</i> , (2015) [3]	Comparative meta-analysis, 8 studies	48,384 schizophrenia vs ~4 million controls	5.54 vs 3.48 fractures/1,000 person-years; IRR 1.72 (1.24–2.39)
Chu <i>et al.</i> , (2022) [4]	Taiwan, nationwide cohort, 10 years	2,028 schizophrenia	Hip aHR 1.78 (1.08–2.93); vertebral aHR 1.40 (1.01–1.95)
Tsai <i>et al.</i> , (2014) [5]	Taiwan, population-based, 10 years	30,335 schizophrenia	Major osteoporotic fracture 5.53% vs 3.51% ($p < 0.001$); post-fracture mortality HR 1.92 (1.63–2.26)
Menendez <i>et al.</i> , (2013) [19]	USA, National Hospital Discharge Survey	10,669,449 lower limb fracture admissions	Schizophrenia: non-home discharge OR 5.6 (5.5–5.8); more in-hospital adverse events; no excess in-hospital death
Ng <i>et al.</i> , (2021) [21]	Singapore, hip fracture registry	38 schizophrenia vs 170 controls	No excess complications; institutionalisation 26.3% vs 4.7% ($p < 0.001$); MBI 76 vs 90 at 12 months ($p = 0.006$)
Ansari <i>et al.</i> , (2024) [22]	Canada (Ontario), 10-year cohort	98,126 hip fractures, 3,700 with schizophrenia	Subsequent fracture sdRH 1.29 (1.09–1.53); earlier refracture in men
Gutierrez <i>et al.</i> , (2024) [20]	USA, propensity-matched national database	Total knee arthroplasty, schizophrenia	Higher acute renal failure, anaemia, pneumonia; longer stay; higher cost
Choi & Park (2022) [18]	Literature review	Severe trauma, ISS ≥ 15	39.2% with psychiatric history; depression triples postoperative complications
Kay <i>et al.</i> , (2014) [25]	USA, single centre	Homeless vs housed orthopaedic trauma	More ED attendances, fewer clinic follow-ups ($p < 0.001$); complication types not different ($p = 0.23$)
Tian <i>et al.</i> , (2020) [17]	Meta-analysis, 111 studies	41,429 tibial fractures, general population	Pooled nonunion prevalence 6.8%
Jensen <i>et al.</i> , (2022) [12]	Meta-analysis, 30 studies	38,465 diaphyseal fractures	Nonunion: smoking OR 1.7; open fracture OR 2.6; infection OR 7.0
Present series (2026)	Morocco, single centre, 2 years	22 limb fractures with severe mental illness	Implant failure 26.3%; early sepsis 21.1%; nonunion 15.8%; amputation 5.3% (of 19 operated)

Limitations

Several constraints qualify these findings. The series is small, retrospective and drawn from a single centre, without a matched control group, so the complication rates cannot be formally attributed to psychiatric illness rather than to the injury profile or the care environment. Follow-up duration was not standardized, and no validated functional score was applied, which prevents any statement about the functional and social outcome — precisely the domain in which the published literature identifies the clearest disadvantage. Psychiatric diagnoses were taken from existing records rather than reassessed prospectively, and substance exposure was documented by declaration and chart review rather than by toxicological assay. Finally, the exclusion of patients lost to follow-up almost certainly removed the most socially precarious individuals from the analysis, which would tend to understate rather than exaggerate the burden described.

CONCLUSION

Trauma in patients with severe mental illness is a common reason for emergency admission and its frequency is set to rise as the global prevalence of mental disorders increases. In this series of 22 limb fractures,

complication rates after surgery exceeded general-population benchmarks by a wide margin — implant failure in more than a quarter of operated patients, early sepsis in a fifth, nonunion in one in six and limb loss in one — and the drivers were behavioural and social rather than technical.

Management must be multidisciplinary from the moment of admission, involving psychiatrists, orthopaedic surgeons, anaesthetists, physiotherapists, specialist nurses, social workers and reception facilities. Close supervision during the stay and after discharge requires staff trained specifically for this population. Where relatives are present and willing, their involvement should be sought systematically to support rehabilitation and social reintegration.

Two operational conclusions follow from our data. First, non-operative treatment deserves greater weight than it is usually given in this population, and elective fixation should follow rather than precede psychiatric stabilisation. Second, the international evidence indicating that a structured care pathway can abolish the complication excess suggests that the results reported here are not an inevitable consequence of psychiatric illness, but a measurable deficit of care

organisation — and therefore correctable. Integrated ortho-psychiatric pathways, formalised in written protocol and supported by adequate social infrastructure, represent the most promising route to improving outcomes in a population that health systems continue to overlook.

DECLARATIONS

Ethics approval and consent to participate:

The study was conducted in accordance with the ethical standards of the Declaration of Helsinki. Institutional review board approval was obtained from [name of committee, reference number]. Given the retrospective and anonymised design, the requirement for individual written informed consent for chart review was waived. Consent for publication of anonymised clinical images was obtained from patients or their legal representatives.

Consent for publication: Obtained for all clinical images reproduced in this article.

Availability of data and materials: The anonymised dataset supporting the conclusions of this article is available from the corresponding author on reasonable request.

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Author contributions:

M.H. conceived the study, collected and analysed the data and drafted the manuscript. R.E.B. contributed to data collection and to the literature review. M.E., M.N. and A.A. contributed to patient management and critically revised the manuscript. R.C. supervised the work and approved the final version. All authors read and approved the submitted manuscript.

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