

## LETTER TO THE EDITOR

# Strategies to Reduce Missed Fracture Diagnoses: Insights from Medical Malpractice Cases in China

## Dear Editor

Orthopedic malpractice claims in China often involve missed diagnoses of fractures, especially in trauma cases. This negligence can significantly harm patients.<sup>1</sup> Diagnostic inaccuracies may also damage the reputation of healthcare entities and professionals, and cause considerable economic losses.

We conducted a review of judicial decisions on fracture omissions in the "China Judgment Document Site (<https://wenshu.court.gov.cn/>)" from January 1, 2021, to June 30, 2023. Using the terms "fracture," "omission," "misdiagnosis," and "soft tissue injury" as search keywords, we identified 52 instances where fractures were erroneously diagnosed as soft tissue injuries. The judgments for these cases were downloaded and analyzed to ascertain the facts and assess the misdiagnoses from a clinical perspective. Among the 52 patients, 34 were male and 18 female, with an average age of  $52.7 \pm 8.4$  years. Post-treatment, each patient suffered poor outcomes, such as malunion and joint dysfunction. The top three missed fracture sites were femoral neck (35.4%), foot and ankle (16.7%), lumbar spine (14.6%) [Table 1]. Of these 52 cases, 41 cases (85.4%) were non-displaced fractures.

**Table 1. Cases of Missed Fracture Diagnoses**

Location of the fracture	n	%
Femoral neck	17	(35.4%)
Foot and ankle	8	(16.7%)
Lumbar spine	7	(14.6%)
Tibiofibular	6	(12.5%)
Hand	6	(12.5%)
Acetabulum	4	(8.3%)
Other	4	(8.3%)

The study delineated injury mechanisms as follows: traffic accidents (46.2%, 24 cases), physical confrontations and

assaults (17.3%, 9 cases), and falls (13.5%, 7 cases). 12 cases (23.1%) were not elaborated upon. The mean interval from injury to fracture diagnosis was 2.6 months (SD = 1.7, range 0.1-7 months). For fracture detection, CT scans were utilized in 32.7% of cases (17 cases), MRI in 23.1% (12 cases), and radiography in 21.1% (11 cases), with 23.1% (12 cases) not specified. Initial assessments were conducted mainly by emergency medicine specialists (51.9%, 27 cases) and other medical professionals such as orthopedists (48.1%, 25 cases). Pertaining to legal disputes, in 63.5% of cases (33 cases), the judgments explicitly stated that the physicians did not meet their responsibilities for adequate disclosure and duty of care.

As Thomas Rüedi (AO Foundation founder) has pointed out, "A fracture first and foremost is a soft-tissue injury",<sup>2</sup> reflecting the intricate relationship between the two entities. Clinically, occult fractures accompanying soft-tissue injuries are common, especially in the spine, femoral neck, carpal, and tarsal bones. Such fractures are susceptible to being underdiagnosed or erroneously classified as mere soft-tissue injuries. Occult fractures are frequently identified via CT or MRI upon the patient's subsequent clinic visit or may only be revealed in conventional X-rays when instability of the fracture induces bone resorption.<sup>3</sup>

To mitigate the risk of fracture underdiagnosis, physicians are advised to implement the following strategies:

1. Thoroughly assess the patient's demographics, evaluate the injury's mechanism, the intensity of the trauma, and conduct a meticulous physical examination to ensure no significant pain is dismissed. Perform radiographic evaluations using dual views, covering both proximal and distal joints, with comparative views of both sides in children when in doubt, and apply CT or MRI when indicated;
2. In cases where a fracture cannot be confidently excluded, recommend immobilization of the affected region to prevent further injury, ensuring patient safety despite potential diagnostic uncertainty;
3. Emphasize the importance of follow-up visits, particularly for pediatric patients, to promptly detect any changes in their condition and facilitate timely progression to the next

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diagnostic steps.

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