

Bilateral Non-Displaced Clavicle Fractures: A Very Rare Case Report

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Learning Point of the Article:

Bilateral clavicle fractures are rare injuries and conservative treatment is considered to facilitate early mobilization and optimize functional outcomes.

Abstract

Introduction: Bilateral clavicle fractures are rare injuries, particularly when both fractures are non-displaced, accounting for less than 0.5% of all clavicle fractures. These injuries are typically associated with high-energy trauma, such as road traffic accidents or falls from height. Diagnosis may be challenging, as plain radiographs can miss subtle or non-displaced fractures, necessitating advanced imaging, such as computed tomography (CT) for accurate detection.

Case Report: We report the case of a 21-year-old male who sustained bilateral non-displaced midshaft clavicle fractures following a high-speed road traffic accident. Initial radiographs were inconclusive despite persistent clinical suspicion. CT imaging subsequently confirmed bilateral fractures involving the middle third of the clavicles. The patient was managed conservatively with bilateral arm slings, analgesia, and activity restriction. At 12-week follow-up, radiographs demonstrated satisfactory fracture union with callus formation. The patient achieved full, pain-free range of motion, including forward flexion (0–180°), abduction (0–180°), and external rotation (0–90°), without complications. This case highlights an important diagnostic pitfall and underscores the role of CT imaging in patients with suspected clavicle fractures and negative radiographs. It also reinforces the effectiveness of conservative management in non-displaced bilateral clavicle fractures, which can result in excellent functional outcomes.

Conclusion: Non-displaced bilateral midshaft clavicle fractures are exceptionally rare injuries that may be easily overlooked, particularly in the setting of high-energy trauma, where initial radiographs can be inconclusive. This case highlights a critical diagnostic pitfall, emphasizing that persistent clinical suspicion should prompt advanced imaging, such as CT, to ensure accurate and timely diagnosis.

Categories: Radiology, Trauma, Orthopedics, hand surgery, fracture, clavicle radiology

Keywords: Bilateral clavicle fracture, computed tomography, midshaft clavicle fracture, non-displaced fracture, trauma.

Introduction

Clavicle fractures are among the most common orthopedic injuries, accounting for approximately 2.6–5% of all fractures and up to 35–45% of injuries involving the shoulder girdle [1,2]. The majority occur in the middle third of the clavicle (69–82%), due

to its biomechanical vulnerability and lack of strong ligamentous support [3,4].

Bilateral clavicle fractures are rare, representing <0.5% of all clavicle fractures, and are usually associated with high-energy trauma, such as road traffic accidents, falls from height, or direct

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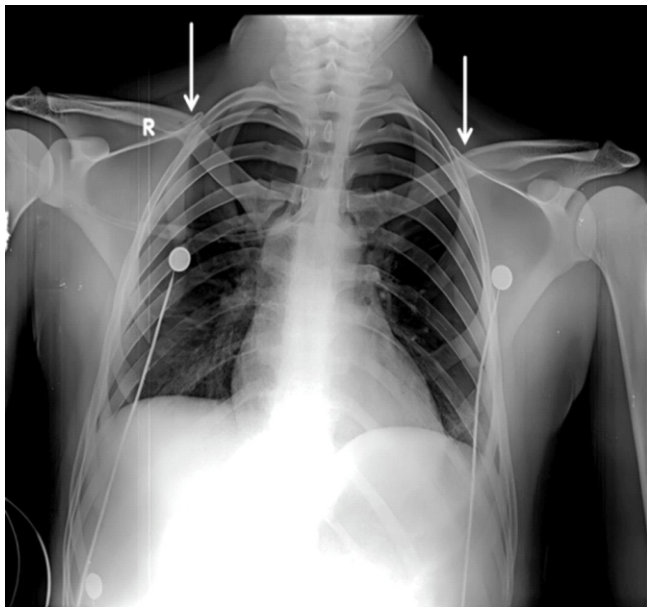


Figure 1: Initial anteroposterior radiograph of both clavicles showing no obvious fracture lines. Findings were inconclusive.

bilateral shoulder impact [2,5]. Non-displaced bilateral fractures are even more uncommon and may be easily overlooked, particularly in the acute trauma setting.

Management of clavicle fractures depends on fracture displacement, shortening, comminution, and associated injuries. While displaced fractures may require surgical fixation, non-displaced fractures are generally treated conservatively with immobilization, analgesia, and early rehabilitation [3,6,7,8].

Conservative management is considered the gold standard in non-displaced fractures due to the clavicle's rich vascular supply, high union rates, preservation of alignment, and avoidance of surgical risks [4,9,10,11,12].

Despite the widespread use of plain radiography as the initial imaging modality, up to 5–10% of clavicle fractures may be missed, particularly when fractures are non-displaced or obscured by overlapping anatomical structures [8,9]. In such cases, computed tomography (CT) plays a crucial role in confirming the diagnosis and guiding management [9,12]. This report presents a rare case successfully managed with conservative treatment, highlighting important diagnostic and therapeutic considerations.

To our knowledge, reports of bilateral non-displaced midshaft clavicle fractures with initially inconclusive radiographs confirmed on CT are

exceedingly rare, particularly in the context of associated head injury managed conservatively, and even more so from this geographic region.

This report presents a rare case of bilateral non-displaced midshaft clavicle fractures following high-energy trauma, successfully managed with conservative treatment, highlighting the importance of thorough clinical evaluation and appropriate imaging.

Case report

A 21-year-old male presented to the emergency department following a high-speed road traffic accident involving a frontal collision. The patient experienced a brief loss of consciousness at the scene.

On admission, he was hemodynamically stable with normal vital parameters. His Glasgow Coma Scale score was 13/15. CT imaging of the head revealed a small subdural hematoma, which was managed conservatively. The patient was admitted to the intensive care unit for close neurological monitoring.

During the secondary survey, the patient complained of bilateral shoulder pain, rated 7/10 on the visual analog scale. Physical examination revealed localized tenderness over the midshaft of both clavicles with mild swelling. There was no visible deformity, skin tenting, or open injury. Active shoulder motion was limited due to pain. Neurovascular examination of both upper extremities was normal.

Initial plain radiographs of the clavicles (Fig. 1) were inconclusive. Given persistent clinical suspicion, CT imaging with multiplanar and three-dimensional reconstruction was performed (Fig. 2, 3, 4), revealing non-displaced fractures of the middle third of both clavicles.

The patient was managed conservatively with bilateral arm slings, oral analgesics (non-steroidal anti-inflammatory drugs), and restriction of upper limb activity. Immobilization was maintained for pain control, followed by gradual mobilization

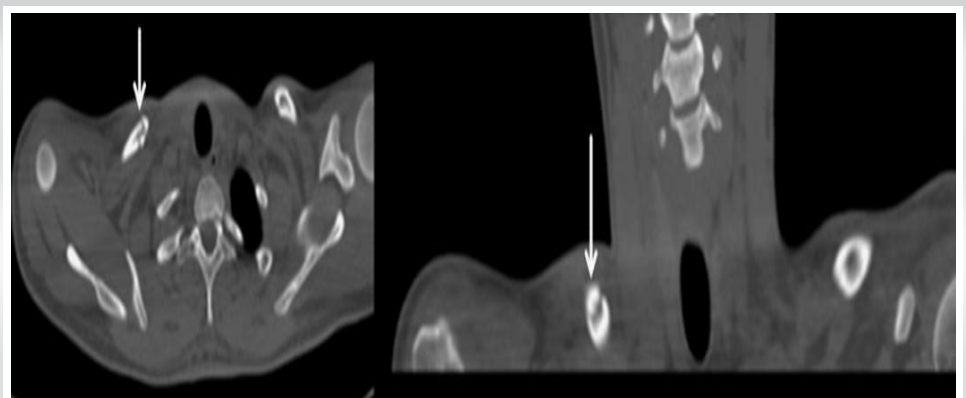


Figure 2: Axial and coronal computed tomography scan demonstrating a non-displaced fracture of the midshaft of the right clavicle.

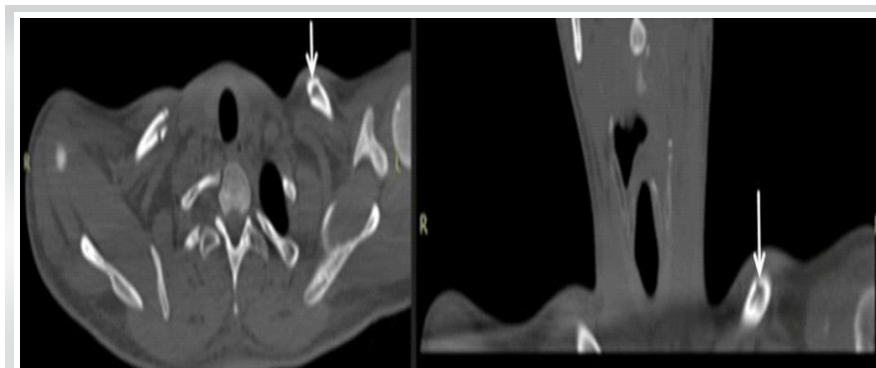


Figure 3: Axial and coronal computed tomography scans demonstrating a non-displaced fracture of the midshaft of the left clavicle.

with supervised physiotherapy.

Serial follow-up radiographs were obtained to monitor healing. At 12 weeks (Fig. 5), imaging demonstrated satisfactory fracture union with callus formation. Functional assessment showed a full, pain-free range of motion of both shoulders, including forward flexion (0–180°), abduction (0–180°), and external rotation (0–90°). The patient successfully returned to normal daily activities without limitations or complications.

Discussion

Bilateral clavicle fractures are rare clinical entities, typically resulting from high-energy trauma, such as road traffic accidents or falls [2,3]. Their rarity and often subtle presentation make diagnosis challenging, particularly when fractures are non-displaced.

The middle third of the clavicle is the most commonly affected region due to its biomechanical vulnerability and stress concentration [3,7]. In bilateral injuries, symmetrical force transmission may lead to similar fracture patterns on both sides, as observed in this case.

A key clinical insight from this case is the limitation of plain radiography. Previous studies have demonstrated that up to 5–10% of clavicle fractures may be missed on initial radiographs, particularly when fractures are non-displaced or obscured by overlapping anatomical structures [6,9]. Missed diagnoses may result in persistent pain, delayed management, and potential functional impairment. In such scenarios, CT provides superior sensitivity and enables accurate visualization of fracture morphology, particularly with multiplanar and three-dimensional reconstruction [9]. It should therefore be considered when clinical suspicion persists despite inconclusive radiographs.

In the acute trauma setting, differential diagnoses for bilateral shoulder pain include acromioclavicular

joint injury, sternoclavicular dislocation, scapular fracture, rib fractures, and soft tissue injuries. These are summarized in Table 1. Careful clinical assessment combined with appropriate imaging is essential to avoid misdiagnosis.

Conservative management remains the gold standard for non-displaced clavicle fractures due to the clavicle's rich vascular supply, which promotes reliable healing [4,8,10,11,12]. Reported union rates range from 90–100% in non-displaced fractures, with excellent functional outcomes and low complication

rates [10,13,14].

Recent literature continues to support the evolving role of imaging and individualized management in clavicle fractures. A 2025 systematic review evaluating temporal trends in midshaft clavicle fracture management highlighted that although surgical fixation provides faster recovery and lower non-union rates in displaced fractures, long-term functional outcomes frequently converge with conservative management, emphasizing the importance of appropriate patient selection [12,13,14,15]. Similarly, a 2026 systematic review of randomized controlled trials reported union rates of approximately 82–94% with conservative treatment compared to 93–100% with surgical intervention, but noted that differences in long-term functional outcomes remain minimal [14,15].

These findings reinforce the present consensus that non-operative management remains appropriate for non-displaced fractures, where anatomical alignment is preserved, and the biological healing potential is high. Long-term outcome studies further support this approach. A 2023 follow-up study



Figure 4: 3D reconstructed computed tomography image showing bilateral midshaft clavicle fractures without displacement.

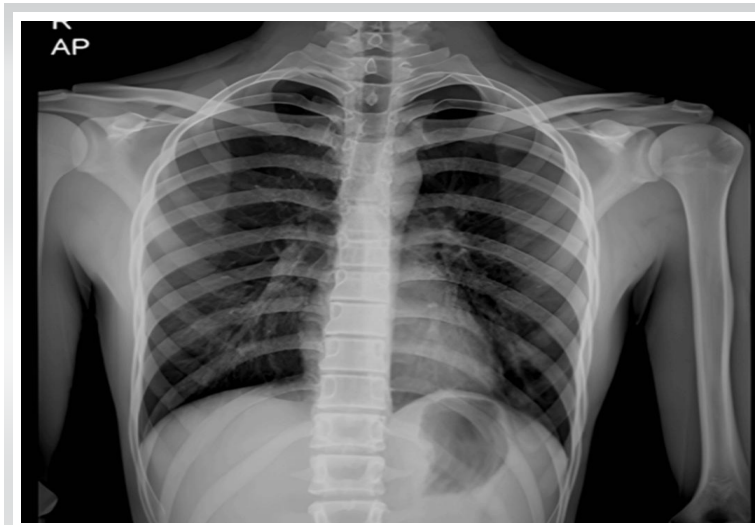


Figure 5: Follow-up radiograph at 12 weeks demonstrating satisfactory healing with callus formation in both clavicles.

evaluating patients treated conservatively for midshaft clavicle fractures demonstrated generally favorable long-term functional outcomes, with most patients achieving satisfactory

shoulder function years after injury [14].

In contrast, surgical intervention is typically reserved for specific indications, such as significant displacement, shortening greater than 2 cm, open fractures, neurovascular compromise, or symptomatic non-union [7]. While operative fixation may offer advantages, such as faster early recovery and reduced risk of non-union in displaced fractures, it is also associated with complications, including hardware irritation, infection, and reoperation [15]. A 2023 systematic review further emphasized that the timing and necessity of surgery remain debated, with outcomes influenced by fracture characteristics and patient-specific factors.

Bilateral clavicle fractures may present additional functional challenges due to temporary impairment of both upper limbs, affecting activities of daily living. Despite this, available evidence suggests that non-displaced bilateral fractures can be successfully managed conservatively, with outcomes comparable to unilateral injuries when appropriately selected [3].

Table 1: Differential diagnosis of bilateral shoulder pain

Condition	Key clinical features	Mechanism/Etiology	Imaging findings	Distinguishing features	Management approach
Acromioclavicular (AC) Joint Injury	Localized pain at AC joint, tenderness, possible step deformity	Direct trauma to shoulder (fall or impact)	X-ray shows AC joint widening or displacement	Pain localized to joint rather than midshaft clavicle	Conservative (low grade) or surgical (high grade injuries)
Sternoclavicular Joint Injury	Pain near sternum, swelling, limited shoulder movement	High-energy trauma	CT scan shows joint subluxation or dislocation	Medial clavicle involvement, possible mediastinal complications	Often conservative; surgery if unstable
Clavicular Stress Fracture	Gradual onset pain, no acute trauma	Repetitive microtrauma (athletes, military)	MRI/CT shows subtle fracture line or periosteal reaction	Insidious onset, no high-energy injury	Rest, activity modification
Rib Fractures (Upper Ribs)	Chest pain, worsens with breathing or coughing	Blunt thoracic trauma	X-ray or CT shows rib fracture	Pain more lateral/inferior, respiratory symptoms	Analgesia, respiratory support
Scapular Fracture	Shoulder pain, reduced mobility	High-energy trauma	CT shows scapular body or neck fracture	Posterior shoulder tenderness	Often conservative; surgery if severe
Shoulder Contusion/Soft Tissue Injury	Diffuse pain, bruising, no deformity	Direct trauma	Normal imaging	No fracture on CT/X-ray	Symptomatic management
Pathological Clavicle Fracture	Pain may precede trauma, possible swelling	Underlying tumor, infection, metabolic bone disease	Lytic/blastic lesions on imaging	Atypical fracture pattern, systemic signs	Treat underlying cause ± surgery
Brachial Plexus Injury	Pain with neurological deficits (weakness, paresthesia)	Traction or compression injury	MRI/nerve studies may show injury	Neurological symptoms predominate	Neurological management, rehab
Cervical Spine Injury (referred pain)	Neck pain radiating to shoulder/clavicle	Trauma, degenerative disease	CT/MRI shows cervical pathology	Associated neck stiffness, neuro signs	Immobilization, specialist management

AC: Acromioclavicular, CT: Computed tomography, MRI: Magnetic resonance imaging



The present case is particularly noteworthy due to the combination of bilateral involvement, absence of displacement, and initial radiographic inconclusiveness. This highlights an important diagnostic pitfall: Reliance solely on plain radiography may lead to missed injuries. Clinicians should therefore maintain a high index of suspicion in trauma patients presenting with bilateral shoulder pain and pursue advanced imaging when clinical findings and radiographs are discordant [6,9].

Overall, this case reinforces present evidence that conservative management of non-displaced midshaft clavicle fractures yields excellent functional and radiological outcomes while avoiding surgical risks. It also underscores the critical role of CT imaging in detecting subtle fractures and guiding appropriate management.

Conclusion

Non-displaced bilateral midshaft clavicle fractures are exceptionally rare injuries that may be easily overlooked, particularly in the setting of high-energy trauma, where initial radiographs can be inconclusive. This case highlights a critical diagnostic pitfall, emphasizing that persistent clinical suspicion

should prompt advanced imaging, such as CT, to ensure accurate and timely diagnosis.

Conservative management remains the treatment of choice in non-displaced fractures, offering high union rates, excellent functional recovery, and avoidance of surgical risks. Despite the potential functional limitations associated with bilateral involvement, appropriately selected patients can achieve complete and pain-free restoration of shoulder function.

Overall, this case underscores the importance of integrating thorough clinical evaluation with appropriate imaging strategies and reinforces that non-operative management can yield excellent outcomes even in rare and diagnostically challenging presentations.

Clinical Message

Bilateral non-displaced clavicle fractures are exceptionally rare and can be overlooked on initial radiographs following high-energy trauma. Careful clinical evaluation and advanced imaging are essential to prevent missed diagnoses. Persistent clinical suspicion should prompt CT imaging to ensure accurate diagnosis, while conservative management can result in excellent functional and radiological outcomes.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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