

## Bilateral fracture of clavicles at two different locations occurring simultaneously

<sup>1</sup> Dr. Kaushik Kr. Dutta, <sup>2</sup> Dr. Arijit Dhar, <sup>3</sup> Dr. Arup Kr. Daolagupu

<sup>1</sup> M.S. Orthopaedics, Registrar, Department of Orthopaedics, Gauhati Medical College & Hospital, Guwahati, Assam, India

<sup>2</sup> M.S. Orthopaedics, Associate professor, Department of Orthopaedics, Silchar Medical College & Hospital, Silchar, Assam, India

<sup>3</sup> M.S. Orthopaedics, Professor and Head, Department of Orthopaedics, Silchar Medical College & Hospital, Silchar, Assam, India

### Abstract

**Introduction:** Bilateral fractures of clavicles occurring simultaneously are rare with reported incidence of 0.43% of clavicle fractures with an overall incidence of between 0.011 and 0.017%. There are a few case reports on bilateral midclavicular fractures in literature but combination of midshaft in one side and lateral end in other side occurring simultaneously is rare.

**Case presentation:** A 30 years old female met with a road traffic accident and was brought to our emergency department. She was diagnosed to have comminuted midshaft clavicle fracture in right side (Allman <sup>[6]</sup> type 1, Robinson <sup>[7]</sup> type 2B2) and displaced lateral end fracture of clavicle in left side (Allman type 2, Robinson type 3 B1A). The midshaft fracture on the right side was fixed with precontoured clavicle locking plate by classical superior incision. The lateral end fracture of the left clavicle was fixed with a subacromial hook plate in the same sitting.

**Conclusion:** Simultaneously occurring bilateral displaced fractures of clavicle treated with locking plates gives good functional outcome and cuts down the period of morbidity.

**Keywords:** Bilateral, Clavicle, plating

### 1. Introduction

Clavicles are frequently fractured bone in the body accounting for 2.6% of all fractures and 44% of those in the shoulder girdle <sup>[1]</sup>. Contrarily bilateral fractures of clavicles occurring simultaneously are rare with reported incidence of 0.43% of clavicle fractures with an overall incidence of between 0.011 and 0.017% <sup>[2]</sup>. In majority of reported cases mode of injury is high energy trauma. The mechanisms of injury include compressive force across both the shoulder girdles <sup>[2]</sup> and bilateral direct blow to the shoulder girdle <sup>[3]</sup>. Most common site of fracture being the midshaft (69-82%) followed by lateral end (21-28%) and medial end (2-3%) <sup>[4]</sup>. Minimally displaced fractures are usually treated conservatively. For displaced fractures operative treatment results improved functional outcome and lower rates of malunion and non-union <sup>[5]</sup>. Similar to unilateral clavicle fractures the treatment of bilateral clavicle fractures has evolved over the years from conservative measures to operative measures <sup>[2]</sup>. There are a few case reports on bilateral midclavicular fractures in literature but combination of midshaft in one side and lateral end in other side occurring simultaneously is rare.

#### 1.1 Case presentation

A 30 years old female was brought to our hospital's emergency department on 04-02-2014. She met with a road traffic accident where her shoulders got compressed between the ground and the vehicle. She presented to us with pain in her bilateral shoulder. On examination fracture on her right midclavicular region was visible as abnormal bony protuberance. The chest – x ray including bilateral clavicle revealed comminuted midshaft clavicle fracture in right side (Allman <sup>[6]</sup> type 1, Robinson <sup>[7]</sup> type 2B2) and displaced lateral end fracture of clavicle in left side (Allman type 2, Robinson type 3 B1A).

Both upper limbs are provisionally immobilized in sling and for mobilization purpose due to displacement of both the fractures open reduction and locking plate fixation was planned. Subsequently all the routine investigations were done as per hospital protocol and patient was put in to operation two days later. The midshaft fracture on the right side was fixed with precontoured clavicle locking plate by classical superior incision. The lateral end fracture of the left clavicle was fixed with a subacromial hook plate in the same sitting. The operation was uneventful and the patient was discharged on the third post-operative day. Arm sling pouch was applied for three weeks post-operatively. Stitches were removed on 10<sup>th</sup> post-operative day and pendulum exercises were started 1 month post operatively. Patient was followed up monthly for 6 months and then 3 monthly till 1 year. Six weeks following surgery both the fractures achieved good healing. Both the implants were removed after 1 year on patient request. No complications noted during follow up. Patient has full range of movement and she is happy with the treatment.

### 2. Discussion

On literature review we found a few case reports on bilateral clavicle fractures treated operatively or non-operatively. We were not able to find simultaneous fixation of two different fracture patterns on each side with two different implants. Table 1 shows reported cases of bilateral clavicle fractures in the literature, their mode of injury, site and treatment. From the table 1 it is seen that though age range for bilateral clavicle fracture is wide most frequently occurs in young active age group 20-40 years. Both sexes are equally involved in these case reports. Most common mode of injury is high velocity trauma compressing both the shoulders. Only one case of idiopathic bilateral fracture has been reported <sup>[11]</sup>. Bilateral

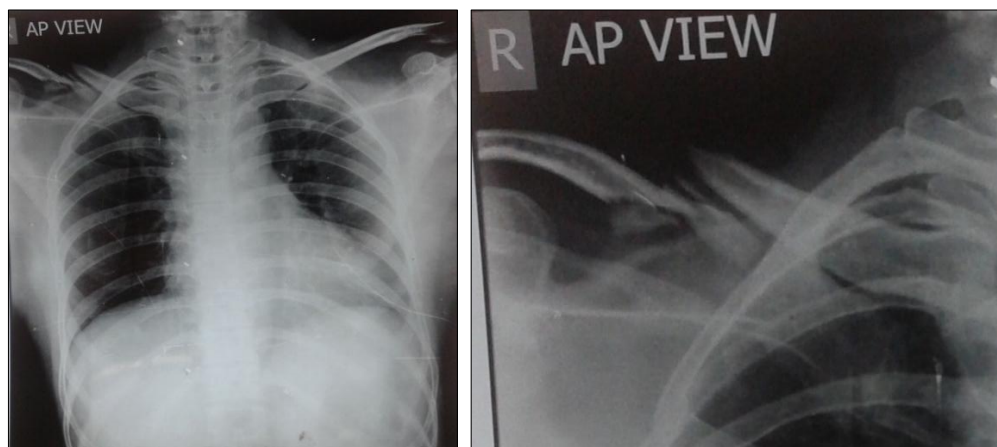
clavicle fracture and displaced fractures are relative indications for fixation of midshaft clavicle fracture [7]. Neer [5] type 2 lateral clavicle fractures treated with acromion hook plate has a high rates of union and good shoulder function [5]. In contrast to unilateral injuries, where each fracture is assessed individually for possible operative intervention, bilateral clavicle fractures are per se an indication for surgical stabilisation [2]. Bilateral fracture of clavicles leads to serious

incapacitation of the patient. The use of low profile anatomical locking plates helps in early mobilization of the affected limb compared to conservative treatment which requires prolonged immobilization. The upper limbs of the patient presented here could be mobilized two weeks after the operation. Full load bearing was allowed after 6 weeks. She gained full range of movement and was pain free at 6 weeks post-operatively.

**Table 1:** A Few Published case reports on bilateral clavicle fractures

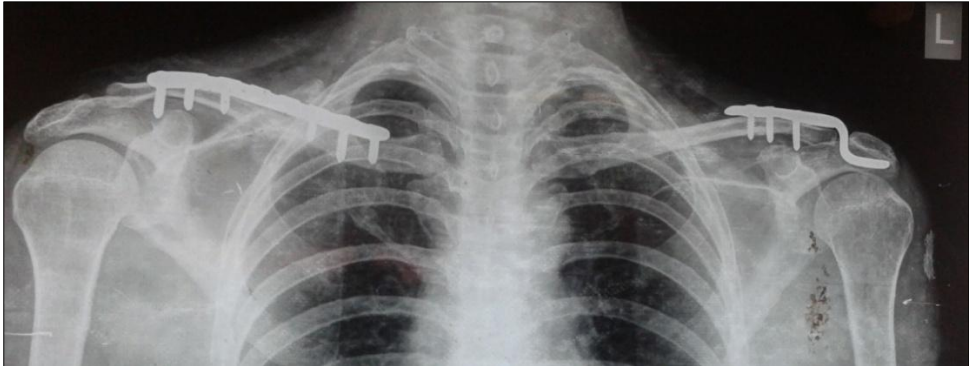
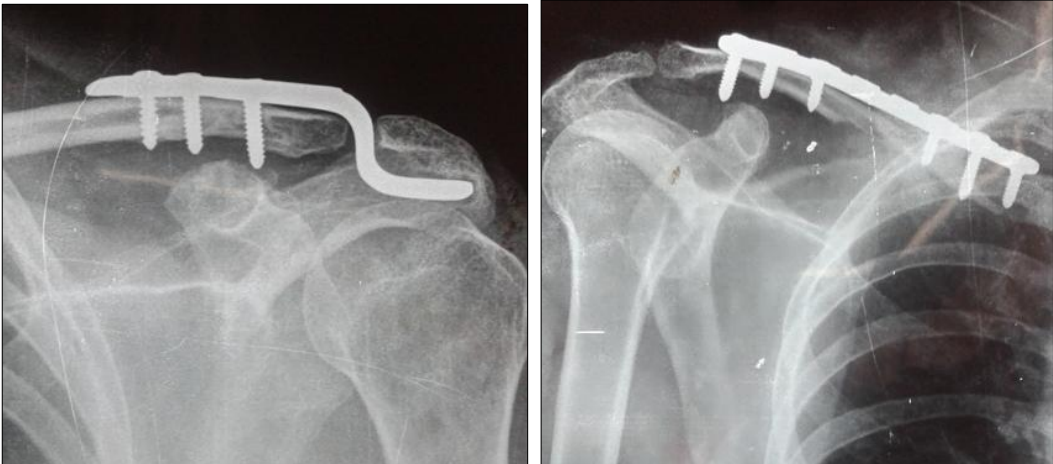
Study	No of cases	Age/sex	Mode of injury	Type of fracture	Treatment	outcome
Sutherland <i>et al</i> 2000 [3]	2	18/M	Compression of both shoulder under car	Outer third	conservative	Union at 6 weeks, full range of movement
		71/F	RTA	Not mentioned	conservative	United at 8 weeks, minor reduction in range of movement
Marya KM 2002 [8]	5	35/M	Crushed between tractor and wall	Midshaft	Conservative	union
		28/M	RTA	Not mentioned	Conservative	union
		38/M	RTA	Not mentioned	Conservative	union
		7/F	RTA	midshaft	Conservative	union
		40/M	RTA	Not mentioned	Conservative	union
Hart R <i>et al</i> 2004 [9]	1	24/F	RTA	Midshaft (floating shoulder)	ORIF with recon plate	union
Peter Kloen 2004 [10]	1	30/F	Fall from elephant	Midshaft	Initial conservative treatment led to non-union which was then treated by ORIF with LCP and bone graft	union
Robert H Quinn <i>et al</i> 2006 [11]	1	20/M	Idiopathic	Medial third	One side conservative, one side ORIF with recon plate	union
Puranik <i>et al</i> 2007 [12]	1	45/F	Trampled and crushed by cows	Midshaft	ORIF with Recon plate	union
Alexander Brunner <i>et al</i> 2008 [13]	1	21/M	RTA	Medial end	ORIF with angle stable locking T-plate	union
N. Bonneville <i>et al</i> 2010 [14]	1	58/F	RTA	Midshaft	Externql fixator	union
HET van den Bout 2011 [2]	1	27/M	RTA	Midshaft	ORIF with anatomical locking plate	Union at 6 weeks
Raghavendra S Kulkarni 2011 [15]	1	23/F	Fall from height and direct blow to shoulder	Medial third	ORIF with intra medullary K-wire	Union at 8 weeks
Our study	1	30/F	RTA	Midshaft on one side and lateral end on other side	ORIF with Anatomical locking plate and hook plate	Union at 8 weeks

**2.1 Clinical photograph**

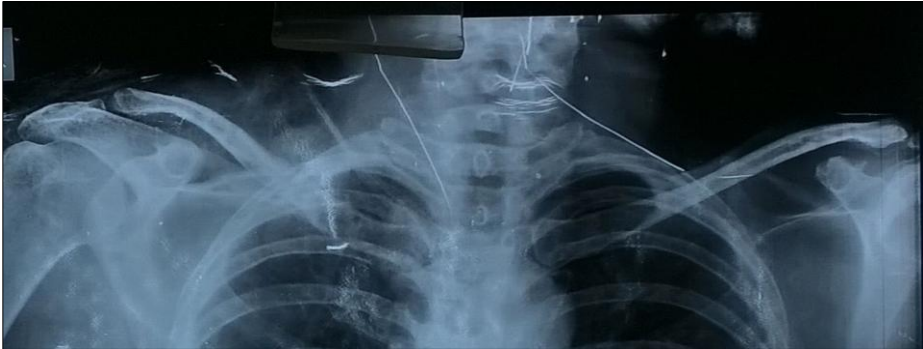




**Fig 1:** Comminuted fracture midshaft right clavicle and fracture lateral end of left clavicle



**Fig 2:** Fixation of fracture with clavicle plate on right and hook plate on left side



**Fig 3:** After implant removal at 1 year



**Fig 4:** Full range of motion at followup

**3. Conclusion**

Simultaneously occurring bilateral displaced fracture treated with locking plates gives good functional outcome and cuts down the period of morbidity. It is safe, effective modality for pain relief and rapid recovery.

**4. References**

1. Postacchini F1, Gumina S, De Santis P, Albo FJ. Epidemiology of clavicle fractures. *Shoulder Elbow Surg.* 2002; 11(5):452-6.
2. CH Snyckers MB ChB, Dip. PEC (SA), MMed (Orth), FCSA (Orth) Consultant, Bilateral clavicle fractures. A case report and review of the literature. HET van den Bout MBChB, LLB Senior Registrar, Department of Orthopaedics, University of Pretoria; Department of Orthopaedics, University of Pretoria; Page 56 / SA Orthopaedic journal Winter. 2011; 10:2
3. Sutherland AG, Knight DJ. Bilateral fractured clavicles-a pair of cases. *Acta Orthop Belg.* 2000; 66(3):306-307.
4. Apleys’ system of orthopaedics and fractures 9th edition Chapter, 24.
5. Campbell’s operative orthopaedics twelfth edition chapter, 56.
6. Allman FL Jr. Fractures and ligamentous injuries of the clavicle and its articulation. *J Bone Joint Surg Am.* 1967; 49(4):774-84.
7. Robinson CM. Fractures of the clavicle in the adult. Epidemiology and classification. *J Bone Joint Surg Br.* 1998; 80(3):476-84.
8. Marya KM, Yadav V, Kochar H. Bilateral clavicle fractures. *Hong Kong Journal of Orthopaedic surgery.* 2002; 6(1):39-41.
9. Hart R, Janeček M, Buček P, Chaker A. Bilateral clavicular and scapular neck fractures. *Scripta medica (BRNO).* 2004; 77(1):3-10. February, Case report
10. Peter KLOEN. Bilateral clavicle non-unions treated with anteroinferior locking compression plating (LCP);A case report; *Acta Orthop. Belg.* 2004; 70:609-611
11. Robert H, Quinn MD, Jessica Drenga APRN. Concurrent Bilateral Nontraumatic Fractures of the Clavicle. *Clinical orthopaedics and related research,* 2006; 447:252-255. ©Lippincott Williams & Wilkins
12. Puranik G, Gillham N. Bilateral fractured clavicles with multiple rib fractures. *Emerg Med J.* 2007; 24(9):675. Erratum in: *Emerg Med J.* 2007; 24(12):867.
13. Alexander Brunner a, Edris Wedi, Alexander Hoffmann, Reto Babst. Bilateral fracture of the medial clavicles treated by open reduction and internal fixation using angle stable locking T-plates; *Injury Extra.* 2008; 39:276-278.
14. Bonneville N, Delannis Y, Mansat P, Peter O, Chemama B, Bonneville P. Bilateral clavicle fracture external fixation. *Orthop Traumatol Surg Res.* 2010; 96(7):821-4.
15. Raghavendra Kulkarni1 S, Rachana Kulkarni M, Pankush Arora 2, Shyam AK. Bilateral Fracture Clavicles occurring simultaneously and treated with Intramedullary Fixation; *Journal of Orthopaedic Case Reports* 2011; 1:1.