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The use of a hookplate in SC pathology

Alexander Van Tongel, MD PhD

AZ St Lucas Gent AZ St Jan Brugge UZGent AZ St Lucas Brugge Zorgsaam Terneuzen



1. Introduction



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Cleidocranial dysplasia
 cleido = clavicle
 cranial = head
 dysplasia = abnormal forming

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3 patient-based shoulder scores

- American Shoulder and Elbow score (ASES)
- Quick DASH
- patient-based Constant Murley score (CS).


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The significance of the clavicle on shoulder girdle function
 Alexander Van Tongel, MD, PhD*, Iwein Pieters, MSc, Lieven De Wilde, MD, PhD
Department of Orthopaedic Surgery and Traumatology, Ghent University Hospital, Ghent, Belgium

Results

- 36 patients (27 female, 9 male)
- mean age of 40 years
- Bilateral absence (17), bilateral partial absence (16) and 3 patients had a total absence on one side and a partial absence on the other side.
- The average patient-based CS at was 79, Quick DASH score was 11 and ASES score was 93.
- no correlation between partial and total absences and the shoulder scores.




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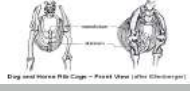
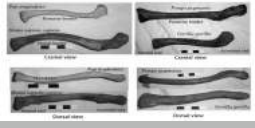
The most common complaints

- strength deficiency
- difficult to throw something far away






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2. Function

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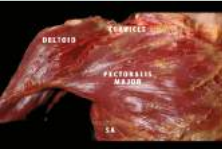

2. Function

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2. Function

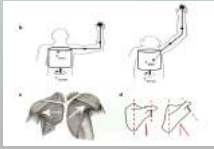

Clavicle =
bony framework for muscle insertions and origins
M Deltoid – Pars clavicularis M Pectoralis major

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2. Function


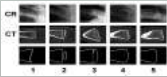
- The clavicular part pectoralis major → flexion, adduction
- The anterior deltoid is weak in strict transverse flexion but assists the pectoralis major during shoulder transverse flexion / shoulder flexion (elbow slightly inferior to shoulders).

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3. Embryology



- Intramembranous ossification
the first bone in the body to ossify (5th week of fetal life)
- Secondary ossification center (medial and lateral)
- Last bone to ossify in human body: medial clavicle (age of 22y)

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4. Anatomy

ORIGINAL COMMUNICATION
A Cadaveric Study of the Structural Anatomy of the Sternoclavicular Joint
A. VAN PELLELT, J. W. PRADROMBA, A. LUYKEN, M. POOLBAND, J. VAN D. WELBY
Department of Orthopedic Surgery and Radiology, Ghent University Hospital, Ghent, Belgium
Received 12 October 2010; accepted 12 February 2011; published online 12 March 2011
© 2011 Blackwell Publishing Ltd, *Journal of Orthopaedic Research*, 29, 1233–1240

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4. Anatomy

Costoclavicular ligament

Posterior SC ligament is much stronger than anterior SC ligament

Injury

posterior SCL: protraction
anterior SCL: retraction

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5. Medial clavicle fracture

Medial clavicle fractures: 2 to 3% of all clavicle fractures

Several classifications have been described

- Allman classification
- Edinburgh classification
- Trockmorton classification

1. Allman RJ. Fractures and ligamentous injuries of the clavicle and its articulation. J Bone Joint Surg Am 1967;49:774-84
2. Postacchini F, Gurnia S, De Santis P, Albo F. Epidemiology of clavicle fractures. J Shoulder Elbow Surg 2002.
3. Robinson CH. Fractures of the clavicle in the adult: Epidemiology and classification. J Bone Joint Surg Br 1998;80:476-84.

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5. Medial clavicle fracture

No clinical consequence to classifications

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5. Medial clavicle fracture

Not based on correlation with ligaments

CLAVICLE FX - DISTAL THIRD Neer, CDRR 58:33

1 Medial displaced coracoclavicular ligaments intact
2 Displaced coracoclavicular ligaments ruptured
3 Intra-articular AC joint

Neer CS, 2nd. Fractures of the distal third of the clavicle. Clinical orthopaedics and related research. 1968 May-Jun;58:43-50.

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5. Medial clavicle fracture

Anatomically based classification of medial clavicle fractures

Alexandri Van Tongel, Alexander Toussaint, Sofie Elissen, Stijn Van Damme, Jeroen Mouton, Larissa De Wilde
Zinnou An, Elisabeth Hospital Ghent, Ghent, Belgium

Two types

Type 1

Type 2

Van Tongel A, Toussaint A, Herregods S, Van Damme S, Marrannes J, De Wilde L. Anatomically based classification of medial clavicle fractures. Acta Orthop Belg 2018 Mar;84(1):62-7.

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5. Medial clavicle fracture

Non-displaced Type I = Type IA

18 fractures

Van Tongel A, Toussaint A, Herregods S, Van Damme S, Marrannes J, De Wilde L. Anatomically based classification of medial clavicle fractures. Acta Orthop Belg 2018 Mar;84(1):62-7.

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5. Medial clavicle fracture

Displaced Type I = Type IB

12 fractures

Van Tongel A, Toussaint A, Herrgods S, Van Damme S, Marrannes J, De Wilde L. Anatomically based classification of medial clavicle fractures. Acta Orthop Belg. 2018 Mar;84(1):62-7. UZ Gent -schoudergroep TerBrugGen

5. Medial clavicle fracture

Non-displaced Type II = Type 2A

2 fractures

Van Tongel A, Toussaint A, Herrgods S, Van Damme S, Marrannes J, De Wilde L. Anatomically based classification of medial clavicle fractures. Acta Orthop Belg. 2018 Mar;84(1):62-7. UZ Gent -schoudergroep TerBrugGen

5. Medial clavicle fracture

Displaced Type II = Type 2B

3 fractures

Van Tongel A, Toussaint A, Herrgods S, Van Damme S, Marrannes J, De Wilde L. Anatomically based classification of medial clavicle fractures. Acta Orthop Belg. 2018 Mar;84(1):62-7. UZ Gent -schoudergroep TerBrugGen

5. Medial clavicle fracture

	number of patients	constant score	oxford score
Type 1A	18	79	43
Type 1B	12	66	36
Type 2A	2	90	48
Type 2B	3	79	41

- Significant difference between Type 1B and the Type 1A for Constant score ($p=0.007$) and Oxford score ($p=0.036$)
- all symptomatic non-union \rightarrow Type 1B

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6. Treatment

Inverted distal clavicle anatomic locking plate for displaced medial clavicle fracture

Yong Wang¹ · Jianming Jiang¹ · Bia Dou¹ · Faxjun Zhang¹

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6. Treatment

Operative Management of Periarticular Medial Clavicle Fractures—Report of 10 Cases

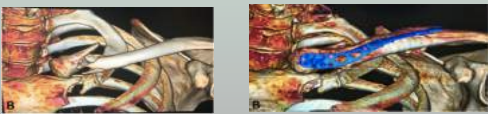
Ketsuke Oe, MD, Lucianer Casal, MD, Christian Herbolzer, MD, Alexander Wolmann, MD, Masahito Miwa, MD, Masahiro Kurosaki, MD, and Volker Buchhorn, MD

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6. Treatment

Displaced medial end clavicle fractures treated with an inverted distal clavicle plate contoured through 90 degrees

Andrew Titchener, FRCS Orth, Tr, Abbas See, BA, Lee Van Rensburg, FRCS Orth, Tr, Graham Lytherleigh-Strong, FRCS Orth*



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6. Treatment



Posterosubclavicular plate

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5. Medial clavicle fracture



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6. Treatment



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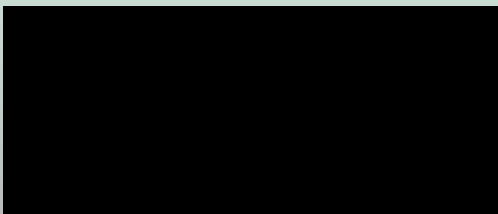
6. Treatment

- Hookplate



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6. Treatment



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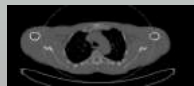
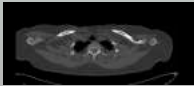
5. Medial clavicle fracture

Clinical outcome 5 patients

- average age: 52 years (between 48 and 55 years)

- average follow-up: 13 months (between 8 and 28 months)

Patient	gender	follow-up (months)	outcome	pre-op constant score	post-op constant score	complications
1	male	28	non-union	63	79	
2	male	19	union	54	83	
3	female	18	union	57	82	
4	male	12	non-union	61	85	sternal cyst - removal plate 3 months
5	female	8	union	45	76	



Conclusion

1. The most common orientation is a fracture line originates medial to costoclavicular ligament (Type I fracture)
2. Overall good clinical outcome of conservative treatment of medial clavicle fracture
3. Constant and oxford score significant lower in displaced Type I fracture and a higher probability on symptomatic non-union
4. Hookplate may be an operative option in case of symptomatic non-union of displaced Type I fractures



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Thank
you

