



# CLAVICLE ORIF



## Clavicle ORIF for acute fractures or non-unions +/- Bone Grafting

Sling	From Day 1	Restrictions	Strengthening
4 weeks	GHJ PROM to 90 degrees for first 4/52. C-spine, Elbow, Wrist and hand AROM. Submaximal Isometrics Rotator Cuff	No unsupported activity for the first 4 weeks unless doing HEP.	Submaximal Isometrics from Day 1 (not max use 30% as guide) for the rotator cuff.

Factors that may affect progression rate:

- Bone health
- Age
- Diet
- Smoking and Alcohol status
- Metabolic conditions such e.g. Diabetes
- Patient biopsychosocial considerations/ additional contributing factors.

Treatment Note: Cases which involve reconstructing missing bone with a structural bone graft may require a slower rehab protocol, i.e. delay increased loaded strengthening until 3 months – this will be specified in the operation note. Follow up Outpatient Physiotherapy at 2 weeks. When considering dose of prescribed exercise consider aim of the exercise and the individual patient – consider they may need to build up to desired dose and manipulating the F.I.T.T principles. Consider avoiding muscle activity of those originating or inserting into the clavicle such as pec major, SCM, Deltoid and UFT. General fracture healing time 6-8 weeks.

Phase 1 (Day 1 - 4 weeks) Initial in hospital and on discharge exercises

**Aims/Goals:** Shoulder protection – In Sling for 4 weeks. Sling can be removed for home exercise programme. To prevent unnecessary atrophy and avoid developing a stiff shoulder. Adequate pain management.

**Avoid:** Removing the sling due to weight of the arm can impact the fracture site.

Exercise:	Dose:
Pendulum exercises within the sling – ensure truly passive	
Passive ROM <ul style="list-style-type: none"> <li>• Shoulder Flexion to 90 degrees</li> <li>• Shoulder Abduction to 90 degrees</li> <li>• Shoulder external rotation</li> <li>• Active Cervical spine, Elbow, Wrist and</li> </ul>	



Hand range of movement as pain allows.	
<b>Strengthening</b> <ul style="list-style-type: none"> <li>Start submaximal isometric contractions for the rotator cuff – *Belly press and not pushing against the hand in neutral as there is less pec activity in the belly press position.</li> <li>Start periscapular muscle strengthening as able within precautions</li> </ul>	
<ul style="list-style-type: none"> <li>Gripping a towel/small ball/ pair of socks.</li> </ul>	
<ul style="list-style-type: none"> <li>Weighted rotator cuff strengthening on the unoperated arm, considering the principle of cross-talk<sup>1</sup>.</li> </ul>	

**Treatment Note:**

- Reminder on importance of pain control.
- Use of ice pack
- Stitches to be removed at 2/52 post op at GP practice
- Follow up in clinic 6-8/52 post op.
- Sling removed at 4 weeks – this can be removed for exercise, washing, dressing and eating.
- Driving is normally possible at 4/52 however this is dependent on patient function and safety and specific post op instructions. Patients should always check with the DVLA and insurance company.
- Patient can still engage with lower limb rehab which can still be dynamic – consider lunges will activate the scapular stabilising muscles for example.

**Phase 2 (4 - 8 weeks)**

**Aims/Goals:** Increase from PROM to AROM. At 2 months the patient should have full active range of movement

**Avoid:** Excessive loading through the clavicle. Avoid weighted above head activity.

Exercise:	Dose:
<b>Submaximal Isometric Contractions:</b> <ul style="list-style-type: none"> <li>Patient tolerated to increase load as able.</li> </ul> <p>Continue weighted rotator cuff strengthening on the unoperated arm, considering the principle of cross-talk. Start weighted rotator cuff strengthening supported at 4 weeks in neutral position and gradually reduce support and progress to range in the scapular plane as able once the patient has regained full PROM.</p>	



<p>Patient Controlled ROM:</p> <p>PROM to active assisted to full AROM as able</p> <ul style="list-style-type: none"> <li>• Shoulder Flexion</li> <li>• Shoulder Abduction</li> <li>• Shoulder external rotation</li> <li>• Hand behind the back</li> </ul>	
<p>Proprioception and weightbearing:</p> <p>Start loaded proprioception work for the shoulder as able (hands on a table with weight transfer from side to side (progressive loading as able)</p> <p>Consider progression using gym-ball (either control in standing or using the gym-ball to control the weight load on the upper limb when the patient is on their hands and knees.</p> <p>From 6 weeks progressing through weight bearing with press up progressions (Against the wall, against the wall with feet further away, against a table, on to hands and knees and to full (if appropriate)</p> <p>*be guided by the patient with pain &lt;4 on NPS. Weightbearing to stimulate osteoblast formation (Wolff's Law<sup>2</sup>).</p>	
<p>Stretching:</p> <p>Consider if restricted abduction or lateral rotation the need to stretch through the anterior structures – this can be static (e.g pec stretch with hand against the wall starting low and gradually building up as able or using eccentric exercises – supine horizontal abduction</p>	

**Treatment Note:**

- Follow up in clinic 6-8/52 post op.
- Patient can still engage with lower limb rehab and strengthening of the non-operated side to facilitate recovery.

**Phase 3 (8 weeks onwards)**



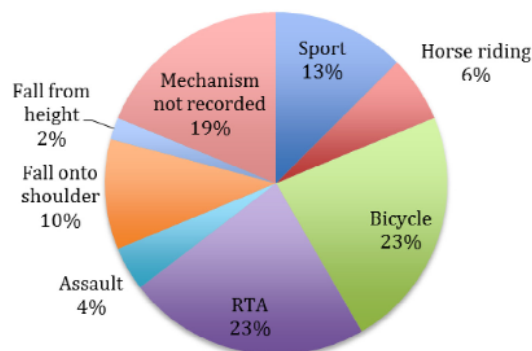
**Aims/Goals:** Return to sporting activities and heavy manual work.

**Avoid:** Overloading beyond patients' capacity.

**Treatment Note:** Aim for function specific rehabilitation considering manipulating training principled for power and endurance. Loaded cuff strengthening and kinetic chain rehabilitation if appropriate. This will be patient specific and gradually increase weightbearing / loading through the upper limb. Consider principles of fracture healing / healing times with sports which may have a contact / impact element and build this into your rehabilitation as a graduated / graded process. Introduce graduated loading with hands above the head.

### **Appendix: Procedure Summary**

Most clavicle fractures heal without problem but some subtypes need operative intervention, as do those that do not unite and cause symptoms. The fixation is performed to bring the bone fragments back into alignment and support them while they heal. The surgical approach to the clavicle involves incising the delto-trapezial fascia and repairing it at the end. The fixation itself needs to be protected for around 4-6 weeks after surgery until enough bone healing has occurred to allow unrestricted arm movement. Early rehab is geared towards preventing the whole weight of the arm hanging down and causing stress on the fixation, whilst maintaining ROM as much as possible. Also, the delto-trapezial fascia needs time to heal to prevent deltoid detachment. The main identifiable modifiable feature to non-union is smoking where smokers were 14.28 times more likely to have non-union<sup>3</sup>. Below is the MOI from a reference Jarvis et al. (2018) who reported an infection rate of 2.4%. 3 of 82 fractures resulted in a frozen shoulder (3.7%). Mean union time was 120 days.



**Figure 3** The mechanism of injury as displayed in a pie chart. RTA, road traffic accident.

### **Reference List**

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[www.upperlimbspecialist.co.uk](http://www.upperlimbspecialist.co.uk)



1. Farthering, P. (2009). Cross-education of strength depends on limb dominance: implication for theory and application. *Exercise and Sports Science Reviews*, 37(4), 179-187. Doi:10.1097/JES.0b013e.
2. Rowe, P., Koller, A. & Sharma, S (2020). Physiology, Bone Remodelling. StatPearls Publication. Available at <https://www.ncbi.nlm.nih.gov/books/NBK499863/> [Accessed: 08.01.21].
3. Jarvis, N., Holliday, L., Sinnott, M., Mackenzie, T., Funk, L. & Monga, P. (2018). Surgery for the fractures clavicle: factors predicting non-union. *Journal of shoulder and elbow surgery*, 27, pe155-e159. Doi:10.1016/j.jse.2017.10.010.