



Effective Health Care

Surgical Treatment of Clavicle Fractures

Nomination Summary Document

Results of Topic Selection Process & Next Steps

- Two portions of the topic *Surgical Treatment of Clavicle Fractures* were found to be addressed by existing systematic reviews.
- The question related to the surgical versus non-surgical treatment in adolescents and adults was found to be addressed by the Cochrane systematic review titled *Surgical versus conservative interventions for treating acute fractures of the middle third of the clavicle*, five meta-analyses, and two other systematic reviews of randomized controlled trials (RCTs), published between 2012 and 2014, which compared surgical versus non-surgical interventions in adolescents and adults with acute displaced midshaft clavicle fractures.
 - Lenza M., Buchbinder R., Johnston R., Belloti J., et al. Surgical versus conservative interventions for treating fractures of the middle third of the clavicle. *Cochrane Database Syst Rev*. 2013; 6:6: 1-79.
 - Kong L., Zhang Y., Shen Y. Operative versus nonoperative treatment for displaced midshaft clavicular fractures: a meta-analysis of randomized clinical trials. *Arch Orthop Trauma Surg*. 2014; 134(11):1493-500.
 - Yang S., Zhang R., Zhu Q., Wang G., et al. Evaluation of surgical and non-surgical interventions for clavicle fractures. *Acta Orthop Traumatol Turc*. 2014;48(3):253-8.
 - Xu J., Xu L., Xu W., Gu Y., et al. Operative versus nonoperative treatment in the management of midshaft clavicular fractures: a meta-analysis of randomized controlled trials. *Journal of Shoulder and Elbow Surgery* 2014, 23(2), 173-181.
 - Rehn C, Kirkegaard M, Viberg B, Larsen M. Operative versus nonoperative treatment of displaced midshaft clavicle fractures in adults: a systematic review. *Eur J Orthop Surg Traumatol*. 2014; 24(7):1047-53.
 - Xu C, Li X, Cui Z, Diao X, et al. Should displaced midshaft clavicular fractures be treated surgically? A meta-analysis based on current evidence. *Eur J Orthop Surg Traumatol*. 2013; 23(6):621-9.
 - Liu G, Tong S, Ou S, Zhou L, et al. Operative versus non-operative treatment for clavicle fracture: a meta-analysis. *Int Orthop*. 2013; 37(8):1495-500.
 - Ban I, Branner U, Holck K, Krashennikov M, et al. Clavicle fractures may be conservatively treated with acceptable results-a systematic review. *Dan Med J*. 2012; 59(7):A4457.
- The question related to the surgical versus other surgical treatment in adolescents and adults was found to be addressed by one Cochrane systematic review, two meta-analyses, and four systematic reviews of RCTs, published between 2011 and 2015, which appeared to compare surgical versus other surgical interventions in adolescents and adults with acute midshaft clavicle fractures.
 - Lenza M., Belloti J., Gomes dos Santos J., Matsumoto M., et al. Surgical interventions for treating acute fractures or non-union of the middle third of the clavicle. *Cochrane Database Syst Rev*. 2009; 7(4): 1-42.

- Zhu Y., Tian Y., Dong, T., Chen W., et al. Management of the mid-shaft clavicle fractures using plate fixation versus intramedullary fixation: an updated meta-analysis. *Int Orthop*. 2015; 39(2):319-28.
- Barlow T., Beazley J., Barlow D. A systematic review of plate versus intramedullary fixation in the treatment of midshaft clavicle fractures. *Scott Med J*. 2013; 58(3): 163-167.
- Wijdicks, F., Houwert R., Millett P., Verleisdonk E., et al. Systematic review of complications after intramedullary fixation for displaced midshaft clavicle fractures. *Can J Surg*. 2013 Feb;56(1):58-64.
Wijdicks F., Van der Meijden O., Millett P., Verleisdonk E., et al. Systematic review of the complications of plate fixation of clavicle fractures. *Arch Orthop Trauma Surg*. 2012 May;132(5):617-25.
Houwert R., Wijdicks F., Bisschop C., Verleisdonk E., et al. Plate fixation versus intramedullary fixation for displaced mid-shaft clavicle fractures: a systematic review. *Int Orthop*. 2012 Mar;36(3):579-85.
Duan X., Zhong G., Cen S., Huang F., et al. Plating versus intramedullary pin or conservative treatment for midshaft fracture of clavicle: a meta-analysis of randomized controlled trials. *J Shoulder Elbow Surg*. 2011 Sep;20(6):1008-1015.
- The questions related to surgical versus non-surgical treatment in children and surgical versus other surgical treatment in children were not feasible for full systematic review due to the limited data available for a review at this time. These topics could potentially be considered for new research in comparative effectiveness.

Topic Description

Nominator(s): Individual

Nomination Summary: The nominator is interested in this topic because of the relatively high incidence and prevalence of clavicle fractures, a condition treated across multiple specialties, including both pediatric and adult orthopedic surgery, family practice, sports medicine, and among trauma specialists. There is variation in care and perhaps outcomes for this common condition.

The nominator nominated this topic to inform the development of a practice guideline or other form of guidance. The development of this guideline could reduce variation in care for clavicle fractures, provide benchmarking standards, and consequently improve patients' care and outcomes.

Staff-Generated PICO

Population(s): Pediatric/adolescent and adult patients with acute clavicle fractures

Intervention(s): Surgical interventions for acute clavicle fractures

Comparator(s):

- Surgical treatments for acute clavicle fracture
- Non-surgical treatments for acute clavicle fracture

Outcome(s):

- Hospitalization; length of stay, readmissions
- Perioperative complications (≤30 days): pain; superficial and deep infections; delayed wound healing; and mortality.

- Late complications; delays in the restoration of the structure and function of upper limb (e.g., mal-union and non-union); hardware-related complications; quality of life; functional status; chronic pain; need for additional surgeries.

Key Questions from Nominator: What are the comparative risks and benefits among different surgical interventions? Are these risks different between pediatric or adolescent populations and adult populations with clavicle fractures?

Considerations

- Clavicle or collarbone fractures are common, especially in children and young adults. Common causes for these fractures in young children are falls from cribs/bed, fall during play, unspecified causes and suspected abuse. In young adults, common causes for these fractures include sports and road traffic accidents. In the elderly, simple falls are a leading cause of clavicle fracture.
- There is no gold standard for the surgical treatment of acute clavicle fractures, and the available methods vary in terms of the techniques and hardware used. In addition, outcomes of treatments can be variable, as seen in post-operative complications like rates of nonunion, malunion, and the need for additional surgeries. It is important to understand the comparative effectiveness of the treatment options for clavicle fractures to reduce variability of care and help inform improved clinical decision-making by clinicians and patients.
- Surgical versus non-surgical treatment in adolescents and adults: Findings were consistent across the Cochrane systematic review, five meta-analyses, and two other systematic reviews. Surgical treatment was associated with lower nonunion and malunion rates compared to non-surgical treatment. However, the authors of the Cochrane systematic review and one of the meta-analyses described the evidence for surgical versus non-surgical treatment to be of low quality.
- Comparison of surgical approaches in adolescents and adults: We identified one Cochrane systematic review, two meta-analyses, and four systematic reviews that addressed the comparison of intramedullary fixation and plate fixation, the major surgical treatment options for treating midshaft clavicle fractures in clinical practice. Conclusions were not consistent across these reviews.
- Surgical versus non-surgical treatment in children and surgical versus other surgical treatment in children: Identified studies generally focused on the combined population of adults and adolescents. Limited studies on children (e.g., 0-12 years) were available.