

# Prehospital Reduction of Dislocations

Paramedic Mini CAT – Fanshawe College

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## Clinical Scenario:

You are called code 3 to an 18-year-old female patient who was tackled in a rugby game and is complaining of severe shoulder pain. Upon arrival, you assess your patient to have an isolated shoulder injury and the joint appears to be dislocated. You make your patient as comfortable as possible, provide analgesics, put her injured arm in a sling for stability and transport to the hospital. After arriving at the hospital, the nurse informs you that you will be on delay for several hours as there are currently no beds available. Your patient is in severe pain and she has been given the maximum dose of analgesics.

## Background

The ankle, patella, and the shoulder are the most common joints that can be dislocated. The shoulder joint is one of the most unstable joints in the body. It allows for the range of motion required for daily activities at the expense of stability. Anterior shoulder dislocations account for 90% of dislocation cases in the general population and are the most frequent dislocation treated in emergency medicine. This has resulted in many studies researching different reduction methods and the potential complications. If paramedics were provided the proper training, dislocations could be reduced prehospitally which would ultimately reduce clinician time, imaging, sedation, and even hospital admission (Fennelly et al., 2020).

## Review question

Would it improve patient outcome if paramedics could reduce isolated dislocations in a prehospital setting?

**Search strategy (Basic):** (paramedic or ambulance or prehospital or pre-hospital) AND (shoulder or patella and dislocation) AND (reduce or reduction or relocation)

**Limits:** Last 5 years, peer-reviewed journals, English language

**Search outcome:** MEDLINE: 4 results, CINHALL: 2 results

**Included for review:** 3 papers were chosen as relevant for this CAT based on the question at hand.

Title, author, year	Study Design	Population	Intervention	Results	Strengths (+) & Weaknesses (-)
<p>Management of prehospital shoulder dislocation: feasibility and need of reduction</p> <p>Authors: T. Helfen · B. Ockert · P. Pozder · M. Regauer · F. Haasters</p> <p>July 9, 2015</p>	<p>Prospective, multi-centre cohort study.</p> <p>16 study centres in Germany and Austria.</p> <p>The study took place over the course of 12 months.</p> <p>The aim of the study was to evaluate the feasibility of shoulder reduction in pre-hospital practice.</p> <p>Inclusion criteria: clinically manifested shoulder dislocation.</p> <p>LOE: 3</p>	<p>Emergency physicians performed reduction.</p> <p>70 patients with isolated shoulder dislocations (70% male, 30% female).</p> <p>&gt;16 years of age Mean age: 40.2</p>	<p>All 70 patients with a dislocated shoulder were treated.</p> <p>A reduction or trial of reduction took place in 47 (66.6%) of cases.</p> <p>4 different techniques were applied for reduction: Arlt (4.2%), Hippocrates (60%), scapular manipulation (25.5%), and self-reduction (4.2%).</p> <p>95.8% of patients received pain medication, 4.2% did not receive any pain medication.</p>	<p>66.7% of dislocations occurred in sport and 33.3% occurred at work or other.</p> <p>Hippocrates was the more favoured method for reduction by emergency physicians.</p> <p>In 70 (100%) patients, perfusion of affected extremity was without pathological findings after reduction.</p> <p>In 7 patients (10%) investigation showed neurological pathologies.</p> <p>In those 7 patients (10%) neurological pathologies declined after reduction.</p> <p>90% of patients were immobilized after reduction.</p> <p>Surgeons had a greater first attempt success rate of reduction (72.3%)</p>	<p>(+) Multi-centre study. (+) A cohort study was the appropriate method to measure results. (+) Different methods of reduction were attempted. (+) Adequate age distribution. (+) Clearly focused issue discussed and studied. (+) Objective comparison and analysis made. (+) Results displayed quantitatively. (+) Compliance with ethical requirements. (+) Peer reviewed.</p> <p>(-) Does not confirm percentage of successful reductions. (-) No randomization or blinding. (-) No follow-up post reduction of affected joint. (-) Small sample size. (-) Uneven distribution of male vs female patients.</p>

Title, author, year	Study Design	Population	Intervention	Results	Strengths (+) & Weaknesses (-)
				<p>compared to anaesthetists (35.3%)</p> <p>There is no obvious contraindication for emergency physicians to reduce dislocated shoulders in the pre-hospital setting (Helfen et al., 2015).</p>	<p>(-) Excluded patients under 16 years of age.</p> <p>(-) No specific technique recommended.</p> <p>(-) Limited geographical area.</p>
<p>Medical speciality, medication or skills: key factors of prehospital joint reduction</p> <p>Georg Siebenbürger, Christian Zeckey, Julian Fürmetz, Wolfgang Böcker, Tobias Helfen</p> <p>March 7, 2018</p>	<p>Prospective, multi-center cohort study.</p> <p>Investigating the management of shoulder, patella, and ankle joint dislocations and correlation between skill level of physicians and successful reductions.</p> <p>The anonymous study was conducted from May 2012 – May 2015.</p> <p>16 emergency physician rescue stations in Germany and Austria.</p>	<p>Emergency physicians performed the reduction.</p> <p>61 (51.7%) anaesthesiologists, 41 (34.5%) surgeons, 16 (13.5%) other specialty.</p> <p>118 patients with isolated dislocated joints (60.2% male, 39.8% female).</p> <p>&gt;16 years old Mean age: 40.1</p>	<p>Reduction attempt was performed on 97 (82.2%) of all patients.</p> <p>65% of patients received analgesia for pain.</p>	<p>Reduction of patella 95.5% of patients with success rate of 100%.</p> <p>Reduction of ankle joints 84.1% of patients with success rate of 54.1%.</p> <p>Reduction of shoulder joints 60.6% of patients with success rate of 70%.</p> <p>No correlation between pain and success of reduction.</p> <p>Surgeons had a greater first attempt success rate of reduction of the</p>	<p>(+) Multi-centre study.</p> <p>(+) Clear and focused research question.</p> <p>(+) All outcomes considered.</p> <p>(+) No bias in population selection.</p> <p>(+) Peer reviewed.</p> <p>(+) Results displayed quantitatively.</p> <p>(-) No follow-up post reduction of affected joints.</p> <p>(-) Small sample size.</p> <p>(-) Limited geographical area.</p> <p>(-) No specific technique recommended.</p> <p>(-) Excluded patients under 16 years of age from study.</p>

Title, author, year	Study Design	Population	Intervention	Results	Strengths (+) & Weaknesses (-)
	<p>Inclusion criteria: evident joint dislocation.</p> <p>LOE: 3</p>			<p>shoulder (73.2%) compared to anaesthetists (31.1%) compared to other specialties (25%).</p> <p>Surgeons had a greater first attempt success rate of reduction of the ankle (87.8%) compared to anaesthesiologists (83.6%) compared to other specialties (37.5%).</p> <p>Surgeons had a greater first attempt success rate of reduction of the patella (90.2%) compared to anaesthesiologists (88.5%) compared to other specialties (87.5%).</p>	
<p>A systematic review of pre-hospital shoulder reduction techniques for anterior shoulder dislocation and the effect on patient return to function</p>	<p>Systemic review</p> <p>Trauma and orthopedics, Royal United Hospital and Stoke Mandeville Hospital, United Kingdom.</p>	<p>181 patients were included in the 4 studies.</p> <p>Inclusion criteria: sports or wilderness injuries.</p>	<p>First attempt success rate of shoulder reduction ranged from 54% - 94.9%.</p> <p>7 techniques were used to reduced shoulder dislocations in the 4 studies: (1)</p>	<p>No acute complications reported following reduction.</p> <p>Any neurological deficits from injury improved after the shoulder reduction.</p>	<p>(+) 4 relevant studies were included.</p> <p>(+) Addressed a clearly focused question.</p> <p>(+) Peer reviewed.</p> <p>(+) Results of all studies clearly compared and</p>

Title, author, year	Study Design	Population	Intervention	Results	Strengths (+) & Weaknesses (-)
<p>Joseph T. Fennelly, Lysander Gourbault, Gregory Neal-Smith, Akhilesh Pradhan, Venkat Gade, Jonathan A. Baxter</p> <p>August 12, 2020</p>	<p>This study assesses the risk of complication of shoulder reduction in a pre-hospital setting and which technique has the highest success rate (Fennelly et al., 2020).</p> <p>LOE: 2</p>	<p>Each study reported reduction techniques for anterior shoulder dislocations.</p> <p>Mean age range of: 40.1 - 42.0</p>	<p>Hippocratic maneuver, (2) self-reduction, (3) external rotation maneuver, (4) Stimson's technique, (5) traction/counter-traction, (6) a novel 5-step technique, and (7) other unnamed techniques.</p>	<p>No significant correlation between pain and success of reduction.</p> <p>The highest success rate for first reduction attempt was observed in the study of Bokor-Billman et al. using their unnamed technique at 94.9%.</p> <p>Within the studies, surgeons showed the highest first attempt success rate of reduction compared to other specialties.</p> <p>There is no preferred technique.</p> <p>No documented data in any of the studies in regards to patient's function post reduction.</p> <p>Suggested that earlier shoulder reduction reduces risk of an unstable joint in the future.</p>	<p>displayed quantitatively.</p> <p>(-) Small sample size.            (-) Sample population only included active people. Excluded elderly and young.            (-) No research regarding post reduction function of affected extremity.            (-) Research does not compare in hospital reduction to prehospital.</p>

**Comments:**

There is only a small amount of evidence supporting prehospital shoulder joint reduction and even less evidence supporting ankle and patella reduction. Skill of the physician was a larger factor than the actual method of reduction when it came to success. All sample sizes in the studies were small and geographically limited.

**Considerations:**

Preclinical treatment of a dislocated joint is complex. With the appropriate clinical judgement and expertise, the reduction of a joint in a prehospital setting can be a safe and viable option (Fennelly et al., 2020). Current data depicts a prehospital reduction to decrease neurovascular stress, muscle spasm, and pain. However, further research is still needed. These studies were performed where there was no paramedic intervention and only emergency physicians were performing the reductions. The level of education and skill are not comparable. Several different reduction techniques were performed and not one is proven to be superior over the other.

**Clinical bottom line:**

Due to the lack of high-quality evidence supporting prehospital joint reduction, clinical practice cannot be changed for paramedics at this time.

**References**

- Fennelly, J. T., Gourbault, L., Neal-Smith, G., Pradhan, A., Gade, V., & Baxter, J. A. (2020). A systematic review of pre-hospital shoulder reduction techniques for anterior shoulder dislocation and the effect on patient return to function. *Chinese Journal of Traumatology*, 23(5), 295–301. <https://doi.org/10.1016/j.cjtee.2020.08.003>
- Helfen, T., Ockert, B., Pozder, P., Regauer, M., & Haasters, F. (2015). Management of prehospital shoulder dislocation: Feasibility and need of reduction. *European Journal of Trauma and Emergency Surgery*, 42(3), 357–362. <https://doi.org/10.1007/s00068-015-0545-5>
- Siebenbürger, G., Zeckey, C., Fürmetz, J., Böcker, W., & Helfen, T. (2018). Medical speciality, medication or skills: Key factors of prehospital joint reduction. A prospective, Multicenter Cohort Study. *European Journal of Trauma and Emergency Surgery*, 44(4), 637–642. <https://doi.org/10.1007/s00068-018-0933-8>

## Appendix

#	Query	Limits/Expanders	Last Run Via	Results
<b>S4</b>	( paramedic or ambulance or prehospital or pre-hospital ) AND ( shoulder or patella and dislocation ) AND ( reduce or reduction or relocation )	Limiters - Scholarly (Peer Reviewed) Journals; Linked Full Text; Date of Publication: 20160101-20221231 Expanders - Apply related words; Apply equivalent subjects Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE	<b>4</b>
<b>S3</b>	( paramedic or ambulance or prehospital or pre-hospital ) AND ( shoulder or patella and dislocation ) AND ( reduce or reduction or relocation )	Limiters - Full Text; Published Date: 20160101-20221231; Peer Reviewed Expanders - Apply related words; Apply equivalent subjects Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	<b>2</b>
<b>S2</b>	( paramedic or ambulance or prehospital or pre-hospital ) AND ( shoulder or patella and dislocation ) AND ( reduce or reduction or relocation )	Limiters - Full Text; Published Date: 20160101-20221231; Peer Reviewed Expanders - Apply related words; Apply equivalent subjects Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	<b>2</b>
<b>S1</b>	( paramedic or ambulance or prehospital or pre-hospital or out of hospital ) AND dislocation AND ( reduce or reduction )	Limiters - Full Text; Published Date: 20160101-20221231; Peer Reviewed Expanders - Apply related words; Apply equivalent subjects Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	<b>6</b>