Guideline 9.1.7 - First Aid Management of Crush Injury

Summary

Who does this guideline apply to?

This guideline applies to adults, adolescents and children.

Who is the audience for this guideline?

This guideline is for bystanders, first aiders and first aid providers.

Summary of Recommendations

The Australian and New Zealand Committee on Resuscitation (ANZCOR) makes the following recommendations [all Good Practice Statements]:

1. Remove all crushing forces as soon as possible if safe to do so.
2. Control external bleeding.
3. Do not routinely apply arterial tourniquets before the removal of the crushing force unless there is actual or suspected life-threatening bleeding.
4. All persons who have been subjected to crush injury, including from their own body weight, should be taken to hospital for immediate treatment.

1.0 | Introduction

Crush injuries may result from a variety of situations, including vehicle entrapment, falling debris, industrial accidents or by prolonged pressure to a part of the body due to a person's own body weight in an immobile person.[1-5] *Crush syndrome* refers to the multiple problems that may subsequently develop, most commonly as a result of crush injuries to the limbs, particularly the

legs[1]. Crush syndrome results from disruption of the body's chemistry and can result in kidney, heart and other problems. The likelihood of developing acute crush syndrome is directly related to the compression time, therefore crushed persons should be released as quickly as possible, irrespective of how long they have been trapped.[1, 2]

2.0 | Recognition

Crush injury should be suspected whenever there is a crushing force. A crush injury should be suspected whenever a part of the body is crushed or compressed or when you are unable to fully see or examine a part of the body.

Crush injury can also result from prolonged pressure to a part of the body due to the person's own body weight when immobile and may show few signs or symptoms.

Persons with crush injuries may show signs and symptoms of bleeding (Refer to ANZCOR Guideline 9.1.1, ANZCOR Guideline Shock 9.2.3 and ANZCOR Guideline First Aid Management of Hypothermia and Cold-Related Injuries 9.3.3).

A person with a crush injury may not complain of pain, and there may be no external signs of injury. All persons who have been subjected to crush injury, including from their own body weight, should be taken to hospital for immediate investigation.[2-4]

3.0 | Management

If the person is unresponsive and not breathing normally, follow ANZCOR Basic Life Support Flowchart (Guideline 8).

1. Ensure your safety and the safety of others [Good Practice Statement].
2. **Send for an ambulance** [Good Practice Statement].
3. If it is safe to do so and physically possible, remove all crushing forces from the person as soon as possible[1] [Good Practice Statement].
4. Control any external bleeding[5, 6] (Refer to ANZCOR Guideline 9.1.1) [Good Practice Statement].
5. Treat other injuries [Good Practice Statement].
6. Prevent or treat hypothermia (Refer to ANZCOR Guideline 9.3.3) [Good Practice Statement].
7. Reassure and constantly re-check the person's condition for any deterioration [Good Practice Statement].
8. If the person is unconscious and breathing normally, follow ANZCOR Guideline 3 [Good Practice Statement].

4.0 | Use of tourniquets

There is insufficient evidence to recommend the routine use of tourniquets prior to the release of a crushing force to delay the onset of reperfusion injury. We acknowledge the work of Schwartz et al in 2015[7] but are waiting for higher certainty of evidence but note difficulty in conducting this research.

Bleeding may be significant following the release of a crushing force.

ANZCOR recommends the application of tourniquet(s) where there is actual or anticipated life-threatening bleeding from a limb, before or immediately following the removal of the crushing force (Refer to ANZCOR Guideline 9.1.1), on the proviso that this should not delay release of the crushed person [Good Practice Statement].

Further Reading

- ANZCOR Guideline 8 - Cardiopulmonary Resuscitation
- ANZCOR Guideline 9.1.1 - Principles for the control of bleeding for first aiders
- ANZCOR Guideline 9.2.3 - Shock
- ANZCOR Guideline 9.3.3 - Hypothermia: First Aid and Management

References

1. Greaves I, Porter K, Smith JE. Consensus statement on the early management of crush injury and prevention of crush syndrome. J R Army Med Corps. 2003;149(4):255-9.
2. Aoki N, Demsar J, Zupan B, Mozina M, Pretto EA, Oda J, et al. Predictive model for estimating risk of crush syndrome: a data mining approach. J Trauma. 2007;62(4):940-5.
3. Brown A, Nicholls R. Crush Syndrome: A report of 2 cases and a review of the literature. Brit J Surg. 1977;62(4):397-402.
4. Burns K, Cone DC, Portereiko JV. Complex extrication and crush injury. Prehosp Emerg Care. 2010;14(2):240-4.
5. Jagodzinski NA, Weerasinghe C, Porter K. Crush injuries and crush syndrome - A review. Part 1: The systemic injury. Trauma. 2010;12(2):69-88.
6. Hatamizadeh P, I N, Vanholder R, Rashid-Farokhi F. Epidemiological aspects of the Bam Earthquakes in Iran: the Nephrological Perspective. M J Kid Dis. 2006;47(3):428-38.
7. Schwartz DS, Weisner Z, Badar J. Immediate Lower Extremity Tourniquet Application to Delay Onset of Reperfusion Injury after Prolonged Crush Injury. Prehosp Emerg Care. 2015;19(4):544-

About this Guideline

Search date/s	First Search 2018. Most recent search September 2024
Question/PICO:	The PICOST (Population, Intervention, Comparator, Outcome, Study Designs and Timeframe) *Population:* Adults, children and infants out of hospital with a crush injury or sustained crushing force. *Intervention:* Any intervention by a lay (not HCP) provider. *Comparators:* Any other intervention or none. *Outcomes:* Improve survival to hospital discharge or length of stay, or reduced complications or sequelae of the injury . *Study Designs:* Randomized controlled trials (RCTs) and non-randomized studies (non-randomized controlled trials, interrupted time series, controlled before-and-after studies, cohort studies) are eligible for inclusion. It is anticipated that there will be insufficient studies from which to draw a conclusion, hence case series may be included in the initial search. The minimum number of cases will be set by the lead author after discussion with the subcommittee. Grey literature and social media and non-peer reviewed studies, unpublished studies, conference abstracts and trial protocols are eligible for inclusion as well. All relevant publications in any language will be included as long as there is an English abstract. *Timeframe:* All years
Method:	Search of Pubmed, CochraneLibrary and grey literature
Primary reviewers:	Finlay Macneil
Other consultation	N/A
Major changes	Guideline Reviewed. No change to current guideline published in 2019
Worksheet	Insert link to Excel doc
Approved:	June 2025
Guidelines superseded:	July 2019

Referencing this guideline

When citing the ANZCOR Guidelines we recommend:

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