

## 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.

#### Recommendations

The Australian and New Zealand Committee on Resuscitation (ANZCOR) make the following recommendations:

1. Removing all crushing forces as soon as possible.
2. Controlling external bleeding.
3. Avoiding routinely applying an arterial tourniquet prior to the removal of the crushing force unless there is actual or suspected life-threatening bleeding.

#### Level of Evidence

Level IV

#### Class of Recommendation

Class A - Recommended

## 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 their 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.<sup>1,2</sup>

## 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 their own body weight in an immobile person and may show few symptoms or signs.

Persons with crush injuries may show symptoms and signs of bleeding ([Guideline 9.1.1](#)), shock ([Guideline 9.2.3](#)) and hypothermia ([Guideline 9.3.3](#)).

A person with a crush injury may not complain of pain and there may be no external signs of injury. Any person who has been subjected to crush injury, including from their own body weight, should be taken to hospital for immediate investigation.<sup>2-4</sup>

## 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
2. **Call an ambulance**
3. If it is safe to do so and physically possible, remove all crushing forces from the person as soon as possible<sup>1</sup>
4. Control any external bleeding<sup>5,6</sup> ([Guideline 9.1.1](#))
5. Treat other injuries
6. Maintain body temperature (prevent hypothermia)
7. Reassure and constantly re-check the person's condition for any deterioration
8. If the person is unconscious and breathing normally, follow ANZCOR [Guideline 3](#) Recognition and First Aid Management of the Unconscious Victim.

## 4.0 | Use of tourniquets

There is insufficient evidence to recommend the routine use of a tourniquet prior to the release of a crushing force to delay the onset of reperfusion injury. The application of a tourniquet is recommended where there is life-threatening bleeding from a limb before or immediately following the removal of the crushing force ([Guideline 9.1.1](#)). Bleeding may be significant following the release of a crushing force.

A tourniquet may be put into position prior to the release of the crushing force in anticipation of life-threatening bleeding but this should not delay the release of the crushed person.

## References

1. Greaves, I, Porter, K and 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. Predictive modelling for estimating risk of crush syndrome: a data mining approach. *J Trauma.* 2007;62(4):940-5
3. Brown, AA and Nicholls, RJ, Crush syndrome: A report of 2 cases and a review of the literature. *Brit J Surg.* 1977;64(6):397-402
4. Burns, K, Cone, DC, Portereiko, J.V. Complex extrication and crush injury. *Prehosp Emerg Care.* 2010;14(2):240-4
5. Jagodzinski, NA, Weerasinghe, C and Porter, K, Crush injuries and crush syndrome - A review. Part 1: The systemic injury. *Trauma.* 2010;12(2):69-88
6. Hatamizadeh, P, Najafi, I, Vanholder, R, Rashid-Farokhi, F, et al., Epidemiologic Aspects of the Bam Earthquake in Iran: The Nephrologic Perspective. *Am J Kid Dis.* 2006;47(3):428- 38
7. Zideman, D. A., Singletary, E. M., De Buck, E., et al. (2015). Part 9: First aid: 2015 International Consensus on First Aid Science with Treatment Recommendations. *Resuscitation*, 95, e225. [http://www.cprguidelines.eu/assets/downloads/costr/S0300-9572\(15\)00368-8\\_main.pdf](http://www.cprguidelines.eu/assets/downloads/costr/S0300-9572(15)00368-8_main.pdf) Accessed 20/9/2019

## 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](#)

## About this Guideline

<b>Search date/s</b>	Jan 2013 – Feb 2019
<b>Question/PICO:</b>	<p>P: Out of hospital crush injury</p> <p>I: i) All interventions  ii) Early remove crushing force  iii) Apply tourniquet before remove crushing force</p> <p>C: i) no intervention  ii) Delayed removal crushing force  iii) No tourniquet before remove crushing force</p> <p>O: i) Survival  ii) Sudden cardiac arrest  iii) Renal failure</p>
<b>Method:</b>	Literature Review for evidence published since last review (2013) leading to NHMRC Level of evidence
<b>Primary reviewers:</b>	Finlay Macneil; Jason Bendall
<b>Other consultation</b>	ANZCOR Member Organisations
<b>Worksheet</b>	<a href="https://resus.org.au/worksheets-to-support-guidelines/">https://resus.org.au/worksheets-to-support-guidelines/</a>
<b>Approved:</b>	November 2019
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