Guideline 9.4.8 - Envenomation - Pressure Immobilisation Technique

Introduction

The pressure immobilisation technique (PIT) was introduced for the treatment of Australian snake bites[1] and is suitable for other elapid snake bites.[2] It is also recommended for envenomation by a number of other animals. The PIT retards the flow of lymph[3] by which venoms gain access to the circulation.

It has also been shown that there may be inactivation of certain venoms and venom components when the injected venom remains trapped in the tissues by the pressure bandage.[4]

Use of the Pressure Immobilisation Technique

The Pressure Immobilisation Technique (PIT) **is** recommended for application to bites and stings by the following creatures:

- All Australian venomous snakes, including sea snakes [Class A; LOE III]
- Funnel Web spider [Class A; LOE IV]
- Blue-ringed octopus [Class B; LOE Expert Consensus Opinion]
- Cone shell [Class B; LOE Expert Consensus Opinion]

The Pressure Immobilisation Technique is **NOT** recommended for the first aid management of:

- other spider bites including redback;
- jellyfish stings;
- fish stings including stonefish bites
- stings by scorpions, centipedes or beetles.

The evidence for PIT evolved from small-scale animal studies, and tracer studies in humans. No field based direct comparisons of first aid techniques in humans affected by snakebite exist. Where

field based studies have reported outcomes after application of PIT no clear benefit has been shown. This may be confounded by poor quality PIT application, as most observational studies report inadequately applied PIT in the field.[5-7] It has not been shown clearly which component of the PIT inadequately applied (the local pressure, the full limb bandaging or the limb immobilisation) is potentially causative of the lack of observed clinical efficacy, if not all three. There is insufficient evidence to determine which technique or method of bandage application is most effective in the field in minimizing venom absorption. Techniques reported include local pressure first then a fully limb encircling pressure bandage, or a limb encircling bandage only. Furthermore whilst commencing the encircling bandage distally and moving proximally may improve comfort and tolerance of the bandage, it may act to increase venom movement. Starting proximally and working distally may further minimise venom movement but may cause distal oedema /fluid retention and make the bandage too uncomfortable for prolonged use. Training (using manometer feedback) has been shown to improve the pressure achieved with PIT, and the use of elasticised bandages may also improve the pressure obtained in PIT application.[5, 6] [Class A; LOE: III-2]

Management

If resuscitation is needed it takes precedence over the PIT (refer to ANZCOR Guideline 8). However the resuscitation team should apply PIT as soon as possible to potentially minimise further venom flow.

If on a limb, apply a broad pressure bandage over the bite site as soon as possible.. Elasticised bandages (10-15cm wide) are preferred over crepe bandages, if neither are available, clothing or other material should be used.[5] [Class A; LOE: III-2]The bandage should be firm and tight, you should be unable to easily slide a finger between the bandage and the skin.

In order to further restrict lymphatic flow and to assist in immobilisation of the limb, apply a further pressure bandage, commencing at the fingers or toes of the bitten limb and extending upward covering as much of the limb as possible.[3] [Class A; LOE: III-2] The bandage should be applied over existing clothing if possible. The purpose of this bandage is to further restrict lymphatic flow and assist immobilisation. (Alternatively, a single bandage may be used to achieve both pressure on the bite site and immobilisation of the limb. In this method, the bandage is initially applied to the fingers or toes and extended up the limb as far as possible including the bite site).[4, 8] [Class A; LOE: Expert Consensus Opinion].

Splint the limb including joints on either side of the bite, to restrict limb movement. The splint material can be incorporated under the layers of the bandage. For the upper limb, use a sling. [Class A; LOE: Expert Consensus Opinion].

Keep the victim and the limb completely at rest. Bring transport to the victim if possible. Transport the victim to medical care, preferably by ambulance. If alone, the victim should apply the pressure immobilisation bandage as completely as possible over the bite site and affected limb. They should keep immobile until assistance arrives. If they are unable to obtain urgent help to come to them,

then apply local pressure if possible, immobilisation is contraindicated and they should move themselves to seek urgent help. Do not remove the bandages or splints before evaluation in an appropriate hospital environment. [Class A; LOE: Expert Consensus Opinion]

If the bite is not on the limb, firm direct pressure on the bite site may be useful. Do not restrict breathing or chest movement and do not apply firm pressure to the neck or head. [Class A; LOE: Expert Consensus Opinion]

Note:

- DO NOT cut or excise the bitten area, or attempt to suck venom from the bite site.
- DO NOT wash the bitten area.
- DO NOT apply an arterial tourniquet. (Arterial tourniquets that cut off circulation to the limb, are potentially dangerous and are not recommended for any type of bite or sting in Australia)

References

1. Sutherland SK, Coulter AR, Harris RD. Rationalisation of first-aid measures for elapid snakebite. *Lancet* 1979; **1**: 183-185.
2. Gauthier N, Thomas S. Consensus on ECC & CPR Science and Treatment Recommendations. First Aid worksheet 270: What is the safety, efficacy and feasibility of compressive wrapping for coral snake (elapid) envenomation? 2005: Retrieved 18 July 2011 from http://circ.ahajournals.org/content/2112/2022_suppl/b2011/suppl/DC2443.
3. Howarth DM, Southee AE, Whyte IM. Lymphatic flow rates and first-aid in simulated peripheral snake or spider envenomation. *Medical Journal of Australia* 1994; **161**: 695-700.
4. Sutherland SK, Tibballs J. *Australian Animal Toxins*. Melbourne: Oxford University Press 2001.
5. Canale E, Isbister GK, Currie BJ. Investigating pressure bandaging for snakebite in a simulated setting: bandage type, training and the effect of transport. *Emergency Medicine Australasia* 2009; **21**: 184-190.
6. Norris RL, Ngo J, Nolan K, Hooker G. Physicians and lay people are unable to apply pressure immobilization properly in a simulated snakebite scenario. *Wilderness & Environmental Medicine* 2005; **16**: 16-21.
7. Simpson ID, Tanwar PD, Andrade C, Kochar DK, Norris RL. The Ebbinghaus retention curve: training does not increase the ability to apply pressure immobilisation in simulated snake bite--implications for snake bite first aid in the developing world. *Transactions of the Royal Society of Tropical Medicine & Hygiene* 2008; **102**: 451-459.
8. Sutherland SK, Hawdon GM, Winkel KD. *First aid for snake bite in Australia* Melbourne: Australian Venom Research Unit. The University of Melbourne 1999.

Further Reading

ANZCOR Guideline 8 - Cardiopulmonary Resuscitation

Ireland G, Brown SGA, Buckley NA, Stormer J, Currie BJ, White J, et al. Changes in serial laboratory test results in snakebite patients: when can we safely exclude envenoming? *Medical Journal of Australia*, 2010;193:285-90.

Anker RL, Straffon WG, Loiselle DS and Anker KM, Retarding the uptake of "mock venom" in humans: comparison of three first-aid treatments. Medical Journal of Australia 1982: 1(5);212-4

Bush SP, Green SM, Laack TA, Hayes WK, Cardwell MD and Tanen DA, Pressure immobilization delays mortality and increases intra-compartmental pressure after artificial intramuscular rattlesnake envenomation in a porcine model. Annals of Emergency Medicine 2004: 44(6);599-604

German BT, Hack JB, Brewer K and Meggs WJ, Pressure-immobilization bandages delay toxicity in a porcine model of eastern coral snake (*Micrurus fulvius fulvius*) envenomation. Annals of Emergency Medicine 2005: 45(6);603-8

Meggs WJ, Courtney C, O'Rourke D and Brewer KL, Pilot studies of pressure-immobilization bandages for rattlesnake envenomations. Clinical Toxicology: The Official Journal of the American Academy of Clinical Toxicology & European Association of Poisons Centres & Clinical Toxicologists 2010: 48(1);61-3

Pe T, Mya S, Myint AA, Aung NN, Kyu KA and Oo T, Field trial of efficacy of local compression immobilization first-aid technique in Russell's viper (Daboia russelii siamensis) bite patients. Southeast Asian Journal of Tropical Medicine & Public Health 2000: 31(2);346-8

Sutherland SK and Coulter AR, Early management of bites by the eastern diamondback rattlesnake (Crotalus adamanteus): studies in monkeys (Macaca fascicularis). American Journal of Tropical Medicine & Hygiene 1981: 30(2);497-500

Sutherland SK, Coulter AR and Harris RD, Rationalisation of first-aid measures for elapid snakebite. Lancet 1979: 1(8109);183-5

Pe T, Muang Muang T, Myint Myint T, Aye Aye M, Kyaw M and Thein T, The efficacy of compression immobilization technique in retarding spread of radio-labeled Russell's viper venom in rhesus monkeys and 'mock venom' NaI131 in human volunteers. Southeast Asian Journal of Tropical Medicine & Public Health 1994: 25(2);349-53

About this Guideline

Search date/s	2011
Question/PICO:	Not available
Method:	Literature review
Primary reviewers:	Not available

Other consultation	
Worksheet	Not available
Approved:	2011
Guidelines superseded:	9.4.8

Referencing this guideline

When citing the ANZCOR Guidelines we recommend:

ANZCOR, 2026, Guideline 9.4.8 - Envenomation - Pressure Immobilisation Technique, accessed 29 September 2026, https://www.anzcor.org/home/first-aid/guideline-9-4-8-envenomation-pressure-immobilisation-technique