



World Water Safety

INTERNATIONAL LIFE SAVING FEDERATION

Gemeenteplein 26 – 3010 Leuven – Belgium
Tel: (32.16) 89.60.60 – E-mail: ils.hq@telenet.be - Web: www.ilsf.org

MEDICAL POSITION STATEMENT - MPS 21

SPINAL INJURY MANAGEMENT

NOTE: This statement is intended for those lifeguards, acting in a professional or volunteer capacity, who are trained in the techniques of water rescue and resuscitation and who assume a duty to safeguard members of the public at aquatic sites. They may be called lifeguards, lifesavers or both. This statement is not directed at members of the public trained in water safety and rescue techniques, but without a duty to respond, who may also be known, in some areas of the world, as lifesavers.

BACKGROUND

The spine is made up of 33 separate bones, known as vertebrae, extending from the base of the skull to the coccyx (tailbone). Each vertebra surrounds and protects the spinal cord (nerve tissue). Fractures or dislocations to the vertebral bones may result in injury to the spinal cord. The direct mechanical injury from the traumatic impact can compress or sever the nerve tissue. This is followed by secondary injury caused by ongoing bleeding into the spinal cord as well as continued swelling at the injured site and surrounding area.

The possibility of spinal injury must be considered in the overall management of all aquatic rescue victims. The risk of worsening the spinal injury in the prehospital period is probably less than previously thought, yet to minimise the extent of the secondary injury, caution must be taken when moving a victim with a suspected spinal injury.

Spinal injuries can occur in the following regions of the spine:

- the neck (cervical spine)
- the back of the chest (thoracic spine)
- the lower back (lumbar spine)

The cervical spine is most vulnerable to injury, with more than half of spinal injuries occurring in the cervical region. Approximately 10% of traumatic spinal cord injuries are aquatic related and include accidents whilst swimming, surfing, diving or jumping into a body of water.

(ref <http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=6442458862>)

STATEMENT

Management of suspected spinal injury should follow the principle of “do no further harm”. An awareness of potential spinal injury and careful victim handling, with attention to spinal alignment, is the key to harm minimisation.

The management principles of the victim with a suspected spinal injury are:

- Immediate recognition of the potential for spinal injury
- Minimal movement and handling of victim
- Immediate assessment of the victim (life-support)
- Immediate spinal care with manual techniques
- Early transfer for definitive assessment and care

Ideally, the recommendation for lifeguards to manage victims with suspected spinal injury using manual techniques rather than with a semi-rigid collar would be part of a system wide approach to the management of suspected spinal injury, with every provider in the chain of care acting consistently, within an agreed management framework.

The Conscious Victim

Tell the victim to remain still but do not physically restrain if unco-operative. Those with significant spinal pain will likely have muscle spasm which acts to splint their injury. Keep victim still, warm and comfortable until help arrives.

If it is necessary to move the victim from danger (i.e. out of the water or off a road), care must be taken to support the injured area and minimise movement of the spine in any direction. Ideally, only first aiders or health care providers trained in the management of spinal injuries, aided by purpose specific equipment, should move the victim.

The Unconscious Victim

Suspected spinal injuries of the neck, particularly if the victim is unconscious, pose a dilemma for the rescuer because correct principles of airway management often cause some movement of the cervical spine.

Airway management takes precedence over any suspected spinal injury. It is acceptable to gently move the head into a neutral position to obtain a clear airway. If the victim is breathing but remains unconscious, it is preferable that they be placed in the recovery position. They should be handled gently with no twisting. Aim to maintain spinal alignment of the head and neck with the torso, both during the turn and afterwards. In victims needing airway opening, use manoeuvres which are least likely to result in movement of the cervical spine. Jaw thrust and chin lift should be tried before head tilt.

SPINAL IMMOBILISATION TECHNIQUES AND DEVICES

The clinical importance of prehospital immobilisation in spinal trauma remains unproven. There have been no randomised controlled trials to study immobilisation techniques or devices on trauma victims with suspected spinal cord injury. All existing studies have been retrospective or on healthy volunteers, manikins or cadavers¹.

Prehospital spinal immobilisation has never been shown to affect outcome and the estimates in the literature regarding the incidence of neurological deterioration due to

inadequate immobilisation may be exaggerated. Spinal immobilisation can expose victims to the risks associated with specific devices and the time taken in application leads to delays in time to removal from the water, extrication time and transport time.^{2,3,4}

Manual In-line Stabilisation

The lifeguard can provide manual stabilisation by standing behind an upright victim or lying/kneeling above the head of a supine victim. He/she should hold the victim's head, whilst stabilising their own arms or resting their elbows on the ground. The aim is to maintain the victim's head in a natural, neutral position aligned with the body, thus avoiding side to side movements. In healthy adults lying supine, padding under the head to lift it 2cm above the level of the body optimises the neutral position.^{5,6}

Cervical Collars

The use of cervical collars by first aid providers is not recommended by the International Liaison Committee on Resuscitation (weak recommendation, low quality evidence)⁷. Consistent with the first aid principle of preventing further harm, the potential benefits of applying a cervical collar do not outweigh harms such as increased intracranial pressure, pressure injuries or pain and unnecessary movement that can occur with the fitting and application of a collar.

The potential adverse effects of cervical collars increase with duration of use and include:

- unnecessary movement of the head and neck with the sizing and fitting of the collar
- discomfort and pain
- restricted mouth opening and difficulty swallowing⁸
- airway compromise should the victim vomit⁸
- pressure on neck veins raising intra-cranial pressure⁹ (harmful to head injured victims)
- hiding potential life-threatening conditions¹⁰

In some countries lifeguards will be required to comply with regulations and protocols that align with the care competencies of the ambulance and emergency medical services (EMS). Lifeguard services able to independently develop policies on spinal care can be confident in the knowledge that not using semi-rigid spinal collars is an internationally accepted level of first aid care.

Spinal Boards

Rigid backboards placed under the victim can be used by lifeguards should it be necessary to move the victim. Where resources allow, manual in-line stabilisation (as described above) should be applied to stabilise the head and neck and the victim should be adequately immobilised prior to moving or lifting the victim.^{11,12} The benefits of stabilizing the head will be limited unless the motion of the trunk is also controlled effectively during transport.¹²

Victims should not be left on rigid spinal boards. Healthy subjects left on spine boards develop pain in the neck, back of the head, shoulder blades and lower back. The same areas are at risk of pressure necrosis.^{13,14,15} Conscious victims may attempt to move around in an effort to improve comfort, potentially worsening their injury.

Paralysed or unconscious victims are at higher risks of development of pressure necrosis due to their lack of pain sensation. Strapping has been shown to restrict breathing and should be loosened if compromising the victim.^{16,17}

Victims may be more comfortable on a padded spine board, air mattress or bead filled vacuum mattress; devices used by some ambulance services.^{18,19}

Log Roll

The log roll is a manoeuvre performed by a trained team, to roll a victim from a supine position onto their side, and then flat again, so as to better manage the airway, examine the back and/or to place or remove a spine board.²⁰

Children

If co-operative, children can have manual in-line stabilisation applied. An uncooperative child struggling with their head in a fixed position causes movement at the neck. Children less than eight years old require back elevation of 2.5cm for neutral spinal alignment.²¹

LEVEL OF EVIDENCE

This document is based on the International Consensus on Science Treatment Recommendations and expert consensus.

POTENTIAL CONFLICT OF INTEREST STATEMENT

None of the participants in the consensus process leading to this position statement has a conflict of interest with the stakeholder industry, technology, persons or organisations that are identified and/or impacted by the position statement.

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APPROVAL

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