**How to use PRiCE treatment for soft tissue injuries**


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**Cormac Norton**
Senior lecturer in emergency care/adult nursing, De Montfort University Leicester, Leicester, England

**Correspondence**
c.norton@dmu.ac.uk

**Conflict of interest**
None declared

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**Keywords**
clinical procedures, clinical skills, first aid, musculoskeletal injury, PRiCE, soft tissue injuries

**Rationale and key points**
This article assists nurses to use the acronym PRiCE (protection, rest, ice, compression and elevation) to guide the treatment of patients with uncomplicated soft tissue injuries to their upper or lower limbs.

- Treatment of soft tissue injuries to limbs is important to reduce complications following injury, alleviate pain and ensure normal limb function is restored promptly.
- Nurses should have an understanding of the rationale and evidence base supporting PRiCE treatment of soft tissue injuries.
- Providing accurate information to patients and carers about the management of soft tissue injuries and anticipated recovery time is an important aspect of treatment.
- Further research is required to develop best practice in the treatment of soft tissue injuries.

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**Preparation and equipment**
- The nurse should provide a clear explanation of, and rationale for PRiCE (protection, rest, ice, compression and elevation) treatment, and obtain informed consent from the patient.
- The patient should be made comfortable. Appropriate analgesia should be provided, where necessary. A simple systemic analgesic, for example paracetamol or ibuprofen, may be considered if the patient has not already self-administered this, or had this administered following arrival at the clinical area. Mandatory medicine prescription and administration protocols should be followed.
- The nurse should remove any clothing and jewellery from the affected limb.
- The nurse should ensure that the necessary equipment is available, including:
  - An ice pack or cold gel pack with a suitable covering, for example a towel.
  - Compression material in a range of sizes, including an applicator.
  - A method to elevate the limb. The method used depends on the location of the injury. For lower limb injuries, methods of elevation include the use of pillows or blankets, or a made-for-purpose device such as a wedge. For upper limb injuries, methods of elevation include the use of triangular
bandages, Bradford slings or collar and cuff slings.

The nurse should provide the patient with printed information on the management of the injury. This should include the rationale for PRICE treatment and the anticipated length of time until recovery. It is important that patients have an understanding of the length of time it may take for musculoskeletal injuries to heal, to encourage them to continue with the treatment regimen.

Procedure
1. Undertake appropriate infection prevention measures, including hand hygiene.

Protection and rest
2. The patient will be primarily responsible for the protection and rest elements of treatment, which are discussed in the evidence-base section of this article. It is important to provide reassurance and advice to the patient. Patient concordance with treatment is essential, because this prevents further injury and may reduce the time it takes to return to normal limb function. Patients should be made aware of the potential risk of developing pressure ulcers if they maintain the same position for a prolonged period. Frequent changes in position are necessary for patients who have reduced mobility to prevent this complication. Risk assessment tools are useful in identifying patients at increased risk of developing pressure ulcers. Examples include the Waterlow Score (Waterlow 2005) and the Andersen pressure ulcer risk assessment (Andersen et al 1982).

Ice
3. Apply an ice pack or cold gel pack to the affected limb. Ice packs or cold gel packs should not be applied directly to the skin, since this may damage the skin. If ice is used, it should be placed in a plastic bag, and a protective material such as a towel should be used to cover the bag. Cold gel packs are increasingly available as an alternative to ice packs. Cold gel packs are often supplied with protective covers. These are used to prevent skin damage, and contribute to infection prevention.

4. Leave the ice pack or cold gel pack in place for 15-20 minutes. Wait at least 2 hours before subsequent applications. This process should be repeated regularly for a minimum of 48 hours.

Compression
5. The most common method of compression involves the use of tubular bandages. Practitioners in some practice settings may also have access to compression garments such as compression stockings.

Tubular bandages
» Select the appropriate size of tubular bandage using the method specified by the product manufacturer.
» Prepare the bandage as necessary, for example by cutting a hole for the thumb when treating upper limb injuries.
» Apply the bandage from joint to joint, for example from the wrist to elbow. Partial application can lead to discomfort and oedema in the limb. Care should be taken to check for any evidence of skin irritation or degradation, suggesting that the compression material is causing a pressure ulcer. If this is the case, the material should be removed.
» Use the applicator to apply the bandage where necessary, considering patient comfort. Be aware that it is not uncommon for an elasticated bandage to slip off the applicator towards the end of application and that this can lead to discomfort for the patient.

Compression garments
» Follow the manufacturer’s instructions for sizing and applying compression garments. Details of the process will vary depending on the manufacturer and site of application.
» Seek expert advice and take particular care when applying compression garments for patients with peripheral
vascular disease or where there are wounds in the affected area.

**Elevation**

6. Elevate the affected limb. Elevation is central to the treatment of soft tissue injuries. The method of elevation will depend on the site of injury. Reduced swelling leads to the return of normal limb functioning and can reduce recovery time significantly (Tsang et al 2003, Collins 2008). When elevating the limb, consider the potential for pressure ulcer development. Bony prominences, for example the olecranon process, calcaneus or malleolus, may be subject to pressure during elevation. This can be avoided through the use of suitable cushioning material, such as a pillow or blanket, and positioning the patient to avoid compression of bony prominences.

**Upper limb**

Use a sling for distal limb injuries, for example to the hand or wrist:

» Apply a triangular bandage using a high-arm sling method. This results in the affected part of the patient's limb resting on their opposite shoulder (Figure 1). Use a sling or collar and cuff sling for proximal injuries, for example to the elbow:

» Apply a triangular bandage using a broad-arm sling method. This results in the patient having their arm across the chest (Figure 2). If a purpose-designed bandage is unavailable, it is acceptable to use a sheet or similar material to form a bandage as a first aid measure.

» Alternatively, apply a collar and cuff sling, which is often preferred since it is lightweight and comfortable on the patient’s neck. This results in the patient having their arm across the chest, in a similar way to a broad-arm sling.

**Lower limb**

Elevation may be implemented in the clinical setting or as a first aid measure. However, it is likely that the patient will be asked to undertake this activity at home. It is important to:

» Position the patient or ask them to lie in a comfortable, supine position.

» Elevate the affected limb using the appropriate equipment. This may involve the use of pillows or blankets in the home.

» Elevate the limb to such a degree that the affected area is higher than the patient’s hips. This will allow oedema to drain effectively.

**Education and advice**

7. Provide the patient with education and advice as follows:

» The patient should be made aware that soft tissue injury healing time varies from person to person. This can vary from 4-6 weeks to several months, depending on the severity of the injury and individual factors such as age. Other factors that may have an effect on healing include the presence of a musculoskeletal disorder, for example osteoarthritis, and medicines use, for example corticosteroid treatment.

» The application of ice may only be effective in the initial inflammatory...
phase. Therefore, the patient should restrict the use of ice to the first 72 hours following injury (NHS Choices 2015).

- The patient should be encouraged to maintain elevation at rest, and begin normal movement of the limb, as soon as comfort permits.
- The patient should be advised to contact the health service as a matter of urgency in the event of any loss of sensation or change of colour in the limb.

**Evidence base**

Historically, the treatment of soft tissue injuries has been guided by the use of the acronym RICE (rest, ice, compression and elevation). However, in recent years this has been adapted to include protection, indicated by the acronym PRICE.

The use of ice and elevation to treat soft tissue injuries has been recommended for many years (Bleakley 2013). Evidence suggests that all components of PRICE treatment result in reduced swelling and tissue damage, increased comfort and reduced length of time to return to normal functioning (Collins 2008). The effectiveness of all aspects of PRICE treatment are affected by patient concordance with recommended treatment, since the reduction of swelling and return to normal functioning takes time (Witjes et al 2012).

While there is limited level 1 research, for example randomised controlled trials, to prove the effectiveness of PRICE treatment definitively, there is sufficient evidence to support its continued use (van den Bekerom et al 2012, Bleakley 2013, Kaminski et al 2013).

Protection and rest are essential components of PRICE treatment. Protection refers to ensuring that no further injury is sustained. This may involve the use of a splint for some patients; however, it is not within the remit of this article to discuss this aspect of management. Rest is a relative term. Patients should be advised not to exert the affected limb, since this could exacerbate the inflammation and swelling. However, it is important that patients commence normal movement of the limb as soon as possible and if comfort permits, since there is evidence that excessive rest can inhibit recovery (Bleakley 2013).

Soft tissue will undergo an inflammatory response in the initial phase following injury (Tortora and Derrickson 2014). Some tissue oedema is essential for healing. However, protracted oedema adversely affects normal mobility of the limb. Reduced oedema leads to increased mobility that enables return to normal function, for example a greater range of movement or load bearing.

Consideration of pressure area injury is important. It is effective practice to undertake a pressure ulcer risk assessment in any patient whose mobility would be adversely affected (Guy 2012). Prevention of tissue damage related to pressure is essential where a patient has reduced mobility as a result of the injury, or potentially because of PRICE treatment. The surface on which the patient elevates their limb can have a significant effect on the risk of developing a pressure injury. For example, a solid surface such as a table or a chair without a cushion could increase the patient’s risk of developing a pressure ulcer (Norton et al 2011). Simple actions such as the provision of a cushion, gel-based rest or air-filled, products may be sufficient to prevent this complication (Haugen et al 2011).

The application of ice (cryotherapy) to soft tissue injuries is advocated (NHS Choices 2015). There is no evidence of harm when the treatment is applied correctly. However, there is limited evidence regarding the efficacy of this treatment in reducing time to return to normal function and recovery (Collins 2008). The application of ice can provide some pain relief, which can justify its use as a component of treatment (Hubbard and Denegar 2004).

Oedema following soft tissue injury leads to increased pain and reduced mobility for the patient. Compression and elevation following soft tissue injuries are effective in reducing traumatic oedema (Tsang et al 2003, Bendahou et al 2014). However, the reduction in swelling is transient, such that the swelling returns as soon as elevation and/or compression are removed.
(Tsang et al 2003). This is relevant to treatment and the patient should be advised that elevation may be required for a substantial period of time. Bendahou et al (2014) found that the time taken to return to normal walking following ankle sprain varied from 25 to 75 days. This can be inconvenient for the patient, and may have a significant effect on their occupation or education in the short term. To encourage concordance with treatment, it should be explained to patients and carers that the chance of a full recovery and return to normal function is increased if oedema can be reduced and the normal range of movement and load-bearing are restored (Bleakley 2013). Healing time varies significantly between individuals, for example, from 6 weeks to 3 months for ankle injuries (Kerkhoffs et al 2012, Witjes et al 2012). If patients are advised of this, they are more likely to be concordant with the recommended treatment regimen.

Further research is required to develop best practice in the treatment of soft tissue injuries. There is no evidence to suggest that cryotherapy and compression materials cause harm when applied correctly. However, their efficacy remains questionable. It is likely that PRICE treatment will be adapted in response to new evidence as this becomes available. It is possible that optimal loading (weight bearing) will be included in the PRICE treatment protocol, changing the acronym to POLICE (protection, optimal loading, ice, compression and elevation) (Bleakley et al 2012). Meanwhile, PRICE treatment remains the best option available to nurses managing patients with soft tissue injuries.

References


