

Non-steroidal anti-inflammatory drugs are often used for analgesia in soft tissue injury. The evidence to support this is weak, plus NSAIDs may even delay healing

Evidence on NSAID use in soft tissue injuries

In this article...

- › Pain relief to choose for soft tissue injuries
- › The role of inflammation in healing
- › The risks and benefits of NSAIDs

Author Kyle Williams is junior charge nurse and supervised practitioner in emergency care at the emergency department, Royal Gwent Hospital, Newport.

Abstract Williams K (2012) Evidence on NSAID use in soft tissue injuries. *Nursing Times*; 108: 45, 12-14.

This article explores the evidence on the use of non-steroidal anti-inflammatory (NSAID) medications in the management of acute soft tissue injuries such as sprains.

NSAIDs have been used for these injuries, on the basis that they reduce pain and lead to a stronger and more effective return to function. However, there is little evidence in support of the latter, and a growing body of evidence is suggesting NSAIDs can delay healing due to their effect on inflammation. The potential side-effects of NSAIDs are another cause for concern.

Paracetamol has been proven to be an effective and safe analgesic that does not interfere with the healing process, and should be the first choice of analgesia.

Those of us working in emergency, urgent or primary care regularly come into contact with patients who have sustained soft tissue injuries. For example, it is estimated that ankle sprains can account for up to 10% of an average emergency department's presentations (Lynam, 2006).

Evidence suggests that those who receive appropriate management within the first 48 hours have an improved outcome in terms of quality and time taken to return to normal function. Along with RICE (rest, ice, compression and elevation) and gentle controlled mobilisation, the assessment and management of pain is an important

part of management (Braund, 2006).

It is essential that the right analgesic agent is chosen in the right circumstances and for the right person. While, over the years, NSAIDs have been commonly used in the management of such injuries, emerging evidence is questioning their use. Concerns have been raised due to their side-effect profile and method of action, which, it is thought, can delay healing time.

To find out more, I undertook a literature search and collated evidence using a range of online databases. I searched for keywords including "soft-tissue injury", "sprain" and "management", "NSAID", "non-steroidal anti-inflammatory", "ibuprofen" and "diclofenac".

Inflammatory phase of healing

The inflammatory phase is an important part of healing and, without it, healing would not occur. Inflammation is characterised by redness, swelling, pain and heat.

Injury to soft tissue triggers a number of pro-inflammatory responses. To begin with, to limit local haemorrhage, vasoconstriction occurs and platelets aggregate, lining the sides of damaged capillaries. The inflammatory process then continues with the production of prostaglandins. These increase local blood flow, vascular permeability and the production of pain-producing chemical mediators that attract inflammatory cells to the site of injury (Hertel, 1997). The body uses inflammation in part to limit use, therefore reducing the chance of further harm and injury (Hertel, 1997).

Inflammatory cells also include macrophages that remove debris; fibroblasts are then introduced to repair damaged tissue (Bowie, 2011; Stovitz and Johnson, 2003).

5 key points

1 Ankle sprains account for up to 10% of attendances at emergency departments

2 Rest, ice, compression and elevation (RICE) is the cornerstone of treatment of soft tissue injuries

3 For those requiring pain relief, paracetamol should be used as a first step

4 NSAID use may impede the inflammatory phase of healing

5 Gastro-intestinal symptoms are experienced by 10%-30% of people using NSAIDs

Advantages and disadvantages of NSAIDs

NSAIDs such as ibuprofen and diclofenac have over the years been routinely prescribed or recommended for the reduction of pain and swelling associated with acute soft tissue injuries, on account of having both analgesic and anti-inflammatory effects (Paoloni and Orchard, 2005).

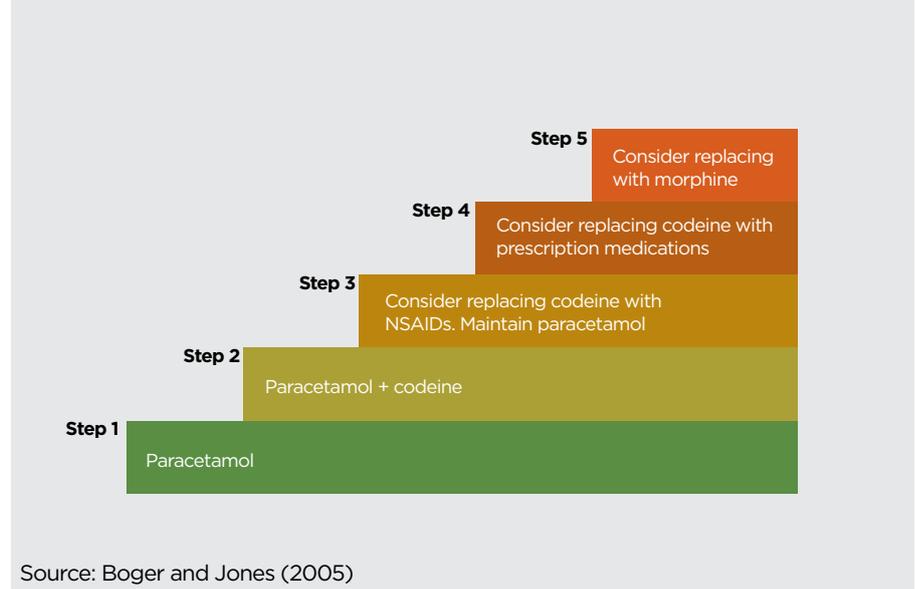
NSAIDs work primarily through their ability to inhibit the enzyme cyclooxygenase (Cox), which in turn blocks the production of pro-inflammatory mediators such as prostaglandins (Jordan and White, 2001); it is this Cox inhibition that allows NSAIDs to reduce pain, swelling and oedema (Bowie, 2011).

It had been thought that halting the inflammation process would allow patients a quicker and more effective return to function (Hertel, 1997). However, there appears to be little evidence supporting this notion. For example, Moorman et al (1999) could not demonstrate any improvement in healing or healing time when ibuprofen was given in the post-injury phase. One exception to this was a study among army recruits with ankle sprain, which found that recruits treated with NSAIDs were able to return to normal activities sooner, albeit with reduced stability and range of movement, compared with those who received a placebo (Slatyer et al, 1997). It should be remembered that these results were gained from a specific group and one needs to question whether similar results can be achieved in the general population.

Recent thinking recommends that NSAIDs are withheld in the immediate post-injury phase when the inflammatory process is at its peak (Braund and Abbott, 2011; Stovitz and Johnston, 2003). The inflammatory phase has important healing properties, stimulating and facilitating soft-tissue repair, regeneration and growth. It therefore follows that reducing this integral process may impair healing, and delay overall healing time (McGriff-Lee, 2003; Mishra et al, 1995).

In addition to their impact on healing, there are concerns about the side-effect profile of NSAIDs. While in the majority of cases these side-effects occur only after long-term use, they do have the potential to occur after short periods of use, especially in people who have underlying health conditions. They can cause the inhibition of enzymes such as Cox, altering thromboxane synthesis which can affect and reduce platelet aggregation. This can lead to increased swelling and bleeding at the injury site and also cause bleeding

FIG 1. THE MODIFIED ANALGESIC LADDER



elsewhere in the body (Bowie, 2011; Jordan and White, 2001).

NSAIDs are directly irritant to the stomach lining, therefore making gastrointestinal symptoms the most commonly encountered side-effect. The *British National Formulary* cautions that “all NSAIDs are associated with serious gastrointestinal toxicity” (Joint Formulary Committee, 2012) and approximately 10-30% of NSAID users will experience gastrointestinal symptoms (Jordan and White, 2001). Other unfavourable effects associated with NSAIDs include nephrotoxicity leading to acute renal failure, bronchospasm and exacerbation of symptoms in people with asthma (Joint Formulary Committee, 2012; Bowie, 2011; Jordan and White 2001).

There has been growing evidence linking the use of NSAIDs with an increase in thrombotic cardiovascular events including stroke and myocardial infarction (Regional Drug and Therapeutics Centre, 2007). This is supported by the BNF, which suggests that all NSAID use can lead to an increase in thrombotic events, with ibuprofen and diclofenac posing the greatest risk; it recommends that the lowest effective dose should be prescribed for the shortest period of time (Joint Formulary Committee, 2012).

Alternatives to NSAIDs

Tackling and managing musculoskeletal pain can be a challenge. Although basic, the cornerstone of management should be RICE (rest, ice, compression and elevation) while avoiding HARM (heat, alcohol, re-injury and massage) (O'Connor and Martin, 2011), as these principles have been

shown to reduce symptoms such as bleeding, inflammation, swelling and pain as well as improving the time taken to recover function after an injury.

While in the majority of cases, these principles alone will provide adequate symptom relief, there will be times when analgesic agents will be needed.

With a diverse range of alternatives to NSAIDs available, emergency clinicians need an easily replicable and evidence-based management approach that does not impede the healing process.

Boger and Jones (2005) adapted the World Health Organization's analgesic ladder in an attempt to promote the safe, logical and effective use of medications to manage musculoskeletal pain. Like the original ladder, this stepwise approach suggests that patients with mild or moderate pain should begin at step one and only progress if the pain is not sufficiently controlled (Fig 1).

Paracetamol is widely available and, due to its efficiency, cost effectiveness and side-effect profile, should be regarded as the initial choice for managing pain (Braund and Abbot, 2011). There is wide-ranging evidence suggesting that paracetamol is an effective choice for treating pain, having a comparable efficiency to that of most NSAIDs (Sachs, 2005). While paracetamol's exact mechanism of action is still undefined, unlike NSAIDs, there is no evidence demonstrating that it either increases bleeding at the injury site or impedes healing in any other way (Braund, 2006; Paoloni and Orchard, 2005). Despite these clear advantages, paracetamol continues to be widely underused (Boger and



Sprained ankle: the inflammatory phase has healing properties and stimulates repair

Jones, 2005). It is thought that due to its wide availability, patients perceive paracetamol to be a poor analgesic “with many believing it to have little or no effect” (Boger and Jones, 2005).

Codeine phosphate, an opiate, is another important drug to consider. Like paracetamol, it is considered a safe drug, known to have relatively few side-effects at treatment doses; it is suggested that constipation is the most commonly encountered side-effect (Joint Formulary Committee, 2012).

To provide its analgesic effects, codeine needs to be metabolised by the body. Any variation in this metabolism can reduce its analgesic effects and it is estimated that approximately 9% of patients in the UK are poor metabolisers of codeine (Williams et al, 2002). Codeine is especially effective when combined with paracetamol, so it is an excellent addition when paracetamol alone fails to control pain adequately. Numerous studies have shown the benefit of codeine-paracetamol preparations. For example, in de Craen et al's (1996) study, codeine-paracetamol preparations were shown to produce significantly more analgesia than paracetamol alone.

Conclusion

Soft tissue injuries are a common reason for presentation to the emergency department. RICE principles, which have been proven to naturally reduce symptoms, such as bleeding and swelling along with decreasing pain, are important in managing soft tissue injury. Ensuring adequate pain relief is also an important part of

management that not only aids patient comfort but also encourages constructive tasks such as controlled mobilisation and strengthening exercises.

The use of NSAIDs in soft tissue injuries remains controversial, due primarily to the scarcity of evidence supporting their benefit and the ever-mounting body of evidence questioning their use. NSAIDs' potential to dampen the healing process should prompt clinicians to reconsider their use, especially in the first 48 hours after a soft tissue injury, when the healing process is at its peak. Clinicians need to bear NSAIDs' side-effect profile in mind when considering their use. There is limited evidence demonstrating that NSAIDs may shorten the time taken to return to normal activity, and this may in some cases prompt clinicians and patients to ignore the potential problems if a swift return to activity at any cost is needed.

With its excellent safety record and wide availability without prescription, paracetamol is an excellent alternative to NSAIDs so should be seen as the initial treatment if pain relief is required. It is particularly useful in musculoskeletal pain, proven to be just as effective as most NSAIDs while having no demonstrable effect on the healing process. In the majority of the population, its effects can be significantly improved with the addition of codeine, again without reducing safety or affecting the healing process.

Recommended research

Further research is needed into the use of NSAIDs in the treatment of soft tissue

injuries to clarify their effects during the healing process.

There is also a scarcity of evidence on the effectiveness of low-dose codeine/paracetamol preparations, such as co-codamol 8/500mg that can be bought over the counter, so more research in this area would be useful.

Finally, more research is needed into the use of topical NSAIDs for soft tissue injury. **NT**

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