A brief review of the effects of preoperative skin traction on hip fractures

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Summary The use of preoperative skin traction is still reported today as a treatment for hip fractures whilst awaiting surgery at many hospitals. The main rationale for its continued use is pain relief for the injured patient. It has also been suggested that traction prior to surgery maintains the position of the fracture, thereby making reduction of the fracture easier when operating. However, there are also disadvantages to its use, primarily concerning the development of pressure sores and the potential damage traction equipment can cause to skin. The studies reviewed concluded that preoperative traction was not successful as an analgesic tool, nor did it contribute to the development of pressure sores. No evidence showed that traction aided fracture reduction or the healing time after surgery. The use of preoperative skin traction should therefore not be used routinely as a therapeutic intervention for hip fractures before surgery.

KEYWORDS
Traction (skin/skeletal);
Hip fractures;
Preoperative treatment

Editor’s comments
To begin to get to grips with the evidence relating to perennial orthopaedic nursing care issues such as traction for hip fractures is daunting for many. This study is a personal perspective based on a brief review of the research to date.

Introduction

Hip fractures present a major challenge to health and social services, placing considerable strain on resources in orthopaedic and geriatric care provision (Fisher and Mowatt, 1997; Hollingworth et al., 1995). The elderly population accounts for approximately 310,000 fractures a year in the UK, with hip fractures costing hospitals £288 million alone (Hollingworth et al., 1995; Woolf and Akesson, 2003). This does not include the needs for extended social care and the services required for hip fracture patients to return to their homes independently. Elderly patients sustaining hip fractures ac-
counts for a significant proportion of trauma patients entering hospitals and Hollingworth et al. (1995) predict that, unless treatment patterns change, or the incidence of falls decline, hip fractures will continue to give rise to costs in the region of 360 million by 2011. As the elderly population continues to increase in number this does not appear to be an unrealistic estimation.

Although great emphasis must be placed upon the rehabilitation of hip fracture patients, focus on the importance of preoperative treatments should also be considered. Early stages of the patient’s care pathway need to be examined to increase understanding of how this care potentially influences future management and rehabilitation of the patient. The use of traction was once a common method of treating patients with hip fractures, however, as new surgical techniques evolved its use has been resigned to preoperative management (Draper and Scott, 1998). Whilst acknowledging that the priority for hip fracture patients is operative treatment within the first 24 h of admission to reduce mortality and morbidity (Parker and Pryor, 1995) predict that, unless treatment patterns change, or the incidence of falls decline, hip fractures will continue to give rise to costs in the region of 360 million by 2011. As the elderly population continues to increase in number this does not appear to be an unrealistic estimation.

For example, Jerre et al. (2000) found that nursing staff felt patient care, such as pressure relief, was compromised due to the traction equipment surrounding patients. Also, in addition to the cardiovascular, pulmonary, neurologic, renal and gastrointestinal systems being at risk (Harvey, 1998; Needof et al., 1993). However, the use of traction can also create complications, especially those related to immobility and bed rest. For example, Jerre et al. (2000) found that nursing staff felt patient care, such as pressure relief, was compromised due to the traction equipment surrounding patients. Also, in addition to the cardiovascular, pulmonary, neurologic, renal and gastrointestinal systems being at risk (Harvey, 1998; Mellett, 1998), difficulties directly related to the application of skin traction need to be considered. Rosen et al. (2001) warns that skin traction is not a benign treatment, with adverse effects including mechanical shearing of the skin, blistering, reduced arterial supply and venous drainage, and nerve compression (Anders and Ornellas, 1997; Anderson et al., 1993; Styracula, 1994a,b; Yip et al., 2002).

**Literature search**

The review presents an analysis of the use of preoperative skin traction for elderly patients with hip fractures. The term hip fracture includes intracapsular (femur neck) and extracapsular (trochanteric and subtrochanteric) fractures of the proximal femur, with the mean age of patients usually ranging from 78 years to 81 years old (Parker and Handoll, 2005). The primary methods of skin traction identified were Hamilton Russell traction or use of a traction boot. Databases CINHAL and MEDLINE were used to obtain research papers focusing on preoperative skin traction in hip fractures. Cross-referencing of papers was also implemented to ensure most papers relating to this area of care were found. No dates were excluded from the search and search criteria encompassed the terms ‘traction (skin/skeletal) use of, hip fractures and timing, preoperative traction’. Nine research papers were found, including a Cochrane review, which focused upon the use of preoperative traction in hip fracture patients, while other articles obtained commented upon the use of preoperative traction and its rationale.

**Findings**

Main areas found related to whether traction relieved pain, eased reduction of a fracture when operated on or if traction contributed to increased pressure sore risk. Each of these issues will be examined and discussed in turn.

**Pain relief**

One rationale for using preoperative traction is that it reduces pain. By overcoming the effects of muscle spasm that inevitably coincides with the injury, traction is thought to promote comfort (Davis and Barr, 1999; Royal College of Nursing, 2002). However, due to the subjective nature of pain, objective assessment is problematic (Rosen et al., 2001). This is further complicated by the high incidence of senile dementia within those that sustain hip fractures (Grimley Evans et al., 1979; Wood et al., 1992). In an attempt to rectify these variables the majority of studies used the visual analogue scale, a valid method of pain assessment. Researchers also implemented assessments on subjects’ mental state to ensure equivalence within sample groups, excluding those with cognitive impairment. The latter was also conducted to ensure that informed consent was provided from participants.
Finsen et al. (1992) examined the use of preoperative traction. Patients were randomised to groups using skin, skeletal or no traction. They reported that patients receiving skeletal traction were administered a higher number of analgesics. However, when examining the type of pain medication provided it is evident that this group actually received less opiates than the group with no traction, which would suggest that patients with skeletal traction in place were in less pain than those with no traction. This discrepancy could compromise the conclusion Finsen et al. (1992) made that preoperative traction should not be used routinely, as the need for analgesia was no higher within the group that had no traction. Although this is correct in relation to paracetamol and codeine, the intake of opiates within this group is actually greater. Nevertheless, Finsen et al. (1992) do acknowledge that comparison of central and peripheral analgesia is a limitation within the study. Also in Finsen et al.’s (1992) study no valid assessment tool was implemented to monitor patient’s pain levels. Instead, the assumption was made that the amount of analgesia administered was a sufficient guide in examining the experience of pain.

Resch and Thorhgren (1998), in their comparison of skin or skeletal traction, used the visual analogue scale and participant’s analgesic intake to determine pain levels. Results showed that those in skeletal traction required fewer doses of pain medication. Although this did not prove to be of any clinical importance, further investigation found that there was a decline in the subjective experience of pain both after the administration of analgesia and the application of either skin or skeletal traction, suggesting that traction reduces preoperative pain. Unfortunately, as Resch and Thorhgren (1998) did not allocate a group to a no treatment intervention, it is difficult to draw any firm conclusions on whether to treat patients with traction from their study.

Jerre et al. (2000) presented two groups, one receiving skin traction and the other no intervention at all. By assessing pain scores every 4 h over a 12-hour period results showed no significant differences in supplementary analgesia provided or pain scores recorded. Anderson et al. (1993) also examined Hamilton Russell skin traction in relation to its potential pain relieving properties and revealed that pain scores were no different between patients who were assigned to skin traction or those that were nursed with their limb free in bed. However, no information is provided regarding the type of pain medication given, and whether this was comparable for both groups of patients.

Stromqvist et al. (1988) have suggested an alternative to the application of traction, stating that by placing a patient’s leg in the position of semi-flexion and lateral rotation pain will be alleviated just as effectively as it provides the lowest intra-capsular pressure. Similarly, Needof et al. (1993) used patients whom had no traction with a supporting pillow, placing the injured limb in flexion, abduction and external rotation, and compared it to those with skin traction. They found no difference between the pain scores of those in skin traction and those using a pillow, despite an increased intake of analgesia by the traction group for the first 24 h. However, assessment of pain scores were only taken on a morning, which is unrealistic to ensure accurate measurement of a person’s pain relating to a traumatic injury.

Comparison of skin traction and the use of a pillow has also been investigated by Rosen et al. (2001) and Yip et al. (2002). Pain levels and analgesic intake were recorded by Rosen et al. (2001) immediately before the choice of intervention, 15 min later and then on subsequent mornings until theatre. Results demonstrated the group using the pillow experienced lower pain scores than the traction group the morning after admission. Interestingly, Rosen et al. (2001) reported that pain scores did not correlate with the amount of analgesia provided, as expressions of pain were lower regardless of how frequently patients received pain medication. It may also indicate that the intervention was a greater factor than medication for the reduction of pain. However, Yip et al. (2002) found that, although pain scores on the evening of admission and first morning after injury were increased in those with no traction, subsequent days were no different in relation to pain levels between the groups with skin traction and those using a pillow for comfort.

The only study to differentiate between pain at rest, and pain on movement between patients with traction and those without was Draper and Scott (1997). They found that pain scores, and doses of analgesia received, were not significantly different between groups upon movement. Nonetheless, pain scores at rest showed that those in traction reported less pain on the first day after injury, but this did not continue into the second day postinjury. However, Draper and Scott (1997) did report a reduced sample size at this time due to patients being operated on, therefore a larger sample size is needed to fully determine pain levels for patients more than 1 day postinjury. Unfortunately, Draper and Scott’s (1997) sample is not comparable. By including participants with cognitive impairment, those having a lower mental function only in the group with no traction, Draper and Scott’s (1997)
results could be greatly flawed, as patients with low mental test scores maybe less likely to report pain. Although they attempted to rectify this with statistical analysis, Parker and Handoll (2005) question the validity of this research.

Pressure sore risk

Another area of significance is the potential correlation between preoperative traction and the development of pressure sores. Studies investigating this hypothesised that traction would predispose a patient to developing ulceration due to the movement of the patient and the care provided by nursing staff. This is further compounded by the fact that many hip fracture patients may have also been lying, undiscovered, for long periods of time before being presented to A&E, and then placed on trolleys with minimal pressure relieving qualities (Fisher and Mowatt, 1997).

Anderson et al. (1993), Draper and Scott (1997) and Jerre et al. (2000) all considered the threat of pressure sore development within their population of participants and reported these findings. Information regarding this subject was provided by personal communication to the Cochrane Review from Needof et al. (1993) and Yip et al. (2002), who declared that there were no significant differences between patients with skin traction and those when nursed without. However, no data is accounted for within their publications, therefore analysis of research design and validity of assessment tools could not be undertaken. Anderson et al. (1993) also confirmed that there were no differences between groups studied, but all patients developed a grade one pressure sore whilst in hospital. Jerre et al. (2000) stated that five of the participants in traction experienced grade one ulceration preoperatively, whereas the group with no traction did not suffer this complication.

The only study that deviated from expectation was Draper and Scott (1997). They provided a comprehensive report upon the assessment of pressure sores, accounting for a total of 46,958 pressure sore observations throughout their study. Information was provided regarding the assessment tool and the body areas assessed for skin deterioration. They revealed that overall scores showed no distinction between groups with traction and those without. However, on further examination it was found that scores of individual body areas suggested that the traction group were actually less likely to incur injury to the heel on the opposite side to the fracture. Draper and Scott (1997) speculate the reason for this is because the traction apparatus provides suspension for some of the patient’s weight, therefore making it easier to move up the bed. They also acknowledge that the low number of pressure sores may be due to frequent pressure checks for research purposes, and therefore may not truly reflect practice.

Skin damage directly caused from the traction equipment has also been commented upon in a number of papers. Shabat et al. (2002) followed 10 patients who developed severe skin slough as a result of skin traction. Unfortunately, no information is provided in relation to how often the skin traction was removed to clean the underlying skin or the frequency of skin assessment whilst traction was in use. Shabat et al. (2002, p. 110) simply state that skin slough was detected on removal of the skin traction device before surgery was performed in five of the patients, whilst skin damage was discovered immediately after surgery in two patients and the final three patients in the postoperative period. The RCN (2002) state that bandages must be reduced daily and skin inspection implemented. Rosen et al. (2001) reported two participants suffering from blisters, with one patient experiencing sensory changes of the foot; this was relieved by adjustment of the traction boot that was in place.

Fracture reduction

As well as considering the immediate implications of traction for nursing care, one must also consider whether preoperative traction has any effect on the outcomes of surgery, and rehabilitation potential thereafter. Anderson et al. (1993) gained the opinion of a surgeon in determining whether fracture reduction was easier in those that had previously been attached to traction or not, finding that there was no difference between groups. Finsen et al. (1992) found that preoperative fracture reduction was faster in those without traction, but like Needof et al. (1993) and Yip et al. (2002), noted that the duration of operation was similar for each group of participants.

Rather than examining the reduction time and ease of surgery, Jerre et al. (2000) evaluated the quality of the fracture reduction, but found no disparity between sample groups with skin traction and no traction. The mean hospital stay was comparable (Anderson et al., 1993), along with the healing rate 4 months later (Jerre et al., 2000). This would therefore indicate that preoperative skin traction does not aid fracture reduction, or subsequently improve the recovery of the patient in terms of healing time.
Discussion

The use of traction has never disappeared, and despite a previous decline, observations of practice suggest its subsequent increase. Although from the research presented, the consensus is that preoperative traction is an ineffective intervention for reducing pain or easing fracture reduction, and although there is no indication that traction predisposes the development of pressure sores, one could always argue that the restrictions placed upon patient mobility from traction is a greater risk than not having it there at all. However, the author believes that due to the methodological discrepancies and inadequate presentation of data in some studies, no firm conclusions can be made relating to this topic. Investigation into why traction may not be effective is also required. For example, Draper and Scott (1996) found that nursing staff had inadequate knowledge of the principles of traction and its implementation, therefore potentially compromising care.

In agreement with Parker and Handoll (2005) other issues need to be addressed to determine whether traction may be an advantage, such as whether traction is beneficial for different types of hip fracture. Attention should also focus upon when patient’s pain is at its highest, and whether traction may be beneficial for particular time periods only. Education in relation to the issues highlighted is essential to ensure the health professional’s care provision is based upon the interest of the patient and not merely upon traditional practices. However, and perhaps most importantly, the subjective experience of the patient in traction needs to be heard (Parker and Handoll, 2005). Being surrounded by traction equipment can be frightening as well as isolating. It is essential that the nursing staff understand the intricacies of traction and it’s rationale, not only so that expert care is provided, but also to ensure that the focus of care is the patient and their experiences, and not the imposing traction apparatus that surrounds them (Harvey, 1998). The author believes further investigation is required into the potential benefits of preoperative traction, rather than instigating a ban upon its use. Healthcare professionals are also encouraged to listen to the wishes of the patient, and what each individual feels is beneficial to them in relation to the application of traction apparatus (Love, 2000).

References


