

Skin Traction and Placebo Effect in the Preoperative Pain Control of Patients with Collum and Intertrochanteric Femur Fractures

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Abstract

Background: Proximal femur fractures are one of the most common injuries necessitating operative treatment. The aim of this prospective study was to evaluate and compare the possible effects of the preoperative application of a skin traction device, with or without weights, on pain relief in patients with acute proximal femur fracture.

Materials and Methods: This study included 108 preoperative patients with hip fractures. The subjects were randomly divided into three groups, and the following treatments were administered: Group 1, skin traction with 2 kg of weights; Group 2, skin traction without weights; and Group 3, pillow placement under the affected limb.

Results: Pain was assessed using the visual analog scale (VAS). No significant differences were observed in the scores of the three groups before the pain relief treatment. All three modes of treatment resulted in significant pain reduction in subjects. Patients treated without a weight-loaded skin traction kit had better pain relief compared to the other two groups; this outcome was statistically significant.

Conclusion: This study indicates that pillow placement under an injured limb can be safely used instead of traction, which has no significant benefit. However, an external device, such as a skin traction kit without

weight, may be used in patients with persistent pain; this external device may have an additive placebo effect, as was proven in this study.

Proximal femoral fractures are among the most common injuries that require surgical treatment. Since it is typically seen in elderly individuals, these patients should undergo comprehensive medical examination prior to surgical approval or surgery. Although hip fracture is rarely observed in young individuals, preoperative preparations may take longer than usual, because hip fractures in this group of patients are caused generally by high-energy traumas. Therefore, pain reduction during the preoperative preparatory period is important in hip fracture patients for both groups.

Since traction is believed to reduce pain, skin traction is used in many hip fracture patients.^{1,2} It is demonstrated in some studies that skin traction does not provide any advantage in pain control, and that additional analgesic agents are required.¹⁻⁷ However, skin traction is still applied in practice, possibly to create the impression that active measures are being taken for pain and fracture control.^{2,8}

Resch and Thorngren found in their study that the patient pain decreased significantly after application of traction.⁹ However, they also stated that a randomized study would be necessary to definitively conclude that traction actually did reduce pain rather than act as a placebo, since the use of a pillow was just as effective in alleviating pain. Although many studies have demonstrated the inferior efficacy of traction, none have evaluated its potential advantages nor the placebo effect of traction. In order to assess the placebo effect of traction, we devised a method by which a skin traction kit could be applied without weight. The objective of this prospective study was to investigate the effectiveness of skin traction without weight in the pain control of patients with acute hip fractures.

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Table 1 Demographic and Preoperative Features of Patients*

	Skin Traction (n = 36)	Skin Traction Kit Without Weights (n = 36)	Pillow (n = 36)
Age (Average years ± SD)	29-100 (76.15 ± 17.68)	23-97 (78.18 ± 16.09)	19-98 (74.93 ± 16.15)
Gender			
Female	23	24	25
Male	13	12	11
Fracture type			
Intertrochanteric	20	20	21
Neck	16	16	15
Trauma to operation interval (hours)	52.8	52.6	54.2

*p > 0.05

Table 2 Averages of Pain Measurements According to the Visual Analog Scale and Additional Analgesic Injections Administered*

	Skin Traction Mean (± SD)	Skin Traction Kit Without Weight Mean (± SD)	Pillow Mean (± SD)
15 minutes before	6.93 (± 1.14)	7.04 (± 1.08)	6.85 (± 1.29)
1 hour after treatment	6.41 (± 0.97)	6.17 (± 1.03)	6.37 (± 1.04)
4 hours after treatment	4.96 (± 0.76)	3.59 (± 0.80)	4.74 (± 0.71)
12 hours after treatment	3.63 (± 0.84)	3.04 (± 0.76)	3.39 (± 0.77)
Number of injections/day	1.64 (± 0.25)	1.44 (± 0.28)	1.52 (± 0.28)

*p < 0.05

Materials and Methods

One hundred and fifteen hip fracture patients were evaluated initially for this prospective study; seven of these patients were excluded from the study, either because of a refusal to participate in the study or a cognitive inadequacy detected in their simple mental scores. The final total evaluated was 108 patients. The mean patient age was 76.4 (range, 19 to 100; SD, 16.5); 66.7% of subjects were female and 33.3% were male (Table 1). Approvals were obtained from the institutional ethics' committees with which the investigators are affiliated.

The 108 patients who participated in the study were randomly allocated into three groups, according to the order of admission to the hospital. In Group 1 (traction group), 2 kg of skin traction was applied, and a pillow was placed beneath the injured leg. Group 1 consisted of 20 patients with intertrochanteric fractures (AO classification: A1-10; A2-8; and A3-2) and 16 patients with collum femoris fractures (Garden type III, 9; Garden type IV, 7). In Group 2 (placebo group), the skin traction kit without the use of weights was applied, and a pillow was placed beneath the injured leg. Group 2 consisted of 20 patients with intertrochanteric fractures (AO classification: A1-12; A2-7; and A3-1) and 16 patients with collum femoris fractures (Garden type III, 8; Garden type IV, 8). In Group 3 (pillow group), only a pillow was placed beneath the injured leg. Group 3 consisted of 21 patients with intertrochanteric fractures (AO classification: A1-12; A2-8; and A3-1) and 16 patients with collum femoris fractures

(Garden type III-7; Garden type IV-8).

There were no statistically significant differences between groups in terms of age, sex, fracture type, and time to operation (Tables 1 and 2). Anti-thrombotic prophylaxis was routinely administered to all patients. The patients also received paracetamol tablets orally 3-times a day routinely. Parenteral tramadol (Grünenthal GmbH, Germany) was administered on demand of patients optionally. Pain was assessed by a visual analog scale (VAS) (0, no pain; 10, worst pain) at 15 minutes before and 1, 4, and 12 hours after the application of either method.⁴ A repeated measurement analysis of variance (ANOVA) test and the Tukey honestly significant difference (HSD) test were performed for intra-group and inter-group comparison, respectively, of the effects of the preoperative pain treatment. P values < 0.05 were accepted as statistically significant.

Results

There were no differences in the VAS pain relief scores of the three groups before the administration of the treatment. Intra-group assessment revealed a statistically significant reduction in pain in all groups after administration of the treatment application (p < 0.05). Inter-group comparative studies indicated that better pain control was maintained in the group that received skin traction without weights (Group 2, placebo group) than in the other two groups; this difference was statistically significant (p < 0.05). Moreover, the patients in the placebo group (Group 2) made fewer demands

for parenteral analgesics than the other two groups (Table 2). Although nonadhesive skin traction kits were used, pressure sores were observed in two patients, and one traction group (Group 1) patient, who was treated using 2-kg skin traction, developed neurapraxia.

Discussion

Previous studies have indicated that traction is not effective in achieving pain control.^{1,3,9} Based on the results of these studies, in our orthopedic clinics, we used only a pillow beneath the injured leg of the patients to provide pain relief. However, this situation led patients to the thought that they were not being taken care of well enough, and their demands for special treatment to reduce or end their pain, as well as their persistence in the application of old methods, have been the starting point of the current study.

Geriatric hip fracture patients often have concurrent medical ailments. The treatment modalities undertaken to resolve the potential risks in these patients may extend the time to the operation. Hip fractures in young patients require urgent surgical intervention. However, complex medical situations related to high-energy trauma in most of these subjects may cause a delay in the time to medical intervention. Therefore, pain control is of critical importance in preoperative patients.

In similar studies carried out previously, no difference was observed between the pain control achieved by traction and by the use of pillows; in fact, pillows were found to be more effective in achieving pain relief than traction.^{1,3,4,6} It was observed that the use of pillows decreased the intracapsular pressure in the hip joint, enabling semiflexion and external rotation of the leg, and this in turn reduced the pain experienced.^{4,9,10} Resch and Thorngren emphasized in their study that there is a need for a randomized investigation to conclude that traction actually does reduce pain rather than act as a placebo.⁹

In our study, skin traction kit without weight was applied (placebo group), in addition to traction and pillow methods. Better pain control was achieved in the placebo group than in the other two groups, a statistically significant difference. We believe that this difference is due to two factors. Essentially, the skin traction kit without weight allowed semiflexion and external rotation, and, thus, reduced pain due to the lack of traction. Secondly, and more significantly, the skin traction kit without weight is believed to have created a placebo effect, as it revealed more successful results in providing statistically significant reduction in pain, compared to the group in which only pillow application was used (Group 3). Although nonadhesive skin traction kits were used, pressure sores were observed in two cases of the traction group (Group 1), and one patient developed neurapraxia, due to the mechanical shearing forces derived from traction with weights. As indicated by previous studies,^{11,12} skin traction with weight is not a benign treatment.

In the current study, pain was assessed 4-times a day, as in the study by Jerre and colleagues.⁴ Pain reduction was observed in the present study after the application of either

one of the three methods. The placebo effect of skin traction was clinically evaluated. In order to assess this placebo effect, a skin traction kit without weights was applied in one of the groups. In the absence of traction weight, the pillow allowed semiflexion and external rotation of the lower extremity and decreased the intracapsular pressure in the hip joint.¹⁰ Pain reduction achieved by this method was more successfully maintained than by the other two methods.

In conclusion, a safe apparatus or device enabling semiflexion and external rotation (as with a skin traction kit without weight) of the injured lower extremity may be used for pain control in hip fractures. Patients also may benefit from a potential placebo effect of the treatment. This approach will also allow patients and their families to be satisfied that active measures are being taken for the reduction of pain.

Disclosure Statement

None of the authors have a financial or proprietary interest in the subject matter or materials discussed, including, but not limited to, employment, consultancies, stock ownership, honoraria, and paid expert testimony.

References

1. Anderson GH, Harper WM, Connolly CD, Badham, et al. Preoperative skin traction for fractures of the proximal femur. *J Bone Joint Surg Br.* 1993;75:794-6.
2. Yip DHK, Chan CF, Chiu PKY, et al. Why are we still using pre-operative skin traction for hip fractures? *Int Orthop.* 2002; 26:361-4.
3. Finsen V, Borset M, Buvik GE, Hauke I. Preoperative traction in patients with hip fractures. *Injury.* 1992;23:242-4.
4. Jerre R, Doshe A, Karlsson J. Preoperative skin traction in patients with hip fractures is not useful. *Clin Orthop Relat Res.* 2000;378:169-73.
5. Rosen JE, Chen FS, Hiebert R, Koval KJ. Efficacy of pre-operative skin traction in hip fractures: a prospective randomised study. *J Orthop Trauma.* 2001;15:81-5.
6. Resch S, Bjärnertoft B, Thorngren KG. Preoperative skin traction or pillow nursing in hip fractures: a prospective, randomized study in 123 patients. *Disabil Rehabil.* 2005;27:1191-5.
7. Parker MJ, Handoll HH. Pre-operative traction for fractures of the proximal femur in adults. *Cochrane Database Syst Rev.* 2006 Jul 19;3:CD000168.
8. Billsten M, Besjakov J, Hyddmark U, et al. Enquiry in Sweden on the use of traction preoperatively in patients with hip fracture and a radiological study on the effect of the traction on ten displaced cervical hip fractures. *Acta Orthop Scand.* 1996;67(Suppl 270):35.
9. Resch S, Thorngren KG. Preoperative traction for hip fracture: A randomized comparison between skin and skeletal traction in 78 patients. *Acta Orthop Scand.* 1998; 69:277-9.
10. Stromqvist B, Nilsson LT, Egund N, et al. *J Bone Joint Surg Br* 1988;70:192-4.
11. Koval KJ. Preoperative skin traction was not useful for hip fractures. *J Bone Joint Surg Am.* 2001; 83(2):303.
12. Shabat S, Gepstein R, Mann G, et al. Deep skin slough following skin traction for hip fractures. *J Tissue Viability.* 2002;12(3):108-12.