The Impact of Stress at Dressing Change in Patients With Burns: A Review of the Literature on Pain and Itching

Abstract: Burn wounds can be particularly painful and stressful for patients, particularly during dressing change and other aspects of wound care. Research into other types of wounds has demonstrated that stress and pain at dressing change are closely linked and related to healing, since high levels of stress and pain are associated with a longer length of time for a wound to heal. Additionally, there is some evidence to suggest a similar relationship between stress and itching. This article presents a review of the literature into stress, pain, and itching in patients with burns. The review demonstrates the importance of dressing change management with these patients. Furthermore, suggestions are made for areas of research that are yet to be explored, as such research, and the findings that emerge, could have important implications for clinical practice when working with people with burns. The common focus of such studies should be the aim of minimizing stress and discomfort for people with burns and other wounds so as to improve patient well being and treatment outcomes.

Key words: burn wound, stress, pain, itching, pruritus

Burn injuries can have significant physiological and psychological consequences, affecting various areas of an individual's life. Studies have reported high prevalence rates of mental health issues, including posttraumatic stress disorder, anxiety conditions, psychosis, substance abuse, and personality disorders in people with burns. Pain is another area of concern that significantly affects these patients, and can continue to be an issue even after the wound has healed. Pain intensity may vary and can manifest in a number of ways, such as persistent background pain or severe pain felt during procedures like dressing changes. Additionally, patients with burns may experience persistent itching, known as pruritus, which can be distressing. In a study of 510 adult patients with burns, the prevalence of mild to severe itching was as high as 87% at 39-months after burn injury, 70% at 12 months, and 67% at 24 months following burn injury.

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Keypoints

- Experience of pain at dressing change can raise a patient’s anxiety levels about subsequent dressing changes.
- Findings have highlighted the importance of minimizing pain, stress, and discomfort in wound care to promote patient well being and healing.
- Although there are several studies exploring these factors in wound care, the majority have focused on ulcers rather than burns.

for people with wounds, and the pain experienced at dressing change can cause them to feel anxious or stressed. Pain and stress appear to have a cyclical relationship: experience of pain at dressing change can raise a patient’s anxiety levels about subsequent dressing changes, which can then lead to the patient experiencing a heightened sense of pain when the dressing change is performed, thus adding to the patients’ anxiety about the next dressing change.

In addition to the psychological effects, stress and pain can actually impair the healing process, resulting in longer healing times and greater costs. Similarly, for people with pruritus following a burn injury, scratching may damage the skin, leading to delayed wound healing. Itching can also cause stress as it may cause difficulties with several factors affecting quality of life such as sleep, daily activities, and psychological well being. Therefore, itching in people with burns could delay healing through the scratching itself, and through the associated psychological stress the itching causes.

Since dressing change can cause patients to experience pain, stress, and itching, which have all been linked with delayed wound healing, dressings and wound care procedures could actually be prolonging treatment rather than promoting healing. However, despite the clear theoretical links between stress, pain, and wound healing, research studies have yet to demonstrate that stress caused by dressing change delays wound healing. Additionally, research is often correlational, telling us little about causal relationships. Therefore, this is an area for further investigation. Nevertheless, these findings highlight the importance of minimizing pain, stress, and discomfort in wound care, so as to promote patient well being and healing.

Although there are several studies exploring these factors in wound care, the majority have focused on ulcers rather than burns, which are unique in that they can be can be particularly painful and itchy, and that burn pain has been associated with psychological distress, such as anxiety and depression. Since wound research has shown that stress and pain have important roles in wound care, a review of the literature is needed about burns specifically, with a focus on how stress impacts people during treatment for their burns; this will be the focus of the current brief review, with the aim of stimulating discussion and ideas for future research in this area.

Review

Much of the research into stress in patients with burns has explored long-term anxiety and mental health conditions rather than procedural pain and anxiety. Weinberg et al explored pain and anxiety levels at dressing changes in a sample of 24 adult patients with burns who were receiving treatment at a hospital. The authors used a visual analog scale to have patients rate their levels of pain and anxiety immediately before and immediately after a dressing change, and again 30 minutes after their dressing had been changed. It was found that pain levels were at their highest immediately after the dressing change; this pattern was evident on all 5 days of the study. Additionally, anxiety levels were highest immediately before the dressing change, except on day 1. One possible reason for this could be that patients were not anticipating the pain on day 1 since they had not yet experienced it. Pain and anxiety scores were correlated immediately after dressing changes.

Similar findings were reported by Byers et al, who compared pain and anxiety levels of 23 adults being treated for burns when they were at rest and when having their dressings changed. Pain and anxiety were measured through the short-form version of the McGill Pain Questionnaire and a visual analog scale for anxiety. Pain levels were found to be highest during dressing change, by a statistically significant margin. Additionally, positive correlations were reported between pain and anxiety.

Anxiety levels were explored in more depth by Carrougher et al in a study that asked 47 adult patients with burns to rate anxiety levels in terms of what they felt was tolerable and what they actually experienced during wound care. “Tolerable” and “experienced” anxiety levels were assessed using 10-point graphic rating scales. Patients regularly reported experiencing levels of anxiety that exceeded that which they categorized as tolerable.
Findings such as these show that dressing changes can be both painful and stressful for patients with burns, and that the pain and stress of the dressing change are linked. Since stress and pain can impact the patient and the healing process, research is beginning to explore ways in which stress and pain can be minimized during dressing changes. Upton and Solowiej\textsuperscript{24} compared pain and stress levels among 10 patients receiving atraumatic dressings (Safetac technology, Mölnlycke Health Care, Norcross, GA) and 39 patients receiving traditional dressings. Atraumatic dressings present a category of products that do not cause trauma to the wound or surrounding skin on removal and reapplication, thus reducing pain.\textsuperscript{25} Specifically, atraumatic dressings utilize technologies that avoid adhesion, such as soft silicone adhesive technology.\textsuperscript{26} The term atraumatic can refer to both adhesive and nonadhesive dressings coated in soft silicone to interact with dry skin, but not the fragile wound surface. Physiological and psychological measures of pain and stress were reported to be lower in patients treated with the atraumatic dressings; this shows dressing type is an important consideration for clinicians and researchers aiming to minimize pain and stress and promote wound healing.\textsuperscript{24}

Since research shows that stress leads to pain and, in turn, pain leads to stress in patients with wounds,\textsuperscript{12,16} it is plausible that stress and itching could have a similar relationship in people with burns. Itching has some association with stress, so it is possible that a dressing that minimizes stress and pain\textsuperscript{23} might also reduce itching. However, because there is no research yet that empirically demonstrates this, the area warrants greater exploration.

While investigating the prevalence of itching, Van Loey et al\textsuperscript{8} found that at 3, 12, and 24 months after a burn injury, a significant predictor of itching was posttraumatic stress. Prevalence of posttraumatic stress disorder (PTSD) has been found to be relatively high in people with burn injuries; a 6-month study found that 36% of a sample of 83 adult patients with burns had PTSD.\textsuperscript{27} Posttraumatic stress has also been predicted of an association with pain,\textsuperscript{28} psychological measures of pain and stress, and promote wound healing in patients with burn wounds,\textsuperscript{24} and severity.\textsuperscript{28}

The findings of Van Loey et al\textsuperscript{8} demonstrate that stress and itching are linked in people with burn wounds. However, causality cannot be inferred from these results, as other studies have suggested that PTSD may actually predispose people to burns injuries in some patients.\textsuperscript{3} Additionally, this study\textsuperscript{8} focused on PTSD or general psychological distress rather than on stress or anxiety in relation to pain at dressing change. It is possible that procedural stress, from painful treatment procedures, is also related to itching in people with burns, although this needs to be investigated.

Research into the dressing-change experiences of patients with burns is scarce compared to the literature on other types of wounds. Furthermore, very little research has explored the potential effects of pain, itching, and stress on the healing process for people with burns. Wisely et al\textsuperscript{29} found that heightened psychological distress had a significant delaying effect on the recovery rate for patients with burns, necessitating longer hospital stays and more surgical procedures. However, this study did not look at stress at dressing change specifically.

Despite the lack of research into pain, stress, itching, and wound healing in patients with burn wounds, other studies have explored potential interventions for minimizing pain, and subsequently stress, for patients with burns during wound care. One intervention that has been found to be effective in minimizing pain in children with burns during dressing changes is the use of virtual reality (VR), which involves immersing the patient in a computer-generated environment and directing their attention away from the pain of dressing changes.\textsuperscript{30} This approach has yielded positive results by reducing pain\textsuperscript{31-33} and anxiety.\textsuperscript{34} Authors of these studies have recommended the use of VR in conjunction with pharmacological interventions.\textsuperscript{32,33} Virtual reality is also effective for other age groups; one study found that VR significantly reduced pain for patients with burns between the ages of 9 and 40 (mean age 27 years) during wound debridement in a hydrotherapy pool.\textsuperscript{35}

Massage therapy has also been reported to be effective in minimizing pain. In a review of 2 studies, Field\textsuperscript{36}...
reported children who received a massage either before or during treatment were more relaxed and less anxious during the procedure. This was true for both children with burns and children with eczema. In the latter group, it was also found that a number of clinical conditions improved in those who received a massage, including a reduction in pruritus. Although this part of the study did not focus on burns, the overall findings suggest that a reduction in stress may also be associated with a reduction in pain perception and itching.

In another study, the authors compared the behavior of children with burns at dressing change between those who received a 15-minute massage, and the control group who received attention by talking with a therapist, but not the massage intervention. Behaviors were rated by independent observers who were blind to the treatment conditions. Children who received a massage were observed to show minimal distress behaviors and no increase in movement during their dressing change. Nurses also reported it was easier to perform the dressing changes for these children. In contrast, children in the control group who received attention only showed increased facial grimacing, crying, moving, and reaching out. Other nonpharmacological therapies, including relaxation, viewing of cartoons, music, hypnosis, and massage, have also been reported to minimize pain when used alongside pharmacological analgesia. These studies show that relaxation, massage, and to some extent, distraction, can reduce self-reported pain in children with burns wounds during dressing change. However, the literature into such interventions in burns patients is largely dominated by studies of children. Adults are likely to differ in their perceptions of stressors in wound care and also in their responses to these stressors, so it is essential that research also explore interventions in adult patients.

Haythornthwaite et al compared the experience of pain in 42 adult patients receiving different interventions. Patients were assigned to 1 of 2 brief cognitive interventions for reducing burn pain: sensory focusing or music distraction. The control group received standard care. Participants in the sensory focusing group reported greater pain relief than those who received music distraction. Additionally, they showed less remembered pain that those in the standard care group. However, no differences were found between groups when taking pain ratings over a series of time points. One interesting finding was that the trait of ‘catastrophizing,’ or thinking catastrophically, predicted pain, memory for pain, and satisfaction with pain control. This shows the way a person thinks can affect the level of pain they perceive. Other studies have also linked catastrophic thinking to high pain levels, suggesting that interventions aimed at minimizing pain should also look at how to alter patients’ thinking patterns. These findings highlight the importance of psychological perception in the experience of pain, providing further support for the link between pain and stress in patients with burns.

It is clear from these studies that there is a correlation between stress and physical symptoms, and there is work to be done to minimize negative effects of wound care treatment. However, further research is needed into the experiences of these patients with stress, pain, and itching, specifically during dressing changes, to influence developments in wound care.

**Conclusion**

This review highlights 3 key areas for further investigation. First, much of the research into the link between stress and pain have focused on types of wounds other than burns; these links are likely to be similar in people with burn wounds, yet research needs to explore the experiences of these patients during dressing change procedures. Much of the research that does exist on the patient population receiving burn treatment involved children and looked at interventions rather than patient experiences of pain and stress. Second, since stress and pain in general are associated with delayed healing, it is important that researchers explore the relationship between stress and pain specifically at dressing change and how the 2 factors impact wound healing. Finally, research needs to explore the links between stress and itching in people with burns. If a bidirectional relationship were to exist, dressings and wound care procedures that minimize either stress or itching might result in a reduction of the other, also leading to improved treatment outcomes. Research into these 3 areas could be used to improve wound care.

**Keypoints**

- The correlation between stress and physical symptoms is clear.
- Virtual reality and massage therapy have been shown to reduce pain in children during wound care treatment.
- Further research is needed into patient experiences with stress, pain, and itching during dressing changes to influence developments in wound care.
care procedures with the aim of minimizing stress, pain, or discomfort, and improving clinical outcomes, including healing time.

References
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