

The impact of psychological distress on the healing of burns

KEY WORDS

- ▶ Burn injury
- ▶ Psychological distress
- ▶ Psychoneuroimmunology
- ▶ Wound healing

Psychological distress among people who have sustained burns is common. The time taken for burn wounds to heal cannot be fully explained by physical factors, such as wound size and depth. A growing body of evidence in the literature indicates that psychological factors impact the wound healing process. Clinicians should give consideration to the importance of psychological influences on the wound healing process within burns care, and also to the potential for psychological interventions to lessen patients' distress and improve wound healing outcomes.

The impact of psychological factors on wound healing is an important and interesting field of research. There is sound evidence to demonstrate that the effects of psychological stress on wound healing are significant (Walburn et al, 2009). The number of recently published reviews that focus on psychological influences on wound healing, post-surgical recovery and psychological interventions that have impacted on healing is testament to the growing interest in this area (Broadbent and Koschwanez, 2012).

Considering the known influence of psychological factors in burn wound healing, the area is, as yet, relatively under researched. The level of psychological distresses arising as a consequence of burn injury however, is well documented. Burns survivors face many challenges, such as pain, loss of control, fear and the demands of burns rehabilitation (Blakeney et al, 2008). There is also a large body of evidence to indicate that psychiatric and psychological disorders are over-represented in patients entering into burns services, compared to both the normal population and the general plastics and trauma population (Patterson et al, 1993; Wisely and Tarrier, 2001).

This article aims firstly to consider research that has been conducted suggesting a link between psychological factors and burn wound healing. It will then consider wound healing research derived from the field of psychoneuroimmunology, before discussing developments in psychological interventions. Finally, it will end with a clinical illustration.

PSYCHOLOGICAL INFLUENCES ON BURN WOUND HEALING

A number of studies have demonstrated a link between psychological distress and longer hospital stays following a burn injury, where longer stays are taken to indicate longer wound healing time. Kamolz et al (2003) reported on four female patients with schizophrenia who were admitted to an inpatient burns unit. They matched these patients to four controls with comparable injuries. The patients with the psychiatric conditions were reported to have significantly longer hospital stays.

Tarrier et al (2005) reported that patients with a pre-morbid diagnosis of psychosis or depression had longer hospital stays and longer wound healing times compared to matched non-psychiatric controls. Similarly, Wisely et al (2010) found that both patients with preexisting psychological diagnosis and those without preexisting psychological diagnoses, but with significant levels of psychological distress as a consequence of their burn injury, showed a similar pattern of delayed recovery in terms of the number of days spent in hospital. Wisely et al (2010) concluded that heightened levels of psychological distress at the time of wound healing appeared to be as important as preexisting psychiatric status on the recovery rate related to a burn injury.

Research has also demonstrated that psychological presentations at the time of the burn or in the acute stages of recovery might impact on longer-term patterns of physical recovery. Thombs et al (2007a), reported that – after controlling for pre-burn physical health, sex, and size of burn – inpatient levels of

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depression significantly predicted post-burn ratings of physical functioning at 2 months post-discharge. They suggested that depression was not only a consequence of experiencing a disabling injury, but also that depression itself could impact on recovery.

Fauerbach et al (2004) found that the rate of physical recovery in a group of patients following a burn injury was significantly slower among patients with either more physical burden (larger burn size) or psychological burden (in-hospital ratings of psychological distress). They concluded that, in addition to aggressive wound closure, interventions that aimed to reduce in-hospital distress might accelerate both psychosocial and physical recovery after a burn injury.

In summary, there is a body of research specific to the burns literature that identifies a level of interaction between psychological and physical factors when considering recovery from burn injury. It is when attention turns to the more specific literature on psychoneuroimmunology, that the relationship between psychological distress and healing of the skin becomes even more compelling.

PSYCHONEUROIMMUNOLOGY

The field of psychoneuroimmunology is concerned with the complex interaction between the central nervous system, endocrine and immune systems, and the ways in which psychological stressors can modify these interactions (Glaser and Kiecolt-Glaser, 2005).

Observational studies examining wound healing have highlighted that greater fear or distress prior to surgery is associated with poorer outcomes, including longer hospital stays, more postoperative complications, and higher rates of rehospitalisation (Kiecolt-Glaser et al, 1998); Rosenberger et al, 2006). Experimental studies on both animals and humans, whereby wounds are created experimentally and healing is then closely monitored, have provided the strongest evidence for the impact of stress on wound repair. Using a punch biopsy model, Bosch et al (2007) highlighted the impact of negative emotions on wound healing in 193 healthy undergraduate students. Those reporting high levels of depressive symptoms were almost 3.6-times more likely to be classified as slow healers compared to those with low levels of depressive symptoms.

Furthermore, interest has started to expand from considering the impact of stress alone, to investigate other psychological factors, such as the effect of positive affectivity, social support, and coping style. Robles et al (2009) demonstrated that following a psychological stress test, individuals with greater trait positive affect had a faster skin-barrier recovery. In the “no stress condition”, however, this positive relationship was not observed. They concluded this demonstrated a stress-buffering effect of trait positive affect on skin barrier recovery.

Developments in human and animal research have pointed to the importance of social support and environmental enrichment on wound healing. In an experimental blister wound study, spouses who demonstrated positive communication behaviours had higher levels of oxytocin. Those with higher levels of oxytocin had faster healing wounds (Gouin et al, 2010). Related to this, animal studies looking at rats raised in isolation demonstrated slower healing times than those raised in groups (Vitalo et al, 2009).

In 2011, Gouin and Kielcolt-Glaser provided an extensive review of observational and experimental studies that clearly demonstrated the link between stress and wound healing. Broadbent and Koschwanez (2012) provided an overview of the developing research literature in the area of psychological influences on wound healing.

UNDERSTANDING MECHANISMS

So exactly how does psychological stress influence wound healing?

It seems that psychological stress can impact directly on several physiological pathways, for example, the activation of the hypothalamic–pituitary–adrenal and the sympathetic–adrenal–medullary axes (Padgett and Glaser, 2003). In particular, enhanced glucocorticoid and catecholamine production can directly influence several components of the healing process. There is also substantial evidence indicating that physiological stress responses can retard the initial inflammatory phase of wound healing (Glaser and Kielcolt-Glaser, 2005).

Additionally, stress has been found to increase susceptibility to wound infection (Rojas et al, 2002). Again, Gouin and Kiecolt-Glaser (2011) provide a detailed review.

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Psychological stress, however, can also impact on the wound healing process through indirect means. For example, Thombs et al (2007b), hypothesised that the longer hospital stays observed in his sample with schizophrenia may be related to symptoms such as depression, which could result in poorer adherence to self-care and rehabilitation regimens.

Psychological distress will increase the likelihood of unhealthy behaviours, for example, increased alcohol and cigarette use. Individuals who are depressed or anxious are also more likely to reduce their participation in day-to-day activity, as well as experience significant sleep disturbance and have a poorer diet (Steptoe et al, 1996; Vitaliano et al, 2002). Hopelessness, a lack of goal-focused behaviour or motivation due to low mood will undoubtedly impact on an individual's likelihood to comply with the rehabilitation regimen expected of them.

The importance of these “indirect mechanisms” should not be overlooked when considering wound healing within the burns population; as highlighted above, the burns population tends to be psychosocially complex.

CLINICAL IMPLICATIONS

Given the evidence, it should follow that if psychological distress impacts on wound healing, then interventions that reduce psychological stress should have a positive impact on wound healing. There have been several studies – again in the general wound healing literature – that do reflect this. For example, there is evidence that stress management interventions before surgery can improve postoperative outcomes, including shorter hospital stays (Johnston and Vogege, 1993; Montgomery et al, 2002). Further studies on the role of social support, written emotional support disclosures, and exercise as a strategy used to manage stress can lead to enhanced healing times (Esterling et al, 1999; Emery et al, 2005; Glasper and Devries, 2005).

There are fewer studies specific to burns, however those studies that have been conducted show similar patterns. For example, Tobiasen and Hiebert (1985), found that patients who engaged in positive psychological coping strategies, such as progressive muscular relaxation and deep-breathing during painful dressing changes, were found to leave hospital on average 1 week earlier than the control group. In

a trial currently underway, Brown et al (2012) hope to demonstrate that by managing children's pain and anxiety levels more effectively, using a multimodal distraction device, they would see an impact on wound healing times.

Of real interest is a recent randomised controlled trial that demonstrated the effects of a psychological intervention to reduce stress on quantitative assessments of wound healing in a surgical population. Broadbent et al (2011) placed polytetrafluoroethylene (ePTFE) tubes into wound cavities to assess indicators of wound healing. Surgical patients were then randomised to standard care, or standard care plus brief instructions on guided imagery with a take home CD. Compared to standard care, those in the experimental group had a greater reduction in perceived stress and improved physiological wound healing indices as measured by the ePTFE tubes. This study advances previous intervention studies that have simply used outcomes such as time to discharge and shows the real potential of psychological interventions to improve healing.

CASE REPORTS

Within a clinical setting it is often hard to measure the specific impact of psychological factors and interventions. However, it is easy to observe that psychological factors can have a significant impact. Consider the following two case examples.

Case one

Patient A, a 51-year-old woman, was admitted to the burns unit with a 49% total body surface area flame burn. It was understood that the patient had set fire to herself, although the circumstances were not entirely clear. She was intoxicated with alcohol on admission and had a significant history of alcohol abuse. Patient A also had a history of problems with low mood and anorexia.

Patient A was seen by the psychologist during her inpatient admission on regular occasions. She remained low in mood, disengaged, and lacked motivation. She expressed that she was pleased that she survived, but had significant functional impairments and scarring. The therapy team had problems engaging her in rehabilitation as she was mostly apathetic. Her progress was very slow and her wound healing fraught with complications. She contracted various infections and had to be isolated

from other patients for a large part of her stay. Her total inpatient stay was 15 months.

Case two

Patient B, a 54-year-old woman, was admitted to the burns unit with a 44% total body surface area flame burn. It was initially thought that Patient B had set fire to the room in which she was sitting in an attempt at suicide, but again the exact circumstances were unclear. The patient was intoxicated with alcohol on admission and had a significant history of alcohol abuse. She also had history of low mood. B was seen by the psychologist during her inpatient stay and also expressed that she was pleased she had survived. She felt that she had been given a second chance and wanted to make changes to her previous lifestyle.

She engaged enthusiastically with the therapy team and the psychologist to reflect on the changes she wanted to make and worked collaboratively in developing manageable and meaningful rehabilitation goals. She had significant functional impairments, but was prepared to work as hard as possible with the therapists and surpassed their initial expectation in terms of how much function she regained. She built bridges with her family and enjoyed contact with the ward staff and fellow patients. Her wound healing progressed as would be anticipated. She was discharged home in just under 6 months.

While it is impossible to match case studies exactly and tease out all the components that influenced the outcome in each of these situations, these cases at least demonstrate how two similar injuries, with similarly psychosocially complex patients, can have quite different outcomes.

CONCLUSION

The field of psychoneuroimmunology has made strides in the past 20 years to demonstrate the relationship between psychological stress and wound healing. While there are fewer studies directly in the area of burns, the findings from this research are still relevant. There has been important progress made in establishing that psychological interventions can reduce stress and improve wound healing. The next steps will be increasing our understanding of the impact of psychological factors and investigating effective psychological interventions.



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