A multinational survey of the assessment of pain when removing dressings

Richard White

Abstract

Background: Skin damage caused by repeated application and removal of adhesive dressings can result in trauma to wounds and peri-wound skin. *Aims:* A multinational survey was undertaken to assess the impact of introducing advanced dressings with Safetac soft silicone adhesive technology on the intensity of wound-related trauma and pain. *Methods:* A survey of 3,034 patients treated with advanced dressings with traditional adhesives (traditional adhesive-based dressings) was conducted in 20 countries. Patients were asked to record their level of pain before, during and after dressing removal. Wound/peri-wound trauma was also recorded. Dressings with Safetac technology were then applied to their wounds, with the same assessment process repeated at the next dressing change. *Results:* When used in the place of some traditional adhesive-based dressings, dressings with Safetac technology demonstrably reduced traumatic injuries to wounds and peri-wound skin. They were also associated with significant reductions in the levels of wound-associated pain measured before, during and after dressing change. *Conclusions:* Advanced dressings with Safetac soft silicone adhesive technology significantly reduced pain during wear, at dressing removal, and after dressing change, when compared with advanced dressings with traditional adhesives. *Conflict of interest:* This survey was conducted by Mölnlycke Health Care. Data analysis was undertaken by Intermetra Business and Market Research Group.

KEY WORDS

Survey
Trauma
Pain
Adhesive dressings
Soft silicone technology

Wounds to the skin, both acute and chronic, can present in a huge variety of forms, affecting all areas of the body and posing different management problems. Generally wounds have to be treated with dressings that will cover and protect them. These dressings often have to be retained in place with retention bandages or tapes so that they do not slip. Alternatively, dressings may have adhesive contact layers as integral components that adhere directly to the wound or adjacent peri-wound skin. These adhesive dressings may present problems when they are removed as they can cause significant levels of trauma to the wound or adjacent skin, resulting in pain for the patient (Dykes et al, 2001: Dykes and Heggie, 2003).

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Pain is a significant problem with all types of wounds and the pain that patients experience may be associated with the wounds themselves, dressings or dressing changes. The treatment of pain has been highlighted as an area of concern and focus for healthcare workers.

The World Union of Wound Healing Societies' (WUWHS) consensus document on minimising pain at wound dressing-related procedures recommends that wound-related pain should be assessed and its intensity rated before, during, and after dressing procedures and that practice should be reviewed if pain is rated as moderate or more (for example, a pain score higher than 4 on a scale of 1–10) (World Union of Wound Healing Societies, 2004). The review of practice should consider current dressing regimens. The highest levels of pain are generally associated with skin and wound damage that occurs during dressing changes (Gerritsen et al, 1994; European Wound Management Association, 2002; Tokumura et al, 2005; Dykes, 2007).

The first step in treating pain is acknowledging that it exists, ascertaining when it occurs and then identifying its primary causes. The most appropriate means for managing the pain and providing supportive measures can then be given. As part of the treatment regimen, routine assessment (at the beginning of and during treatment) should be undertaken. This will enable appropriate changes to be made to treatment regimens that meet the needs of the patient. Assessment tools such as visual analogue scales (VAS) are routinely used to measure levels of pain in patients with wounds (World Union of Wound Healing Societies, 2004; Franks et al, 2007). Using such tools, a regimen for relieving pain and stress should be developed for individual patients, for example offering analgesics and/or psychological and other non-drug therapies as outlined by Acton (2007) and summarised in *Table 1*.

Dressings that use Safetac soft silicone adhesive technology (Mölnlycke Health Care, Gothenberg) have been shown to benefit the patient by minimising the risk of trauma and pain associated with the use of adhesive dressings (White, 2005). Examples of products utilising Safetac technology include:

Table 1
Methods of relieving pain in patients with chronic wounds (summarised from Acton, 2007)

Pharmacological therapies	▸▸ Opioid analgesics (fast acting but adverse effects can be problematic) ▸▸ Topical anaesthetic agents (doubtful efficacy) ▸▸ Non-steroidal anti-inflammatory agents (limited supportive data)
Psychological and other non-pharmacological therapies	▸▸ Cognitive behavioural therapy ▸▸ Relaxation ▸▸ Hypnosis ▸▸ Transcutaneous electrical nerve stimulation ▸▸ Acupuncture ▸▸ Energy healing ▸▸ Physical therapy ▸▸ Distraction (e.g. music) ▸▸ Guided imagery ▸▸ Biofeedback ▸▸ Meditation and prayer
Wound care products	To reduce anxiety associated with dressing-related procedures, appropriate dressings should be selected that: ▸▸ Promote moist wound healing ▸▸ Do not dry out ▸▸ Stay in situ for long periods ▸▸ Do not leak ▸▸ Prevent trauma to wounds and surrounding skin* *Soft silicone dressings fulfil these criteria: they have low peel strengths to reduce damage, are designated as atraumatic and can prevent wound trauma

- Mepilex®, Mepilex® Heel, Mepilex® Lite (absorbent soft silicone foam dressing)
- Mepilex® Ag (antimicrobial soft silicone foam dressing)
- Mepilex® Border, Mepilex® Border Lite/Mepilex® Border Sacrum (self-adherent soft silicone foam dressing)
- Mepilex® Transfer (soft silicone exudate transfer dressing)
- Mepitel® (soft silicone wound contact layer).

In order to further understand the clinical implications of using these dressings, a multinational clinical survey of patients with a variety of different wound types was undertaken, funded by Mölnlycke Health Care.

Aims

The objective of the survey was to assess the impact of introducing advanced dressings with Safetac soft silicone adhesive technology (dressings with Safetac technology) on levels of wound trauma and pain, compared with a previous regimen of advanced dressings with traditional adhesives (traditional adhesive-based dressings) (for analysis purposes these dressings were categorised into adhesive foams, hydrocolloids and others including films, surgical dressings and alginates).

Methods

Patients being treated with a traditional adhesive-based dressing (i.e. a dressing with either a polyurethane, or an acrylic, or a hydrocolloid-based adhesive) as either a primary or secondary dressing were included in the survey. Clinicians who were experienced in the provision of wound care and who were using advanced dressings with traditional-based adhesives as part of their treatment regimen were asked to participate. Patients with chronic and traumatic wounds that were deemed by the clinicians to be suitable were included in the survey. (Patients with infected wounds were excluded). As this was a survey and not a formal clinical trial, recruitment was done on an ad-hoc basis from the participating countries (*Table 2*).

The patients were asked to record their level of pain before, during and after dressing removal rating the pain on a scale of 0–10 (0 = no pain to 10 = unbearable pain). The VAS has been validated for measuring pain severity in patients with wounds (Freeman et al, 2001). It is easy to use and most patients, even with cognitive impairment, are able to use it to indicate their pain severity (Harms-Ringdahl et al, 1986). The VAS used in this study is listed as a suitable pain assessment tool in a consensus document produced by the World Union of Wound Healing Societies (2004).

Table 2
Participating countries

Australia	Italy
Austria	Lithuania
Belgium	Netherlands
Czech Republic	Norway
Denmark	Slovenia
Dubai	Spain
Estonia	Sweden
Finland	Taiwan
France	UK
Germany	USA

The severity of trauma to the wound and peri-wound skin was also evaluated by a qualitative visual assessment carried out by the investigator all of whom were instructed to use a standardised assessment form. Patients were then switched to a second treatment regimen involving a dressing with Safetac technology (Mepilex, Mepilex Lite, Mepilex Border, or Mepilex Border Lite). At the next dressing change (visit 2), trauma and pain levels were measured, recorded, and compared with those obtained at visit 1. A statistical analysis on the pain scores was undertaken using a t-test.

Results

Baseline characteristics

A total of 3,034 patients were involved in the survey. Data relating to the age of the participants are presented in *Figure 1*. Patients presented with a variety of wound types including leg ulcers (venous, arterial and mixed aetiologies), burns, skin tears, pressure ulcers and diabetic foot ulcers (*Figure 2*). *Figure 3* demonstrates the number of different dressings used at baseline, the majority being adhesive foams (n=1,445), hydrocolloids (n=1,095)

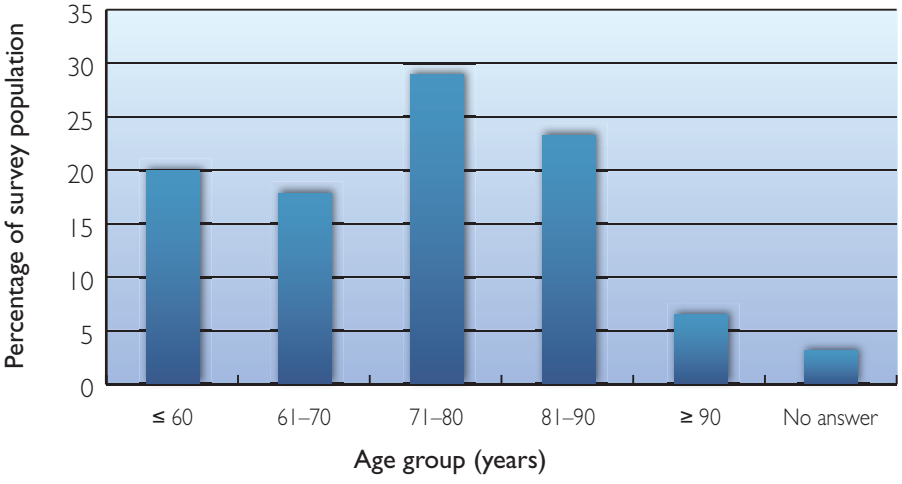

Figure 1. Age demographics of survey population.

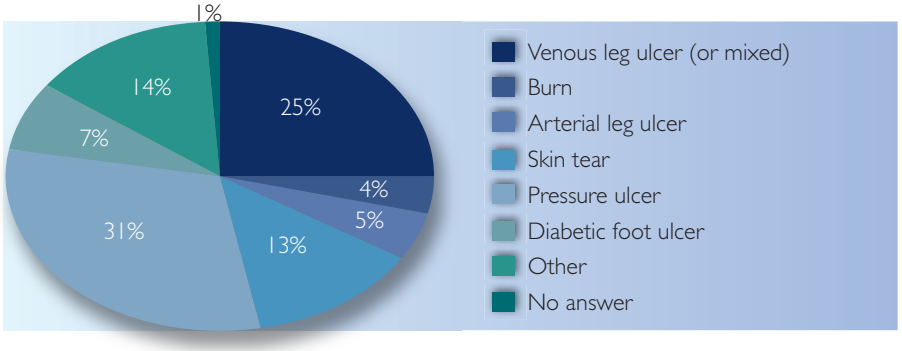

Figure 2. Wound types included in the survey.

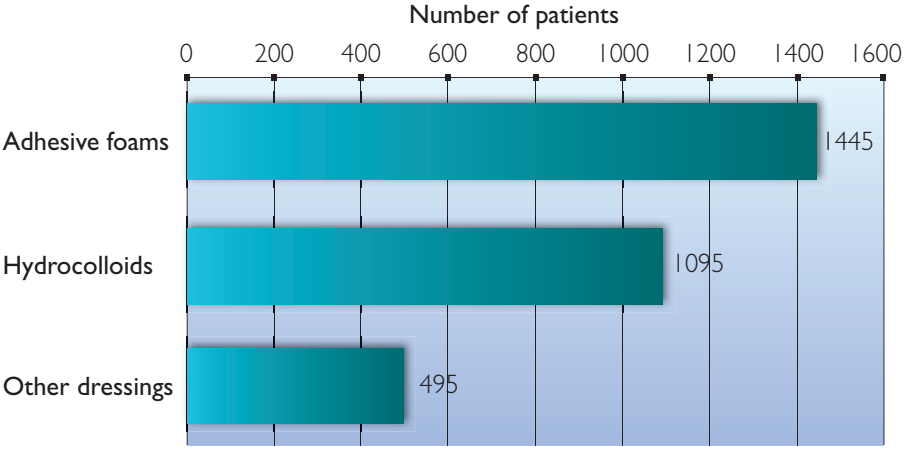

Figure 3. Advanced dressings with traditional adhesives used at baseline.

and other dressings (n=495) such as films, surgical dressings and alginates.

Evaluation of trauma

Data relating to trauma associated with the traditional adhesive-based dressings at visit 1 compared with that associated with the dressings utilising Safetac technology at visit 2 are presented in *Figure 4*. The results at visit 1 demonstrate that about 10% of responses indicated high levels of trauma; 28–39% of the responses indicated moderate levels; 31–35% indicated very slight trauma; and 18–29% indicated no trauma associated with the traditional adhesive-based dressings. In comparison, the results at visit 2 demonstrate that only 1% of responses indicated high levels of trauma; 11% of the responses indicated moderate levels; 35–37% indicated very slight trauma, and about 50% indicated no trauma associated with the dressings utilising Safetac technology.

Evaluation of pain

Data relating to pain (before, during and after dressing removal) associated with the traditional adhesive-based dressings at visit 1 compared with that associated with the dressings utilising Safetac technology at visit 2 are presented in *Figure 5*.

The results from this study show that at visit 1 the ranges of VAS pain scores reported with the traditional adhesive-based dressings were:

- Before removal of the dressings: 2.4–3.2
- At the time of the dressing changes: 4.6–5.2
- After dressing changes: 2.9–3.9.

It was evident that there was a consistent trend associated with all of the traditional adhesive-based dressings evaluated where pain levels increased during their removal.

In comparison, significantly lower pain scores ($p=0.01$) were reported at visit 2 after the patients had been treated with the dressings utilising Safetac technology compared with those reported at visit 1 after the patients had been treated with traditional adhesive-based dressings (*Table 3*).

The ranges of VAS pain scores at visit 2 were:

- Before removal of the dressings: 1.7–1.8
- At the time of the dressing changes: 2.1–2.2
- After dressing changes: 1.6–1.7.

Unlike the traditional adhesive-based dressings, the dressings with Safetac technology were not associated with increased pain at dressing changes. The pain scores at visit 2 remained low and consistent throughout the dressing changes.

When asked about dressing preference, more than 90% of patients surveyed indicated that they preferred the dressings with Safetac technology to their previous dressing regimen (*Figure 6*).

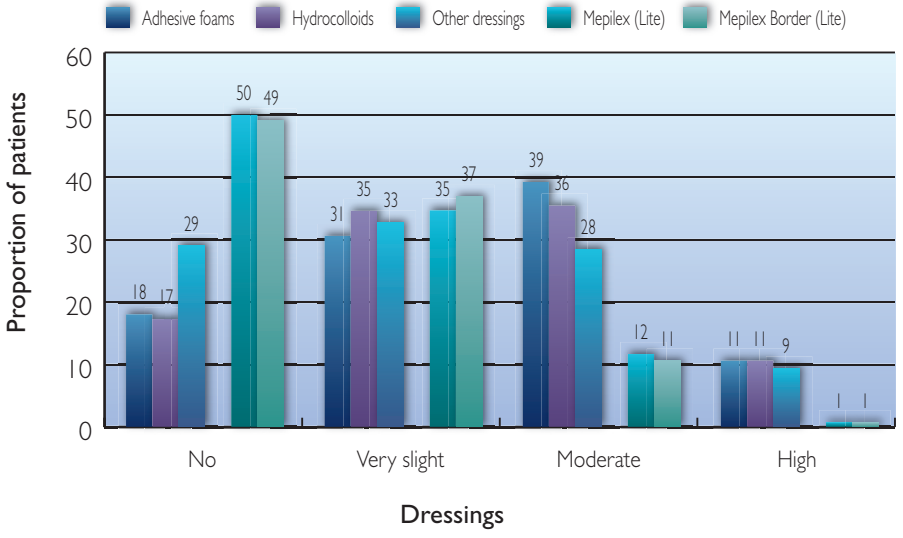

Figure 4. Trauma scores at visit 1 (wounds treated with advanced dressings with traditional adhesives) compared with those obtained at visit 2 (wounds treated with foam dressings with Safetac soft silicone adhesive technology).

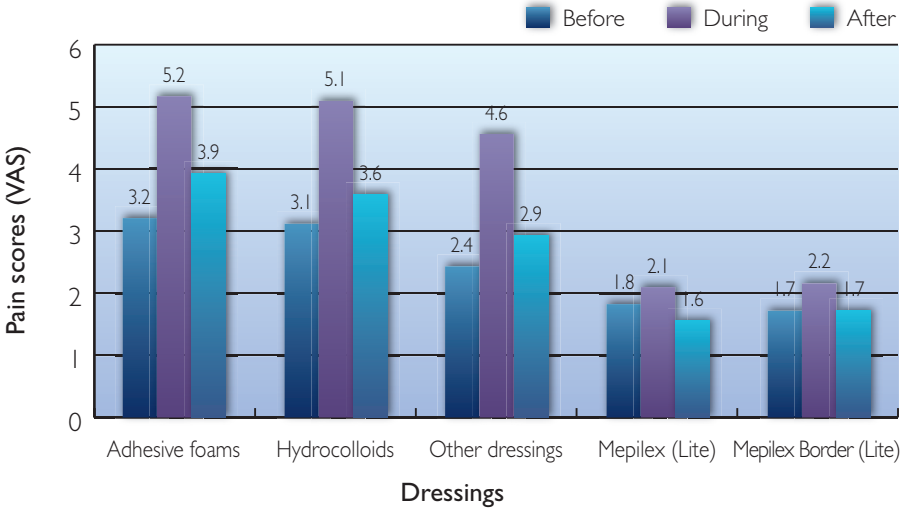

Figure 5. Pain scores at visit 1 (wounds treated with advanced dressings with traditional adhesives) compared with those obtained at visit 2 (wounds treated with foam dressings with Safetac soft silicone adhesive technology) before, during and after dressing removal.

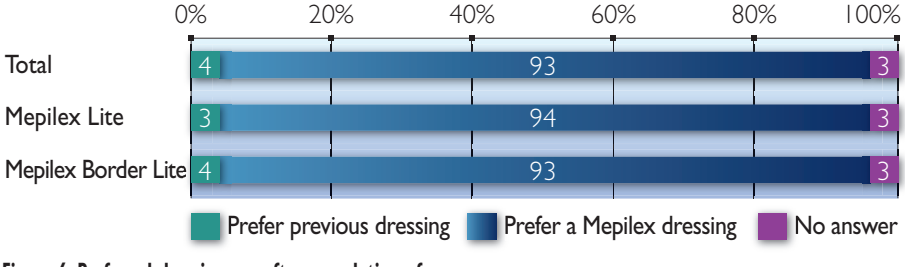

Figure 6. Preferred dressing use after completion of survey.

Discussion

There are a number of criteria that have been listed as necessary to create an optimum wound dressing (Dale, 1997; Morgan, 1998) but essentially a dressing should provide protection for the wound and an optimum environment for healing, but above all it must not cause any further damage or suffering to the patient. Unfortunately, while many dressings go some way to fulfilling these criteria, many of them can cause further trauma and subsequent pain for the patient. The use of inappropriate and sometimes aggressive adhesives on dressings has been shown to cause damage to the newly forming wound bed and/or adjacent peri-wound skin, and the damage caused by repeated application and removal of adhesive dressings is the main cause of trauma to wounds and peri-wound skin (Dykes et al, 2001; Dykes and Heggie, 2003; Dykes, 2007).

This trauma can give rise to variable levels of inflammatory skin damage — oedema, soreness and adverse effects on skin barrier function (Gerritsen et al, 1994; Dykes and Heggie, 2003; Dykes, 2007). In a series of studies, Dykes has shown that some traditional adhesive-based dressings which use acrylic-based adhesives can be more aggressive than others using Safetac soft silicone adhesive technology. When applied to the skin of volunteers with healthy skin it has been shown that traditional adhesive-based dressings demonstrate a greater degree of damage to the stratum corneum (Dykes et al, 2001), higher levels of discomfort (Dykes and Heggie, 2003) and skin damage as measured by transepidermal water loss (TEWL) with greater discomfort measured using a cumulative irritancy score (Dykes, 2007). With the physical trauma caused to the wound and skin, it has been suggested that patients suffer stress as a result of pain related to dressings and dressing changes which may in turn be detrimental to the healing process (Soon and Acton, 2006; Coulling, 2007; Vileikyte, 2007).

A further problem associated with traditional adhesive-based dressings is pain resulting from the damage that they can cause to wounds and peri-wound skin. Pain is a major problem and is most often related to inappropriate dressing selection. The selection of a suitable, non-adherent dressing which will result in greater patient acceptability is a very important part of the holistic approach to treatment (Meaume et al, 2004).

A number of studies have looked at the impact of pain in patients with a variety of different wounds. In a large study undertaken to evaluate the incidence of pain in 5,850 patients with acute (n=2,914) or chronic wounds (n=2,936) of various causes during

Table 3
Statistical analysis of pain scores: traditional adhesive-based dressings *versus* dressings with Safetac technology'

Parameter	Average pain scores (VAS) (n=3,034)
Before removal: first visit (advanced dressings utilising traditional adhesives)	3.0
Before removal: second visit (dressing with Safetac technology)	1.8
Difference	-1.2
Significance	P=0.01
At removal: first visit (advanced dressings utilising traditional adhesives)	5.1
At removal: second visit (dressing with Safetac technology)	2.2
Difference	-2.9
Significance	P = 0.01
After removal: first visit (advanced dressings utilising traditional adhesives)	3.6
After removal: second visit (dressing with Safetac technology)	1.7
Difference	-1.9
Significance	P=0.01

dressing removal, and to evaluate the effect of switching to a non-adherent dressing, patients with both types of wounds reported 'moderate to severe' pain during the medical screening visit (79.9% and 79.7%) and 'very severe' pain in their self-evaluation questionnaire completed at home (47% and 59% respectively) (Meaume et al, 2004). Dressing removal was found to be most painful when there was adherence to the wound bed. Switching to a new, non-adherent dressing reduced pain during dressing changes in 88% of patients with chronic wounds and 95% of patients with acute wounds.

A recent one-day survey was undertaken at a university hospital in Paris, France. The purpose of the study was to evaluate the prevalence, clinical aspects and management of wounds in the hospital by undertaking a 'snapshot' survey of all hospitalised patients to ascertain the prevalence of wounds and the provision of wound care on one specific day in April 2005. The results demonstrated that, out of a total of 624 patients examined, 327 (52%) had 933 wounds (an average of 2.8 per patient). Importantly, pain at wound dressing changes was treated in 89% of cases (Mahé et al, 2006). The findings of Mahé et al highlight that pain at wound dressing change is endemic and, furthermore, often requires a treatment intervention, thus emphasising the need for appropriate dressing usage and dressing change procedures.

A recently published article has highlighted the fact that a high percentage (60%) of patients with venous leg ulcers and other types of chronic wounds exhibit pain, the result of which is detrimental to the well-being of patients (Price et al, 2007) and can delay healing (Soon and Acton, 2006). Price et al underline the message that pain and its cause should be handled as one of the main priorities in chronic wound management, that assessment should be undertaken routinely, and if this is not done then it will lead to patient suffering and increased costs to healthcare service providers (Price et al, 2007).

Pain associated with trauma can, in some instances, be considerable, notably when dressings are changed, and is a concern in patients with chronic wounds (e.g. venous leg ulcers) and friable peri-wound skin. As a consequence, pain management has become a major part of wound care with many organisations and care providers incorporating the management of wound pain into standards and guidelines. The European Wound Management Association (EWMA) has developed a position document that provides clinical recommendations on how to assess and manage wound pain (European Wound Management Association, 2002).

The results from this large multinational clinical survey demonstrate that foam dressings with Safetac soft silicone adhesive, when used in the place of some types of adhesive foams and hydrocolloids, reduce traumatic injuries to the wound or adjacent tissue. The introduction of dressings with Safetac technology resulted in a reduction in the levels of trauma compared with those reported with the advanced dressings utilising traditional adhesive systems. For example, the percentage of responses indicating no trauma with the dressings utilising Safetac technology was almost double that recorded for the advanced dressings with traditional adhesives. The findings also demonstrate that the dressings are associated with clinically significant reductions in levels of wound-associated pain at dressing changes. The low pain scores recorded immediately before dressing change reflect the low levels of pain associated with foam dressings using Safetac soft silicone technology during wear, even though the scores could have been influenced by patients anticipating possible effects of the imminent dressing removals.

The pain scores in this multinational survey seem relatively low when compared with pain scores from patients with wounds reported in the published literature. For example, in a study that was undertaken to evaluate the application of a topical collagen matrix to patients with venous leg ulcers (Wollina et al, 2005), one of the objectives was to measure pain associated with the wound. The mean VAS pain scores before treatment were reported to be 8.72 and 7.88, for the treatment and non-treatment groups respectively. After one week of treatment, the scores dropped to 5.76 and 6.66, although the treated group did show a reduction in pain scores to 3.84 in the second week of treatment. Overall the scores were notably higher than seen in the multinational survey presented in this article. Another study investigated pain as

measured by VAS in patients with skin graft sites treated with three different dressings (Poonyakariyagorn et al, 2002). The pain scores associated with two film dressings were comparable to those obtained in this survey, whereas the pain scores associated with a tulle gauze dressing were much higher. The low pain scores may be explained, at least in part, by the fact that the patients reported their pain scores to the investigators who actually undertook the dressing changes, although this practice is in line with the recommendations of the World Union of Wound Healing Societies in relation to pain assessment (WUWHS, 2004).

Pain scores are also related to the wound type: some wounds are more painful than others, and some wounds may present with little or no pain. It might therefore be appropriate to group this data according to wound type in order to obtain a more detailed view of the ability of foam dressings with Safetac soft silicone adhesive technology to reduce pain.

Conclusion

Trauma to wounds or peri-wound skin may exacerbate the condition leading to delayed healing or further wound complications. Pain leading to increased stress in patients has also been implicated in contributing to a delayed healing response. In view of this, the use of dressings that do not cause trauma and pain present obvious benefits to patients as well as clinical benefits by having the potential to shorten healing times which ultimately makes better use of the limited resources available to health workers treating chronic wounds.

The results of this survey demonstrate that dressings that include Safetac soft silicone adhesive technology benefit patients in terms of significantly reducing pain during wear (as indicated by the pain scores recorded immediately before dressing change), at dressing removal, and after dressing change, when compared with advanced dressings that use traditional adhesives. **WUK**

Key Points

- Repeated application and removal of many adhesive dressings can result in trauma to wounds and peri-wound skin.
- A large, multinational survey was undertaken to assess the impact of introducing advanced dressings with soft silicone adhesive technology on levels of wound trauma and pain associated with dressing application and removal, compared to a previous regimen of using advanced dressings with traditional adhesives.
- Soft silicone dressings, when used in the place of some traditional adhesive-based dressings, reduced traumatic injuries relating to the wound or adjacent skin and significantly reduced levels of pain at dressing change.
- The very low pain scores recorded immediately before dressing change reflect the low levels of pain associated with soft silicone dressings during wear.
- The use of dressings that do not cause trauma and pain present obvious benefits to patients.

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