


Risk factors for peri-traumatic distress and appearance concerns in burn-injured inpatients identified by a screening tool

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Abstract

Introduction: Psychosocial screening of burn-injured patients is a National Burn Care Guideline and is increasingly used to identify individuals most in need of support. It can also generate data that can inform our understanding of patient reported concerns following a burn injury.

Method: As part of routine care, 461 patients admitted to a burns unit were screened soon after admission using a psychosocial screen designed by the service. The questionnaire included items on pre-existing social support, coping, emotional and psychological difficulties, as well as current trauma symptoms and current level of concern about changed appearance following the burn.

Results: Overall, patients reported low levels of appearance concerns (mean 3.7/10) and trauma symptoms (18% reporting flashbacks) in the initial days following a burn injury. In those who did report concerns, there were some significant associations with demographic and other variables. Patients who experienced flashbacks were younger and had a larger total body surface area (TBSA) burn. Higher levels of appearance concern were associated with younger women, larger TBSA and facial burns. However, the relationships found were weak and frequently confounded by other factors.

Conclusion: Overall, the findings indicate that initial trauma symptoms and appearance concerns are not inevitable in this group and there is no substitute for screening in identifying who is most at risk.

Keywords

Appearance, appearance concerns, burns, psychoeducation, psychosocial screening, screen, trauma

Lay Summary

Following a burn injury, as well as physical healing, people may also have other challenges to overcome. For some patients this includes concerns about how their appearance may change, while for others it

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includes emotionally recovering from the psychological trauma experienced. This article is based on data routinely collected using a screening tool, which included questions on social support, coping, appearance concerns, trauma and previous difficulties. This was administered predominantly face-to-face, by a member of the psychology team, to 461 inpatients aged 16–96 years who were admitted to hospital following a burn injury. Of those screened, 41% were female and 59% were male, with the majority (45.8%) being White British. Most patients were screened within seven days of admission (88%), with 41% screened within one day of admission. This article describes how frequently appearance and trauma concerns arise in a group of patients hospitalised for burn injuries. It also describes which people are most likely to report these problems. We found that while some groups of people tend to describe higher levels of trauma or appearance concern than others, not all patients follow the same pattern. The most reliable way of identifying people who need support is to screen all inpatients.

Introduction

Medical care of burn injuries has seen significant improvements in recent decades, leading to increased survival rates and better outcomes for patients.^{1,2} This has prompted renewed shift in focus from reducing mortality rates to reducing or preventing the emotional, psychological and social challenges experienced by burns survivors.^{3–5}

Psychosocial screening

The importance of psychosocial screening has become increasingly recognised within burns services throughout the UK as a way to identify those in need of additional support.⁶ Having an understanding of how pre-burn factors impact on various aspects of recovery and engaging patients proactively enables interventions to be offered earlier rather than when difficulties have escalated or become entrenched.⁷ While most of the evidence available looks at the psychological difficulties people experience in the longer term following a burn injury, screening provides an opportunity to further our existing knowledge of the challenges burns survivors experience in the acute peri-traumatic stage.^{8,9}

Despite the relative frequency with which screening is taking place in UK hospitals, there are no suitable validated measures for use with this population.^{10,11} Screening is informally completed in most burns services across the UK, by either face-to-face interview or through multidisciplinary team meetings; however, we are not aware of any other screening tools being used for this purpose in the acute stage.

There are measures that could capture the different difficulties experienced by burns survivors, such as the Derriford Appearance Scales (e.g. DAS 24, which captures appearance concerns) or the Post-traumatic Stress Disorder

Check List (PCL-5), which identifies individuals with symptoms of trauma.^{12,13} While these provide more in-depth and diagnostic information, due to the length of the questionnaires, time of screening being immediately after the injury, as well as the aim with which these were designed, they are unsuitable for screening purposes in an acute inpatient setting.

Service context

Due to a lack of validated screening tools for use with burns patients in the peri-traumatic stage, an unvalidated psychosocial questionnaire was developed within a specialist burns service in a London hospital and trialled between August 2011 and December 2012. Since, it has been used as a routine screening tool for all inpatients as a way to identify those who may require further psychological support. As such, it has generated a wealth of data, which could contribute to our understanding of the psychosocial needs of recently burned individuals.

The present study

The present study focuses on the exploration of what data generated by the screening tool can tell us about trauma symptoms and appearance concerns in a group of adults with recent burn injuries. These are the two most common reasons for referral to outpatient burns psychology and they are also the aspects of the screen which focus on the impact of the burn, rather than pre-existing factors.

Trauma symptoms in burns survivors

Post-traumatic stress disorder (PTSD) is the prolonged psychological distress experienced by

individuals following a traumatic incident, which is not adequately processed within the first month of the event. It is commonly associated with functional impairment and four symptom subtypes: re-experiencing; hyperarousal; avoidance; and changes in cognition.¹⁴

Research shows that immediately after a traumatic event, trauma symptoms are frequently present in survivors; however, only for a small proportion do these persist and lead to the development of the disorder.¹⁵

Of burn survivors, 20–46% meet criteria for PTSD in the first year following the injury.¹⁶ Research has consistently shown women to be at higher risk than men.¹⁷ The association between trauma symptoms and age, however, remains inconclusive. Data from an Australian study suggested that the prevalence of PTSD reduces as age increases; however, high levels of PTSD have been found in older adult samples.^{18,19}

The prevalence of PTSD has been found to be unrelated to the severity of the burn.^{20,21} Research suggests that rates of PTSD are higher after interpersonal trauma (e.g. assault) than non-interpersonal trauma (e.g. an accident).²² There is also evidence to suggest a significant increase in the likelihood of screening positive for PTSD following a traumatic incident in people who have pre-existing mental health problems at the time of the incident.²³

Appearance concern in burns survivors

There is research to suggest that individuals who place a greater value on appearance are more likely to have negative adjustment following a burn injury.²⁴ Shepherd found that age was negatively related to appearance concerns.²¹ She also found a significant relationship between trauma symptoms and appearance concerns with people with higher trauma symptoms reporting more appearance concerns.

Research has traditionally suggested that women report appearance concerns more frequently and with greater distress than men.²⁵ However, Shepherd found gender was not significantly related to appearance concern in those with burn injuries and neither was total body surface area (TBSA) or location of the injury.²¹ Carr et al. also found that the level of distress in individuals with less visible disfigurement to be as great as for those where it is less obvious.²⁶ There is some evidence of an interaction effect between gender and

face involvement where women with facial burns reported higher depressive symptoms.²⁷

Aims

The data allow us first to describe the sample in terms of the frequency and severity of appearance concern and acute trauma symptoms in a group of recently burned individuals. Furthermore, it enables us to explore the relationship between various demographic, burn-related and other variables and trauma symptoms (indicated by re-experiencing of the event) and level of appearance concern (on a scale of 1–10).

Method

Participants

A total of 461 adult patients were admitted to the Chelsea & Westminster Burns Service between January 2015 and December 2016 (274 men, 187 women; age range = 16–96 years; mean age = 49.76; standard deviation [SD] = 20.6). In terms of ethnicity, 45.8% of the sample identified as White British, 17% as White Other, followed by 3.7% as Black or Black British – African, 2.6% as Asian or Asian British – Indian and 2.4% as Black or Black British – Caribbean. For 6.9% of the sample, ethnicity was recorded as ‘unable to choose’.

Measures

The measure used to collect the data was a 22-item unvalidated psychosocial screen developed by the service. The focus of this paper is not on the development of the screening tool, though item inclusion was based on clinical experience, reasons for referral to the psychology service post injury and a search of existing literature on the factors found to have a significant impact on recovery. As a result, the tool was designed to focus on social support, coping strategies, appearance concerns, traumatic stress symptoms and prior psychopathology.^{7,28–33} During a trial period, the questionnaire was revised and items were removed based on patient feedback and the balance between quality of the information generated, patient burden and clinician time. Only items with face validity were retained in the final questionnaire.

The items covered within the paper were limited to the importance of appearance to self, concerns about changed appearance following the

Table 1. Screening tool items and answer format.

Area	Questions	Answer format
Demographic information	DOB Gender Ethnicity TBSA Severity (depth) Location Mechanism How acquired (e.g. accidental, self-injury, assault)	Gathered from clerking information and clinical notes by clinician
Appearance	How important is your appearance to you? How worried are you now about changes to your appearance following the burn?	Likert scale 1 = not at all to 10 = very much
Trauma	Did you think that your life or someone else's life was at risk? Since the event have you experienced either of the following at least twice: Acting or feeling as though the event is happening all over again? Feeling upset about reminders of the event?	Yes/No
Past difficulties	Have you had any difficult things happen in your life that you may or may not still feel affected by? Have you experienced any emotional/psychological difficulties in the past? Did you have any help for this?	Yes/No How long ago? Please give description.
Risk	Have you ever thought of taking your life, even if you would not really do it? Have you ever reached the point where you seriously considered taking your life or perhaps made plans how you would go about doing it? Have you ever made an attempt to take your life?	Yes/No

burn injury, symptoms of traumatic stress, past difficulties and risk. Please see Table 1 for items considered for analyses. For a copy of the full questionnaire, please see the supplementary file uploaded as part of the submission.

The questions relating to trauma were taken from the Trauma Screening Questionnaire.³⁴ Three of the ten questions from the screening tool were chosen for inclusion based on brevity and relevance in an acute peri-traumatic stage. The remaining items largely pertain to physiological symptoms, which would be confounded by issues such as pain, medication and the hospital environment, therefore not appropriate for use with inpatients.

The questions relating to appearance aimed to identify the extent of the person's current concern about changes to their appearance. A question about how much value the patient placed on appearance pre-morbidly was included as this has been shown to impact adjustment.²⁴

Procedure

Data reported here were collected between January 2015 and December 2016. A total of 548 patients were admitted for overnight inpatient care to the Burns Service over this period and offered psychosocial screening by a member of the psychology team. Of these, 84% were screened ($n = 461$). Those who were not screened either declined or were unable to participate (e.g. due to cognitive impairment, severe mental health or where participation may cause significant distress and the pertinent information could be gleaned from other sources such as liaison psychiatry).

Patients were informed of the purpose of the screen and asked for their consent to participate. Most patients completed screening face-to-face. Where this was not possible, patients were offered a paper version to self-complete or to complete it over the phone. As the screening questionnaire

Burn Injury Mechanism

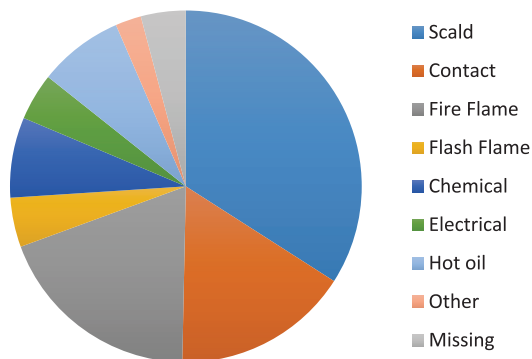


Figure 1. Pie chart showing the mechanism of burn injury.

Total Body Surface Area

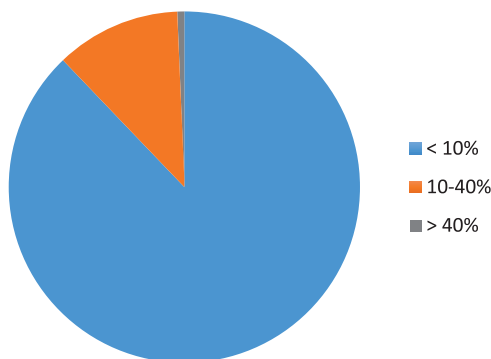


Figure 2. Pie chart displaying the breakdown of the sample based on TBSA affected by the burn injury.

was developed as a clinical tool, it is used flexibly with the main focus being identifying patients in need of further support. In some instances, patients did not provide quantitative responses to all items. Therefore, the data described here contain incomplete cases, where patients provided scores for some items but not others. Their answers were then entered into a secure internal database.

Results

Treatment of data

Raw scores, collected using the psychosocial questionnaire, were entered onto the internal psychosocial database routinely. For the purpose of this paper, the variables of interest were entered into SPSS, coded and computed. Missing data were not replaced using statistical methods. Instead, complete cases were selected for analyses based on the variable of interest.

Burn injury characteristics

Of participants, 34% ($n = 157$) sustained a scald injury, 19% fire flame, 16% contact burn, 7.8% hot oil, 7.4% chemical burn, 4.6% fire flash and 4.3% electrical injury. Mechanism of injury was not recorded for 3.9% of the sample data (Figure 1).

A large percentage of the sample ($n = 188$, 40.8%) sustained a mixed-depth burn, 24.9% had full thickness burns, 19.5% had superficial partial thickness burns and 11% had mid-dermal burns.

In terms of the TBSA, 88% of patients sustained burns that affected < 10% of their body, 11% had burns involving 10–40% TBSA, while 1% (three patients) sustained burns > 40% TBSA. Figure 2 provides a visual representation of this.

Approximately 14% of participants sustained their injury at work, 38.4% reported past mental health difficulties, and out of 457 patients for whom data were recorded, 82 sustained burns to their face in addition to other body areas.

Analyses

Trauma. Descriptive analyses looking at the percentage of patients who reported symptoms consistent with traumatic stress showed that out of 372 patients for whom data were recorded, 29% of patients thought their life was at risk when the incident happened, while 71% did not. In terms of re-experiencing symptoms, approximately 18% reported flashbacks at the time of screening, while 32% reported feeling upset about reminders of the event.

In clinical practice, if patients reported flashbacks, psychoeducation was provided around common reactions following a traumatic incident and grounding techniques were offered. As such, re-experiencing was taken as an indicator of increased risk for future difficulties and included in analyses as a variable of interest.

Flashbacks and age. Descriptive analyses looking at the mean age and SD for those that reported flashbacks ($n = 82$) and those who did not ($n = 355$) found that patients reporting flashbacks had a lower mean age ($M = 42.10$ years, $SD = 16.91$, range 17–80 years) compared to those who did not ($M = 50.49$ years, $SD = 20.55$, range 16–96 years).

Flashbacks and gender. Descriptive analyses for gender and re-experiencing symptoms found that 22% of women ($n = 175$) and 16.4% of

men ($n = 262$) reported flashbacks. A Fisher's exact test revealed that women were no more likely than men to report flashbacks ($P = 0.13$, $\phi = 0.07$).

Flashbacks and TBSA. Mean TBSA was higher in the group of patients that reported flashbacks ($n = 343$, $M = 7.05$, $SD = 9.38$) compared to those who did not ($n = 79$, $M = 3.99$, $SD = 7.08$). This difference was statistically significant ($U = 8613.5$, $Z = 5.07$, $P < 0.001$).

Flashbacks and concerns regarding changed appearance. The group who experienced flashbacks reported higher levels of concern regarding changes to appearance ($M = 5.71$, $SD = 3.82$) than those who did not ($M = 3.31$, $SD = 3.16$). A Mann-Whitney test found the difference to be statistically significant ($U = 7269$, $Z = 4.94$, $P < 0.001$).

Flashbacks and assault. A statistically significant association was found between participants reporting flashbacks and whether the burn injury was sustained as a result of an assault ($\chi^2(1) = 11.89$, $P = 0.001$, $\phi = 0.164$).

Flashbacks and mental health history. No significant association was found between previous mental health difficulties and patients reporting flashbacks following their burn injury ($\chi^2(1) = 2.52$, $P = 0.11$, $\phi = 0.08$).

Appearance. For the whole sample, appearance was found to be moderately important with a mean score of 6.74 out of 10 ($SD = 2.73$), whereas concerns regarding changed appearance mean scores showed low levels of concern with a mean score of 3.7 out of 10 ($SD = 3.39$). A Spearman's rank correlation was conducted to see if there was an association between importance of appearance and level of concern regarding changes to their appearance following the burn. This showed a statistically significant positive relationship ($\rho = 0.344$, $P < 0.001$).

Appearance and age. A Spearman's rank correlation looking at the relationship between age and concerns regarding changes to appearance showed statistically significant results ($\rho = -0.274$, $P < 0.001$), with scores on this variable decreasing as age increased.

Appearance and gender. Descriptive statistics for scores on concerns regarding changes to appearance by gender showed that women scored higher ($M = 4.30$, $SD = 3.65$, respectively) compared to men ($M = 3.27$, $SD = 3.13$). A Mann-Whitney

test showed this difference was statistically significant ($U = 16837$, $Z = 2.79$, $P = 0.005$).

Appearance and facial involvement. A Mann-Whitney test was conducted to see whether there were any differences in concerns regarding changed appearance scores between patients who sustained facial burns and those who did not. This showed statistically significant results ($U = 7225.5$, $Z = 5.66$, $P < 0.001$), with mean rank scores indicating a higher level of concern for those who sustained facial burns.

Appearance and TBSA. A Spearman's rank-order correlation was conducted to determine the relationship between burn TBSA and concerns regarding changed appearance. The results showed a weak, statistically significant positive correlation between the two variables ($\rho = 0.248$, $P < 0.001$). This indicates a higher level of concern about changes to appearance following the burn as TBSA increases.

Discussion

These data give an opportunity to look at a sample of patients very soon after admission to hospital following a burn injury. Overall, there were relatively low rates of people reporting symptoms of trauma. This is indicative of an overall positive picture for burns patients, at least in the short term. Previous research indicates that higher levels of post-traumatic distress in hospital were associated with poorer psychosocial functioning at follow-up.³⁵ It is therefore potentially useful to identify this group and provide psychological support and intervention. In the early stages, this would include psychoeducation around common responses to trauma and grounding techniques with the aim to alleviate symptoms and ensure patients are aware of the support available should difficulties persist. At this stage, these patients would not meet diagnostic criteria as symptoms must be present for more than one month (DSM V).

Analysis of the group of patients who reported flashbacks within their inpatient psychosocial screen revealed that those who had flashbacks were generally younger than those who did not. This is unsurprising and it is commonly found that in individuals who have experienced a traumatic incident, higher levels of PTSD are recorded for younger people.³⁶ However, research has also suggested that high levels of PTSD can be found in older adults.¹⁹ In this sample, the mechanism of burn may be a confounding variable as older

adults frequently have different types of burn injuries to younger adults and these may be less likely to be experienced as traumatic. However, in this group, the age range of individuals reporting flashbacks was 17–80 years, indicating that, despite a trend towards increased problems in younger people, it is still necessary to screen all patients, regardless of age, in order to identify patients who may need timely support.

Women were no more likely than men to report flashbacks during their admission. This is in contrast to previous research, which until recently has consistently found that women were more likely to experience PTSD than men.¹⁷ However, recently published research has found that when considered with all other variables (e.g. demographic, socioeconomic, resources and life events) gender was not a significant predictor of PTSD.³⁶ It may be that in the current sample, gender differences were not found due to screening taking place soon after admission versus 10–11 years later in the study by Bowler et al.³⁶ It would be interesting to see if our findings were maintained or whether other factors may interrupt subsequent processing of the trauma for women more than for men.

A significant association was found between TBSA of the burn and the likelihood of the individual reporting flashbacks at the time of screening ($n = 422$, $P < 0.001$). This was surprising as it does not fit with previous research or with clinical experience.²¹ One can hypothesise that a larger TBSA could be the result of a more traumatic injury or associated with a different mechanism, e.g. flame burn as opposed to scald. Pain may also play a part, in that patients may experience increased pain with larger TBSA burns and there is evidence of a relationship between the intensity of pain described by patients and post-traumatic distress.³⁷ However, we do not have sufficient evidence to explain this association and further research (for example, using a more detailed measure of trauma symptoms) is needed to establish the nature of the relationship.

Flashbacks were also associated with higher scores in relation to a person's concern about appearance change following the burn injury. This is in line with the findings of Shepherd who reported that there was an interaction effect between trauma symptoms and appearance concerns in burns survivors.²¹

In this sample, the likelihood of experiencing flashbacks was increased for individuals who sustained their burn through an assault versus

other types of injury (e.g. accident). This is consistent with the literature.²² Injury resulting from assault may serve to increase perception of current threat, which is an important aspect of the Ehlers and Clark cognitive model of PTSD.¹⁶

It was surprising that previous mental health history was not associated with flashbacks in this sample. Previous research has shown past mental health problems to be a consistent predictor of PTSD.³⁸ While the screen enquires about any previous psychological or emotional difficulties, these are quite broad questions and as such may not be sensitive/ detailed enough to identify any association. Furthermore, while there was no relationship found between past mental health difficulties and experience of flashbacks at time of screening, this does not mean that mental health history is not a risk factor in which patients go on to develop PTSD in the future.

In relation to appearance concern, while there were quite high levels of importance of appearance before the injury, overall the immediate level of concern about change to appearance in this group of patients was low. Again, this presents an optimistic picture for burns survivors. However, there were still a minority of patients that reported high levels of concerns regarding changes to their appearance. Support at this stage was provided in the form of exposure (supporting individuals with looking at their burn injury), mindfulness and psychoeducation (e.g. managing expectations, dealing with social interactions).

Those patients who reported higher levels of personal importance of appearance before the burn also reported higher concern about changes to appearance following the burn. This is intuitive and fits with previous research.²⁴

Gender was significantly associated with appearance concern in this group with women reporting higher levels of concern about changes to their appearance following the burn than men. While significant ($P < 0.005$), the correlation was weak ($z = 2.79$). It is also important to note that the SD is larger in the group of male patients; therefore it is likely that there are some men with high levels of appearance concern. This fits with clinical experience and supports the importance of screening all patients, regardless of age or gender.

A significant association was found between facial burns and concern about changes to appearance following the injury. This is contrary to research and clinical experience which has suggested that visibility does not predict distress.

These results may be influenced by the stage at which screening takes place, often being immediately after the injury occurred when facial swelling may be at its peak. People may initially worry about how they will adjust knowing the burn involves their face; however, the true impact may be unknown at this point. As burn scars mature and the extent of permanent appearance change becomes more evident, body image concerns may emerge in individuals who had initially reported low levels of concerns and vice versa.

A significant positive association was found between TBSA and appearance concerns, as well as between TBSA and flashbacks. This suggests that the greater the surface area of the burn the more concerned people are about changes to their appearance and the more likely they are to report experiencing flashbacks. This is an interesting area to explore further, though it is important to note that these associations were weak. In this study, and as can be seen from Figure 2, the vast majority of patients sustained burns to < 10% of their body, preventing group comparisons based on TBSA ranges.

Limitations and further research

This research was limited by the fact that the screening tool only focused on inpatients. The same service sees approximately 2000 outpatients per year and most psychology referrals, in fact, come from those originally seen as outpatients. For this reason, it is difficult to generalise the results to all burn-injured patients. The context in which screening is offered could potentially provide a different picture in terms of concerns expressed by patients. Therefore, one area for further research would be to consider ways to implement screening on a larger scale to include both inpatients as well as outpatients. This would not be without challenges considering time and resources required.

As this research was based on data collected using an unvalidated questionnaire, caution is required when generalising the results. An obvious future direction would be to attempt validation of this measure; however, it is important to acknowledge that the measure was developed with the aim of being used routinely within the burns service to inform clinicians' understanding of patients' emotional needs and resources. Within the scope of our service, it is not currently possible to formally empirically validate this tool due to limited resources and the heterogeneity

of the patient group (e.g. varying patient and injury characteristics, language and literacy differences) and length/type of hospital admission. Nonetheless, the tool continues to be routinely used within our service and other burns psychology services and feedback suggests that it consistently usefully contributes to patient care.

It is important to note that these data were usually collected within 48 hours of admission to a specialist burns unit. Therefore, making predictions about the potential long-term risk for appearance concern or PTSD would be problematic. In order to develop a better understanding of the long-term impact of burn injuries for individuals, a follow-up at three months after the injury was recently implemented. This will allow us to examine whether the group of people who experience difficulties in the days immediately after their injury continue to struggle during their recovery, and whether the screening was predictive of the kind of difficulties they have later. The three-month follow-up would also enable us to explore areas beyond the scope of this paper, such as items within the screening tool relating to social support and coping to see if these are related to better or worse outcome at follow-up.

Summary

In summary, patients who reported flashbacks at the time of screening were younger and had a larger TBSA compared to those who did not. No significant relationship was found between previous mental health difficulties or gender and patients reporting flashbacks. Increased appearance concerns were associated with younger women, larger TBSA and facial burns. However, the relationships found were weak and frequently confounded by other factors.

While these data give some indication of the profile of patients for whom distress may be higher, these relationships are weak and within 'lower-risk groups' there are still exceptions with very high levels of concern. This suggests there is no substitute for non-targeted screening.

For those who continue to present with symptoms consistent with PTSD, we are then well-placed to assess and if indicated provide evidence-based trauma-focused psychological interventions (NICE Guideline CG26).³⁹ These would include trauma-focused cognitive behavioural therapy (CBT) or Eye-Movement Desensitisation and Reprocessing (EMDR).^{16,40} For patients with ongoing appearance concerns there is a strong evidence base for CBT for appearance anxiety.⁴¹

As such, an important role of psychology within a burns service is to recognise when distress reaches a level for which psychological intervention may be required. In addition to providing peri-traumatic intervention in the form of psychoeducation and grounding techniques, it also gives us the opportunity to monitor those seen as at risk to developing PTSD or appearance concerns.

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