Scar management

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Scars pose a significant concern to individuals and can have a profound effect on their lives, functionally and aesthetically, particularly when highly visible. An increased awareness of this area is important for healthcare professionals to ensure appropriate care in the prevention, assessment and differential diagnosis, management and maintenance of scars.

This handbook offers an overview of the categories of scars including keloid, hypertrophic, stretch marks and acne scars and their assessment with a range of supporting images.

The recognition of scars using the acronym SCAR is useful for the healthcare professional to consider important aspects of assessment and management. Site, Category, Age and Reassurance and the aide memoir is helpful in ensuring all issues are considered.

The psychological effects of scarring can be significant, and helping patients adjust in a positive way can have a profound effect. An important aspect of this is the size of the scar, which, as the evidence identifies, bears little relevance to the impact on the individual. This is an important message and may be underestimated by healthcare professionals.

The Nursing in Practice online staff survey of 251 primary care nurses offers an insight into both the classification of scars seen and also the treatments currently recommended. Importantly, 67% of the respondents always discuss care and treatment of scars with patients, and 89% discuss the best methods of improving scar appearance. However, a third of the respondents identified a need to improve their own knowledge to improve outcomes for the patient.

The management of scars is an important role for all healthcare professionals to consider, and where possible offer accurate assessment, differential diagnosis and evidence-based care to maintain aesthetics and function. Where improvement cannot be achieved, advice on maintenance – including the consideration of camouflage and micro-pigmentation – can be given.

Increased knowledge about scars can ensure that healthcare professionals offer appropriate advice and can ensure that those who need access to a member of the multi-disciplinary team receive it. The role of dispelling myths about scarring and spurious claims regarding inappropriate treatments should form part of the healthcare professional’s role in caring for those with a scar.

This handbook offers an extremely useful overview of the evidence regarding scar management and I urge healthcare professionals to increase their knowledge and improve outcomes for patients.

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Scar recognition and assessment

Scar has been defined as the macroscopic disturbance of the normal structure and function of skin architecture, resulting from the end product of a healed wound. In other words, scar tissue does not look the same as undamaged skin/tissue. This can cause great distress to individuals, particularly when the area affected is highly visible, the face being the most obvious. This may be regardless of whether the scar is acne-related, large surgical scarring or trauma-related. Carr et al reported that 67% of women and 33% of men in the UK were concerned about a scar on their body. Self-esteem and confidence can be seriously affected, in some instances leading to self-imposed isolation. In addition, scars over joints may inhibit movement and may even lead to disability, causing possible financial hardship in addition to emotional distress.

WOUND HEALING

Wound healing comprises several overlapping phases: haemostasis, inflammation, destruction, proliferation, re-epithelialisation and finally maturation and remodelling; the latter stage finally producing the scar tissue. During the later stages of wound healing, all devitalised tissue has been removed from the wound bed and the defect is filled with granulation or connective tissue. This is produced by fibroblast cells, whose main task is the synthesis of collagen fibres. These fibres produce keratinocytes, whose function is to balance the removal of old collagen and produce new collagen until the wound defect is healed and the scar produced. If this process produces too much collagen, increased scarring results. If too little is produced, the scar tissue is weak and easily ruptured. The scar tissue gradually increases in tensile strength, however this will be at best 70% of its original strength and so vulnerable to injury. Initially, the newly healed wound scar will be livid in colour, gradually during the course of a year, the scar will become avascular and take on the classical non-pigmented appearance.

NORMAL SCARRING

Normal linear scar

Scars vary in appearance, usually dependant on the type of injury or surgical procedure, and also on the type and position of the wound area, race and age. Surgical wounds with good approximation of the wound edges by suture, staples or glue will heal with minimal scarring and produce a linear scar.
Superficial dermal scar
Figure 1 shows a newly healed donor site wound, from which a split skin graft had been harvested. The resultant wound is very superficial and heals by re-epithelialising, usually within 10-14 days. Once healed, this requires gentle washing as usual. Pat dry and apply a moisturising emollient such a basic 50:50 liquid in white soft paraffin, applied sparingly twice a day until the donor site has a dry appearance.

Stretched scar resulting from a wound healing by secondary intention
If wound healing is delayed by infection or the wound is over a joint that cannot be immobilised, mechanical force may result in a stretched scar appearance. Stretched scars can also be the result of too little collagen deposition in latter stages of wound healing, often caused by malnutrition.

Hypertrophic scar
Hypertrophic scars are formations of excess scar tissue above the level of the surrounding skin and often present

SCARS CAN BE DIVIDED INTO THE FOLLOWING TYPES:

- **Keloid** – grow beyond the boundary of the original wound site, due to an imbalance in the production of collagen protein.
- **Hypertrophic** – raised and red but do not exceed the boundaries of the original wound site. They can continue to thicken for up to six months and can be itchy or painful.
- **Contracture scars** – causes tightening of the skin and may cause discomfort or affect movement. Contracture scars are often a result of burns.
- **Linear** – a minimal scar that occurs following surgery where there is good approximation of the wound edges by suture, staples or glue.
- **Atrophic** – raised and red but do not exceed the boundaries of the original wound site. They can continue to thicken for up to six months and can be very itchy or painful.
- **Stretch marks** – when the skin is stretched rapidly (during pregnancy, weight gain or loss, or adolescent growth spurts) or when skin is put under tension during the healing process.
- **Acne scars** – a scar that occurs when the wound tries to heal itself resulting in too much collagen in one area. These scars may be referred to as ‘ice pick’, ‘box car’ or ‘rolling’ scars.
Scar Management

Chapter 1 Scar recognition

as raised, angry, painful/itchy scars, which maintain vascularity and therefore lividity. Hypertrophic scars remain within the original wound area and usually develop 6-8 weeks after the epithelialisation is complete. These scars occur more frequently in wounds crossing lines of tension such as over the sternum, upper back and major joints. The cause of hypertrophic scars is the over-production of disorganised collagen fibres. Hypertrophic scarring resolves spontaneously, but can cause distress to the individual. There are many silicone gel and sheet products available, which are thought to aid resolution of hypertrophic scarring by increasing the scar temperature and increasing the rate of collagen breakdown. Massage is recommended for any wound scarring and should commence as soon as epithelialisation is complete – a small amount is massaged against the scar with sufficient pressure to blanch the scar tissue.

Keloid scar
Keloid scars result from over-production of collagen fibres – up to 20 times more than normal scars – and can occur any time after wound healing. Keloid scars are particularly prevalent in Afro-Carribean and Asian races, and are thought to have a genetic predisposition, while Caucasian races may also develop keloid scarring in rare cases. Unlike hypertrophic scarring, the keloid does not remain within the boundaries of the original wound site but extend into previously undamaged skin and tissue. Keloid scars often develop in burn injuries but can also be caused by tattoos, injection sites, skin reactions and surgery. Keloids scars do not settle spontaneously, and excision surgery may exacerbate the problem. Treatment concentrates on prevention by use of pressure garments and massage, as previously described.
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Chapter 1 Scar recognition

SCAR TREATMENT
Bio-Oil has developed a scar assessment tool to help you identify the type of scar and offer appropriate advice and treatment.

S – Site & Skin type – identify whether scar is on a mobility area, and if the patient’s skin type is likely to produce abnormal or worse scarring.
C – Category – is it a keloid, hypertropic, atrophic or contracture scar?
A – Age – is the scar new, still maturing or fully matured?

SITE & SKIN TYPE
Site – scars on high-mobility areas such as joints can restrict movement as the tissue can tighten. In such cases it will help to massage with a moisturising product to maintain elasticity as the scar matures.

Skin Type – darker skin types (particularly Afro-Caribbean and Asian skin) are susceptible to keloid scarring, where there is an overgrowth of dense fibrous tissue outside of the boundary of the wound. Fair, freckled skin types tend to scar more than other skin types.

CATEGORY
There are four different categories of scar that each heal and mature slightly differently:

Keloid scars – grow beyond the boundary of the original wound site, due to an imbalance in the production of collagen protein.
Hypertrophic scars – raised and red but do not exceed the boundaries of the original wound site. They can continue to thicken for up to six months and can be very itchy or painful.
Contracture scars – causes tightening of the skin and may cause discomfort or affect movement. Contracture scars are often a result of burns.
Atrophic – typically small, flat or depressed relative to the surrounding skin and often caused by acne where collagen is destroyed within the dermis where the cysts occurred. Skin can be dryer and less elastic.
Stretch marks (striae) – streaky lines on the surface of the skin in areas where skin has
stretched during pregnancy or rapid growth such as the abdomen, breasts and hips. New stretch marks will be red or purple in appearance, while mature stretch marks will be silvery or white.

**AGE**

**Age of scar** – young scars (typically less than 6-9 months since the wound healed) will present red and possibly raised. Young scars are still maturing so it is important to reassure the patient that the colour will fade over time. Older scars will be faded and pale.

**Age of patient** – both keloid and hypertrophic scarring are more common in younger (typically 10-30 years old) patients with darker skin.

**REASSURE & RECOMMEND**

**Reassure** – whilst scars do not always present a medical issue, they can have a psychological impact on the patient. So where a patient has aesthetic concerns, reassure that scars are extremely common (on average each person has three scars on their face or body). For new scars you can reassure that the scar will continue to mature and improve for up to two years.

**Maintain elasticity** – for scars on mobility areas or those causing discomfort, skin should be kept supple, with regular application of a topical oil or cream.

**Self-care** – nothing can completely remove a scar; however, applying a topical oil or cream can help to improve skin condition and empower the patient to connect with the scar and feel more positive.

**Refer** – for cases of severe or abnormal scarring (eg, keloid) where the scar is causing physical pain or severe mental distress it may be necessary to refer to a dermatologist or plastic surgeon to discuss further treatment options, including corticosteroid injections or surgical procedures. In cases of severe scarring, there are several support groups the patient may find helpful. These include Changing Faces, British Association of Skin Camouflage, The Scar Information Service and Burned Children’s Club.

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The psychological effects of scarring

While there is a plethora of information about scarring, the processes remain poorly understood and there appears to be little universal agreement on its clinical definition. Scars may cause psychological, functional or growth problems. The psychological effects that a scar has on the person and the specific issues that may affect patients with scars from acne, stretch marks (striae), post-operative scars and burn scars will be discussed in this article. Patients will have to live with the effects of scars and therefore it is helpful to think about this from a patient’s perspective. It is also acknowledged that the support a patient receives from healthcare professionals is to enable them to adjust in a positive way to their scars. Therefore this chapter will also explore ways in which the nurse can help the patients come to terms with a scar, giving practical examples as appropriate.

**BODY IMAGE**

Western society places a lot of importance on how we look. Rumsey and Harcourt state that the literature suggests there is a relationship between appearance and self-concept, with a visible disfigurement leading to lowered self-confidence. This lowered self-confidence can affect all areas of the patient’s life, such as when forming relationships or receiving negative reactions from others.

Before addressing how the nurse may help patients to adapt from a psychological perspective, it is helpful to first look at why these types of scars may give rise to psychological problems.

**Acne** is common in adolescents with over 80% of teenagers in both sexes having been affected by the age of 20. The onset of puberty can increase body image concerns and emotional stress can exacerbate acne. Patients with acne also suffer from self-esteem issues and feel embarrassed about their condition. Acne is often found on the face and disfigurements to the face may cause more problems because of the connection between the face and self. Aktan et al found that although boys appeared to have more severe acne, girls appeared to have greater anxiety. However, Smithard et al found that there was no difference in the anxiety levels of boys and girls, and concluded that both sexes should be treated the same. One possibility for the differences found in the two studies could be that females’ coping strategies involve talking about their concerns more than males. There are
also many inaccuracies regarding the causes of acne, and the nurse should dispel myths such as causation of acne through lack of face-washing or poor diet, etc.\textsuperscript{9}

**Striae or stretchmarks** are thought to occur in about 50\% of pregnant women, although this condition is not restricted to pregnant women.\textsuperscript{10,11} The key here is to be aware that the exact mechanism of occurrence – or why striae occur in some and not others – is not understood.\textsuperscript{11} This means that it is difficult to predict who will have striae. There is some evidence that younger women and those with a family history are more likely to develop stretch marks.\textsuperscript{12} A Cochrane review did not find any evidence that using various creams prevented striae.\textsuperscript{10} However, NHS Choices advises avoiding rapid weight gain, and suggests that a healthy diet and daily massage with a moisturiser can help reduce the risk of developing stretch marks.\textsuperscript{13} Although striae tend to occur on the abdomen, hips and breasts and can be hidden by clothing, they could cause embarrassment when going swimming or in changing rooms. When striae is particularly severe it can cause severe itching and discomfort.\textsuperscript{14} Striae are also a feature of Cushing’s disease, and high doses of steroid therapy have been known to induce the condition.\textsuperscript{11}

**Post-operative scars** are better understood, and occur as a direct result of surgery. With planned surgery there is time to discuss scarring. The nurse should have an understanding of the healing process. This is because when the wound has epithelialised there is still a further stage of wound healing, that of maturation.\textsuperscript{15} This takes a period of about 12-18 months (post-epithelialisation) when the scar starts to settle down. Collagen becomes reorganised and the initial lumpiness of the scar eventually goes. The extra blood supply (from angiogenesis) also goes back to normal and the scar will pale.\textsuperscript{15} The nurse needs to spend time with patients, ensuring that they are aware of the likely course of events in terms of scar formation. For example, if a lump is being removed they need to be aware of the depth of the lump and that there may be a ‘dent’ in the skin from where the lump has been removed. Using pictures from previous patients may help them to appreciate the amount of scarring.\textsuperscript{16} Young and Hutchinson also found that patients are extremely concerned about scarring after routine surgery.\textsuperscript{17}

**Burn scars** differ from post-operative scars in that they are likely to be larger and may hypertrophy (see Edwards for further information on hypertrophic scars\textsuperscript{18}). Burns also have an element of trauma for the patient. Patients may wish to talk about how the accident happened and relive the event as a way of coming to terms with it. The nurse should make time to listen to the patients’ concerns.

**HELPING PATIENTS COME TO TERMS WITH A SCAR**
Other people’s reactions influence body image,\textsuperscript{2} therefore the nurse needs to be aware of how he/she approaches the patient regarding their scar as patients may pick up both verbal
and non-verbal communication. This is extremely important when the scars are unpleasant or on obvious places of the body such as the face. Feedback may help to reassure patients and might start the formation of a trusting relationship, which will allow patients to talk to nurses regarding their feelings about the scar.

The size of the scar should not matter. A small survey undertaken by the Scar Information Service found that the majority of patients who were concerned about their scars had small scars. The survey found that patients with smaller scars perceived healthcare professionals to be less sympathetic to them, giving more sympathy to those with large scars. Young and Hutchinson also found that the size of the scar did not alter patients’ concerns. Therefore the nurse must not make the patient feel their concerns are trivial.

The literature appears to focus on visible scars. The author believes that all scars are visible, but some are easier to hide than others, through use of clothing for example. What may be more important is the significance of the area affected to the patient and that should be discussed. The more significant the area, the more support will be needed.

Many patients complain of pruritis (itchy skin) from the scars. The exact cause does not appear to be known but massaging the scar with a little moisturiser may help. If the itchiness is severe then antihistamine tablets could be prescribed.

It is fairly common for scars to be massaged to improve the cosmetic appearance. Massage may disrupt the fibrotic tissue and increase the pliability of the scar, but the exact mechanism of how it works appears to be unknown. However, Shin and Bordeaux found that the evidence to support the use of massage was inconclusive. Even so, they support its use, saying that it is ‘anecdotally effective’ and
appears to be more effective with post-operative scars than any other type. In fact, massage may also have other psychological benefits as patients may find this relaxing. Patients may be concerned about what to use as a moisturiser when massaging scars. There is no evidence in the literature to suggest that any cream or oil was better than another, but the use of a moisturiser prevents damage from friction while massaging.

If the scar is hypertrophic then using silicone gel sheets over the scar may help to reduce the scar, although the exact mechanism of action is still unknown even though it has been in use for more than 20 years.\(^{25,26}\) If silicone gel is to be used, the patient should increase wear time slowly until they can tolerate eight hours or more.\(^{27}\)

**COPING STRATEGIES**

Before coming to terms with a disfigurement it appears that most patients go through a stage of mourning the loss of how they used to look before accepting their new self.\(^{2,8}\) Throughout the grieving process the patient will need someone to listen and encourage them to talk about their feelings. The importance of listening to the patients’ worries cannot be overstated.

Other coping strategies may include direct approaches, such as talking about issues. That way it is possible to find out what the issues are to the patient and then practical suggestions can be offered. If the scar concerns the patient so much, they can be referred to a plastic surgeon, who may be able to make the scar less noticeable,\(^{16}\) or it may be possible to arrange for the patient to have cosmetic camouflage to hide the scar.

On a more practical note, the patient could gently massage the scar twice daily using a moisturiser or oil. Although the evidence to support massage is inconclusive,\(^{24}\) it does give some control back to the patient and, as well as helping to disrupt the fibrotic tissue, may also help to control some of the itching.

If patients start to have difficulties interacting with others due to their scars, they may benefit from social-skills training specifically for people with disfigurements.\(^{3}\) Bessel and Moss found the evidence for this was poor, but it may prove helpful for some patients.\(^{28}\)

**SUPPORT NETWORK**

A good social support network is a way of helping people deal with any stress.\(^{2,3}\) It is important that the nurse also discusses the impact of scars with the patient’s relatives/friends (with the patient’s permission). If those relatives also have difficulty coming to terms with how the person looks then this may be a starting point for them to discuss their feelings.

**CONCLUSION**

In order to be able to deal effectively with patients who have scars, the nurse needs to have an understanding of the causes of scarring. It should be noted that the size of the scar is of little importance compared with the patient’s perception of the scar. It is also important that nurses are sufficiently well informed to be able to dispel popular myths around the causes and prevention of scars. The key issue, however, is simply to make time to talk to the patient.
REFERENCES


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The NIP/Bio-Oil Survey: the results

An online survey looked at the subject of skincare and practice nurse experiences of treating patients with scars and stretch marks. Here is a summary of the results...

Scars and stretch marks occur as a natural result of the healing process. However, research has shown that scarring can have a significant psychological impact, and many patients view their scars as unsightly and unwanted. Primary care nurses are well placed to provide advice and support for these patients, as well as recommend appropriate treatments.

Scars can be divided into the following types:

- Keloid – an overgrown scar that can spread outside the original area of skin damage.
- Hypertrophic – a scar that is raised above the surrounding skin, taking the form of a red raised lump.
- Stretch marks – when the skin is stretched rapidly (during pregnancy, weight gain or loss, or adolescent growth spurts) or when skin is put under tension during the healing process.
- Acne scars – a scar that occurs when the wound tries to heal itself resulting in too much collagen in one area. These scars may be referred to as ‘ice pick’, ‘box car’ or ‘rolling’ scars.

Treatments include chemical peels, laser therapy, steroids, or over-the-counter topical remedies. Although scarring and stretch marks are natural parts of the healing process and growth and weight loss respectively, many patients view them as unsightly and unwanted. The affected skin will go through numerous changes as it matures, but it often never attains the appearance of the surrounding skin. Therefore, it is not surprising that patients often seek help from a health professional as to how to prevent or reduce the impact of scars and stretch marks. With this in mind, Nursing in Practice, in association with Bio-Oil, ran a survey to gauge the breadth of experience and knowledge of the treatment of scars and stretchmarks among primary care nurses (see Figure 1 for a breakdown).

PATIENT PROFILE
We asked respondents to the survey about the types of scars they see in practice. The majority said they see patients who have scars due to surgery (73%), followed by...
stretchmarks due to weight gain (59%) and then scarring due to accidents/trauma (56%) (see Figure 2). The stage of healing is an important part of diagnosis and planning of treatment, and 76% of nurses said they see newly formed scars once wounds have healed. Around 56% of respondents see old scars, 18 months after wounds have healed.

Most of the scars seen in primary care practice, according to the nurses surveyed in Nursing in Practice, are keloid scars (43%), followed by atrophic (30%) and hypertrophic (27%). With regard to the opportunistic questioning of patients about their scars, a total of 16% of nurses would bring up the subject if they noticed visible scarring while treating the patient for another condition; however, most (74%) said this would depend on the patient and their situation.
PSYCHOLOGICAL IMPACT

The appearance of scars can have a huge impact on patients’ psychological wellbeing, inhibiting them from daily activities, and occasionally causing depression or feelings of low self-esteem. Our nurses said that they felt approximately half of patients they see with old scars have experienced a psychological impact. This is largely related to concerns about the skin’s appearance and 44% of nurses said they feel the impact is aesthetic rather than medical. When asked about patients’ feelings about their scars, 75% described patients as feeling ‘self-conscious’ about their scars, in contrast to ‘embarrassed’ (8%) or ‘worried/concerned’ (6%).

It was clear from the survey that some patients experience delayed recovery from accidents due to the psychological effects their scars have. Around 26% of nurses have experienced this in practice, emphasising the need for care to encompass mental as well as physical health issues.

TREATMENT

Most nurses (67%) who responded to the survey said they always discuss care and treatment of scars with patients who are having stitches or dressings removed. Nurses offer a wide range of advice about the treatment of scars and stretchmarks, and most (89%) discuss with patients the best methods of improving the appearance of new scars. Other forms of advice are:

- Reducing the appearance of old scars (56%).
- Reducing the appearance of uneven skin tone (32%).
- Reducing the appearance of newly formed stretch marks (47%).
- Reducing the appearance of old stretch marks (32%).
- Preventing the formation of stretch marks (48%).

FIGURE 3: WHAT TREATMENT DO YOU CURRENTLY RECOMMEND FOR SCARRING? (Minor scarring such as surgery wounds, cuts, caesarean section and minor burns)
There are a number of treatments that nurses can advise to promote healing (see Figure 3). The majority (49%) suggest using topical oils and, perhaps surprisingly, 14% said they do not suggest patients use any treatment as the scars will fade with time.

NURSES’ CONFIDENCE
Just over half of nurses (66%) said they feel confident or fairly confident discussing scarring with patients, with 3% feeling ‘unconfident’, and the majority do not feel they are giving the best advice they possibly could. This is due to an inadequate level of training for most, although 31% attributed their lack of confidence to the fact that no best practice guidelines exist on scar treatment. With regard to patient outcomes, 31% stated they do not believe patients are satisfied with the level of advice they receive from health professionals about scar treatment.

CONCLUSION
It is clear from the results of the survey that primary care nurses require more training in how to manage and treat scars and stretchmarks, with a large number of professionals seeing patients with scars who have experienced a negative psychological impact.

This survey ran from 15 June to 1 July 2011. A total of 251 primary care nurses completed the survey, the majority of whom were practice nurses who have been working in a primary care setting for more than 10 years. The survey was sponsored by Bio-Oil.
Scar treatment

Is the treatment we use for problem scars enough? They are a challenging issue not only as an entity to treat; but the patient suffers with clinical, functional and psychosocial issues that need addressing for management.

INTRODUCTION

Scars and their complicated forms have been described over 1,000 years ago. Nevertheless we still have poor understanding of the patho-physiological and microbiological causes of why certain wounds scar differently than others. There have been predictive factors established throughout the literature – such as site of wound, tension of wound closure, race of the patient, etc – but these are not absolute and great variations exist.

When we refer to managing scars we always talk about hypertrophic scars and keloids. Their practical distinction is difficult and many clinicians are still struggling. However, there are clear distinctive signs in their definitions and what should follow is the understanding of its management. Hypertrophic scars are raised scars that grow within the border of the wound margin, whilst keloid scars grow beyond the wound margin.¹ Their cause is from stress to the skin that breaks the skin continuity – this can range from an inflammation (chicken-pox lesions), to a clear surgical cut. Understand that a hypertrophic scar will regress as the scar matures, while a keloid has a great probability of never reaching maturity and will continue its growth beyond all margins of the initial wound (see Figure 1).

Once a diagnosis of the type of scar is made it is important to take a moment and consider that we are not treating a scar but a patient baring a scar who needs to be managed appropriately. Assessment of the scar is not enough. The patient needs to be assessed before, during and after treatment so all aspects are met. Use assessments where they are actively involved, such as Patient and Observer Scar Assessment Scale (POSAS). Acknowledge the impact it might have on their quality of life by completing the Dermatology Life Quality Index (DLQI) questionnaire and act on it if deemed necessary by incorporating a clinical psychologist in your team.² The clinical symptoms of pain and itchiness should be addressed from the beginning and not left on the sidelines until the scar has settled.

Once the patient has been assessed, there is a large cohort of treatments that we can use. We will discuss them in detail as they range from topical non-invasive measures to more complex surgical approaches with chemotherapy and radiotherapy aids. They have all been validated and proven to work with different degrees of success, but as no two scars are the same, treatment
success varies from patient to patient – especially in the less aggressive treatments. Even more importantly, as with all diseases, prevention is of immense importance. Make sure that a newly forming, normal-looking scar has taken the path to maturation. This must be attended and managed to prevent, if possible, the complicated states of scarring.

**TREATING ‘NORMAL SCARS’**

**Massaging and the application of a moisturiser**

This technique of preventing aberrant scarring is thought to break collagen fibrous tissue, which will help flatten the scar.\(^3\) It should be done in a circular motion and not too deep that it will cause discomfort. Using a moisturiser helps in hydrating the scars and prevents friction whilst massaging.

**TREATING ‘ABNORMAL SCARS’**

Hypertrophic scars and keloids also benefit from hydration and massaging, as the constant stress of clothing rubbing on the wound is avoided while at the same time the lesion can become more pliable and less symptomatic. On the other hand, more aggressive lesions need further and more intense treatment. We have divided these into the invasive and non-invasive types, and discuss how we can further help our patients after the treatment has finished and has been successful.

**NON-INVASIVE TREATMENTS**

**Pressure garment**

This is a useful tool in suitable areas of the body and should be applied once the wound has healed or the stitches have just been removed.\(^4\) It is imperative to explain to the patient that this is worn at least 23 hours a day whilst the scar is maturing.\(^1\) The pressures exerted on the scar counter-act the stress at the edges of the wound and at the same time limit its extension beyond its margins. Using the pressure garments in hot or humid conditions has brought the opposite results, so its use is limited to your area in the world and the time of the year.\(^5\)

**Silicone gel/sheet**

Topical silicone gel and sheeting is a well-established treatment for the management of scars. Its therapeutic effects on predominantly hypertrophic scars have been well documented with great success.\(^6\) The gel and sheets are known to help hydrate and soften the scar. Patients’ concordance, however, cannot be emphasised enough, as they will have to use this type of treatment for at least three to four months immediately after the wound has closed. The gel form of silicone is advisable to use in exposed areas of the body – especially the face and neck – as constant rubbing by the clothes will wipe it away, while the silicon sheets can be used in cloth-baring areas.
INVASIVE TREATMENT

Intraleisional injections of steroid therapy
This kind of treatment applies to scars that cause complications due to being wider and stretched, cause contractures, or are hypertrophic or keloidal. This treatment option is commonly used when initial management, as discussed above, is not effective or the scar has matured. This treatment, if used in the early stages of scar healing, will cause atrophy. It is essential that the patients be committed to this treatment as it entails a course of six sessions of treatment per cycle. Failure to do so will reduce the efficacy of the treatment.6 One cycle is usually sufficient to treat a small keloid. It is important to start with a low dose of triamcinolone at 10mg/ml for the first two sessions and follow with a stronger dose at 40mg/ml, as it has been shown to decrease the reoccurrence rate considerably.7

Scar revision
This type of surgery will help in minimising the scar so that it is more consistent with the surrounding skin tone and texture.5 Although this technique provides a better aesthetic result, the scar will not completely disappear but can be fashioned to improve the deformity it can cause. It is vital to note that scar revision is not an option for everyone, especially when the patient has a history of abnormal scarring or difficulty in wound healing. In addition, a follow-up after surgery is necessary to monitor and apply preventative measures whilst the wound is healing.

Intraleional excision with steroid injection
This, in essence, is a debulking procedure used in keloids. The rational is that no normal skin is injured and the remaining keloidal borders are only left to follow on with treatment of usually intraleional steroid injections. The intraleional injections are as a rule started in 4-6 weeks following the surgery when the new scar is closed. It is important to note that failure to follow the excision with further therapy will result in the keloid recurring.

Extralesional excision and radiotherapy
This complete excision of the keloid to normal skin tissue is reserved for refractive and difficult-to-treat keloids. The excision is followed by radiotherapy with a delivery of 10Gy to the area of the new scar only. This needs the involvement of a radiotherapist and the informed consent of the patient as there is a risk of cancer to the area of 1-2% at 30 years, especially if the area treated is the female breast or the thyroid to the neck. The delivery of radiotherapy can be in one visit or in multiple visits, depending on the protocols at different units. The literature shows better results and less recurrence, with multiple radiotherapy sessions giving up to 10Gy in total.8

5-Fluorouracil injections
This 50-year-old chemotherapy agent has been used in scar management in ophthalmology for over a decade and now is showing great results in treating skin-deforming scarring. It is
reserved for keloids as an intralesional injection only to small keloids (<1cm³) or in larger keloids following extralesional excision. The similarities of keloid behaviour to cancer lesions has made this kind of treatment popular, and the recurrence rates appear to be much lower than even radiotherapy treatment. The systemic complications of chemotherapy are avoided by the small amount given intralesionally. However, small local complications exist as with all treatments and expert opinion should be consulted before this treatment.

**Other available treatments**
There are many more treatments that are used around the world today for different scars such as cryotherapy, laser, chemical peeling, etc. They have seen success but are not without complications. We have not included them here as their success is still not well documented and access to them, especially within the NHS, is still very limited.

**CONCEALING A SCAR**
Regardless of how successful our scar treatment has been, the fact remains that once the skin has been injured it will leave a scar, which will be different in colour and texture to the surrounding skin. This is why once we have successfully treated a scar we must follow it up with methods to camouflage it.

**Skin camouflage (medical ‘make-up’)**
Using medical make-up – which is hypoallergenic, waterproof and odourless – under the guidance of a specialist nurse will not only make sure the camouflage needed is of the ideal consistency and colour to mask it and make it appear the same as the surrounding skin, but will also teach the patients to use it throughout their life (see Figure 2).

**Micro-pigmentation**
In a similar manner as with make-up, the specialist will match the colour of the surrounding skin and ‘tattoo’ the scar to appear the same as the surrounding skin. This is a permanent camouflage with great advantages, especially on hair-baring areas as micro-pigmentation can imitate a shaved area on a male’s face or eyebrows where hair does not grow on the scar.
CONCLUSION
Injured skin heals by forming a scar. Whether a scar will have a linear, uncomplicated pattern or a hypertrophic keloidal pattern it has to be managed appropriately to offer the best results to our patients. The aesthetics of a scar take second place to the deformity, the functionality and, importantly, the psychosocial issues that accompany them. It is more cost-effective to prevent or even treat a problem scar than to allow it to ‘take over a patient’s life’. Ignoring a large scar because clothes cover it does not minimise its effects on the patient’s quality of life – we have found precisely the opposite. Hidden scars impact patients’ lives more than exposed ones.

Whichever techniques you use in your practice are welcome, as long as they are successful, with only small complications and recurrence rates. However, we cannot stress enough the need for a guiding protocol to fall back on for difficult, resistant-to-treatment scars. Use a multidisciplinary approach with specialist nurses, plastic surgeons, radiotherapists, clinical psychologists and occupational therapists. And last but not least, treat the patient and not the scar – this will be more rewarding for both parties.

REFERENCES

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