

**A Textbook of  
Interdisciplinary  
Approach to  
Wound Care**



UNIVERSITY OF IBADAN LIBRARY

**Edited by**

**Prisca Olabisi Adejumo**

**Ibadan University Press**

**2014**

# Contents

	<b>Page</b>
Dedication	iv
Acknowledgement	vii
Preface	ix
Contributors	xi
Introduction	xiii
<b>Chapter</b>	
<b>1</b> <b>Theoretical, Physiological and           Socio-Psychological Perspectives of Wound</b> <i>Adebayo O. Adejumo</i>	1
<b>2</b> <b>Overview of Non-Operative Wound           Management in Contemporary Nigeria:           Yesterday, Today and Tomorrow</b> <i>Richard E. Nnabuko</i>	23
<b>3</b> <b>Prevention of Wound</b> <i>Oluwatoyin A. Olufemi</i>	33
<b>4</b> <b>Risk Factors and Prevention of           Pressure Ulcer</b> <i>Rose E. Ilesanmi</i>	59
<b>5</b> <b>Foot Screening</b> <i>Ade F. Adeniyi</i>	81
<b>6</b> <b>Diabetic Foot Ulcer</b> <i>Jokotade O. Adeleye</i>	111
<b>7</b> <b>Cost of Wound Care</b> <i>Oladoyin B. Ogunbowale</i>	141

<b>8</b>	<b>Nurses' Role in Wound Care</b> <i>Prisca O. Adejumo</i>	157
<b>9</b>	<b>Physical Therapy in the Management of Ulcer</b> <i>Arinola O. Sanya and Ade F. Adeniyi</i>	171
<b>10</b>	<b>Roles of Medical Social Worker in Wound Care</b> <i>Isaiah M. Ojedokun</i>	191
<b>11</b>	<b>Wound Debridement</b> <i>Ayodele O. Iyun</i>	217
<b>12</b>	<b>Strategies in Wound Closure</b> <i>Samuel A. Ademola</i>	231
<b>13</b>	<b>Building a Wound Care Team</b> <i>Prisca O. Adejumo</i>	249
	<b>Index</b>	263

---

# Theoretical, Physiological and Socio-Psychological Perspectives of Wound

*Adebayo O. Adejumo*

## **Introduction**

Both active and inactive members of the society have risk for injury with the possibility of developing wounds. A wound is an injury in which the skin or an organ is broken by some external force such as a blow or surgical incision, with damage to the underlying tissue. Exposure of an individual to obnoxious emotional events and stimulus could also lead to psychological injury of immense magnitude. Even when no obvious physical injury is seen in such a situation, its outcome could be lethal on the mind with the possibility of resultant physical injury.

Wound literature is replete with issues such as causes, pathophysiology, medical-surgical management, very little attention has been given to theoretical, historical and socio-psychological perspectives of wound. This chapter is therefore focused on filling these gaps. Efforts were made to highlight related theories about wound care and management; influence of historical events on present day wound handling practices, as well as socio-psychological concepts associated with wound and wound healing, yet laying emphasis on the relevance and application of these theories in holistic and multi-disciplinary approach to the handling of wounds.

## **Meaning of Theories**

A theory is a set of statements or principles, commonly devised as correct, postulated to explain a group of facts or phenomena, especially one that has been repeatedly tested or is widely accepted and can be used to make predictions about natural phenomena. It is a belief or principle that guides action or assists comprehension or judgment (The Free Dictionary 2013). Its argument is not arbitrary but derives its validity from the aggregate of experiences to which

it must permanently refer for empirical control. In sum, a theory is a fact-based framework for describing a phenomenon.

In clinical and behavioural sciences, theories are used to provide a model for understanding human thoughts, emotions and behaviours. The theories that are applied in wound management derive from many disciplines related to clinical patient management. This cut across human physiology, bio-chemistry, medicine, psychology, physiotherapy, nursing, pharmacy and allied fields. But the understanding and application of relevant theories (as appropriate) assist in better handling of wound, more effective treatment outcome, and overall assurance of quality patient care. In practical terms, knowledge of the theory behind the understanding of the normal and patho-physiological processes and its implication for wound management constitute theories in this context. Theories formulated in this manner are required as basis for meaningful assessment, planning, implementation and evaluation of professional actions and prescriptions. By way of application, theories related to wound give clear instruction, help to develop skills, give greater insight and thrust for day-to-day wound handling practices. Further, theories and their application in wound management constitute the bedrock of evidence base, for scientific approach to individual patient wound care needs.

### **Historical Perspective**

The history of wound and wound care cut across pre-historic and modern medicine. That wounds heal by itself is a common knowledge, irrespective of its outcome, whether scar-less or with tissue loss. Hunters and gatherers identified herbal remedies capable of assisting wound healing. The relevance of hygiene, haemostasis, wound dressing, and germ theory also provided empirical evidence to support wound care practices. Records of ancient medical practice are replete with accounts of varieties of wound care techniques in ancient Egypt and Greece including practices such as the use of lint, honey, animal and other topical products. The explanation for the use of these were rested on the concept that the lint provided a fibrous base that enhanced wound site closure similar to the lay down of fibrin in haemostasis; the

animal grease provided a barrier to environmental pathogens, mimicking the epidermis and cutaneous layers of the skin, while the honey served as an antibiotic agent.

Egyptians believe that closing a wound preserves the soul and prevents the exposure of the spirit to "infernal beings," as was documented in the Berlin papyrus, while Greeks supported the idea of wound closure and also differentiated between acute and chronic wounds. Galen of Pergamum associated wound-site moisture with successful healing. Very little advances were recorded in the Middle Ages and the Renaissance, but the most profound advances, both technological and clinical, came with the development of microbiology and cellular pathology in the 19th century.

In the 19th century, the introduction of hand washing by Ignaz Phillip Semmelweis reduced maternal wound infection, just as Joseph Lister in the 1860s began treating his surgical gauze with carbolic acid, reducing his surgical team's mortality rate by 45%. Ernst van Bergmann six years later introduced heat sterilization of surgical instruments marking the beginning of aseptic surgery and reduction in the rate of surgical wound infection. Paul Leopold Friedrich in 1898 discovered the role of wound excision in reducing open wound infection. During WW1 a chemist, Henry Dakin invented Dakin's solution, sodium hypochlorate and boric acid, to wash out the traumatic wounds of British soldiers fighting in France, manually reducing the presence and count of microorganisms in wounds and wound debris in the process, leading to greater improvement in wounds so treated.

Molan (2001) reported the relevance of honey in the healing of infected wound because of its antibacterial properties and topical ointment effect as emphasis on empirical evidence in shaping wound handling practices increased. The discovery of synthetic non absorbable sutures in the 1950s paved the way for inert, longer lasting wound closure with faster wound healing. George Winter and Howard Maibach also introduced moist wound dressing found to improve wound re-epithelisation. Within the last two decades, wound grafting and bio-technology such as cloning and tissue engineering have been further developed; serving as possible

"Living skin equivalents" often mimicking cellular platforms for the release of growth factors essential for proper wound healing.

In many situations, patients with wounds commonly report that pain associated with wound could be worse than the impact of deformities that may accompany injuries and wounds (Krasner 1998). The management of chronic wound pain for instance and the consideration of related socio-psychological factors are fast becoming emerging wound treatment priorities, now viewed as an integral part of wound care.

### **Psycho-Physiological Perspectives in Wound Healing:**

#### **Review of Literature**

Literatures in the area of physiology of wounds are filled with simple and complex explanations on bio-chemical and anatomical changes that follow deliberate or accidental tissue injury. A more concise account presented by Cole-King and Harding (2001) is the focus of this section.

Going by Cole-King and Harding's (2001) account, tissue damage triggers a number of processes and activates various cells and cellular elements to achieve the complex events resulting in tissue restoration. The process of healing is orchestrated by a number of active tissue factors called cytokines, which are secreted by lymphocytes, platelets, and macrophages within the wounded area. The tissue damage itself acts as a trigger for wound healing to begin.

Initially, a normal clotting mechanism is required to activate succeeding stages. An inflammatory phase follows, which results in neutrophils, monocytes, and macrophages appearing in large numbers in the wounded area. Tissue macrophages play a major role in debridement of the area and secretion of peptides that stimulate neovascularization and the migration of lymphocytes and fibroblasts into the wound. Proliferation then occurs with the formation of collagen from the fibroblasts present in the wound area. The collagen matures, being remodelled and cross-linked, enhancing the tensile strength of the forming scar.

The cellular immune system seems to play the largest role in the regulation of these various phases of wound healing. Macrophages

and T lymphocytes have the greatest influence on wound healing (Barbul 1990). IL-1 and tumor necrosis factor are the main chemokines released by these activated macrophages (Leibovich and Ross 1975). T lymphocytes also participate in wound healing, migrating into a wound after the inflammatory phase (Fishel, Barbul, Beschoner, Wasserkrug and Efron 1987).

No doubt good immune functioning is extremely important in regulating wound healing as well as in preventing wound infection, which can have a detrimental effect on normal healing. Although, the cascade of events outlined above is seen in normal healing, one or more of the above processes may be compromised in some patients, resulting in delayed healing and formation of a chronic wound (Cole-King and Harding 1998).

Psychoneuroimmunology has established a link between psychological factors and the endocrine and immune systems (Ader, Cohen and Felton 1995). The role of the endocrine and immune systems in healing has been well researched (Barbul 1990). It is therefore possible that psychological factors have a role in the pathogenesis and recurrence of some chronic wounds (Anderson, Marcia, Andberg 1979; Olshansky 1992). Stotts and Wipke-Tevis (1996) refer to researches showing how psychophysiological stress has been identified as a cause of delayed healing. Palmer (1995) discusses how psychological and psychosocial problems can affect wound healing, suggesting that the "psycho-social aspect of community health is often the most vital part of dealing with wounds that will not heal."

Kiecolt-Glaser *et al.* (1995) found that the healing of punch biopsy wounds "took significantly longer" in patients with dementia and that the caregivers of these patients reported significantly more stress than caregivers of control subjects. Examination stress was associated with delayed healing of hard-palate punch biopsy wounds in 11 dental students (Marucha, Kiecolt-Glaser and Favagehi 1998). The stress experienced by these subjects predated their punch biopsies and hence the delayed healing, suggesting a directional relationship between stress and delayed healing. The authors suggest that stress-related alterations in immune function may lead to impaired healing. Franks *et al.*



(1994) also found a statistically significant mean reduction in depression in patients whose leg ulcers had healed, although the mean reduction in anxiety was not significant

### **Exudate Theory of Wound**

Exudate, also known as wound fluid or wound drainage, plays a normal part in the healing process in all wound types and aetiologies. In general, the quantity of exudate produced decreases as the wound progresses towards healing (Thomas 1997). Exudate is particularly noticeable during the inflammatory and proliferative phases of healing because it provides nutrients as an energy source for metabolizing cells and plays a role in regulating the moisture level in the local wound environment.

High level of exudates cause problem while of selecting dressing products capable of handling the fluid level and also in preventing damage to the surrounding skin. Leakage of exudate through the dressing not only increases the risk of cross-infection, it may also be distressing for the patient because of soiling of clothing and beddings and possible mal-odour. There are differences in the composition of acute and chronic wound fluid and even between the fluids of different types of acute wounds, which have differing profiles of proteinases, proteinase inhibitors and cytokines (Baker and Leaper 2000).

By manipulating exudate, it may be possible to speed up or improve the healing process. However, due to the many different wound types and underlying patient conditions, and because the phases of wound healing overlap, it is difficult to determine the 'optimum balance' of cytokines, growth factors and proteolytic mediators that should be present at any particular point during the healing process (van Rijswijk and Harding 2000). There are also important variations in the constituents and volume of exudate produced during healing, so it is difficult to define 'normal' levels of exudate production (Harding 1997).

### *Constituents of Exudates*

Exudate is known to be similar to serum, having similar concentrations of potassium and sodium ions (Vickery 1997). Exudate has fewer red blood cells but approximately six times as many white cells as does blood, supporting the role of exudate in wound cleansing and debridement (Thomas 1997). Perhaps the most important constituents of exudates are the growth factors, which stimulate various parts of the wound-healing process, the matrix metalloproteinases (MMPs), which break down the wound matrix and, finally, the inhibitors of MMPs known as TIMPs (tissue inhibitors of matrix metalloproteinases).

Metalloproteinases (MMP) are proteolytic enzymes, that is enzymes that degrade protein. A sub-group of metalloproteinases, the matrix metalloproteinases (MMPs) specifically degrade or cleave at least one of the extracellular matrix proteins, for example collagen or elastin. MMPs include collagenase and elastase. MMPs not only degrade proteins but also cause degradation of key functional molecules such as growth factors (Tren Grove *et al.* 1999). In chronic wounds there is an imbalance in the amount of MMPs and TIMPs.

### *Over-hydration and Skin Damage*

Over-hydration occurs when fluid is trapped against the skin. The outer layer of the skin - the stratum corneum - is a physical barrier but does allow passage of water through the skin by a process known as trans-epidermal water loss (TEWL). When liquid is trapped on the skin surface or the skin is occluded, preventing TEWL, the keratinocytes swell and are capable of absorbing several times their own weight in liquid. This can be seen as the plump, wrinkling of the skin that commonly occurs after swimming or prolonged bathing. The process of TEWL usually resolves this once the skin is no longer immersed. When the peri-wound skin is exposed to fluid in the form of exudate, however, the same process also occurs and the moisture remains in contact with the skin for much longer periods. It is suggested that this over-hydration of the epidermis may stimulate the release of pro-

inflammatory cytokines that initiate a further inflammatory response and the associated release of MMPs (Klingman 1995).

Once over-hydration has occurred, the skin is less able to withstand physical trauma because the stratum corneum becomes weaker and less elastic and is therefore more susceptible to physical damage, such as that caused by the removal of adhesive dressings or the chemical assault from the wound exudates.

### *Exudate Management*

In order to manage exudate effectively, its quantity and type should be assessed and described. It is important to interpret correctly any change in the level of exudate produced. At certain points in the healing process, clinicians will identify an 'average' or 'normal' level of exudate as being indicative of normal progression - and a sudden increase in the level of exudate is frequently taken to indicate the presence of infection. However, other practical factors, such as the presence of oedema, the rehydration of necrotic tissue or connection to another drainage site, such as a stoma, may also increase the level of exudate, and these factors should also be considered (Thomas 1997).

### *Measuring Levels of Exudates*

The most obvious reason for estimating the level of exudate is to assist in the selection of an appropriate dressing or wound-management product. There are practical difficulties associated with the objective measurement of the quantity of exudate. Two possible methods of measuring exudate production are: collecting fluid in, for example, a drainage bag; and collecting and weighing dressings. Realistically, neither of these are practical options in most instances and therefore, a more subjective measure is usually used in clinical practice. Many practitioners estimate exudate volume in terms of dressing usage, equating frequency of dressing change to the volume of exudate. A simple version of this method has been described by Mulder (1994), who suggests using 10x10cm gauze as the base comparison. He defines the levels as absent, minimal, moderate and high.

### *Colour and Consistency of Exudates*

It is usual to describe the colour and consistency of the exudate as well as its volume. Mulder (1994) suggests descriptors based on the visual components of the exudate: serous, sanguineous, serosanguineous and purulent. Pseudomonas infections produce thick, malodorous, sweet-smelling, green exudate, while proteus infections produce an ammonia-like odour.

### *Management Plan*

Once an accurate assessment has been made, an appropriate plan of management should be formulated. For example, compression bandaging may be used in venous hypertension and diuretics may be prescribed if heart failure is causing gross pedal oedema. When a high level of exudate is expected, measures to protect the surrounding skin from damage should be employed. These include the use of simple barrier creams and the now widely available skin-protectant wipes or sprays. If there are likely to be very frequent changes of dressing, which may lead to tape damage of the surrounding skin, a keyhole dressing using a film or thin hydrocolloid may be more appropriate because it allows the tape to be secured to the dressing rather than to the vulnerable peri-wound skin. Dressings may manage exudate in a variety of ways, including absorption, transmission (by allowing free drainage through the dressing or by transpiration), interaction or by a combination of these ways. There are several generic types of product, which may be classified within these categories.

### *Absorbency*

Perhaps the most common method of management is the use of absorbent dressing products such as foams or alginates. These vary considerably in their levels of absorbency and comparative information both within the literature and from the manufacturers. It is difficult to interpret objectively due to lack of a standard methodology. The type of absorption required depends on the characteristics of the wound being managed.

Some products claim selective absorbency of the liquid component of the exudate, concentrating the beneficial wound

proteins in the wound space (Achterberg *et al.* 1996). However, in the light of the high concentrations of other factors, such as MMPs, which may have a detrimental effect, this issue requires further investigation, with some authors suggesting that, especially in chronic wounds, the fluid (exudate) may be so toxic that it may be beneficial to cleanse the wounds regularly (Wyssocki 1996).

### *Transmission*

Where there is a 'very high' level of exudate, absorbent products may not be sufficient and the exudate may be better handled by being allowed to drain freely, either into a drainage-type system similar to a stoma bag or by passing through a porous wound-contact layer and having less expensive outer padding layers, which are changed more frequently. More sophisticated systems of drainage allow the collection of fluid via a negative-pressure system.

Where there is minimal exudate, some products are able to handle the fluid by having a 'breathable' outer covering, which functions in a similar way to the stratum corneum. This breathability in a dressing product is described as the moisture vapour transpiration rate (MVTR). The higher the MVTR, the greater the dressing's ability to allow fluid to evaporate (Bolton *et al.* 2000). This method of managing fluid is suitable only for low amounts of exudate, but is often used as part of a combined approach.

### *Patient-centered Considerations*

When selecting products to manage exudate, additional patient-focused factors must not be forgotten. Several studies addressing quality-of-life issues in patients with wounds suggest that many of them suffer embarrassment and social isolation due to dressing leakage or malodour (Hamer *et al.* 1994; Hyland and Thomson 1994). Many patients view exudate as 'unclean', and, while current recommendations suggest leaving dressings in situ for as long as possible and that wounds should be cleaned only when necessary, it should not be forgotten that there is a real need for people to 'feel clean'. This is not to suggest that research-based practice should be

ignored, simply that patients' wishes and needs must be addressed. Some very absorbent dressings can become quite heavy when almost ready to change, especially in areas where they may be affected by gravity, such as on breast wounds, where the dressings may pull considerably on the surrounding skin, causing discomfort.

In summary, management of exuding wounds remains a real clinical challenge. A basic understanding of the role and function of exudate should assist the practitioner in appropriate assessment of the patient and his or her wound. Defining terminology in a standardized and objective way will facilitate communication and evaluation of planned care. Knowledge of the way different categories of dressing products perform and how their usage may be optimized will allow a range of realistic treatment options to be considered and a tailored approach to the patient's needs designed.

#### **The Neil and Barrell's (1998) Transition Theory of Wound**

As presented by Neil and Barrell (1998), acute wounds progress through a timely and orderly sequence of repair that leads to the restoration of functional integrity. In chronic wounds, this timely and orderly sequence goes awry. As a result, people with chronic wounds often face not only physiological difficulties but emotional ones as well. The study of body image and its damage as a result of a chronic wound fits well with Selder's transition theory. The Transition Theory also describes patients' experience with chronic wounds as a transition or change-over process that needs to be appreciated by healthcare providers. This notwithstanding, wound healing processes often get hindered due to biopsychosocial imbalances in the patient, quality of care, and other related factors.

#### **George Winter's Wound Healing Theory**

According to the postulates of Winter, epithelial cells migrate more rapidly with the scab in case of moist wounds as compared to dry wounds where the cells have to spend more energy and time. Winter on his experimental models of domestic pigs measured the histological epithelialization of wounds that were covered with occlusive materials. The results show a significant progress in

healing with this kind of dressing (Winter 1962; Winter 1975). The use of simple gauze on wounds had some disadvantages as it could not keep a constant moist environment and also it was difficult to change the gauze dressing without causing secondary trauma to the wound and the removal of the newly formed epithelium. Under those circumstances simple gauze started to be replaced by new dressings created with the concept that the wound environment would have to be moist and a different type of wound would need a different type of dressing which would have better control of its micro environment (Hinman and Maibach 1963; Turner 1985). Healthcare professionals should be aware of moist wound dressings and also differentiate between the various categories; such that appropriate decisions can be implemented for the patient. Studies by Ashcroft and Mills (2002) have also proved that a moist environment can increase the rate of the inflammatory response, thus leading to a rapid rate of cell proliferation and healing in wounds that are much deeper. By this method, more complex wounds can also be treated with better outcomes. This has been demonstrated by the rapid decline in chronic wounds, especially diabetic foot ulcers and the amputations associated with such wounds (Alvarez 1983).

Based on the Modern Wound Healing Theory by Winter, characteristics of an ideal moist wound dressing would be: Firstly, to constantly maintain a moist wound environment. Secondly, the excess of exudates should be absorbed; the third reason is that dead spaces should be removed. The fourth reason is to provide a means of thermal insulation and barrier against the prevention of microbes, and finally protect the wound. In this case we can say that the wound should be carefully dressed. The ideal dressing can be recommended which has to be easy while applying and removing, hypo allergic, provide space for Moisture Vapour Transmission to the wound, and must control the level of proteases, yet comfortable to the patient. With the evidence proposed by George Winter, there are a number of modern dressings that cater to all the characteristics of an ideal wound dressing.

### **The Living Theory of Wound by Hawkins and Hollinworth**

The Living Theory of Wound by Hawkins and Hollinworth (2003) is a concept previously only used in education. The theory deals with the characteristics or potentials of the personnel managing a case. It is based on the integration of known knowledge, newly taught knowledge and increased self-awareness. The major principle of living theory is that one's values are questioned, modified, clarified and sometimes changed completely in striving to improve one's professional practice. This approach has been explored among nurses involved in a research project incorporating teaching psychological theories and counselling skills to enhance the psychological support of patients with wounds. It includes using the enhanced way of working with patients with wounds, to using it to maintain optimum psychological balance (Hawkins and Hollinworth 2003).

### **Psychological Perspective of Wound Healing**

As presented by Hopkins (2001), addressing the psychological needs of patients who have chronic or acute wounds present a daily challenge to clinicians, but the subject is poorly addressed in the literature. It is possible that professionals find it difficult to articulate and describe the strategies employed to help patients cope with wounds (Anon 1995), yet a great number of people who make a full physical recovery following a critical injury still suffer psychological adjustment difficulties, even much later..

### *Physical and Emotional Wounds*

Faugier (1988) suggests that wounding, particularly long-term damage to the integrity of the body, will inevitably leave emotional as well as physical scars. However, such emotional scars are often difficult to detect. People's minds can be harder to treat than their bodies. The human psyche has the capacity to rationalize, ignore or deny the unpleasant if it conflicts with self-perception. A patient may not be willing to admit the degree to which they are affected by an injury, yet there is little doubt that living with a wound has a huge impact on a person's psyche, particularly if it also affects their ability to perform everyday tasks.



Clinicians can help patients come to terms with a physical injury through warmth, empathy, acceptance and by helping them to face reality without resorting to destructive defence mechanisms (Faugier 1988). Magnan (1996) suggests that defence mechanisms related to wounds may find expression in suppression, avoidance and withdrawal. Grieving may also form part of an individual's response to a wound (Magnan 1996) in instances where the person is trying to come to terms with loss of bodily function or altered body image.

### *Psychosocial Response to Wounds*

Wound healing can test a patient to the limit of his or her endurance (Dewar 1995). Physical suffering, grieving for a lost limb, having to endure hospitalisation and ongoing treatment when healing may be non-existent or slow are some of the issues that an individual with a wound may have to cope with. Reactions to deformities, particularly when they are on the face, can be very damaging and lead to 'social death' for the sufferer (Magnan 1996). A capacity to endure is therefore called for.

Pain is a significant factor in wound management. Patients need to be encouraged to ask for remedies for the alleviation of pain and may need to be informed about appropriate treatments. Pain can result in agitation and irritability. At its worst it may be so overwhelming that it will cause psychological changes resulting in increased anxiety. Pain will compound the stresses already affecting the patient with a wound.

Some patients may feel guilt and that they are somehow responsible for causing their wound, which may or may not be the case. Clinicians should help address these issues by encouraging them to share thoughts that they might feel are irrational, thereby helping them to achieve a greater sense of perspective or objectivity about their situation (Lenehan 1986).

When a person is suffering - for example, with a wound - it is possible that they will feel betrayed by their body. Ultimately, however, if the wound becomes permanent or semi-permanent, people tend to become resigned to their altered state (Morse and Fife 1998; Magnan 1996). The attending health worker can take a

number of steps including counselling, psycho-education and psychotherapy among others to help people come to terms with such changes.

Depression, which can lead to depressive illness, is a possible consequence of enduring a wound or injury. Even after a wound has healed it may take people several years before they perceive themselves to be recovered (Welch 1995). Depression may be rooted in denial or anger about a patient's circumstances and often leads to introverted behaviour. A long period of hospitalisation, uncertain prognosis and severe functional loss are strong contributors to acute depression (Welch 1992). Predictably, there is less denial, depression and anger when the recovery period is short and uninterrupted with a return to full functioning. Additionally, it is well established that psychological stress modulates immune system functioning and a fully functioning immune system is integral to timely and effective wound healing.

#### **Sociological Perspective of Wound Healing**

As observed by Detillion, Craft, Glasper, Prendergast, and DeVries (2004) it is well documented that psychological stress impairs wound healing in humans and rodents. However, most research effort into influences on wound healing has focused on factors that compromise, rather than promote, healing. Detillion, Craft, Glasper, Prendergast, and DeVries (2004) determined if positive social interaction, which influences hypothalamic-pituitary-adrenal (HPA) axis activity in social rodents, promotes wound healing. Siberian hamsters received a cutaneous wound and then were exposed to immobilization stress. Stress increased cortisol concentrations and impaired wound healing in isolated, but not socially housed, hamsters. Removal of endogenous cortisol via adrenalectomy eliminated the effects of stress on wound healing in isolated hamsters. Treatment of isolated hamsters with oxytocin (OT), a hormone released during social contact and associated with social bonding, also blocked stress induced increases in cortisol concentrations and facilitated wound healing. In contrast, treating socially housed hamsters with an OT antagonist delayed wound healing. Taken together, these data suggest that social interactions buffer against stress and promote wound healing through a

mechanism that involves OT-induced suppression of the HPA axis. The data imply that social isolation impairs wound healing, whereas OT treatment may ameliorate some effects of social isolation on health.

### Cultural practices about wound among the Yoruba in South West, Nigeria

Many cultures have peculiar viewpoints about wound and wound handling. While these practices may not be fully rooted in modern science, the motive behind cultural wound practices combine elements of science, myths, beliefs and values transmitted from one generation to the other. This article highlights some practices associated with wound among the Yoruba of South West, Nigeria as documented by Ayeni (2004). In this population, scarification and tattooing is a cultural practice. It involves deliberately cutting into the skin, and then allowing the wound to heal, leaving a permanent scar. This is often motivated by facial and tribal marks cherished by the people before Westernization. At times, pigment was introduced into the wound so that it becomes incorporated into the scar. To make a scar more prominent, soot is rubbed into it (Camphausen 1998). The Yoruba mix the fine, black powdery smoke of a lamp with alcohol before putting it into a wound. They often make a gouge, then spread open the wound and rub into it a mixture of soot or kerosene and soot, continually opening and re-anointing until the scars were of the desired depth (The Medical Museum 2004). Some use the *abotiko* while others use *ibo*, *efinrin*, or *taba* leaf even in traumatic wounds because of their perceived haemostatic and wound protective properties. The *abotiko* leaf which is squeezed and rubbed unto the bleeding marks give the mark a green colour. "Soot mixed with *tiro* (native antimony) is ground to a powder and rubbed into cuts to produce a blue-black effect making them more noticeable. A juice that is blue in colour, *buje*, is sometimes used (de Negri 1964). To stop wound bleeding, various medicines are applied; the Yoruba use a herbal medicine made from black ashes derived by burning dry reeds (Ojo 2004). Thus, just as there is diversity in the types of scars produced, artists use various techniques, tools, and materials.

## Conclusion

Chronic and acute wound prevention and treatment require a strong foundation of the theory and principles of wound management combined with current, evidence-based practice. Clearly, there are substantial data in human studies to suggest that psychological stress and the subsequent effect on immune system disruption can impact wound healing; just as social isolation also hinders wound healing. The purpose of this chapter is to present a foundation and a review of the existing literature on theories of wound, the association between psychological, socio-cultural and physiological factors and wound healing in humans. This article provides a glimpse of what is known and what is still left to be discovered in the exciting area of theoretical and socio-psychological perspectives of wound and wound healing. Other local and socio-cultural perspectives of wound should be explored further. Psychological stress can lead to unhealthy behaviours which may impact wound healing such as smoking (Sivamani, Pullar and Manabat-Hidalgo *et al.* (2009), poor nutrition, (Vitalo, Fricchione and Casali *et al.* 2009), and altered sleep (Glaser, Kiecolt-Glaser and Marucha *et al.* 1999). Additionally, Glaser, Kiecolt-Glaser and Marucha *et al.* (1999) point out that stress can negatively impact sleep, leading to disturbed sleep patterns and a reduction in growth hormones, which may down-regulate the tissue repair response. These confirm the inter-relatedness of biological, physiological and socio-psychological factors in handling of wound in the global quest for optimized, holistic and inter-disciplinary approach to wound management.

## References

- Achterberg, V., Welling, C. and Mayer-Ingold, W. (1996) Hydroactive dressings and serum proteins: An in vitro study. *Journal of Wound Care*, 5: 2, 79-82.
- Ader, R., Cohen, N., & Felton, D.L. (1995) Psychoneuroimmunology: Interactions between the nervous system and the immune system. *Lancet*, 345: 99-103.

- Anderson, T.P., Marcia, M. and Andberg, B.A. (1979) Psychosocial factors associated with pressure sores. *Archives of Physiological Medical Rehabilitation*, 60: 341-6.
- Anon (1995) Skin lesions from aggressive adhesive on Valleylab electrosurgical return electrode pads. *Health Devices* 24(4):159-60.
- Ashcroft, G.S. and Mills, S.I. (2002) Androgen Receptor mediated inhibition of cutaneous wound healing. *Journal of clinical investigation*, 110(5)615-624.
- Ayeni, A. (2004) Observations on the Medical and Social Aspects of Scarification in Sub-Saharan Africa: History of Medicine Summer Term paper, Ottawa, University of Ottawa, Canada. Available at <http://www.med.uottawa.ca/historyofmedicine/hetenyi/ayeni.htm>.
- Baker, E.A. and Leaper, D. J. (2000) Proteinases, their inhibitors, and cytokine profiles in acute wound fluid. *Wound Repair and Regeneration*, 8: 392-398.
- Barbul, A. (1990) Immune aspects of wound repair. *Clinical Plastic Surgery*; 17: 422-33.
- Bolton, L.L., Monte, K. and Pirone, L.A. (2000) Moisture and healing: beyond the jargon. *Ostomy/Wound Management*, 46: (suppl 1A) 51S-62S.
- Camphausen, R. (1998) Return of the Tribal: A Celebration of Body Adornment: Piercing, Tattooing, Scarification, Body Painting. Rochester. *Inner Traditions*, 5.
- Cole-King, A. and Harding, K.G. (2001) Psychological factors and delayed healing in chronic wounds. *Psychosomatic Medicine*, Vol. 63, 2, pp.216-220 b.
- de Negri, E. (1964) "Tribal marks-decorative scars and painted patterns." *Nigeria magazine*. 81 106-116.
- Detillion, C.E., Craft, T.K. and Glasper, E.R. et al. (2004) Social facilitation of wound healing. *Psychoneuroendocrinology*, 9(8):1004-11.
- Dewar, A. and Morse, J. (1995) Unbearable incidents: failure to endure the experience of illness. *Journal of Advanced Nursing*, 22: 957-64
- Dewar, A.L. (1995) Unbearable incidents: Failure to endure the experience of illness. *Journal of Advanced Nursing*, 22, 957-64
- Faugier, J. (1988) "On Being Wounded," *Senior Nurse*, 8(1): 18.
- Fishel, R.S., Barbul, A., Beschoner, W.E., Wasserkrug, H.L. and Efron, G. (1987) Lymphocyte participation in wound healing: Morphologic assessment using monoclonal antibodies. *Annual Surgery*, 206: 25-9.

- Franks, P.J., Moffat, C.J., Connolly, M., Bosanquet, N., Oldroyd, M., Greenhalgh, R.M. and McCollum, C.N. (1994) Community leg ulcer clinics: Effects on quality of life. *Phlebology*, 9: 83-6.
- Glaser, R., Kiecolt-Glaser, J.K. and Marucha, P.T., *et al.* (1999) Stress-related changes in proinflammatory cytokine production in wounds. *Archives of General Psychiatry*, 56:450-56.
- Hamer, C., Cullum, N.A. and Roe, B.H. (1994) Patients' perceptions of chronic leg ulcers. *Journal of Wound Care*, 3: 2, 99-101.
- Harding, K. (1997) Is exudate a clinical problem? In *Wound Exudate: Proceedings of the joint meeting of European Wound Management Association and European Tissue Repair Society*. (eds) Cherry, G., Harding, K. London: Churchill Communications.
- Hawkins, J. and Hollinworth, H. (2003) Teaching nurses psychological support of patients with wounds. *British Journal of Nursing*. May 8-21; 12(9):543-8.
- Hinman, C.D. and Maibach, H. (1963) Effect of air exposure and occlusion on experimental human skin wounds. *Nature*, 200: 377-8
- Hopkins, S. (2001) Psychological aspects of wound healing. *Nursing Times*, 97, (48); 57.  
[http://en.wikipedia.org/wiki/History\\_of\\_wound\\_care](http://en.wikipedia.org/wiki/History_of_wound_care)
- Hyland, M. E. and Thomson, B. (1994) Quality of life of leg ulcer patients: Questionnaire and preliminary findings. *Journal of Wound Care*, 3: 6, 294-298.
- Kiecolt-Glaser, J.K., Marucha, P.T., Malarkey, W.B., Mercado, A.M. and Glaser, R. (1995) Slowing of wound healing by psychological stress. *Lancet*, 346: 1194-6.
- Klingman, A.M. (1995) Hydration injury. In *The Irritant Dermatitis Syndrome*. (eds) van der Valk, P., Maibach, H.I. Boca Raton, Fla: CRC Press.
- Krasner, D. (May 1998) Painful venous ulcers: Themes and stories about living with the pain and suffering. *Journal of Wound Ostomy Continence Nursing*, 25 (3): 158-168.
- Leibovich, S.J. and Ross, R. (1975) The role of macrophage in wound repair. *American Journal of Pathology*, 78: 71-91.
- Lenahan, G.P. (1986) "Emotional Impact of Trauma." *Nursing Clinics of North America*, 21(4):729-40, December 1986. 45.
- Lucas, V.S. (2011) Psychological stress and Wound Healing in Humans. *Wounds*, 22 (4):76-83.

- Magnan, M.A. (1996) "Psychological Considerations for Patients with Acute Wounds," *Critical Care Nursing Clinics of North America*, 8(2): 183-93.
- Marucha, P.T., Kiecolt-Glaser, J.K. and Favagehi, M. (1998) Mucosal wound healing is impaired by examination stress. *Psychosomatic Medicine*, 60: 362-5.
- Molan, P.C. (2001) "Honey as a topical antibacterial agent for treatment of infected wounds". *Nursing Times*: 49 (7-8): 96.
- Morse, S.R. and Fife, B. (1998) Coping with a partner's cancer: Adjustment at four stages of the illness trajectory. *Oncology Nursing Forum*, 25:751-60.
- Mulder, G.D. (1994) Quantifying wound fluids for the clinician and researcher. *Ostomy/Wound Management*, 40: 8, 66-69.
- Neil, J.A. and Barrell, L.M. (1998) Transition Theory and its relevance to patients with chronic wounds. *Rehabilitation Nursing*, Nov-Dec; 23 (6):295-299.
- Ojo, S. (2004) Scarification and Tattooing among the Yorubas (Interview). York University Department of History.
- Olshansky, K. (1992) Psychological factors in recurrent pressure sores [letter]. *Plastic Reconstruction Surgery*, 90: 930.
- Palmer, I. (1995) Healing the mind as well as the body. *Community Nurse*, 1: 18-20.
- Sivamani, R.K., Pullar, C.E. and Manabat-Hidalgo, C.G. et al. (2009) Stress-mediated increases in systemic and local epinephrine impair skin wound healing: Potential new indication for beta blockers. *PLoS Medicine*, 6(1):e12.
- Stotts, N.A. and Wipke-Trevis, D. (1996) Co-factors in impaired wound healing. *Ostomy Wound Management*, 42: 44-54.
- The Free Dictionary (2013) Wound. Downloaded via <http://www.thefreedictionary.com/wound>
- The Medical Museum (2004) Body Alterations. Exhibits throughout the Hospital: The Medical Museum: University of Iowa Healthcare.
- Thomas, S. (1997) Assessment and management of wound exudate. *Journal of Wound Care*, 6: 7, 327-330.
- Trengrove, N., Stacey, M.C. and Macauley, S. et al. (1999) Analysis of the acute and chronic wound environments: the role of proteases and their inhibitors. *Wound Repair and Regeneration*, 7: 442-452.
- Turner, T.D. (1985) Which dressing and why. In *Wound Care*. (ed.) Westaby, S. London: Heinemann Medical Books.

- van Rijswijk, L. and Harding, K. (2000) Issues and clinical implications (commentary). In *Wound fluids: A reflection of the state of healing*. (ed.) Staiano-Coico, L., Higgins, P.J., Schwartz, S.B. et al. *Ostomy/Wound Management*, 46: (suppl 1A), 85S-93S.
- Vickery, C. (1997) Exudate: What it is and what is its function in acute and chronic wounds? In *Wound Exudate: Proceedings of the joint meeting of EWMA and ETRS*. (eds) Cherry, G., Harding, K. London: Churchill.
- Vitalo, A., Fricchione, J. and Casali, M. et al. (2009) Nest making and oxytocin comparably promote wound healing in isolation reared rats. *PLoS ONE*, 4(5):e5523.
- Welch, W.J. (1992) Mammalian stress response: Cell physiology, structure/function of stress proteins, and implications for medicine and disease. *Physiology Review*, 72:1063-1081.
- Wikipedia (2013) History of Wound Care. Available at [http://en.wikipedia.org/wiki/History\\_of\\_wound\\_care](http://en.wikipedia.org/wiki/History_of_wound_care)
- Winter, G. (1962) Formation of the scab and the rate of epithelisation of superficial wounds in the skin of the young domestic pig. *Nature*, 193: 293-294.
- Winter, G. D. (1975) Methods for the biological evaluation of dressings. In: Turner TD, Brain KR, eds. *Surgical Dressings in the Hospital Environment*. Surgical Dressings Research Unit, UWIST, Cardiff: 47-81
- Wysocki, A.B. (1996) Wound fluids and the pathogenesis of chronic wounds. *Journal of Wounds, Ostomy and Continence Nursing*, 23: 283-290.