IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

A REVIEW STUDY ON WOUND CARE MANAGEMENT THROUGH TEXTILE BASED PRODUCT

Dr. Ankita Singh Rao

Assistant Professor

Poornima University

School of Design and Arts

ABSTRACT: Textiles based products are used in the area of medical science in different ways for Wound care, dressing, silicon gauze, suture materials play a very important role in developing wound care products. Proper selection of wound dressing is important. Quicken healing of wound is totally based on the type of dressing on the wounded area. Dressing depends on the type of wound and deepness of wound, healing of wound depends on proper dressing, variant of dressing materials like bandages, gauges depends on type of wound and their management.

INTRODUCTION: Wound is discontinuity; break in *epithelium tissue of the skin. Skin has the largest area of the body where the wounds occur: by infections like bacterial, fungal, virus. It is a breach in the continuity of skin or tissue caused by an accident, act of violence or surgery. Wound healing is that body mechanism which easily repairs the entire injured parts. It is a loss of continuity of skin due to injury mainly soft tissues are damaged during injury. It is simple when only skin is involved, it is complex when it involves underlying nerves, vessels, and tendons etc.

The skin is unique or main organ in the body and it involves two layers: the epidermis and the dermis. Under the dermis layer the hypodermis or same tissue like as the hypodermis, oily or full of fat tissue are seen there. Skin has majorly three main functions: protection, regulation and sensation. It is an organ of security and protection, the chief function of the skin is to perform as a barrier or hurdle, it protects from: mechanical impacts and pressure, changes in temperature, micro-organisms, radiation and chemicals and skin also controls many characteristics of physiology in the body that is: body temperature such as sweat and hair, and changes in outer passage /circulation and fluid balance through sweat. It is also an organ of sensation, having a wide network system of nerve cells that observe changes in the environment. Skin is the unique receptors for heat, cold, touch, and pain. “Damage to these nerve cells is known as neuropathy,

which results in a loss of sensation in the affected areas. Patients with neuropathy could not feel pain when they feel pain, injury, increasing the risk of severe wounding or the worsening of a main wound."

- **CLASSIFICATION OF WOUND (Rank and Wakefield)**

Wounds are classified under as two groups such as:

1. **TIDY WOUNDS**: Tidy wounds are those wounds which are caused by surgical incision and sharp objects. Usually done by primary suturing and healing process is done in primary intension.

2. **UNTIDY WOUNDS:** Untidy wounds are those wounds which require secondary suturing and skin grafting or flap may be needed. These wounds are infectioneous that's why healing process may be delayed. Untidy wounds are occurs due to : crushing, tearing, *avlusion, *devitalized injury (to deprive vitality of life, in dentistry to destroy the vitality of the dental pulp), vascular injury, burns and multiple irregular wounds. They are having severe and chronic condition.

OTHER CLASSIFICATION OF WOUNDS:

(a) Closed wounds

1. Contusion
2. Abrasion
3. Heamatoma

1. **Contusion wounds**: Contusion wounds are those wounds where injury occurs without breaking the skin tissue, generally it produces clotting, and collection of blood on the skin.
2. **Abrasion wound**: In this wound the layer of skin is scraped due to any kind of forceful friction or abrasion. These wounds need proper cleaning and antibiotics, proper dressing on injured area.
3. **Heamatoma**: This refers to the collection of blood during the time of injury, a blood clot formed from blood that has been released by trauma. Heama means blood; toma means tumer or clot of blood.

(b) Open wounds

1. Incised wounds
2. Lacerated wounds
3. Penetrating wounds

1. **Incised wound:** They are caused by sharp objects like knife, scissors, blade, glass etc.
2. **Lacerated wound**: They are caused due to blunt objects like fall on stone, accidents etc.

3. **Penetrating wounds**: It will require exploration. Damage of blood vessels and nerves requires specialized surgery. Most similar to incised wounds, should be explored layer by layer, it followed primary suturing within period of 6 hours of injury.
4. Crush injury.
5. War wounds and gunshot wounds.
6. Traction and *avlusion injury (traction: align and immobilise (restrict the movement of limb to allow healing) unstable fracture of cervical spine, avlusion injury (tearing and separation of the body part, complete displacement of a tooth from alveolar bone)
7. Injuries to nerves, either clean, cut or crush.
8. Injuries to arteries and veins (major vessels)
9. Injuries to internal organs may be penetrating and non-penetrating (blunt) type wound.

Wounds types

An Open wound

Lacerated wound of leg

A lacerated knee

An infected puncture

A puncture wound

- **ACUTE AND CHRONIC WOUND:**

1. Acute wounds are those wounds that heal within the define period of time.
2. Chronic wounds are those when acute wounds fail to heal properly or slow healing called chronic wound.

CLASSIFICATION OF SURGICAL WOUND:

1. Clean:

1. Uninfected, no inflammation
2. Resp, GI, GU tracts not entered
3. Closed primarily

Examples: Ex lap, mastectomy, neck dissection, thyroid, vascular, hernia, splenectomy

2. Clean-contaminated:

1. Resp, GI, GU tracts entered, controlled
2. No unusual contamination

Examples: Chole, SBR, Whipple, liver txp, gastric surgery, bronch, colon surgery

3. Contaminated:

1. Open, fresh, accidental wounds
2. Major break in sterile technique
3. Gross Spillage from GI tract
4. Acute non-purulent inflammation

Examples: Inflamed apply, bile spillage in chole, diverticulitis, Rectal surgery, penetrating wounds.

4. Dirty:

1. Old traumatic wounds, devitalized tissue
2. Existing infection or perforation
3. Organisms present before procedure

Examples: Abscess I&D, perforated bowel, peritonitis, wound debridement, positive cultures pre-operative

- **WOUND HEALING**

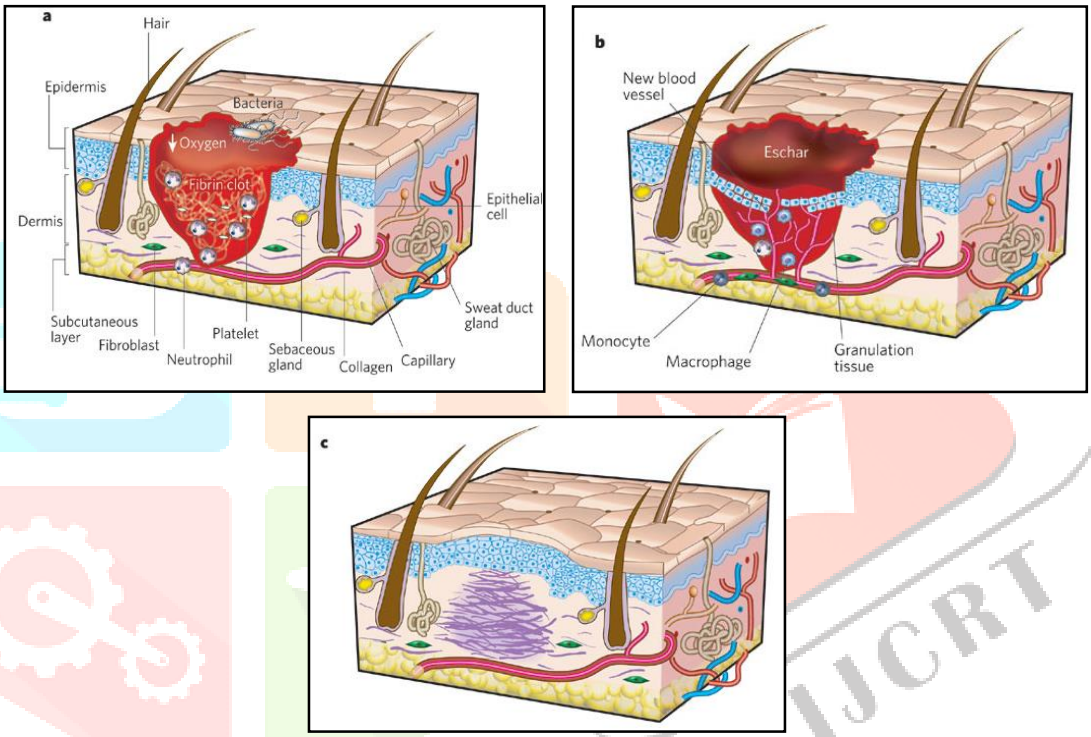
The term healing refers to the replacement of damaged or cracked tissues by living tissues. The healing process having two aspects;

(a) Contraction: In the process of contraction a mechanical change in the size of deficiency, defect or discontinuity of surface which occurs in first few weeks.

(b) Replacement: In the process of replacement movement of cells from one place to another and multiplication / increment of nearby or close cells which provides extra time to fill the gap. This is follow in two ways:

1. **Regeneration:** In this process of the replacement the lost tissues are replaced by the similar tissues and growth of tissues in the surrounding of undamaged specialized cells.
2. **Repair :** Repair means the replacement of damaged or lost tissues by vascular connective tissues which are in composition of fibrosis, serum and scar tissue formation.

Wound healing / repair



***Three classic stages of wound repair : (a) inflammation, (b) new tissue formation, (c) remodeling (*Source of diagram : wikipedia)**

The wound healing process can be done by two ways:

(a) Wound healing by 1st intention.

(b) Wound healing by 2nd intention

(a) Wound healing by 1st intention: Wound is sutured in primary stage with the help of clips, threads or adhesive material. Then the wound healing occurs and *scar formation is there so it is called as the wound healing by 1st intention. Wound edges are approached with sutures and wounds are healing rapidly with complete closure.

(b) Wound healing by 2nd intention : When the wound skin is not repaired in 1st intention or primary stage, then the wound becomes infected and breaks, scar tissues take long time to heal, it heals slowly with the fibrosis. It indicates wide scars, which are frequently contracted; this may lead converted into disability. The wound will be healed by 2nd intention through 4 processes.

(1) **Inflammation**: Inflammation is first stage of wound healing. Here direct breach in the continuity of skin.

(2) **Epithelisation:** The second stage of wound healing is epithelisation. In this stage skin tissues are grow.

(3) **Angiogenesis**: Angiogenesis is the third healing stage of wound. It creates blood vessels in the skin.

(4) **Remodeling:** It is the last stage of wound healing. Here healing signs are seen.

The phases of wound healing are

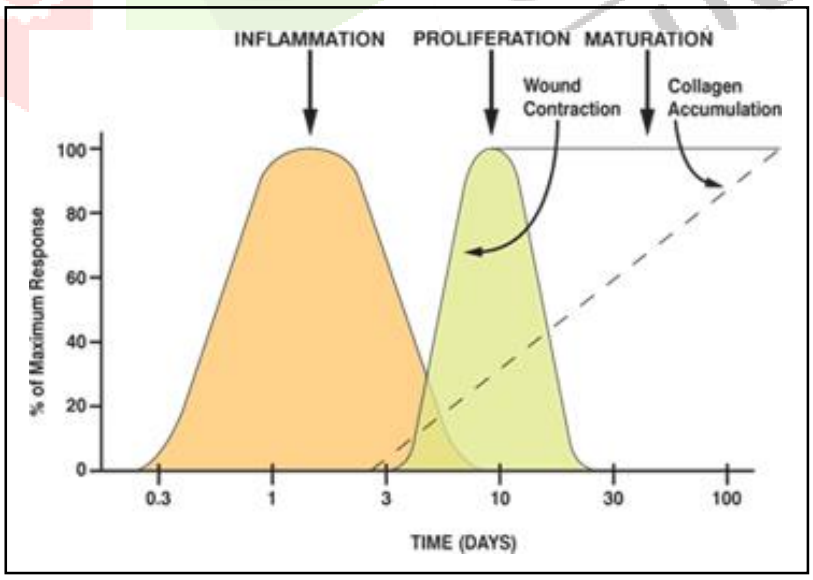
1. Inflammatory phase
2. Proliferation phase
3. Maturation phase

1. **Inflammatory phase (lag or substrate or exudative phase):** This phase occurs during the first few days of an injury. The wounded or injured area efforts to restore the normal state through constructing blood vessels to control bleeding. This phase needs the protection and prevention for the spreading of infection.

2. **Proliferation phase (collagen phase**): This phase occurs during about 3 weeks of an injury (depending upon the severity of the wound). *Granulation tissues occur in the area of wound which fulfils the gap between the tissues and cells. New cells are migrating from one place to another to form a new area around the wound. It is the phase of repair. "Wound / injury are repair in this state by the formation of new tissues, *fibroblast, new cells and collagens."

3. **Maturation phase (Remodeling):-** Maturation is the last phase and it occurs once the wound has closed. Here healing signs are seen.

Phases of wound healing



Graphical representation of the Wound healing by 2nd intention through 4 processes according to the time period of wound. 1. Inflammation, 2. Proliferation 3. Angeogenesis 4. Remodeling. (*Source of graph: wikipedia)

- **COMPONENTS OF WOUND HEALING:**

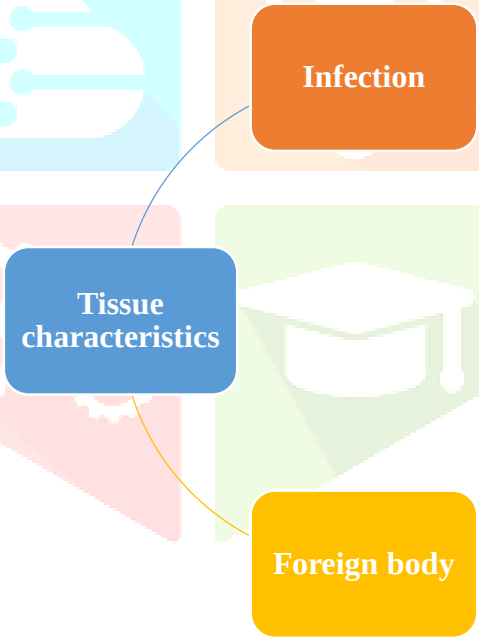
1. Epithelisation: Epithilisation occurs mainly from the edges of the wounds by a process of cell movement and cell multiplication / increment. This is mainly accepted by marginal basial cells, within the 48 hours of the whole wound is re-epithelised.

2. Wound contraction: wound contraction starts after 4 days and it are generally completed by 14 days. "It is carried about particular fibroblast, because of their contraction elements they are called as myofibroblasts. It is the nature's way of reducing the size of defect there by serving the wound healing. Wound contraction ready to occur when there is loose skin as in back region etc. Skin contraction is greatly reduced when it occurs over the skin."

3. Contractive tissue formation: Formation of granulation tissue or vascular connective tissue is most important and fundamental step in wound healing.

- **FACTORS AFFECTING WOUND HEALING**

Wound healing is composite biochemical and cellular event which can be affected by local and systematic factors.



(a) Local factors

1. Infection:- One of the major important factors which affecting hindered wound healing. It indications to improved collagenolysis (rope like protein of extracellular matrix) and shortage of vital nutrients for the fibroblast (cell in a connective tissue responsible for the production of collagen/ growth).

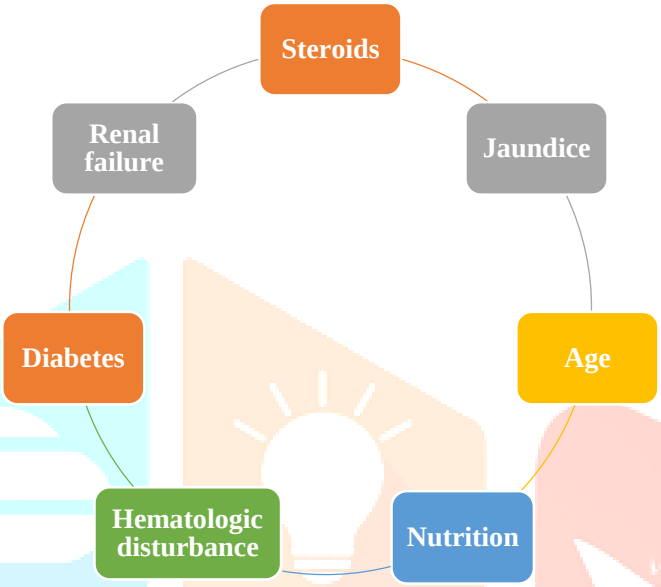
2. Adequate blood supply: Due to arterial and venous disease causes ischaemia which results in poor or delayed healing. Those conditions seen in patients who are having marginal arterial disease also have poor healing.

3. Foreign body: - Any foreign body like broken glass, gravel and small stones mainly in a road traffic accident, hampers healing by causing foreign bodies reaction and infection. Suture materials,

needles and gauze pieces missing in the wound can all damage healing due to the effect of foreign bodies which are injected or, introduced in the body.

4. Tissue characteristics:- Tissues are generally composed in the cells of like surface epithelium of skin, oral cavity, transitional epithelium of urinary tract heal rapidly, because of the revival and replacement of missing tissues by living tissues. When the nerve cells and cardiac muscle, once injured they are permanently lost.

(b) Systematic factors



1. Age:- Reduction of protein taking with increasing age this may leads to poor wound healing.
2. Nutrition:- Nutrients are very essential for the process of wound healing.
3. Hematologic disturbance:- Dimunition of granulocytes indications to a deficiency of “chemotaxis and phagocytosis with an improved viewpoint of wound infection and poor wound healing.”
4. Diabetes:- It postponed the healing of wound.
5. Renal failure:- Development of fibroblast (cell in a connective tissue responsible for the production of collagen/ growth) is reserved.
6. Jaundice:- It affects fibroblasts and tube formation.
7. Steroids:- Wound healing is decreased due to their inhibitory effect on fibroblasts granulation tissue formation.

- DEFINITION AND MEANINGS:

* Wound is discontinuity; break in epithelium tissue of the skin.
* Healing is to restore health or tending to cure.
* Granulation tissue: in the formation of wounds during healing.
* Collagen: structure of protein.
* Contusion: is the injury or bruise without breaking the skin.
* Haemostatic: is the surgical procedure of stopping the flow of blood.

* Laceration: is the act of tearing.
* Epithelisation is the healing by the growth of epithelium tissues over a without covering of natural or usual surface.
* Sutures are the stitches which are done in injury.
* Devitalized: to deprive of life
* Vitality: grow, develop.
* Fibrin: is a thread like protein fiber.
* Aqvlusion : tearing and separation of the body part.

- **STUDIES ON WOUND CARE MANAGEMENT**

Prof. Laga S.K and Darne Apurva 2013, the aim of this article to describe that the wound healing depends on proper medication and also on proper dressing, variation of dressing material depends on type of wound and wound management.

Bhargava Deepti and Jahan Shahnaz 2012, expressed views on textile based dressing. Chosen of the material for wound according to the absorbency, elasticity, comfort ability, durability etc. Following these are the properties of textile material which are seen in dressing material of wound. Wound dressing promotes the wound healing. Dressing on wound is to prevent or protect the wounded area from the external application. "The key qualities of fibers and dressings as wound care products include that they are bacteriostatic, anti-viral, fungi static, non-toxic, high absorbent, non-allergic, breathable, haemostatic, biocompatible, and can be manipulative to incorporate medications, also provide reasonable mechanical properties". Hence textile based material or product is very useful for wound dressing either in surgical wound or non-surgical wound, the variety of material totally depends on type of wound and the depth of wound.

Ajmeri R. Jitendra, Ajmeri Chitra and Joshi N. B, described about the textile material and products that have been skilfully managed for particular and suitable needs for medical and surgical applications. During the management of products there are some points which are to be kept in mind are absorbency, strength, air permeability, durability, elasticity of textile-based product for wound management.

Nithyakalyani. D and Ramchandran. T, explained that textile-based products (dressing, silicon gauze, suture materials) plays a very important role in developing wound care products. Proper selection of wound dressing is important. Quicken healing of wound is totally based on the type of dressing on the wounded area.

Agarwal Yogita, Kapoor Rupali and Barhanpurkar Shyam, highlights in this paper - that a fabric of bandage which is used to support medical application in the form of dressing or splint. Textile based fabric or material (cotton, polyester, silk, regenerated cellulose, viscose, Lyocell, Polyamide, Polyvinyl alcohol,

and Polyurethane urea) are used in bandage to restrict heavy blood flow from wounded area by the use of this material on that particular wound area, bleeding flows slows down because material soaks or absorbs that blood from the area. Bandages are available in wide range. Some special bandages are designed for the shape of particular part of the body.

- WOUND DRESSING THROUGH TEXTILE

Biomedical textiles are those textiles products which are highly used for biological application. They are used for clinical or hygienic purposes. The main role of wound dressing is to promote quick healing of wound. "A wound can be defined as cut or break in the continuity of any tissue, caused by injury or operation. Wounds cause pain, bleeding, disability and death. They have always been common and the problems associated with their treatment are as old as mankind and advances in the care of wounds have advanced the whole art of surgery. Wound healing is body's natural process of regenerating dermal and epidermal tissues which involves a sequence of complex events, resulting in restoration of wounded tissue to normal state found prior to wound repair". Textiles based products are used in the area of medical science in different ways for Wound care, dressing, silicon gauze, suture materials play a very important role in developing wound care products. Proper selection of wound dressing is important. Quicken healing of wound is totally based on the type of dressing on the wounded area. Dressings should be easy to apply and it should be painless on removal, it should create the optimal environment for wound-healing, and should require fewer dressing changes, thereby reducing nursing time. Wound-dressing materials are mainly classified as absorbent and non-absorbent, depending on the type of fibres used. Dressings vary with the type of wound and wound management. Dressings may vary with the type of wound and wound management, and no single dressing is generally applicable in every type of wound. "Natural fiber like cotton, silk; synthetic fibers like polyamide are used, but regenerated cellulose fibres (viscose), polypropylene, collagen, alginate, chitin, chitosan fibres also have been found to be suitable as modern wound dressing. Fibres used in wound care application must be nontoxic, non-allergic and non-carcinogenic."

- PROPERTIES OF WOUND CARE MATERIAL

a) Wound care material should be soft, pliable and pad the wound to protect from further injury.
b) Healing properties regulates mainly with the substances which are applied to or supplementary to the wound care materials.
c) Absorbing material used for easy penetration of wound secretion.
d) sterile and nontoxic materials.

Bibliography

1. Ajmeri, J. R., Ajmeri, C., & Joshi, N. B. Role of Medical Textiles in Wound Mangement. *Asian Textile Journal*.
2. Anderson, I. (2009). What is venous leg ulcer. *Wound Essentials Volume 4*, 1-5.
3. Agarwal, Y., Kapoor, R., & Barhanpurkar, S. (n.d.). Bandage Fabric. *Technical Textiles*, 1-9.
4. Bhargava, D., & Jahan, S. (n.d.). Textile Based Wound Dressing. *Technical Textile*, 1-9.
5. Chinta, S. K., Landage, S. M., & Abhishek. (n.d.). Medical Textiles Approach for Wound Care By Nonwovens. *Technical Textiles*, 1-8.
6. Role of Alternative Medical system (Homeopathy) forthe Development of product which will in the remedy of Varicose Vein Ulcer By: Ankita Singh Rao.

Webliography

1. www.wekipedia.com
2. www.wrongdiadnosis.com
3. www.fiber2fashion.com
4. www.technicaltextile.net
5. www.worldwidewounds.UK