



Use Of Collagen Therapy On Wound Has A Constructive Influence On Wound Healing, For Faster The Recovery Period

Mr. Ashwani Kumar Sen (Ph.D. Scholar)¹, Dr. Th. Bidyani Devi (Ph.D. Guide)²

¹(Nursing, Malwanchal university, Indore, India)

²(Nursing, Malwanchal university, Indore, India)

Abstract-

Collagen therapy has emerged as an effective adjunct in the management of acute and chronic wounds. As a key structural protein in the extracellular matrix, collagen plays a vital role in tissue repair, cellular migration, and angiogenesis. The use of collagen-based dressings and therapeutic formulations provides a bioactive environment that supports natural healing mechanisms. This therapy demonstrates a constructive influence on wound healing, enhancing moisture balance, reducing inflammation, and promoting granulation tissue formation. Clinical observations indicate that collagen therapy significantly accelerates the recovery period, particularly in non-healing or slow-healing wounds. Overall, collagen therapy represents a promising and biologically compatible approach to achieving faster and more efficient wound recovery.

Keywords: Collagen therapy, Extracellular Matrix, Moisture balance, Granulation.

1. Introduction

Collagen is structurally and functionally a key protein of the extracellular matrix which is also involved in scar formation during the healing of connective tissues. Many collagen dressings have been developed to enhance wound repair, particularly of non-infected, chronic, indolent skin ulcers. The use of collagen dressings is supported by relatively sparse and insufficient scientific data. This review identifies the supporting evidence for the use of the dressings which are available, often with widely different claimed advantages and modes of action, and considers future developments and assessment of collagen dressings. Over the last 30 years, there has been a shift from traditional wound dressings towards those advanced therapies that aim to optimize the wound healing environment (Enoch and Harding, 2003). In more recent years, wound care products have been developed that aim to replicate or add to the ECM. The ECM is the major component of the dermis and provides a structural support for cells, growth factors, and receptors that are essential to wound healing.

2. Collagen therapy

Definition:-Collagen dressings are dressings that are derived from animal sources, such as bovine (cattle), equine (horse) or porcine (pig) sources. The collagen helps to promote the growth of new collagen at the wound site, prompting an often speedier recovery period. Collagen dressings can also help with fibroblast production, and according to Medscape, some dressings may also help maintain the appropriate temperature of the wound site's microenvironment.

3. Mechanism

Collagen, the protein that gives the skin its tensile strength, plays a key role in each phase of wound healing. It attracts cells, such as fibroblasts and keratinocytes, to the wound, which encourages debridement, angiogenesis, and reepithelialization. In addition, collagen provides a natural scaffold or substrate for new tissue growth.

Collagen dressings stimulate new tissue growth and encourage the deposition and organization of newly formed collagen fibers and granulation tissue in the wound bed.

4. Indications

EXAMPLES OF WOUNDS THAT MAY BENEFIT FROM A COLLAGEN DRESSING INCLUDE:

- PARTIAL- AND FULL-THICKNESS WOUNDS
- wounds with minimal to heavy exudate
- skin grafts and skin donation sites
- second-degree burns
- granulating or necrotic wounds
- chronic nonhealing wounds (to jump-start wounds that are stalled in the inflammatory phase by reducing mediators of inflammation)

5. Contraindications

Don't use collagen dressing in the following circumstances-

- Third degree burns
- Patient sensitivity to bovine (cattle), porcine (swine), or avian (bird) products.
- Wounds covered in dry scar.

6. Type of wound care dressing

Hydrocolloid: Hydrocolloid dressings are used on burns, light to moderately draining wounds, necrotic wounds, under compression wraps, pressure ulcers and venous ulcers.

Hydrogel: This type of dressing is for wounds with little to no excess fluid, painful wounds, necrotic wounds, pressure ulcers, donor sites, second degree or higher burns and infected wounds.

Alginate: Alginate dressings are used for moderate to high amounts of wound drainage, venous ulcers, packing wounds and pressure ulcers in stage III or IV.

Collagen: A collagen dressing can be used for chronic or stalled wounds, ulcers, bed sores, transplant sites, surgical wounds, second degree or higher burns and wounds with large surface areas.

Frequency of dressing changes. The frequency of dressing changes varies depending on the brand, but ranges from daily to every 7 days.

Formulations

A variety of topical formulations of collagen are available, such as freeze-dried sheets, pastes, pads, powder, and gels. Some dressings include alginates or even antimicrobial additives. The collagen source varies—bovine, porcine, or avian.

Cellular and/or Tissue-Based Products (CTPs): Cellular and/or Tissue Based Products (CTPs), also known as skin substitutes, and biological products were primarily developed due to problems encountered with allografts (skin from another human) and xenografts (skin from another species). Skin substitutes

facilitate healing and regeneration for chronic wounds. These products work by applying the product over the entire wound surface area providing extracellular matrices to encourage immune function and tissue regeneration. Skin substitutes can be used on patients with lower limb diabetic ulcers, venous ulcers, burn wounds, surgical and traumatic wounds (e.g., donor sites and graft, post laser surgery, and post podiatric surgery)

Growth Factors

Growth factor Becaplermin gel is human derived protein that is not systemically absorbed and does not develop neutralized antibodies. Becaplermin promotes wound healing by enhancing

Cellular and/or Tissue-Based Products in Chronic Wounds
<p>*Skin Substitute Grafts</p> <p>Non-Autologous Human Skin</p> <ul style="list-style-type: none"> • Dermal or epidermal • Cellular and Acellular
<p>Grafts</p> <ul style="list-style-type: none"> • Homograft • Allograft
<p>Non-Human Skin Substitute Grafts</p> <ul style="list-style-type: none"> • Xenograft
<p>Biological Products – <i>Product forms a sheet scaffolding for skin growth. Graft is anchored with provider's choice of fixation.</i></p>
<p>Non-Graft CTPs – <i>considered advanced wound care dressings</i></p> <ul style="list-style-type: none"> • Gels • Ointments • Powders • Particles • Foams • Liquids • Injectables
<p>Collagen Attributes</p> <ul style="list-style-type: none"> • Antimicrobial • Alginate • Hydrogel • Non-adherent
<p>Collagen Derived Sources</p> <ul style="list-style-type: none"> • Bovine • Equine • Porcine • Avian

granulation tissue formation. Faster healing rates have been shown with this specific growth factor.

Collagen Dipeptides Supplement

Collagen dipeptides are highly concentrated Proline-Hydroxyproline (PO) and Hydroxyproline-Glycine (OG) that reach the cellular level in the skin, bones, and joints. The PO and OG send signals to cells, energizing the collagen peptide production by fibrocytes and chondrocytes to promote growth of hyaluronic acid, aiding in wound healing.

7. Wound heal by support of collagen dressing

Collagen dressings support a moist wound healing environment, encourage the deposition of new collagen fibers, support new tissue growth and granulation tissue formation in the wound bed. Excessive MMP's in the wound bed can interfere with the normal wound healing process. Collagen dressings bind and inactivate

MMP's found in the extracellular matrix. MMP's attack and break down collagen, so collagen dressings give these enzymes an alternative collagen source. This allows the body's natural collagen to be readily available for tissue growth during the wound healing process.

Collagen dressings are available in many forms. They can be found as an amorphous gel to provide moisture or in sheet or powder forms that are capable of absorbing various levels of wound exudate. Collagen dressings may also be combined with silver to deter bioburden or biofilm in the wound environment. Some collagen dressings are combined with additional ingredients such as ethylenediaminetetraacetic acid (EDTA), carboxymethyl cellulose (CMC) or alginate to enhance the performance of the collagen, giving a dual action to decrease MMP activity or control exudate. Using a collagen dressing appropriately may stimulate healing in a stalled wound. Wound healing success is dependent on clinical assessment and treatment, choosing the right dressing on the right wound at the right time. Acceleration of wound healing in chronic or stalled wounds may decrease healing time and reduce over-all wound care costs.

8. Role of Collagen in Wound Healing

In a healing wound, a cascade of events occurs and is broken into what is known as the phases of wound healing. These include platelet accumulation, inflammation, fibroblast proliferation, cell contraction, angiogenesis and re-epithelialization. This cascade ultimately leads to scar formation and wound remodeling. Collagen plays an important role in each of these phases of wound healing due to its chemotactic role. It attracts cells such as fibroblasts and keratinocytes to the wound. This encourages debridement, angiogenesis and re-epithelialization. A chronic wound is stalled at one of these healing stages. This usually occurs during the inflammatory phase and is linked to elevated levels of matrix metalloproteinases (MMPs) in the wound. In normal wound healing, proteases such as MMPs, are attracted to the wound during the inflammatory phase and have an important role in breaking down unhealthy ECM so that new tissue forms. However, when MMPs are present in a wound at elevated levels for a prolonged period of time, this results in the destruction of healthy ECM, which is associated with delayed wound healing and an increase in wound size. When the excess of MMPs is not balanced by normal physiological processes, alternative methods are required to reduce protease levels in the wound. This suggests a role for dressings containing collagen in the management of wounds where healing is stalled (Rangaraj, et al., 2011)

Collagen Dressing Types

Collagen dressings are available in:

- Powders
- Amorphous gels/pastes
- Gel-impregnated dressings
- Standard-size wound dressing pads
- Ropes for undermining or cavity wound fill

9. Conclusion

Understanding the introduction and definition of collagen, indication, contraindication. There are four type of collagen dressing – Hydrocolloid, hydrogel, alginate and collagen. Understand wound that it is a break in the continuity of any bodily tissue due to violence, where violence is understood to encompass any action of external agency, including, for example surgery, burn and trauma. Some growth factors are necessary for wound healing. Role of collagen in wound healing is also very important for faster healing. There are some different type of collagen dressing with their uses that are using in wound healing. Understand the collagen therapy with their all aspect like Introduction, definition, mechanism, indication, contraindication, type of wound care dressing, CTP's , growth factors, wound heal by support of collagen dressing, role of collagen in wound healing and type of collagen dressing.

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