

## Nipple Wound Care: A New Approach to an Old Problem

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### Abstract

Nipple soreness and nipple trauma have long been associated with breastfeeding, and persist despite the many clinical advancements in the field of lactation. Management of nipple wounds has been approached in a variety of ways over the years in an attempt to treat and resolve this problem. Incorporating the scientific principles of modern wound care management can provide additional effective treatment options. Wounds are characterized by depth and extent of tissue destruction, regardless of their location on the body. Current wound treatment methods employ the use of moisture to aid healing. A moist environment is critical for epithelization, the proliferation and migration of epithelial cells across the surface of a wound during healing. Nipple wounds also heal by this process. Using a particular type of wound dressing, a hydrogel sheet wound covering, on a nipple wound offers several advantages. These dressings help maintain a moist environment, decrease the chance of bacterial infection, are easy to use, and provide immediate pain relief. *J Hum Lact* 1997; 13:313–318.

**Keywords:** nipple trauma, wound, epithelization, hydrogel dressing

### Introduction

Breastfeeding is a learned art for mothers and for babies. During the learning period, the goal is to prevent nipple pain and trauma from ever developing by teaching mothers appropriate positioning and attachment skills. However, if nipple damage does occur, treatment should promote healing and comfort for the mother, and should not compromise the health of the baby, or the maternal milk supply.

It has been reported that up to 96% of all women experience some degree of nipple pain or trauma in the early weeks of breastfeeding.<sup>1,2</sup> Even with the availabil-

ity of lactation professionals, support groups, and “how-to” books, women cite nipple pain and trauma as one of the primary reasons for the discontinuation of breastfeeding.<sup>3</sup>

Treatment of nipple pain and trauma has been approached in a variety of ways over the years, confusing both breastfeeding mothers and the professionals trying to assist them. Some sources have advocated the principles of dry wound healing, advising the use of sunlight, hair dryers, and light bulbs among others.<sup>4,5</sup> Others suggest the application of expressed breast milk on the nipple followed by air drying.<sup>5,6</sup>

On the other hand, advocates of moist wound healing have suggested the application of any one of a plethora of products, such as lanolin, vegetable oils, petroleum jelly, vitamin E oil, antiseptic ointments, and creams and veterinary products not intended for human consumption.<sup>4,5</sup> Concerns regarding the safe ingestion of these substances by a nursing baby, and/or allergic response in the mother have led many lactation consultants to avoid using any commercial products for nipple care.

Many mothers with sore nipples rely on outdated breastfeeding literature and on anecdotal remedies

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passed down from one generation to another, misconceptions abound.<sup>7</sup> Unfortunately, self-care based on inaccurate information is likely to continue as long as professional advice is viewed as conflicting.

Professionals working with lactating mothers need to determine an approach to nipple wound care that is based on a knowledge of causative factors, skin/breast anatomy, wound assessment, modern wound care principles, and on current standards of treatment.

### Assessment of Nipple Trauma

When nipple pain or trauma occurs, new mothers commonly call breastfeeding help-lines for guidance. For obvious reasons, it is impossible to assess the extent of nipple damage via the telephone, or to accurately determine its cause. It should not be assumed that giving a mother a standard list of interventions over the phone will result in resolution of the problem. It is essential that the mother/baby dyad be seen by a lactation specialist as soon as possible, as not only can tissue breakdown accelerate quickly, but intense pain may influence the mother to stop breastfeeding prematurely.

Consultation time should be arranged around the infant's nursing pattern so that a feeding can be observed. Poor maternal positioning and attachment technique are commonly identified and easily modified sources of pain and trauma. Maternal breast, areola, and nipple configuration should be carefully noted and documented, as well as infant oral tone, anatomy, suck, and behavior at the breast.

Sometimes, the damage done is too severe for a mother to nurse without pain and further trauma, despite corrections to breastfeeding technique. In this event, alternate infant feeding methods should be temporarily employed. The mother should be taught how to regularly express her breast milk until the problem has resolved and breastfeeding can be comfortably resumed.

In order to determine appropriate and effective treatment measures, it is necessary to identify the potential causative factors. There are numerous possibilities including the following: (1) improper positioning and poor attachment of the infant at the breast, resulting in friction, compression, and/or unrelieved negative pressure;<sup>6,8</sup> (2) breast engorgement hindering optimal attachment;<sup>6,8</sup> (3) maternal breast/nipple anatomical variations;<sup>6,8</sup> (4) use of an ineffective, poor-quality breast pump, poor pumping technique including excessive duration of pumping sessions, improper suction settings, inexact positioning of the nipple within the flange, inappropriate flange size, and improper self-cycling;<sup>8</sup> (5) infant ana-

tomical variations of the mouth, palate, tongue, lingual frenulum;<sup>9</sup> (6) prenatal nipple "toughening" (e.g., repetitive abrasive rubbing);<sup>6</sup> (7) nipple cleansing with inappropriate agents that remove natural oils from the skin resulting in drying and cracking;<sup>8</sup> (8) dysfunctional/disorganized infant suck: tongue thrusting, tongue sucking, tongue humping, or chewing/biting action;<sup>6,8</sup> and (9) the presence of dermatologic pathology such as yeast overgrowth, eczema, or dermatitis on the nipple.<sup>10,11</sup>

### Principles of Anatomy Key to Guiding Treatment

Understanding skin and breast anatomy can lead to more effective treatment (Figure 1). The structure of the breast is consistent with the integumentary system, containing epidermal, dermal, and subcutaneous layers.<sup>12</sup> The epidermis is the outermost layers of the breast, areola, and nipple. The epidermis is avascular and protects underlying cells from water loss as well as from mechanical and chemical harm.<sup>13,14</sup>

The dermal layer of the breast lies directly below the epidermis and is composed primarily of collagenous and fibrous connective tissue.<sup>13,14</sup> The dermal layer of the

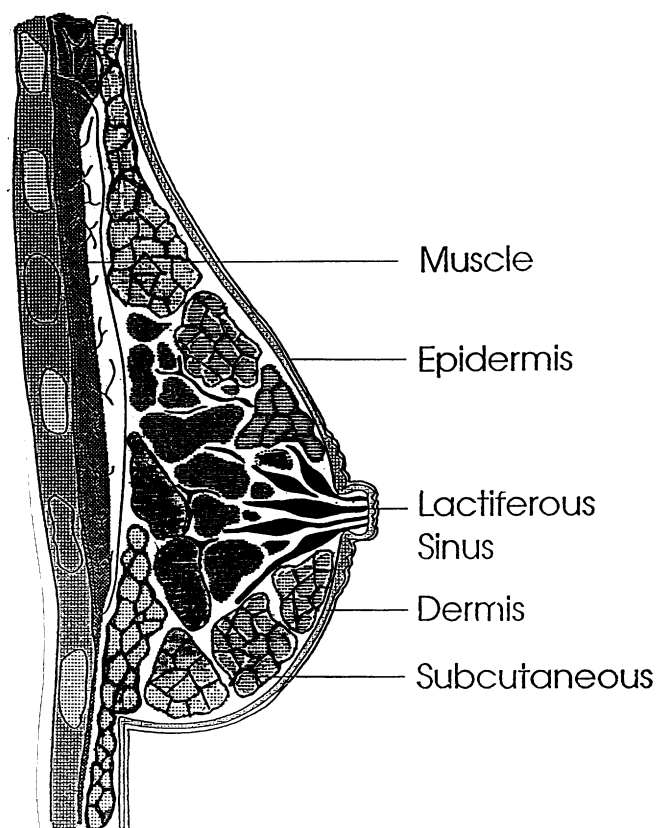


Figure 1. Breast anatomy.

nipple also contains 15–25 small milk ducts surrounded by connective tissue that carry milk from lactiferous sinuses through the nipple exiting by way of the 15–25 nipple pores found on the nipple face.<sup>12,15,16</sup> The areola is comprised of sebaceous glands, apocrine sweat glands, Montgomery tubercles, blood vessels, nerve fibers, and hair follicles.<sup>12,15,16</sup> The subcutaneous layer is found beneath the dermal layer and comprises a large portion of the breast. It contains blood vessels, nerves, lymphatic vessels, alveoli, lactiferous ducts, fatty and connective tissue.<sup>12,14</sup> Its fatty and loose connective tissue insulates, pads, and protects against mechanical injury and stores calories.<sup>14</sup> Muscle, tendon, and bone lie beneath the subcutaneous layer of the breast on the chest and are the supporting structures.<sup>12</sup>

### Guidelines for Wound Assessment

Accurate assessment of the wound will facilitate the development of an effective treatment regimen that allows optimal wound healing to occur. Professional medical terminology and assessment technique should be used in evaluating and documenting the degree of tissue damage and status of wound healing in order to communicate credibly with physicians and other members of the health care team. Assessment of a wound should include the following: location, depth of tissue destruction, size, visible and nonvisible characteristics of the wound, and the appearance of the surrounding tissue.

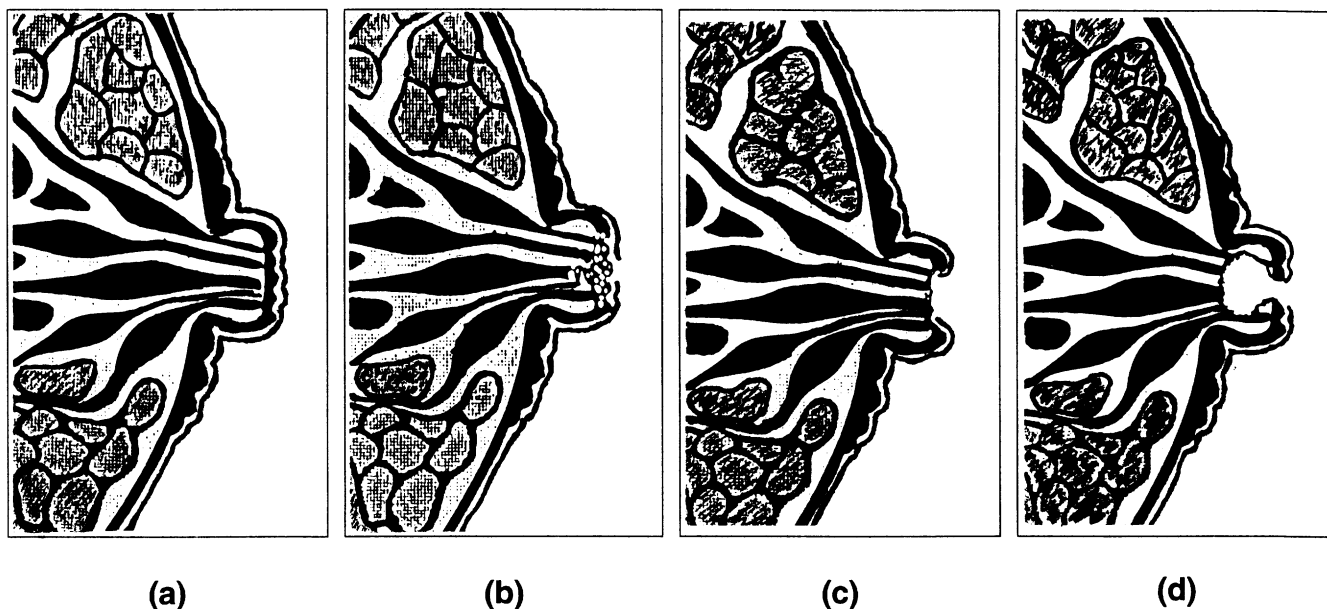
**Location:** The location of the wound on the nipple is important in determining cause as well as appropriate treatment. Note whether it is on the right or left nipple, on the nipple face, side of the nipple, at the nipple-areolar junction, or on the areola. Be specific by describing the location with respect to a clock face (e.g., 12 o'clock or 9 o'clock).

**Depth of tissue destruction:** There are several different classification systems used to describe tissue breakdown. Each system describes the depth of skin/tissue damage. Currently, there is no standard classification system used for nipple wounds. However, nipple wounds can be divided into types based on wound depth and the extent of tissue damage (Figure 2). In our practice, nipple wounds involving destruction of the epidermal layer only, are classified as superficial wounds (Figure 2b). Nipple wounds involving destruction of the epidermis and upper or lower layers of the dermis are classified as partial thickness wounds (Figures 2c–2d).

**Size of the wound:** A wound should be measured in length and width using millimeters or centimeters using a clean plastic measuring guide.

**Visible characteristics:** Wounds should be evaluated for redness, drainage (note color, type, and amount), edema, epithelization, and condition of surrounding skin.

**Nonvisible characteristics include:** Other characteristics such as odor and pain should also be assessed.



**Figure 2.** Depth of tissue destruction: (a) normal breast/nipple tissue; (b) superficial wound: destruction of the epidermal surface; (c) partial-thickness wound: destruction of the epidermis and/or upper layers of the dermis; (d) partial-thickness wound: destruction of the epidermis to the lower layers of the dermis.

### Principles of Moist Wound Healing

The management of painful nipple wounds presents a challenge to health care professionals because there is no clear consensus among lactation specialists regarding the approach to treatment. The consensus among wound care specialists, however, is consistent with principles of moist wound healing.<sup>13</sup> The goal of wound treatment is based on principles of topical treatment that are derived from scientific studies of the wound healing process. These principles are consistent with the literature, and wound care specialists recognize that these principles have a direct influence on the phases of healing. To recognize how a moist environment influences the phases of healing, there must be an understanding of what occurs in each of the three phases.

#### Inflammatory Phase

The inflammatory phase is the initial phase of healing and occurs anywhere from 0–3 days after trauma.<sup>13,14</sup> It is during this phase that the control of bleeding and prevention of bacterial invasion beyond the area of injury occur.<sup>13,14</sup> Vasodilation also occurs, and the tissues show signs of redness, warmth, and pain.<sup>13,14</sup> A clot is formed. Moisture plays an important role in this phase as it decreases the amount of devitalized tissue present in the wound. The presence of devitalized tissue prolongs the inflammatory phase, which prolongs the healing process, and increases the potential for bacterial growth.<sup>13,14,17</sup>

#### Proliferative Phase

The proliferative phase is the second phase of healing and occurs anywhere from 3 to 24 days post injury.<sup>13,14</sup> The presence of moisture during the proliferative phase provides the environment needed for the proliferation and migration of epithelial cells across the wound bed and the formation of new tissue. This process is known as epithelization. Moisture has been shown to increase the rate of epithelization up to 50%.<sup>13,14,17</sup> Because nipple wounds heal by epithelization, a moist environment is crucial.

#### Maturation Phase

Maturation is the final phase of healing and can last up to 2 years.<sup>13,14</sup> The newly formed tissue is fragile and possesses never more than 80% of its previous strength, therefore increasing the risk of wound recurrence.<sup>13,14</sup> Moisture aids healing by decreasing tissue drying which can lead to trauma, bacterial invasion, and discomfort.<sup>13,14</sup>

### Treatment Options

The “ultra-pure” lanolin products currently used in the treatment of nipple wounds do help create a moist setting and are a marked improvement over the concoctions of the past. Interdisciplinary collaboration with wound care specialists has provided us with additional safe, sound, effective treatment options.

The application of a moisture retentive hydrogel dressing can be very useful in the treatment of a wide range of breast and nipple wounds. Hydrogel dressings create a moist environment which facilitates healing.<sup>17–20</sup> They can be used on a superficial nipple abrasion that involves only the epidermis, as well as on deeper cracks and fissures that reach into the dermis and even the subcutaneous layer of the breast.

For the past 2 years, we have used a hydrogel sheet dressing in the treatment of nipple tissue destruction in several hundred breastfeeding mothers (Figure 3). Mothers were given verbal and written instructions regarding how to use the dressing on the effected nipple. The mothers wore the same dressing at all times for one to three days, removing it only to breastfeed. This treatment was continued until the nipple wound healed. The positive response from mothers was overwhelming.

The hydrogel dressing was shown to be effective in providing a moist environment for healing. Mothers found that the treatment provided significant pain relief, was simple to use, and cost effective. Following this initial success, the hydrogel dressing is currently being examined in a randomized clinical research study to validate its effectiveness compared to other nipple wound treatments.

Hydrogel dressings are available in the form of a solid sheet or as a gel.<sup>19</sup> The dressings are comprised of cross-



Figure 3. Hydrogel dressing in place over wound.

linked polymers.<sup>14</sup> They are comprised of up to 96% water and contain no medication. The dressing material is not absorbed into the mother's tissue, therefore there should be no health risk for the nursing infant.

There are several advantages to using hydrogel sheet dressings for a nipple wound. They: (1) maintain a moist environment for healing;<sup>13,14,17-20</sup> (2) decrease the risk of bacterial infection;<sup>17,19</sup> (3) provide immediate cooling, pain relief upon application of the dressing;<sup>14,17-20</sup> (4) act as a mechanical barrier;<sup>17</sup> (5) support some autolytic debridement due to moisturizing effects;<sup>13,14,17-20</sup> (6) absorb some drainage;<sup>13</sup> (7) provide a nonadherent surface for easy application and removal;<sup>13,14,18-20</sup> (8) are reusable;<sup>20</sup> (9) are available in different forms and sizes;<sup>13,19,20</sup> (10) are cost effective, as one dressing lasts for several days.<sup>13,19,20</sup>

Hydrogel dressings are manufactured by many different companies. In our experience, the hydrogel sheet dressings such as ClearSite (New Dimensions in Medicine) and Flexderm (Dow Hickam Pharmaceuticals) are two that work well for nipple wounds in the breastfeeding mother. The dressings are available through medical supply companies and are usually part of existing hospital stock, as they are used for wounds found elsewhere on the body. They are packaged 5-10 per box. Mothers typically need to purchase only one or two dressings.

The guidelines found in Table 1 should be utilized when using a hydrogel sheet dressing on a nipple wound for healing to precede in a safe and cost effective manner. Follow-up care is a vital part of the healing process and should be included in the treatment plan. Continuous evaluation is important in monitoring the physiological effects of the dressing on the wound, and is important for the psychological well-being of the mother as well. Follow-up care allows the health-care professional to determine the progress of wound healing, to assess for signs of infection, and can help the mother resume nursing without tissue reinjury.

**Table 1.** Guidelines for use of hydrogel dressing on a nipple wound.

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Wash hands before handling breast or dressing.
Cut dressing 1/4-1/2 inch larger than the wound.
Remove the backing from the dressing.
Apply the gel side to wound. Use breast pad in bra to hold in place.
<b>Remove</b> dressing for nursing, placing it on a clean surface, gel side up.
Reapply the dressing after nursing or expressing, if baby temporarily off the breast.
Use a new piece of dressing every 1-3 days or as needed.
There is <b>NO</b> need to wash breast before nursing.
Consult health-care professional as necessary.
<b>CAUTION:</b> Dressing must be removed before nursing to prevent accidental choking.

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## Conclusion

Health-care professionals working with breastfeeding mothers are challenged to base their care of nipple wounds on current research and protocols. To prevent nipple wounds, it is essential that mothers be taught proper techniques for positioning and attachment, for equipment use, and breast care. The occurrence of nipple pain and skin damage necessitates a comprehensive consultation with a lactation consultant or a knowledgeable health care provider in order to determine contributing factors (maternal and infant) and to initiate appropriate interventions and teaching. Use of moist wound healing principles can optimally enhance wound healing. Collaboration with wound care specialists can improve the quality of care available to mothers, expand our knowledge base, and create new and exciting treatment options.

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