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TLC dressings made easy

Introduction

The normal wound healing process is fragile and can be interrupted at any stage, leading to a potential delay in wound closure. Dressings that incorporate a lipido-colloid (TLC) healing matrix can support and maintain a moist wound healing environment to aid this process. Studies have shown that when the TLC healing matrix comes into contact with the wound bed, it promotes fibroblast proliferation and synthesis of the extracellular matrix (critical in supporting normal wound healing), while minimising adherence of the dressing to newly formed tissue, reducing pain and improving quality of life. This made easy reviews how TLC dressings can be used to stimulate healing in a range of acute and chronic wounds.

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THE WOUND HEALING PROCESS

Normal wound healing is a complex process comprising a number of overlapping phases. The process starts with haemostasis and formation of a fibrin clot over the wound surface, progresses through a destructive inflammatory phase and then a restorative, proliferative phase. The final process is that of maturation and remodelling of the wound area (Figure 1). In most wounds, healing progress should be visible within 2–4 weeks (Vowden, 2011).

Figure 1. Phases of wound healing following haemostasis

Inflammatory phase	Proliferation phase	Maturation phase
• Blood vessels dilate to allow essential cells such as white cells, growth factors and nutrients to reach injured area • Exudate levels increase with autolysis of any devitalised necrotic/sloughy tissue • Signs of inflammation evident – erythema, heat, oedema, pain	• New network of blood vessels develop • Blood vessels provide oxygen and nutrients to allow production of healthy granulation tissue by fibroblasts • New granulation tissue forms, comprising collagen and extracellular matrix	• Remodelling of the collagen and contraction of wound edges • Cell activity reduces and the number of blood vessels decrease • Continues until wound is closed

Granulation tissue begins to appear in the wound during the proliferative phase and continues until the wound bed is covered. It consists of new blood vessels, with endothelial cells and fibroblasts, as well as other components essential for the formation of new extracellular matrix (ECM) (Schultz et al, 2005).

During angiogenesis, fibroblasts enter the wound and increase in number (Box 1). They produce collagen and other proteins that are key components of the ECM, along with polysaccharides. The ECM is a structural support to cells and tissues and is the largest component of skin. It plays an important role in healing, forming the basis of granulation tissue and a scaffold for the growth of new blood vessels (Schultz et al, 2005).

BOX 1: WHAT ARE FIBROBLASTS?

- Cells that move into the site of injury during the proliferative stage and increase in number
- They degrade the fibrin clot and replace it with new ECM and collagen structures
- This matrix supports activity and movement of fibroblasts as well as the formation of granulation tissue
- If low in numbers, fibroblasts will not be able to produce healthy granulation tissue (Bainbridge, 2013)

The normal wound healing process is fragile and can be interrupted at any stage. A chronic wound can stall within any phase of healing (Vowden, 2011), although this usually occurs at the inflammatory stage and is associated with high level of proteases in the wound (Gibson et al, 2009). This can lead to destruction of healthy ECM, and reduced fibroblast and growth factor activity, with the potential to delay wound healing and increase wound size (Vowden, 2011).

To reduce the risk of delayed wound healing, the principles of wound bed preparation, which is now well established, should be applied from the start with the aim of achieving healing within the optimum time frame and to reduce the risk of chronicity (Vowden, 2011).

WHAT IS TLC?

Technology Lipido-Colloid (TLC) (developed by Laboratoires URGO) comprises a matrix containing hydrocolloid and lipophilic substances (Figure 2, page 2). It has been shown to promote the proliferation of fibroblasts, which contributes to the formation of new tissue in the wound. TLC is used in a wide range of dressings as neutral TLC, combined with silver (TLC-Ag) or a protease inhibitor (TLC-NOSF).

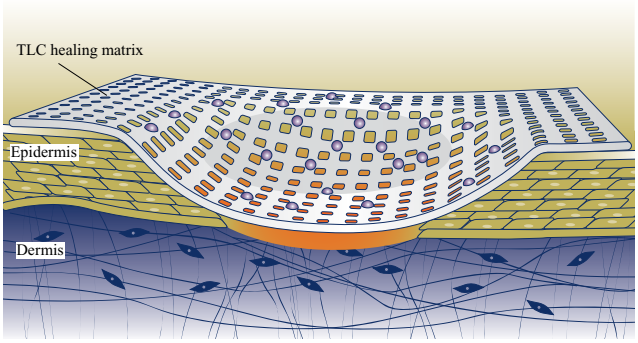


Figure 2: TLC dressings conform to the wound bed. This has been shown to stimulate fibroblast activity and synthesis of new extracellular matrix, essential for the formation of healthy granulation tissue and epithelialisation.

HOW DOES TLC WORK?

When in contact with wound exudate, the hydrocolloid particles within the TLC healing matrix become hydrated, swell and interact with the lipophilic substances to form a lipido-colloid gel. This helps to support and maintain a moist wound healing environment.

When in direct contact with the wound bed, the TLC healing matrix has been shown *in-vitro* to enhance proliferation of fibroblasts. This has the potential to stimulate ECM production and encourage formation of granulation tissue for wound healing (Bernard et al, 2005; Bernard et al, 2007; Bernard et al, 2009).

The TLC healing matrix minimises adherence of newly formed granulation tissue to the dressing and facilitates atraumatic, pain-free removal (Meaume et al, 2004). When used as a contact layer, the permeable matrix allows exudate to pass through onto any absorbent pad or secondary dressing, reducing the risk of maceration of the surrounding skin.

USING DRESSINGS WITH TLC

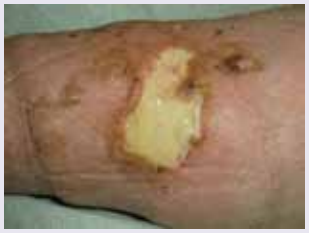
TLC is unique to a range of dressings that can be used on acute and chronic wounds with low to high exudate (White et al, 2011). The dressings can be considered where the treatment aim is to stimulate healing, while preventing tissue damage, and reducing pain and patient discomfort. In addition, they may be used on infected and sloughy wounds to prepare the wound bed for healthy tissue granulation and healing (Box 2).

How to select from the TLC range of dressings

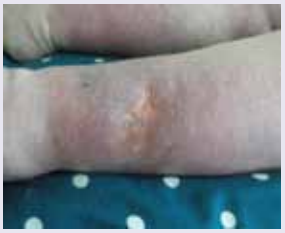
When choosing a TLC dressing (Table 1), it is important to base selection on the volume of exudate, size and position of the wound, and condition of the wound bed and surrounding skin.

- **Resolve infection/critical colonisation:** If a wound is assessed to be critically colonised, a silver-containing antimicrobial dressing may be indicated. TLC-Ag dressings such as UrgoTul Silver with silver salts and UrgoTul SSD with silver sulphadiazine rely on exudate to activate the release of the silver contained within the dressing. They have broad-spectrum antimicrobial activity and have been shown *in-vitro* to be effective against *Pseudomonas aeruginosa* and meticillin-resistant *Staphyloccus aureus*. For infected wounds, TLC-Ag dressings can be used in combination with systemic antibiotics. Once the signs and symptoms of infection are no longer present, consider an alternative TLC dressing that matches the wound conditions to promote healing.
- **Remove excess slough:** Excess slough will delay healing and needs to be removed. The UrgoClean range, comprising a TLC layer and hydro-desloughing fibres, works by softening the slough and absorbing the increased volume of exudate that occurs with autolysis. (Note: UrgoClean Rope can be used in cavity wounds or around awkward areas such as digits. This is not coated in a TLC layer to aid dressing application.)
- **Accelerate chronic wound healing:** Once the wound bed is clean, UrgoClean can be replaced with a TLC-NOSF dressing from the UrgoStart range, which has the ability to accelerate wound healing by rebalancing the wound biochemistry and providing a moist wound healing environment (Meaume et al, 2012a).
- **Promote wound contraction:** UrgoTul is a non-adherent wound contact layer, allowing trauma-free removal to protect newly-formed tissue and minimise pain for the patient (Meaume et al, 2004). UrgoTul Absorb Border is a relatively new addition to the range; it combines a TLC contact layer on a foam absorbent pad with a soft silicone border. The dressing is suitable for low to moderately exuding wounds and can be used on delicate or sensitive skin. The border can be cut to facilitate contouring of the dressing around difficult-to-dress areas while minimising damage to fragile or sensitive skin.

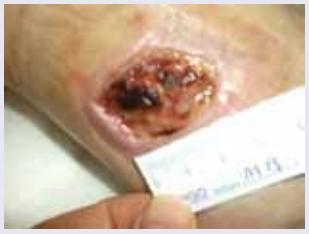
BOX 2: BEFORE AND AFTER TREATMENT WITH TLC DRESSINGS



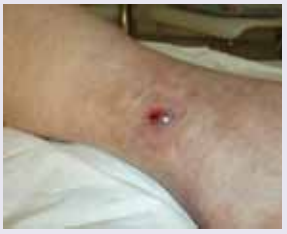
8-week old mixed aetiology leg ulcer with sloughy wound bed before treatment with UrgoClean



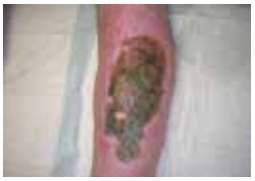
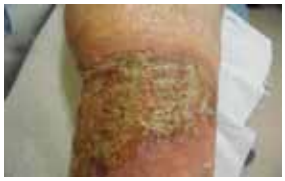
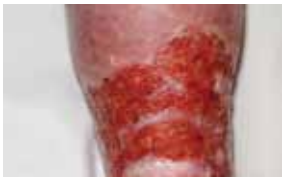
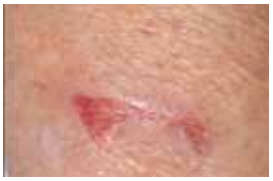
Wound 6 weeks later, after treatment with UrgoClean



7-week old haematoma to left leg before treatment with UrgoStart



Wound 5 weeks later, after treatment with UrgoStart

Table 1: Guide to appropriate TLC dressing selection				
Action based on wound healing phase	**Manage infection**	**Manage slough**	**Accelerate healing**	**Promote wound contraction**
				
Treatment goals	• Reduce bacterial burden • Provide clean wound bed for granulation tissue	• Remove slough • Provide clean wound bed for granulation tissue	• Promote granulation tissue formation	• Protect newly formed tissue
Dressing choice	• UrgoTul SSD • UrgoTul Silver • UrgoCell Silver	• UrgoClean	• UrgoStart Contact • UrgoStart	• UrgoTul • UrgoTul Absorb Border • UrgoCell TLC
Indications	• Non- to low-exuding wounds, at risk of infection or with signs and symptoms of local infection/critical colonisation • Can be combined with an absorbent layer for heavily exuding wounds • Can be used in cavity wounds (excluding UrgoCell Silver)/under compression	• Sloughy leg ulcers, pressure ulcers, diabetic, acute or chronic wounds • Can be used under compression (pad) • Can be used in cavity wounds (rope)* *This is not coated in a TLC layer to aid dressing application	• Low to moderately-exuding chronic leg ulcers, pressure ulcers, diabetic foot ulcers and recurring wounds • Minimum duration of treatment 4-5 weeks • Can be used under compression • UrgoStart Contact can be used under a secondary dressing to protect the periwound area and vulnerable tissue	• Non- to moderately-exuding acute wounds (e.g. burns, traumatic wounds, skin abrasions, postoperative wounds), chronic epithelialising wounds (leg ulcers, pressure ulcers, diabetic foot ulcers) and painful skin conditions (e.g. epidermolysis bullosa [UrgoTul]) • Can be used under compression

When applying a TLC dressing, ensure it overlaps the wound edges by at least 1cm to protect periwound skin. Non-adhesive TLC dressings can be cut using sterile equipment, but should not be layered or folded. If a secondary dressing is required, the absorbency level should be based on the volume of exudate to maintain a moist wound environment (e.g. UrgoTul Absorb Border can be used as a secondary dressing). Alternatively, a simple retention bandage (e.g. K-Band or K-Lite) can be used for low-exuding wounds.

Discontinue TLC dressings when the treatment goals have been met. Fully evaluate the dressing and wound status at every dressing change to guide product selection.

COST BENEFITS OF USING TLC DRESSINGS

Dressings that incorporate the TLC healing matrix can achieve favourable results in acute and chronic wounds using the principles of wound bed preparation. They can be applied from the start and used sequentially to clean the wound bed and promote granulation tissue formation for healing (White et al, 2011).

TLC dressings can be left in place for up to 6–7 days, reducing the frequency of changes (Meaume et al, 2005), and potentially nursing time, while avoiding excessive disturbance to the wound. A recent health economic study looking at the use of UrgoStart over one year, showed a reduction in nursing time of 21 hours per patient, as well as a reduction in the total number of dressings used. This resulted in an overall saving of £1,812 per patient (Data on file, Urgo Laboratories).

WHAT IS THE EVIDENCE FOR TLC?

Laboratory studies have demonstrated that neutral TLC (e.g. UrgoTul range) is able to stimulate fibroblast proliferation after 24–72 hours (Bernard et al, 2005; Bernard et al, 2009. In addition, when fibroblasts are in contact with TLC, they produce significantly more (pro)collagen I than controls. The results also showed that TLC stimulated the production of hyaluronic acid, which aids cell proliferation, and may help to explain how TLC dressings alone can promote healing (Bernard et al, 2007).

There is a good level of evidence from randomised controlled trials and clinical, observational and *in vitro* studies on the efficacy, tolerability and acceptability of TLC dressings in a range of wound types. When considered together the evidence shows the following benefits for the TLC product range:

- **Neutral TLC dressings (e.g. UrgoTul, UrgoClean ranges): reduce pain; easy to use; leave no residue in wound bed; conformable, minimise risk of maceration, malodour and bleeding; reduce dressing change frequency; and can be used under compression with no leakage issues (Burton et al, 2004; Smith et al, 2004; Meaume et al, 2005; Ma et al, 2006; Tan et al, 2009; White et al, 2011; Meaume et al, 2012b)**
- **TLC-NOSF dressings (UrgoStart range): faster healing rates; cost effective (Meaume et al, 2012a; Richard et al, 2012; data on file)**
- **TLC-Ag dressings (e.g. UrgoTul SSD, UrgoTul Silver, UrgoCell Silver): manage infection and reduce skin inflammation for enhanced healing (Carsin et al, 2004; Lazareth et al, 2008; Bisson et al, 2013).**

CASE 1: POSTOPERATIVE GROIN WOUND WITH EXUDATE AND DELICATE PERIWOUND SKIN

A 78-year-old female was readmitted to hospital 8 weeks after aortic valve replacement with a wound in her groin. The procedure to replace her heart valve had been undertaken via a percutaneous route, using her groin as the entry site.

The wound had become infected, resulting in increased exudate levels. Due to the anatomical site, the wound was difficult to dress. Initially, silver-containing dressings were used to reduce the bacteria; however, the secondary foam dressings applied did not manage the exudate effectively or stay in place in the groin. The periwound skin became excoriated and painful (Fig 1), making the decision to continue adhesive dressings a challenge.

To create a moist wound environment and manage the exudate, the decision was made to use UrgoClean Rope in the cavity with UrgoTul Absorb Border dressing as the secondary dressing. At dressing change 5 days later, the wound had improved and the skin excoriation had completely resolved (Fig 2). The dressing contoured well into the groin, facilitating effective absorption of exudate and good contact with the TLC healing matrix. The patient was discharged back to the community.

Figure 1: Wound at presentation

Figure 2: Wound at first dressing change 5 days later

CASE 2: POST-AMPUTATION FOOT WOUND IN A PATIENT WITH DIABETES

A 60-year-old gentleman with type 2 diabetes presented with a red, hot, swollen and painful left hallux. He was treated for infection with oral antibiotics, but the toe deteriorated and the patient was admitted via Accident & Emergency; he underwent incision and drainage on 18 November followed by debridement and amputation of first ray on 21 November.

On 11 December, the wound measured 9.7cm x 7.2cm and exudate was copious. It was dressed with UrgoClean to deslough the wound, which was retained using a K-Band (Fig 1). The patient was given a PRAFO boot to allow weight bearing and prevent further breakdown. Dressings were changed 2–3 times a week depending on strikethrough. He was discharged from hospital on 18 December with follow up once a week in the podiatry clinic and twice-weekly visits by the district nurse. The patient was receiving triple therapy to achieve optimum wound healing. This was continued until the end of January 2014 (Fig 2).

UrgoClean was applied until 4 June, at which point the dressing was changed to UrgoTul Absorb Border. On 26 June the wound measured 1.4cm x 0.5cm (Fig 3). Over the treatment period there was no maceration of the surrounding tissue and there was no pain on removal at dressing changes. The dressings left no residue in the wound bed and provided a simple, but effective treatment.

Figure 1: Wound at the start of treatment with UrgoClean (11 December, 2013)

Figure 2: Wound 4 weeks after the start of treatment with evidence of granulation tissue (27 January, 2014)

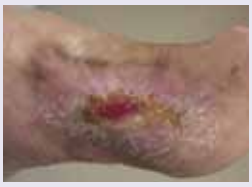


Figure 3: UrgoTul Absorb Border started on 4 June. Wound measured 2cm x 1cm with evidence of healing on 26 June (week 28)

AUTHOR DETAILS

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References

Bainbridge P (2013) Wound healing and the role of fibroblasts. *J Wound Care* 22(8): 407–12.

Bernard FX, et al (2005) Stimulation of the proliferation of human dermal fibroblasts in vitro by a lipidocolloid dressing. *J Wound Care* 14(5): 215-20.

Bernard FX, et al (2007) Effects of a lipidocolloid dressing on the production of the extracellular matrix by human dermal fibroblasts *in vitro*. *JPC* XII 58; 9–11.

Bernard FX, et al (2009) [Effect of the new Cellosorb micro-adherent dressing on the proliferation of fibroblasts *in vitro*]. *JPC* XIV 67; 42–4.

Bisson JF, et al (2013) Effects of TCL-Ag dressings on skin inflammation. *J Dermatol* 40(6): 463–70.

Burton F (2004) An evaluation of non-adherent wound contact layers for acute traumatic and surgical wounds. *J Wound Care* 13(9): 371–3.

Carsin H, et al (2004) A silver sulphadiazine-impregnated lipidocolloid wound dressing to treat second-degree burns. *J Wound Care* 13(4):145–8.

Lazareth I, et al (2008) The role of a silver releasing lipido-colloid contact layer in venous ulcers presenting inflammatory signs suggesting heavy bacterial colonisation. Results of a randomized controlled study. *Wounds* 20(6): 158-66.

Ma KK, et al (2006) The effectiveness of using a lipidocolloid dressing for patients with traumatic digital wounds. *Clin Nurs Res* 15(2): 119–34.

Meaume S, et al (2012a) A randomised, controlled, double-blind prospective trial with a Lipido-Colloid Technolog-NOSF wound dressing in the local management of venous leg ulcers. *Wound Rep Regen* 20(4): 500–11.

Meaume S, et al (2012b) Management of chronic wounds with an innovative absorbent wound dressing. *J Wound Care* 21(7): 315–6, 318, 320–2.

Meaume S, et al (2011) Use of a new, flexible lipidocolloid dressing on acute and chronic wounds: results of a clinical study. *J Wound Care* 20(4): 180, 182–5.

Meaume S, et al (2005) Evaluation of a lipidocolloid wound dressing in the local management of leg ulcers. *J Wound Care* 14(7):329-34.

Meaume S, et al (2004) The importance of pain reduction through dressing selection in routine wound management: The MAPP study. *J Wound Care* 13(10): 409–13.

Richard JL, et al (2012) Management of diabetic foot ulcers with a TLC-NOSF wound dressing. *J Wound Care* 21(3):142–7.

Schultz GS, et al (2005). Extracellular matrix: review of its roles in acute and chronic wounds. *World Wide Wounds*. Available from http://www.worldwidewounds.com/2005/august/Schultz/Extrace-Matric-Acute-Chronic-Wounds.html

Smith J, et al (2004) Evaluation of Urgotul plus K-Four compression for venous leg ulcer. *Br J Nurs* 13(6)

Tan PW, et al (2009) The use of Urgotul in the treatment of partial thickness and split thickness skin graft donor sites. *Int Wound J* 6(4): 295–300.

Vowden P (2011) Hard to heal wounds Made Easy. *Wounds International* 2(4).

White R (2005) Evidence for atraumatic soft silicone wound dressing use. *Wounds UK* 104–9.

White R, et al (2011) Supporting evidence-based practice: a clinical review of TLC technology. *J Wound Care* 20(8):1–36.

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