

Clinical evaluation of technology lipido-colloid in the management of acute wounds in China

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Abstract: Wound management has evolved from considering wound dressings as a means to provide protection to a medium that enhances wound healing and also takes into consideration patient aspects such as atraumatic removal. Technology-lipido colloid (TLC) is described as a healing matrix as it stimulates fibroblasts, which is achieved through maintaining a moist wound environment. It also provides atraumatic removal, thus it not only protects the wound but avoids unnecessary pain for the patients. This article discusses five cases from China where the TLC was used on a variety of wounds with positive outcomes both for the wound and the patients.

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One of the oldest medical manuscripts known to man is a Sumerian clay tablet that dates back to 2100BC (Shah, 2011). The three healing methods described in this tablet, washing the wound, applying dressings and bandaging the wound, are still followed today, be it in a different way (Alexandrescu, 2016). On the other hand, traditional Chinese healers have looked at wound healing in a more artistic and holistic approach, giving emphasis to the concept that the body, mind and spirit have to be stabilised and well aligned in order for healing to take place (Bhattacharya, 2012). Throughout the ages, in different cultures, civilisations continued tending to wounds in their different manners, using what was available, like animal dung, saliva, local herbs and practices and beliefs, such as using smoke and 'magic' (Ojok et al, 2012).

However, scientific research has provided us with the basis for a paradigm shift, from considering wound dressings as a means to provide protection, to rationalising that dressings should be used as a medium which can positively influence the wound healing environment (Cutting, 2010). The 'revolution' of modern wound care can be attributed to ground breaking studies conducted in the 1960's, mainly by George Winter (1962) and Hinmann and Maibach (1963), who identified that wounds managed in a moist environment

show better healing than those exposed to air. Early modern wound management concentrated on rectifying the concern that many wounds were being treated inadequately, with the outcome being delayed healing (Rippon et al, 2016). Subsequently, there has been growing and consistent evidence in the literature highlighting the benefits of balanced, moist wound healing (Rippon et al, 2016). While this has been essential, there was a lack of acknowledgment of patient-centred concerns such as wound pain (White et al, 2011). In many patients' perspective, background and procedural pain are the most distressing and stressful aspects of having a wound (White et al, 2011), they consider dressing removal and wound cleansing to be the most painful situations (Brown, 2014). Adherence of dressings to the wound bed is a major cause of trauma, resulting in procedural pain experienced by the patients (Brown, 2014).

Approaches to local wound management need to incorporate a moist environment, minimising trauma both during the dressing change and throughout the wear-time, as well as the application of effective, evidence-based principles of wound bed preparation in order to reduce wound related pain and promote wound healing (Haesler, 2017). This emphasises the need for health professionals to take into consideration the healing properties of the

dressing while giving importance to the effect on the patients' wellbeing, bearing in mind wound trauma that causes pain, which is a common reason for fear and stress that leads to lack of adherence (Evans, 2014).

Furthermore, clinical knowledge that is based on experience, but also supplemented by evidence from the wound management literature, needs to be the main factor that influences decisions (White et al, 2011). Evans (2017) noted that: '*Wound care is everyone's job, but no one's responsibility*' (Evans, 2017), and, often, health professionals apply task-orientated or ritualistic care based on what has been done for a long time, conceivably using 'skills' that they may not be fully competent in (Gardner, 2019). Wound management can be improved and health professionals need to acknowledge that sometimes, one has to 'know what you don't know' in order to take those first steps towards improvement. It has to be acknowledged that, although there is a number of barriers for integrating evidence in into daily clinical practice, results from suboptimal care lengthens healing times and patient suffering (Gardner, 2019).

The use of wound contact layers

Contact layers are generally made up of a thin, single layer of non-adherent mesh-like material. They are mostly used to protect newly formed granulating tissue (Evans, 2014). These wound contact layers have been mentioned as early as 1766, using wax and oil (Tissot, 1766), while paraffin impregnated gauze was introduced in 1915 during World War 1, and were thereafter, commonly available in flat tins for decades (Thomas, 2010). Conversely, George Winter was not in favour of these dressings, as he suggested that:

'the greasy mass is too mobile at the wound surface area with the result that the coarsely woven fabric tends to sink in the exposed tissue; the epidermis migrating across the wound surface area immediately beneath the dressing wanders into the interstices of the fabric and in consequence some adhesion results through the growth of tissue into the dressing' as well as suggesting that they can 'provoke a foreign body giant cell and macrophage reaction' (Winter, 1975).

While dressings should not produce interface friction and shear, traditional dressings, such as normal saline soaked gauze and paraffin-impregnated gauze, contribute to wound

trauma and inflammation (Harris et al, 2012). More recently, 'atraumatic dressings' have been introduced, describing those wound contacts that do not cause trauma to the newly formed granulating tissue and periwound skin (Thomas, 2010). Among the available dressings, contact layers (and previously, greasy gauzes) are probably widely used in all types of wounds because of the ease of use and clinician familiarity.

Technology lipido-colloid

Technology lipido-colloid (TLC) comprises of a flexible matrix which is based on the impregnation of hydrocolloid (carboxymethylcellulose) and lipophilic substances into a fine polyester mesh (McGrath et al, 2014). TLC was developed to amalgamate the benefits of the hydrocolloids and the greasy gauzes with added benefits of longer wear time (seven days) as well as being atraumatic due to its jellification, conformability. The matrix jellifies when in contact with the wound fluid, forming a lipidocolloid gel that creates a moist environment within the wound to promote healing. The TLC contact layer has a small pore size of 500µm through which the granulating tissue is not able to migrate, preventing adherence and trauma to the wound bed, avoiding pain and bleeding during dressing changes, while the open mesh pores prevent occlusion to allow any exudate to pass through to a secondary dressing in order to avoid wound bed and periwound skin maceration (White et al, 2015). It is stated that, in this manner, the TLC healing matrix meets many of the pre-discussed characteristics of the ideal dressing (White et al, 2011). Preclinical *in vitro* test were carried out to evaluate the efficacy and claims of the contact layer. The studies presented by Bernard et al (2005; 2007), demonstrated that TLC stimulates fibroblast proliferation by 45% and also stimulates (pro) collagen 1 production by 43%. Clinical trials included a multicentre observational study, involving a total of 5850 patients (acute wounds: n=2914; chronic wounds: n=2936), which was conducted to discover the incidence of pain in patients during dressing removal, and the effect of switching to TLC (Meaume et al, 2004). In comparison with the period before changing to the TLC healing matrix, 95% of patients with acute wounds and 88% with chronic wounds reported no pain or less pain at dressing change (Figure 1). Furthermore, 83%

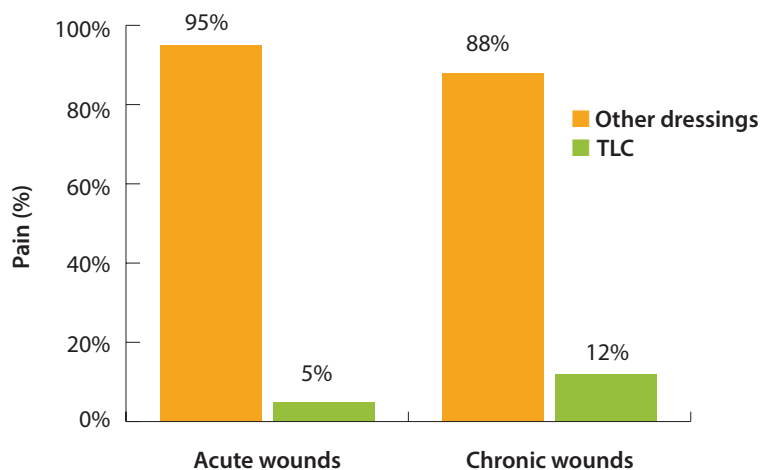











Figure 1. Technology lipido-colloid (TLC) was associated with no or less pain at dressing change (Meaume et al, 2004)

of patients stated that, since switching to a TLC dressing, they felt substantially less anxious before treatments, while 80% of patients with acute wounds and 71% with chronic wounds stated that they wished to continue with this dressing.

There were two non-comparative multicentre prospective clinical studies conducted using the same protocol in France and Germany involving 100 paediatric patients with 70 wounds (55 burns and 15 other wounds) from France and 30 (22 burns and eight other wounds) from Germany (Letouze et al, 2004). In the French study population, 86% of the burns (superficial and deep partial-thickness) and 53% of the other wounds healed completely within the four weeks, while figures for the German study population were 100% and 88% respectively and






Case study 1

- A female 29-year-old patient with severe abrasions on the left aspect of the neck and cheek
- The wound was irrigated with saline solution and a hydrocolloid dressing was applied
- On day seven a Technology lipido-colloid (TLC) healing matrix dressing was applied
- Healing occurred after 31 days.

On admission	Application of hydrocolloid film/thin (8 March)	1st dressing change 12 March (day 4 after admission)
		
March 15 (day 3 after dressing change)	TLC healing matrix contact layer (TLC-Ag) used (March 15)	March 29
		
April 6	April 10	April 15
		

Case study 2

- Child (gestational age 39 + 4 weeks) born on January 10, 2020, with skin deficiencies and exposed capillaries on the back, hip and dorsal thigh skin
- TLC silver was applied for infection management/prevention with TLC foam dressing as a secondary dressing to manage exudate
- The wound was showing progress and the wound was well on the healing progress with almost complete epithelialisation by the 3 April

On admission	Initial dressing - TLC Ag and TLC foam	January 13
		
Application of TLC contact layer	April 3	
		

dressing removal was considered non-traumatic, inducing very limited pain in both arms.

Other smaller clinical studies were conducted in Europe. The matrix's efficacy and safety were evaluated in a multicentre non-comparative trial involving 92 patients treated to healing or up to 4 weeks (Meaume, 2002). Results showed 32.4% of the acute wounds (mainly postoperative), 12.5% of the leg ulcers and 14.3% of the other chronic wounds completely healed before 4 weeks and surface areas decreased on average by 76.4%, 63.5% and 44.2%, at study endpoint, respectively. For burns, 19 patients out of the 20 burn patients healed (95%) within 5–19 days.

Clinical evaluation

The following report, conducted at the different facilities in the People's Republic of China, examines five cases where health professionals used TLC in the management of patients suffering from different acute aetiologies. The



authors adopted the use of the modality in view of the clinical evidence available and to test replication in a different environment other than European facilities.

Case 1 (Dr Li Qiuju)

A female 29-year-old patient was admitted to the Second Hospital of Jilin University, Changchun, Jilin Province, on the 8 March, 2018, with a fractured pelvis sustained during a road traffic accident. She also had severe and extensive abrasions on the left aspect of the neck and left cheek over the mandibular region (*Case study 1a*). The patient was admitted to the orthopaedic department for further management. On inspection of the abrasions, it was noted that dry scab had formed. The wound was irrigated with physiological saline solution and a hydrocolloid dressing was applied for autolytic debridement on 8 March (*Case study 1b*) and changed on 12 March

Case study 3

- A 15-year-old male patient presented with a superficial second degree burn on the dorsal aspect of the right hand
- TLC contact dressing was applied to allow flexibility and non-adherence
- Subsequently the dressing was changed every 2 to 3 days
- By the fourth and final dressing change (9 days), the wound was healed.

On admission 5 November	1st dressing change 7 November	2nd dressing change 9 November
		
<p>3rd dressing change 12 November</p>	<p>4th and final dressing change 14 November</p>	
		

(after 4 days in place; *Case study 1c*), again with hydrocolloid. On the 15 March (*Case study 1d*), the wound bed was now clear. A TLC healing matrix dressing (UrgoTul; Urgo Medical) was applied to enhance epithelialisation on 15 March (*Case study 1e*). Thereafter the dressing was changed every 4 days (*Figure 2f–2h*), with wound closure achieved by April 15 (after 31 days) (*Case study 1j*). The health professional's experience with the dressing was positive, suggesting that both dressings were easy to apply and the dressing changes were pain free for the patient.

Case 2 (Dr Li Xiaohong)

A male child was born on January 10, 2020 (gestational age: 39 +4 weeks), by caesarean section. The child was one of twins, the other foetus had expired in the uterus at 16 weeks of gestation. The birth weight was 3.8 kg. Post-delivery, the baby's blood glucose was measured at 1.9 mmol/l, which was treated with intravenous infusion of 10% glucose and the blood glucose was remeasured at 2.9mmol/l;

the activity of G-6-PD was 0.15. After birth, the baby's back, hip and dorsal thigh skin was deficient and the capillaries were exposed (*Case study 2a*). Considering the severity of the disease, the baby was hospitalised and initially diagnosed as congenital skin deficiency, neonatal hypoglycemia, and G-6-PD deficiency. During the course of the disease, the child's mental reaction was normal, without fever, convulsions and vomiting. Faeces and urine were passed normally.

Initially TLC Silver (TLC-Ag) was applied for infection management/prevention (*Case study 2b*) with TLC foam dressing as a secondary dressing to manage exudate. On the 13 January, a small area of the back wound was necrotic. This was managed by surgical debridement and covered with an alginate and TLC foam dressing (UrgoTul Absorb, Urgo Medical) for exudate management. The patient was nursed in the prone position with two hourly lateral turnings to prevent pressure on the wound surface (*Case study 2c*). The dressing was

changed every 2–4 days. On the 29 January, the wound on the back was recovering. A TLC healing matrix contact layer (UrgoTul contact healing matrix) was applied (*Case study 2d*) to accelerate the growth of granulation tissue and epithelialisation. The wound was showing progress and the wound was healing with almost complete epithelialisation by the 3 April, after 60 days (*Case study 2e*)

Case 3 (Dr Qiao Liang)

A 15-year-old male patient presented with multiple partial-thickness and full-thickness burns, with a total body surface area (TBSA) of 85%. The wound on the dorsal aspect of the right hand was a superficial partial-thickness burn (*Case study 3a*). Due to the nature and position of the wound, the decision was taken to manage this particular wound with a flexible, non-adherent wound contact layer and therefore, a TLC dressing was applied (UrgoTul contact healing matrix). Subsequently the dressing was changed every 2 to 3 days (*Case study 3b–4d*). By the fourth dressing change (9 days), the wound was nearly healed (*Case study 3e*). The health professional commented on how the conformability of the

dressing enabled a good fit, making the dressing convenient to manage the hand wound.

Case 4 (Dr Tong Shihong)

A three-day-old baby was admitted to the neonatology department on the 20 June 2017. On the second day after birth, a serous blister was found on the dorsum of the right foot. By the third day after birth, the area of the blister was enlarged to the dorsum of the foot extending over the malleolar region and patient was referred to the superior hospital for inpatient treatment. After admission, various examinations were completed. The Enterostomal Therapist and Chief of Dermatology were consulted and they excluded epidermolysis bullosa, following which the condition was diagnosed as congenital skin defect. Debridement, drainage and removal of blisters were performed. The boundary of the lesion was clear and the base showed bright red tissue. The surface was covered with a layer of yellow soft crust. A small amount of pale yellow exudate was observed and the wound area was 6cm × 7.5cm (*Case study 4a and 4b*). TLC contact layer (UrgoTul contact healing matrix) was applied (*Case study 4b*). The dressing was changed three

Case study 4

- A three-day-old baby was admitted to the neonatology department with a blister on the dorsum of the foot extending over the malleolar region
- TLC contact layer was applied
- By the 1 August the wound was completely healed

On presentation 20 June	On presentation 20 June	After 2 dressing changes 26 June
		
1 August	1 August	
		

Case study 5

- A 14 month-old-female baby was referred with a two-week history of *Staphylococcal* scalded skin syndrome
- Initial treatment included application of ethacridine sterile gauze for dressing for infection management
- After 4 days, wound management was changed to TLC contact healing matrix as signs and symptoms of skin infection had subsided
- The lesions had healed totally and the child was asymptotic after 13 days

On presentation 7 February	Application of ethacridine sterile gauze 7 February	First application of TLC 11 February	Five days after starting TLC 16 February	Lesion completely healed 24 February
				

times a week. By the 26 June (6 days, 2 dressing changes), the wound area had reduced to 5cm x 2cm (*Case study 4c*). The same regime was continued and by the 1 August the wound was completely healed (*Case study 4d and 5e*).

Case 5 (Dr Zheng Hongnv)

A female baby of 14 months was referred on the 7 February, 2018, with a two-week history of red punctated rash of unknown origin, mainly on the face, with gradually spreading all over the body. Before referral, herpes ulceration had spread over whole body associated with large areas of desquamation and local rash wounds with exudate. The child was admitted to determine the cause and for management of the rash and respiratory tract infection (*Case study 5a*). Diagnosis – *Staphylococcal* scalded skin syndrome. Initial treatment included application of ethacridine sterile gauze (ethacridine applied to a sterile gauze) for dressing for infection management (*Case study 5b*). On the 11 February, wound management was changed to a TLC dressing (UrgoTul) as signs and symptoms of skin infection had subsided (*Case study 5c*), the dressing was changed every three days. Good progress was noted after five days with the regimen with the child also being less distressed. By the 24 February, the lesions had healed totally and the child was asymptotic (*Case study 5d*).

Conclusion

Wound dressings have evolved, especially during the past few decades, and their role

has changed from passive coverage to active dressings that promote healing by maintaining a balanced moist environment, and accelerate the wound healing process. Consideration for the patients' perspective, such as avoidance of procedural and background pain should be prioritised in a plan of care. In this paper, the authors presented five cases of acute wounds, mostly performed in paediatric field; they showed favourable conclusion by means of application of the TLC healing matrix (UrgoTul). Wound closure and favourable patient and clinician experience were reported in all cases such as ease of use and pain reduction. Further cases have been conducted with similar results, encouraging the inclusion of this modality as part of the routine management of acute wounds by the health professionals. **WAS**

Declaration of interest: Emilio Galea is employed by Urgo Medical as the International Medical Director for Australasia, Middle East and South Africa. The dressings used in the cases discussed were provided as free samples by Urgo Medical. UrgoTul Contact®, UrgoTul Ag/Silver®, UrgoTul Absob® are patented products (Laboratoires Urgo, Chenôve, France). Li Qiuju, Li Xiaohong, Qiao Liang, Tong Shihong and Zheng Hongnv have no conflicts of interest to declare.

References

- Alexandrescu V *Wound Healing: New Insights Into Ancient Challenges*. BoD–Books on Demand, 2016
- Bernard FX, Barrault C, Juchaux F et al (2005) Stimulation of the proliferation of human dermal fibroblasts in vitro by a lipidocolloid dressing. *J Wound Care* 14(5):215–20. <https://doi.org/10.12968/jowc.2005.14.5.26775>
- Bernard FX, Juchaux F, Laurensou C (2007) Effects of

- a lipidocolloid dressing on the production of the extracellular matrix by human dermal fibroblasts in vitro. *J Physical Chemistry* 12(58):9-11.
- Bhattacharya S (2012) Wound healing through the ages. *Indian J Plast Surg* 45(2):177-9. <https://dx.doi.org/10.4103%2F0970-0358.101255>
- Brown A (2014) Strategies to reduce or eliminate wound pain. *Nurs Times* 110(15):12-5
- Cutting KF (2010) Wound dressings: 21st century performance requirements. *J Wound Care* 19(Sup):4-9. <https://doi.org/10.12968/jowc.2010.19.Sup1.48258>
- Evans J (2014) A solution to cost-effective wound management in the community. *Journal of Community Nursing* 28:46-51.
- Evans K (2017) Improving wound care through reducing variation in practice. *Journal of Community Nursing* 31(2):20-1.
- Gardner S (2019) The theory-practice gap in wound care: effective ways of embedding your learning into clinical practice. *Wound Care Today*. <https://tinyurl.com/y34kjk4z> (accessed 12 November 2020)
- Haesler E, White W (2017) Minimising wound-related pain: A discussion of traditional wound dressings and topical agents used in low-resource communities. *Wound Practice & Research* 25(3):138-44
- Harris CL, Laforet K, Sibbald RG, Bishop R (2012) Twelve common mistakes in pilonidal sinus care. *Adv Skin Wound Care* 25(7):324-32. <https://doi.org/10.1097/01.asw.0000416004.70465.8a>
- Hinmann CD, Maibach H (1963) Effect of air exposure and occlusion on experimental human skin wounds. *Nature* 200:377-8. <https://doi.org/10.1038/200377a0>
- Letouze A, Voinchet V, Hoecht B et al (2004) Using a new lipidocolloid dressing in paediatric wounds: results of French and German clinical studies. *J Wound Care* 13(6):221-5. <https://doi.org/10.12968/jowc.2004.13.6.26630>
- Meaume S, Teot L, Lazareth I 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. <https://doi.org/10.12968/jowc.2004.13.10.27268>
- Meaume S, Senet P, Dumas R et al (2002) Urgotul®: a novel non-adherent lipidocolloid dressing. *Br J Nurs* 12;11(Sup3):S42-50. <https://doi.org/10.12968/bjon.2002.11.sup3.10556>
- McGrath A, Newton H, Trudgian J, Greenwood M (2014) TLC dressings Made Easy. *Wounds UK*. 2014 <https://tinyurl.com/y25oakgb> (accessed 12 November 2020)
- Ojok F, Bua E, Akise R (2012) The impact of traditional treatments on wound care in sub-Saharan Africa. *Wounds International* 3(1):7-8. <https://tinyurl.com/yx9ow7xg> (accessed 12 November 2020)
- Rippon M, Ousey K, Rogers A, Atkin L (2016) Wound hydration versus maceration: understanding the differences. *Wounds UK* 12(3):62-68. <https://tinyurl.com/y525nbbo> (accessed 12 November 2020)
- Shah JB (2011) The history of wound care. *J Am Col Certif Wound Spec* 3(3):65-6. <https://dx.doi.org/10.1016%2Fj.jcws.2012.04.002>
- Thomas S. Surgical dressings and wound management. UK. Medetec Publications 2010.
- Tissot. Advice to people in general with regard to their health. Becket and De Hondt, 1766. <https://tinyurl.com/y2chj8eg> (accessed 12 November 2020)
- White R, Cowan T, Glover D (2011) Evidence-based dressing selection. *J Wound Care* 20(Sup1):4-8. <https://doi.org/10.12968/jowc.2011.20.Sup1.4>
- White R, Cowan T, Glover D (2015) Supporting evidence-based practice: a clinical review of TLC healing matrix. *J Wound Care* 24(8):S1-48
- Winter GD (1962) Formation of the scab and the rate of epithelization of superficial wounds in the skin of the young domestic pig. *Nature* 193(4812):293-4. <https://doi.org/10.1038/193293a0>
- Winter GD. Methods for the biological evaluation of dressings. In: Turner TD, Brian KR (eds). *Surgical dressings in the hospital environment*. Cardiff: Surgical dressing research unit, UWIST, Cardiff, 1975

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