**Understanding the use of collagen/oxidised regenerated cellulose dressings**

Collagen-containing dressings have a broad evidence base for efficacious use; collagen/oxidised regenerated cellulose (ORC) in particular restores balance to the wound’s microenvironment, which is critical to healing. Clinicians should consider collagen/ORC dressings when faced with a stalled wound, or where healing may be complicated by risk factors. In three case studies detailed herein, holistic assessment was undertaken to determine risk and choose a course of management that included a collagen/ORC dressing and other therapies as appropriate. In each case, despite long periods of non-healing and the presence of complicating factors, collagen/ORC dressings restarted healing and led to full wound closure. These outcomes demonstrate collagen/ORC is a cost-effective choice when implemented appropriately.

Although there is a perception that advanced therapies such as collagen/oxidised regenerated cellulose (ORC) increase wound care spend, this perception is predominately driven by focusing on the cost of individual dressings rather than the overall cost of care. Advanced dressings are often more cost-effective if they result in less-frequent dressing changes and faster, more-effective healing. Collagen/ORC dressings (e.g. PROMOGRAN PRISMA® and PROMOGRAN®) can improve quality of life for patients and healing rates in chronic and hard-to-heal wounds and, in the case of PROMOGRAN PRISMA, reduce symptoms of infection or critical colonisation.

It is therefore important that clinicians consider collagen/ORC dressings when faced with a wound that is not moving towards healing in the expected time frame, or where healing may be complicated by a number of patient and wound factors. More importantly, these advanced dressings must be used correctly, in line with the results of accurate assessment and based on a full understanding of their clinical and patient benefits. Avoiding inappropriate application or use in inappropriate circumstances will ensure the cost-effectiveness of using collagen/ORC dressings in the care and management of chronic and hard-to-heal wounds.

**The benefits of collagen/ORC dressings**

Collagen-containing dressings have a broad evidence base for efficacious use. Collagen/ORC binds to and deactivates harmful proteases, restoring balance to the wound’s microenvironment, encouraging the growth of healthy cells in the wound bed. It is important that clinicians consider collagen/ORC dressings when faced with a wound that is not moving towards healing in the expected time frame, or where healing may be complicated by a number of patient and wound factors. More importantly, these advanced dressings must be used correctly, in line with the results of accurate assessment and based on a full understanding of their clinical and patient benefits. Avoiding inappropriate application or use in inappropriate circumstances will ensure the cost-effectiveness of using collagen/ORC dressings in the care and management of chronic and hard-to-heal wounds.

**Box 1. Factors that may complicate wound-healing**

**Patient**
- Pathology (i.e. illness)
- Comorbidity (e.g. diabetes, vascular disease)
- Medication (e.g. oncology drugs)
- Lack of psychosocial support
- Pain
- Non-concordance with treatment

**Wound**
- Longer-than-expected duration (e.g. chronic venous leg ulcer)
- Large or expanding size (in area or depth)
- Poor wound bed condition (e.g. lack of granulation tissue)
- Ischaemia
- Inflammation
- Difficult anatomy (e.g. sacrum)

**Figure 1. The role of collagen in wound healing.**

*Haemostasis: helps to stop bleeding*

*Cell attraction and growth: stimulates growth and infiltration of healthy cells in the wound bed*

*Structure building and wound contraction: promotes deposition of new collagen, which provides structure for healing, and helps wound contract towards closure*

*MMP suppression and low-antigenic/-inflammatory responses: reduces protease activity, which has been shown to increase inflammation and breakdown of proteins that can lead to chronicity*
WE KNOW COLLAGEN
THAT’S WHY WE ADDED SOMETHING IMPORTANT: ORC

PROMOGRAN® Protease
Modulating Matrix composed of:
• 55% Collagen
• 45% ORC

PROMOGRAN® Prisma Wound
Balancing Matrix composed of:
• 55% Collagen
• 44% ORC
• 1% Silver-ORC

To learn more about the benefits of PROMOGRAN® & PROMOGRAN PRISMA®, please contact your Systagenix representative or visit www.systagenix.com

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of granulation tissue, thus moving the wound towards healing [Figure 1, p34][9].

Furthermore, the addition of ORC enhances the efficacy of the dressing, with combination dressings performing significantly better than collagen-only dressings at reducing overall protease activity and enhancing antimicrobial efficacy[8,10]. During in vitro testing, after application of collagen/ORC, proteases had less than 10% residual activity — thereby reducing inflammatory activity in wounds — which was not achieved by any of the collagen-only dressings tested. In addition, the collagen/ORC dressing demonstrated significantly more effective bactericidal activity against *Staphylococcus aureus* and *Pseudomonas aeruginosa* than collagen-only dressings tested[8].

Furthermore, collagen/ORC dressings have also been shown to promote human dermal fibroblast proliferation and cell migration in vitro, meaning ingrowth of healthy tissue increases[11]. And the addition of silver to the collagen/ORC combination presents additional, broad antimicrobial activity without inhibiting effectiveness of any dressing components[9].

Taken together, the evidence shows that collagen/ORC dressings can provide the structure and environment necessary to speed healing in hard-to-heal wounds and restart healing in those where healing has stalled.

**Understanding PROMOGRAN PRISMA®/PROMOGRAN®**

PROMOGRAN PRISMA matrix is a freeze-dried composite of 55% collagen, 44% oxidised regenerated cellulose (ORC) and 1% ORC-silver. The matrix is designed to promote an optimal healing environment and kick-start the healing process. The silver in PROMOGRAN PRISMA also helps protect against increased bioburden and critical colonisation. PROMOGRAN is also a collagen (55%)/ORC (45%)-containing matrix, for use where the wound is not at particular risk of increased bioburden, nor showing signs of increased bioburden. In the presence of exudate, PROMOGRAN PRISMA/PROMOGRAN matrix transforms into a soft and conformable, biodegradable gel; this is designed to allow contact with all areas of the wound[12].

**Improving healing rates**

Collagen/ORC therapy has been proven to be more effective than therapy with standard wound dressings[13–21]. However, these advanced dressings must be used correctly, in line with the results of accurate assessment and based on a full understanding of their benefits. Avoiding inappropriate application or use in inappropriate circumstances will ensure the cost-effectiveness of using collagen/ORC dressings in the care and management of chronic and hard-to-heal wounds.

In the case of hard-to-heal wounds, it’s important to assess for complicating factors, treat infection, optimise the wound bed and implement standardised treatment (e.g. pressure relief, appropriate compression) before considering collagen/ORC dressings [Figure 2].

Laboratory testing has indicated that PROMOGRAN is useful in managing diabetic foot ulcers (DFUs), particularly those of less than 6 months’ duration[8]. When neuropathic DFUs were managed with PROMOGRAN, an increased number of wounds healed, with shorter time to healing[8]. In a recent study, early management of leg ulcers with PROMOGRAN PRISMA/PROMOGRAN showed increased rates of healing for wounds predicted to be hard to heal, highlighting the need to adopt advanced therapies early to improve outcomes[13].

Although wounds exhibiting stalled healing also benefit from the use of PROMOGRAN PRISMA/PROMOGRAN (see case studies, beginning p29), wounds have greater potential to achieve full healing if appropriate therapy begins within 6 months of a wound’s development[13]. It is therefore critical to not delay the use of an appropriate dressing by repeatedly trialling standard therapy. The failure to implement the right therapy early extends healing time, increases the number of dressing changes (which is costly even in the case of standard dressings), depletes nursing time and, ultimately, wastes valuable monetary resources.

With healthcare organisations under increasing financial pressure, it is easy to restrict formularies to cheaper products in an effort to save money. However, this type of approach may not be clinically ideal. Cheaper does not always equate to cost-effective, as dressings with higher per-unit costs may prove more cost-effective in the long term by reducing healing times, preventing chronic wound development, and streamlining the cycle of care, resulting in patients being discharged to the community or transferred back to generalist services, rather than staying in or being admitted to hospital[22].

Wound care clinicians should therefore strive to implement robust evaluation of advanced dressings such as PROMOGRAN PRISMA/PROMOGRAN to identify which products improve wound management for clinicians and enhance outcomes for patients[25].
Carry out full holistic assessment, taking special care to consider complicating factors (see right).

Put in place all corrective measures in accordance with best practice (e.g. compression therapy for venous leg ulcers, pressure offloading).

Is the wound responding to treatment as expected and within the expected time frame — 40% reduction in wound size in 4 weeks*?

Put in place all corrective measures in accordance with best practice (e.g. compression therapy for venous leg ulcers, pressure offloading).

Are there clinical signs of infection?

Follow local pathway for infection management.

Is the wound bed at least 70% free of slough?

Commence wound debridement.

Is the affected area well-perfused?

Start PROMOGRAN PRISMA or PROMOGRAN.

Has wound size reduced by 40% over the 4 weeks*?

Has wound size reduced by 40% over the 4 weeks*?

Continue for 4 weeks, changing every 72 hours.

Discontinue PROMOGRAN PRISMA/PROMOGRAN and reassess the patient and wound.

Consider discontinuing PROMOGRAN PRISMA/PROMOGRAN and changing to a simple wound dressing.

Examples of MDT members:
- Tissue viability specialist
- Vascular specialist
- Diabetologist
- Infection specialist

Consider referral to other members of the multidisciplinary team (MDT) for further investigation (see above).

*40% applies to venous leg ulcers; 50% reduction should be used for DFUs [24,25].

Patient factors:
- Pathology
- Comorbidity
- Medication
- Lack of psychosocial support
- Pain
- Non-concordance with treatment

Complicating factors

Wound factors:
- Longer-than-expected duration
- Large or expanding size (area or depth)
- Poor wound bed condition
- Ischaemia
- Inflammation
- Difficult anatomy

Figure 2. Care pathway for the use of PROMOGRAN® and PROMOGRAN PRISMA®.
Selecting and using PROMOGRAN PRISMA/PROMOGRAN

Clinicians should use an appropriate clinical pathway to identify wounds that are failing to progress in an expected time frame, and determine whether collagen/ORC dressings are appropriate [Figure 2].

PROMOGRAN PRISMA/PROMOGRAN can be used for the management of a wide variety of wounds that are clear of necrotic tissue or excess slough, including:

- Diabetic ulcers
- Venous ulcers (note: can be used under compression therapy)
- Pressure ulcers
- Ulcers caused by mixed vascular aetiologies
- Traumatic and surgical wounds

The dressings are contraindicated in patients with known hypersensitivity to their components. PROMOGRAN PRISMA is contraindicated in extensive burns. Where wound infection is evident, systemic antimicrobial therapy may be used in conjunction with PROMOGRAN PRISMA/PROMOGRAN under supervision.

Before applying PROMOGRAN PRISMA/PROMOGRAN, dry, necrotic tissue must be removed by debridement per local protocols. For optimal effect, apply the matrix directly to the entire wound bed, as the dressing will gel in contact with exudate. For a wound with low or no exudate, wet the matrix with saline or Ringer's solution in the tray the dressing is packaged in before applying. The dressing can be cut or folded and placed in wounds. PROMOGRAN PRISMA/PROMOGRAN must be covered with gauze or a non-adhering or a hydropolymer dressing, and can be used along with appropriate compression therapy or offloading.

Once the wound bed is composed mostly of healthy granulation tissue and the wound edges are beginning to contract, PROMOGRAN PRISMA/PROMOGRAN should be discontinued in favour of standard treatment, per local protocols. If the wound condition has not improved as expected, PROMOGRAN PRISMA/PROMOGRAN should be discontinued and the wound and patient reassessed; consider referring the patient to a tissue viability, vascular, diabetes or other specialist for further evaluation, diagnosis and treatment of any underlying disease.

Case studies

Where wound-healing has stalled — or not even begun — in wounds and patients with complicating factors, collagen/ORC dressings should be used along with other best-practice care to ensure time- and cost-effective care. The following case studies cover a pressure ulcer and two traumatic wounds of 3 months’ to 3 years’ duration and demonstrate that, even after long periods of non-healing and in the presence of complicating factors, PROMOGRAN PRISMA can restart the healing process and achieve full closure. In each case, holistic assessment was undertaken to determine risk and choose a course of treatment that included a collagen/ORC dressing and other therapies as appropriate.

Case 1: Recurrent pressure ulcer on left leg

This 53-year-old female with history of multiple sclerosis and osteoporosis presented with a recurrent PU to the left lateral malleolus that had been present this time for 19 months. Although she was non-weight-bearing due to being wheelchair bound, she was very independent and had care support from her partner and family. She had dependent oedema due to the immobility.

The PU measured 36mm x 27mm [Figure 3]. Multiple dressings had been applied by her husband and nursing staff, with minimal healing progress. The patient had been provided with pressure-relieving equipment, but it had not been used regularly.

After a full holistic assessment, including duplex scan to ensure there was no underlying...
arterial disease, it was determined that the pressure damage had been caused by the leg rest of her wheelchair. Because the wound had longer-than-expected duration, was free of necrotic tissue, and would benefit from structural support (i.e. skin was fragile and prone to break down due to the patient’s health status), the decision was made to use a collagen/ORC dressing. PROMOGRAN PRISMA was chosen due to the complexity of the patient’s health status, the duration of the wound and the presence of signs indicating increased bioburden. In addition, the wheelchair leg rest was modified to pad the metal parts, and compression therapy (20 mmHg) was applied to reduce oedema.

After 4 weeks on the care regimen, the wound measured 23 mm x 19 mm, a 55% reduction in wound surface area from baseline. After 11 weeks of treatment, the wound measured 5 mm x 7 mm, a 96% reduction from baseline. By week 12 of the regimen, the wound had healed. Enhanced healing had improved the patient’s quality of life, as she no longer needed to take time out to attend clinic appointments.

Case 2: Traumatic wound of 3 years’ duration
This 68-year-old female was a smoker with history of hypertension. She presented with a trauma wound to the right gaiter caused by a fall onto a caravan step in 2011. She had been self-treating and was treated by health professionals for 3 years with no progress towards healing.

After 4 weeks on the care regimen, the wound measured 23 mm x 19 mm, a 55% reduction in wound surface area from baseline. After 11 weeks of treatment, the wound measured 5 mm x 7 mm, a 96% reduction from baseline. By week 12 of the regimen, the wound had healed. Enhanced healing had improved the patient’s quality of life, as she no longer needed to take time out to attend clinic appointments.

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Case 3: Stalled wound in a patient with diabetes and ischaemia
This 63-year-old male had a history of diabetes and ischaemic heart disease. He presented with an injury to his right leg that had been caused by a cricket ball. He had been treated for 10 weeks with a variety of dressings and multiple courses of antibiotics before referral to the tissue viability team.

A full leg ulcer assessment found an ABPI of 1.06, mild oedema and skin changes, including...
haemoglobin staining and induration. The wound, which measured 2.6 cm x 1.3 cm, was treated for 3 weeks with an antimicrobial debridging agent to remove slough from the wound bed, and layered hosiery (24 mmHg) was applied.

After debridement was complete, management with PROMOGRAN PRISMA was commenced due to complexity of the patient's health status and the risk of increased bioburden. After 17 days, wound surface area had decreased to 0.5 cm x 0.3 cm (95% from baseline) [Figure 8]. Over the next 2 weeks, the wound healed completely and the patient was discharged from the tissue viability service. He was extremely happy that his wound had healed, and he no longer had the discomfort of the wound or the inconvenience of having to attend clinic appointments, allowing him to get on with his life.

**Conclusion**

There is a broad evidence base for the use of collagen/ORC dressings, demonstrating their ability to decrease wound inflammation, restart healing in wounds that have stalled, and dramatically improve outcomes in hard-to-heal wounds. These case studies demonstrate that, even after long periods of non-healing and in the presence of complicating factors, collagen/ORC dressings can restart the healing process and achieve full closure. These advanced dressings can be used in a wide variety of wound types, including those that are showing signs of increased bioburden, so long as slough and necrotic tissue have been thoroughly debrided. When chosen and applied appropriately, collagen/ORC dressings are efficacious and cost-effective and lead to improved clinical outcomes.

**References**