



WHS
Wound
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Abbreviation and Acronym

NSAIDs = non-steroidal anti-inflammatory drugs

STSG = split-thickness skin graft sites

PolyMem[®] Wic[®] Silver[®] Rope: A Multifunctional Dressing for Decreasing Pain, Swelling, and Inflammation

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Problem: Choosing the most appropriate dressing to meet the complex needs of patients with narrow deep wounds, such as tunnels, fistulas, and cysts, is a daunting task. Such wounds are difficult to cleanse and tend to be extremely painful. Wound patients need a drug-free dressing that handles exudates, decreases the need for traumatic cleansing during dressing changes, and addresses wound pain, inflammation, and swelling.

Solution: Multifunctional PolyMem[®] dressings (the generic name is polymeric membrane dressings) contain ingredients that work synergistically to continuously cleanse wounds and bring about rapid healing. Nonadherent PolyMem provides atraumatic dressing changes. PolyMem also decreases persistent wound pain. PolyMem Silver provides effective antimicrobial action without destructive silver toxicity.

New Technology: PolyMem Wic[®] Silver[®] Rope is a new strong, but exceedingly supple, dressing comprised of PolyMem Wic Silver reinforced with embedded surgical mesh. Insertion and removal is so simple that patients often change their dressings themselves. The unique features of PolyMem combine to make the nonadherent dressings not only extremely comfortable, but also anti-inflammatory, thus addressing both persistent and procedural wound pain.

Indications for Use: PolyMem Wic Silver Rope is especially appropriate for deep wounds with narrow openings, such as tunnels, fistulas, and cysts, but it can be used in any acute or chronic wound, even in the presence of infection.

Caution: PolyMem dressings enhance autolytic debridement, which often results in production of large quantities of pale yellow enzyme- and nutrient-rich wound fluid during the first treatment week. Extra-absorbent PolyMem Max secondary dressings can contain excess fluid.

UNMET NEED

CHOOSING THE MOST APPROPRIATE dressing to meet the complex needs of patients with narrow deep wounds, such as tunnels, fistulas, and cysts, is a daunting task. Such wounds are difficult to cleanse and tend to be extremely painful. Pain-associated inflammation and increased swelling can lead to secondary ischemic injury as circulation is restricted.¹ Ischemia slows healing and predisposes tis-

sues to infection. Cold therapy decreases inflammation and swelling, but it also decreases circulation. Anti-inflammatory drugs, such as steroids and nonsteroidal anti-inflammatory drugs, also delay healing.² Patients with deep wounds need a drug-free dressing that handles exudates, decreases the need for traumatic cleansing during dressing changes, and addresses wound pain, inflammation, and swelling.

PRODUCT TECHNOLOGY

As industry produces an ever-expanding array of modern dressings and other modalities, many wound experts worldwide are simplifying their formularies by stocking their shelves with the PolyMem family of dressings. This is because all PolyMem dressings contain optimal concentrations of a surfactant and glycerin, plus a super-absorbent starch locked into the polyurethane substrate.³ These ingredients work synergistically to recruit fresh nutrients from the body into the wound bed while removing damaging wound fluid and locking it inside the dressing, resulting in an ideal moisture balance and brisk wound healing. The surfactant also works directly to break the chemical bonds that cement slough to the wound bed. This continuous cleansing of wounds usually eliminates the need for painful manual debridement and even rinsing at dressing changes.³ PolyMem is non-adherent, providing atraumatic dressing changes. PolyMem also decreases persistent wound pain.³ The elemental silver in PolyMem Silver products is locked into the dressings, where it provides effective antimicrobial action without destructive silver toxicity.⁴

INNOVATION

Cleansing deep narrow wounds can be difficult. The clinician may be unable to see the entire

wound bed. Irrigation and negative pressure therapy are ineffective at debridement of adherent slough. Gauze packing is often used to absorb exudate with the expectation that it will also pull off some slough. Application and removal is usually extremely painful, and persistent pain is a common problem as well. Conventional modern rope dressings, while made of more absorbent materials, share most of the disadvantages of gauze packing.

But now, wound care professionals have access to a dressing that can atraumatically continuously cleanse narrow deep wounds and handle exudates while simultaneously decreasing persistent wound pain, inflammation, and swelling (Fig. 1). PolyMem Wic® Silver® Rope is a new strong but exceedingly supple PolyMem Wic Silver dressing reinforced with embedded surgical mesh, created for use in narrow deep wounds. Insertion and removal is so simple that patients are often able to change their dressings themselves. This is possible because the unique features of PolyMem combine to make the nonadherent dressings not only extremely comfortable, but also anti-inflammatory, thus addressing both persistent and procedural pain.³ Addressing pain and inflammation is an important aspect of wound management, not only to improve patient quality of life, but also to decrease ischemia, improve immune function, and enhance healing.^{1,5}

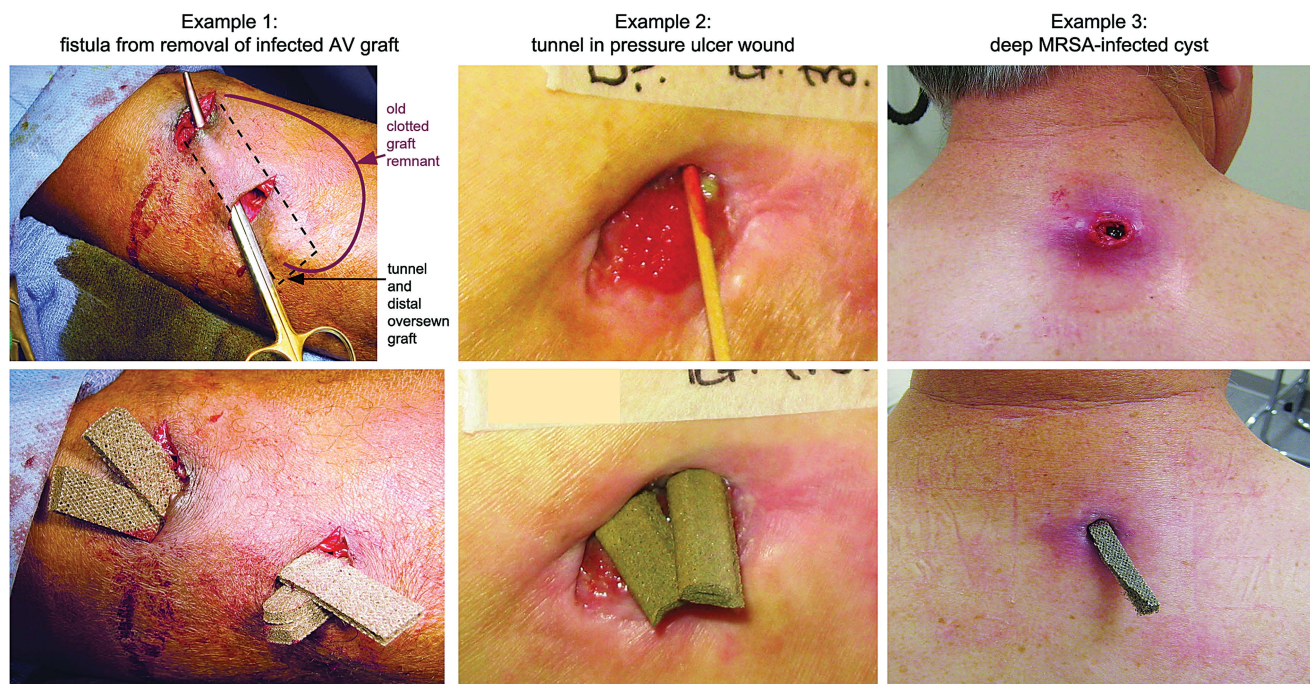


Figure 1. PolyMem® dressings can decrease inflammation, pain, and swelling, while continuously cleansing wounds.³ PolyMem Wic® Silver® Rope is specially designed to speed healing in deep wounds with small openings. Example photos demonstrate PolyMem Wic Silver Rope insertion in a fistula, two tunnels within a pressure ulcer, and a sebaceous cyst. The cyst photos were taken at consecutive dressing changes: a decrease in inflammation and swelling is clearly visible.

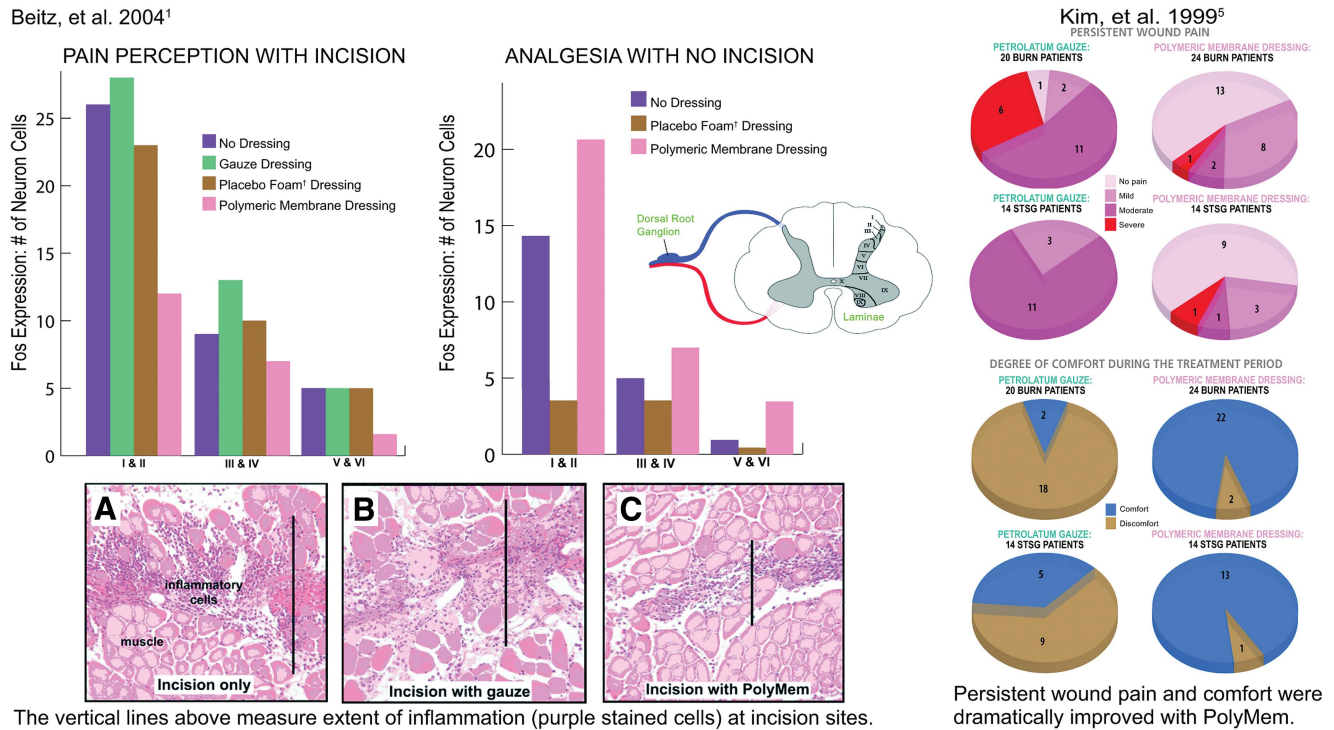


Figure 2. Bar graphs: When PolyMem, rather than placebo foam, was applied, animals with and without incisions had less pain receptor activation and experienced more analgesia ($p < 0.005$).⁷ Histology slides: PolyMem concentrated the inflammatory response to the immediate incision area, which prevented secondary ischemic injury.⁷ Pie charts: Petrolatum gauze or PolyMem was applied to patients with burns or split-thickness skin graft sites. Patients with burns or split-thickness skin graft sites in the PolyMem groups experienced far less pain and were significantly more comfortable.

PEER-REVIEWED DATA

While PolyMem Silver Wic Rope is a new wound dressing configuration, its foundation is a PolyMem dressing, which has notable research support. Published studies date back to 1990, when Carr and Lalagos found that pressure ulcers healed dramatically more quickly when dressed with PolyMem. Hayden and Cole published a single-blinded, randomized, controlled study in 2003 showing that the use of PolyMem decreased pain and inflammation after arthroscopic knee surgery (Evidence Level I).⁶ Using an animal model, in early 2004 Beitz *et al.* found that PolyMem inhibited pain via the nervous system response (the nociceptors) at the application site, even through intact skin (Fig. 2).⁷ As a result of this nociceptor inhibition, PolyMem dressings significantly reduced the spread of swelling into surrounding undamaged tissues, while concentrating the inflammatory cells into the injury site, where they promote healing.⁷

Yastrub's 2004 randomized, controlled, pressure ulcer patient study showed that PolyMem dressings, when compared with antibiotic ointment, dramatically improved wound healing (Evidence Level I).⁸ Yastrub also demonstrated that Poly-

Mem compares favorably to accepted standards for an ideal wound dressing.⁸ Burd *et al.* published an independent study of modern silver dressings in 2007, finding that PolyMem was the most absorbent dressing and that its use led to the greatest cell viability of the six modern moist wound dressings compared.⁴ In 2010 the National Pressure Ulcer Advisory Panel recommended PolyMem's unique category, generically called "polymeric membrane" dressings, for use in palliative care for exudate control, wound cleansing, and pain relief.⁹

NON-PEER-REVIEW OBSERVATION

A 72-patient controlled study by Kim *et al.* published in a Korean-language peer-reviewed journal in 1999 found that PolyMem dramatically increased epithelization and increased patient comfort while decreasing pain (Fig. 2).¹⁰ The authors reported that the dressings were also easy to use and economical.¹⁰ By 2002, the Food and Drug Administration had found sufficient evidence to permit the claim that PolyMem dressings reduce and relieve pain. Since then, ~150 unique peer-reviewed poster presentations by over 50 independent (not

industry sponsored) clinicians worldwide attest to the ability of PolyMem dressings to continuously cleanse wounds, decrease procedural (dressing change) pain and persistent wound pain, and speed healing. The new PolyMem Wic Silver Rope has already been featured in 10 peer-reviewed conference posters. The highly respected wound textbooks, *Chronic Wound Care* and *The Wound Management Manual*, both state that PolyMem dressings decrease wound pain and help achieve wound closure.³ *The Wound Management Manual* also states that flushing at dressing changes, which disturbs the wound bed, is rarely needed when PolyMem is used.³

SUMMARY ILLUSTRATION

PolyMem Wic Silver Rope is 1 cm x 35 cm. It can be cut lengthwise for narrower wounds, or stacked for wider cavities. The rope is designed to be pushed gently into place with a cotton-tipped applicator inserted into the slit in the end of the rope.



CAUTION, CRITICAL REMARKS, AND RECOMMENDATIONS

Most methods of handling copious exudate, including negative pressure therapy, are contraindicated in infection and are unsafe over structures such as tendons, vasculature, and bone, but PolyMem products are specially designed to handle such difficult wound conditions.

Patients should be informed that autolytic debridement, promoted by all PolyMem products, often results in production of large quantities of pale yellow wound fluid, particularly in the first week of PolyMem use. This enzyme-rich fluid is not foul-smelling and does not indicate wound infection. Extra-absorbent PolyMem Max secondary dressings can contain this fluid. Barrier creams may be applied to the periwound if frequent dressing changes are not practical during this initial treatment phase.

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AUTHOR DISCLOSURE AND GHOSTWRITING

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REFERENCES

- Merrick MA: Secondary injury after musculoskeletal trauma: a review and update. *J Athletic Training* 2002; **37**: 209.
- Tarnawski AS, Jones MK: Inhibition of angiogenesis by NSAIDs: molecular mechanisms and clinical implications. *J Mol Med* 2003; **81**: 627.
- Lee BY: The diabetic foot: a comprehensive approach. In: *The Wound Management Manual*, edited by Lee BY. New York: McGraw-Hill, 2005, pp. 360–361.
- Burd A, Kwok CH, Hung SC, Chan HS, Gu H, Lam WK, and Huang L: A comparative study of the cytotoxicity of silver-based dressings in monolayer cell, tissue explant, and animal models. *Wound Repair Regen* 2007; **15**: 94.
- White RJ: Wound infection-associated pain. *J Wound Care* 2009; **18**: 245.
- Hayden JK and Cole BJ: The effectiveness of a pain wrap compared to a standard dressing on the reduction of postoperative morbidity following routine knee arthroscopy: a prospective randomized single-blind study. *Orthopedics* 2003; **26**: 59.
- Beitz AJ, Newman A, Kahn AR, Ruggles T, and Eikmeier L: A polymeric membrane dressing with antinociceptive properties: analysis with a rodent model of stab wound secondary hyperalgesia. *J Pain* 2004; **5**: 38.
- Yastrub DJ: Relationship between type of treatment and degree of wound healing among institutionalized geriatric patients with stage II pressure ulcers. *Care Manag J* 2004; **5**: 213.
- Langemo DK, Black J, and National Pressure Ulcer Advisory Panel: Pressure ulcers in individuals receiving palliative care: a National Pressure Ulcer Advisory Panel white paper. *Adv Skin Wound Care* 2010; **23**: 59.
- Kim Y, Lee S, Hong S, Lee H, and Kim E: The effects of polymem on the wound healing. *J Korean Soc Plast Reconstr Surg* 1999; **109**: 1165.