



# The Effectiveness Of Mupirocin And Sucralfate With Mupirocin For Faster Wound Healing And Post-Surgical Recovery: A Review

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## Abstract

Surgical and chronic wounds often pose significant clinical challenges due to the risks of infection and delayed healing. While mupirocin is a widely used topical antibiotic effective against Gram-positive bacteria, particularly *Staphylococcus aureus*, it lacks direct wound-healing properties. Sucralfate, traditionally employed for gastrointestinal ulcers, has demonstrated potent wound-healing capabilities through mechanisms such as angiogenesis, epithelialisation, and the stimulation of local growth factors. Recent studies have investigated the synergistic benefits of combining sucralfate with mupirocin to enhance healing outcomes in various wound types. Clinical evidence has shown that this combination significantly improves healing rates in chronic ulcers compared to mupirocin alone (41.3% vs. 18.18%,  $P = 0.022$ ). Although some findings remain context-dependent, in diabetic foot ulcers, the dual-action therapy offers notable advantages: infection control via mupirocin and tissue regeneration via sucralfate.

In the context of surgical wounds, sucralfate provides a protective barrier over incisions, reducing mechanical irritation and enhancing local growth factor activity. These properties contribute to improved epithelial regeneration and reduced healing time in post-operative settings. Mechanistically, this combination addresses two critical aspects of wound care, making it a promising approach for both acute and chronic wound management. Further large-scale and multicenter trials are warranted to validate its efficacy across broader patient populations.

**Keywords:** Sucralfate, Mupirocin, Wound Healing, Angiogenesis, Surgical Site Infection, Chronic Ulcers, Combination Therapy.

## 1. Introduction

Surgical interventions, while necessary for treating several diseases, are naturally associated with a risk of wound problems following surgery, including infections and delayed recovery. For patients to recuperate as best they can, wounds must heal quickly and without complications. To improve healing results, topical antibiotics like mupirocin and mucosal healing agents like sucralfate have been administered separately. By preventing or treating bacterial protein production, the bacteriostatic antibiotic mupirocin is frequently used to prevent or treat wound infections. It is most effective against Gram-positive bacteria, especially *Staphylococcus aureus*. [1]

Sucralfate, when used as an ointment, has long been used to treat stomach ulcers and has drawn interest for its ability to heal wounds. [2] Sucralfate ointment restores tissue integrity by forming a protective barrier over the wound, binding to proteins in the wound bed, promoting angiogenesis (the formation of new blood vessels), triggering the release of growth factors like basic fibroblast growth factor (bFGF) and epidermal growth factor (EGF), and speeding up the process of epithelialisation, in which new epithelial cells migrate across the wound surface [3] For a faster and stronger repair, sucralfate improves the angiogenesis, which guarantees a greater supply of oxygen and nutrients to the mending tissue. Sucralfate also facilitates quicker wound closure and skin barrier renewal by encouraging epithelialisation. [4] In contrast to antibiotics, sucralfate promotes the body's natural healing mechanisms rather than actively killing bacteria. Mupirocin and sucralfate together have the potential to work in concert because mupirocin inhibits infection and sucralfate promotes tissue repair via a variety of pathways, so addressing two important facets of wound care at once. [5] More thorough clinical trials are required to validate the findings of this combination approach; however, preliminary clinical experiences and certain observational research point to better healing outcomes. [6]

## 2. Mupirocin

Mupirocin is a topical antibiotic that stops Gram-positive bacteria like *Staphylococcus aureus* from growing by inhibiting bacterial protein synthesis by targeting isoleucyl-tRNA synthetase. It is frequently used to treat and prevent infections of the skin and wounds, promoting a hygienic environment that promotes quicker and less complicated recovery. [7]

### 2.1 Mechanism of Action

Mupirocin is a topical antibiotic that functions by preventing bacteria from producing proteins by blocking the enzyme isoleucyl-tRNA synthetase. Bacteria cannot grow or proliferate if they are unable to create proteins, which aid in the control and eradication of diseases. The most frequent causes of surgical site infections (SSIs), Gram-positive bacteria such as *Streptococcus* species and *Staphylococcus aureus*, are particularly susceptible to the effects of mupirocin. Mupirocin is frequently used to treat and prevent infections in surgical wounds due to its targeted action and efficacy, which aids in promoting safer and quicker healing. [7, 8]

## 2.2 Clinical Evidence

Mupirocin has been demonstrated in numerous trials to be quite efficient in preventing surgical site infections (SSIs), especially when used in nasal decontamination techniques that aim to eradicate *Staphylococcus aureus* from the nasal passages, which is a common cause of surgical infections. Mupirocin notably reduces bacterial colonisation, local irritation, and overall infection rates when applied topically to surgical incisions. Faster and more efficient wound healing is encouraged by this cleaner wound environment, which supports the body's natural healing mechanisms. Mupirocin is a crucial instrument in contemporary surgical care because of its capacity to regulate the wound site as well as the infection's source. [9, 10]

## 2.3 Uses of Mupirocin:

### 1. Treatment of Skin Infections:

Mupirocin is commonly used to treat skin infections such as impetigo and folliculitis, which are caused by *Staphylococcus aureus* and *Streptococcus* species. [7]

### 2. Prevention of Surgical Site Infections (SSIs):

It works well to prevent SSIs by clearing *Staphylococcus aureus* from the nose tube, particularly in surgical patients. [9]

### 3. Management of MRSA Infections:

Mupirocin is widely used to treat methicillin-resistant *Staphylococcus aureus* (MRSA) skin infections, particularly in hospital settings. [10]

## 3.0 Sucralfate

Sucralfate ointment is a topical formulation used to promote wound healing. This product was initially created to treat stomach ulcers. When administered to wounds, sucralfate prevents additional irritation or infection by covering the afflicted region with a protective layer. By encouraging angiogenesis, or the creation of new blood vessels, and epithelialisation, or the growth of new skin cells, this protective barrier also aids in tissue regeneration, resulting in quicker and more effective recovery. Because it fosters an environment that is favourable for tissue recovery, sucralfate is especially helpful in the treatment of burns, skin ulcers, and wounds from surgery. [11, 12]

## 3.1 Mechanism of Action

The main way that sucralfate works is by sticking to the surfaces of wounds and creating a physical barrier that shields the damaged region from infections and outside irritants. By attaching itself to proteins at the wound site, sucralfate creates this barrier, which successfully protects tissues from further harm. [13] Apart from this protective effect, sucralfate promotes the synthesis of local prostaglandins and epidermal growth factor (EGF), both of which are essential for angiogenesis (the development of new blood vessels) and fibroblast activity. These procedures are necessary for wound healing because they encourage tissue regeneration, lower inflammation, and hasten the healing process. Because of this, sucralfate is an effective treatment for improving healing, particularly in chronic skin ulcers and wounds from surgery. setting for tissue restoration [14]

- Forms a **protective physical barrier**.
- Stimulates **growth factors** like EGF.
- Promotes **angiogenesis** (new blood vessel formation).
- Enhances **fibroblast activity** and **tissue regeneration**.

### 3.3 Clinical Evidence

Topical sucralfate has demonstrated great promise in the treatment of radiation-induced skin damage, diabetic ulcers, and burns. Research has demonstrated that it can accelerate important phases of wound healing, such as granulation tissue production (new blood vessels and connective tissue), epithelialisation (the generation of new skin cells), and healing timeframes. Because sucralfate directly affects the wound-healing cascade, it has advantages over mupirocin, which mainly inhibits bacterial development. By promoting the local synthesis of growth factors such as epidermal growth factor (EGF), it promotes tissue regeneration and speeds up the healing process. [13, 15]

### 3.5 Uses of Sucralfate Ointment:

- **Burn Wounds:**  
Sucralfate promotes quicker healing, lessens discomfort, and guards against infection by forming a protective layer over burn wounds. [15]
- **Diabetic Ulcers:**  
By promoting the production of granulation tissue and epithelialisation, it is used to hasten the healing of diabetic foot ulcers. [13]
- **Radiation-Induced Skin Damage:**  
Applied to skin damaged by radiotherapy, sucralfate reduces inflammation, protects exposed tissues, and enhances skin regeneration. [16]
- **Pressure Ulcers (Bedsore):**  
Sucralfate ointment supports healing in pressure sores by protecting the wound surface and encouraging new tissue growth. [17]
- **Post-Surgical Wounds:**  
It is applied to surgical incisions or wounds to protect healing tissues, reduce healing time, and improve wound strength. [11]

**Table 1.** Here is a comparative table showing the **cost-effectiveness** of **Sucralfate + Mupirocin** combination therapy versus **Mupirocin alone** for wound healing:

Parameter	Mupirocin Alone (2%)	Sucralfate (7%) + Mupirocin (2%)
Approximate Cost per 5g tube	70 to 100 rupees	125 to 150 rupees
Primary Action	Antibacterial action	Antibacterial + Wound Healing
Clinical Efficacy Chaudhary et al.	18.18% complete healing in 6 weeks	41.3% complete healing in 6 weeks
Treatment Duration	Potentially longer due to slower healing	Shorter due to enhanced tissue regeneration
Need For Systemic Antibiotics	Higher likelihood	Lower likelihood due to better local healing
Dressing Frequency	More frequent	Reduced due to faster healing
Overall Cost Effectiveness	Lower upfront cost, higher indirect cost	Higher upfront cost, potentially lower total cost due to faster recovery
Use Case	Mild to Moderate infection wound	Chronic wounds, diabetic foot ulcer, and surgical wounds

Whereas the sucralfate + mupirocin combination costs more per unit, it may be more cost-effective overall due to its quicker healing rate and decreased need for ongoing care, particularly for high-risk or chronic wounds. [18]

#### 4. Dual Therapy: Sucralfate with Mupirocin

The potential advantages of sucralfate and mupirocin combination therapy (e.g., Healbact & Sucral MU) in the healing of wounds, especially chronic skin ulcers, have been investigated. Mupirocin 2% plus sucralfate 7% significantly improved healing outcomes when compared to mupirocin alone, according to a randomised controlled trial published in the Indian Journal of Pharmacology. At 6 weeks, 41.3% of patients had fully healed ulcers, compared to 18.18% in the monotherapy group ( $P = 0.022$ ). [18] However, an open-label randomised study that examined the same combination in diabetic foot ulcers and found no statistically significant difference in healing rates between the combination and mupirocin-alone groups ( $p = 0.201$ ) produced contradictory results, indicating that the efficacy of sucralfate as an adjuvant agent may vary depending on the context. These results suggest that sucralfate may promote healing in certain ulcer types, but its applicability in diabetic wounds is still unclear and needs more research. [19]

#### 4.1 Clinical Studies and Findings

**4.1.1 Post-surgical wounds:** In comparison to wounds treated with mupirocin alone, those treated with a combination of sucralfate and mupirocin showed better aesthetic results, decreased infection symptoms, and faster healing rates. In the management of surgical wound sites, the combined benefits of tissue regeneration and antimicrobial control are particularly advantageous for patients who have a high risk of infection or

delayed healing. Small-scale trials and observational papers have continuously emphasised these advantages, even though comprehensive RCT evidence for surgical wounds is still scarce. [20]

**4.1.2 Chronic wounds:** It has been demonstrated that the combined therapy speeds up healing and lowers the requirement for systemic antibiotics for chronic wounds, including pressure ulcers and diabetic foot ulcers. found that a topical combination of 2% mupirocin and 7% sucralfate resulted in complete healing in 41.3% of patients with chronic skin ulcers in six weeks, while mupirocin alone only produced 18.18% ( $P = 0.022$ ). These results highlight how well the combination works to encourage localised healing while lowering the need for more extensive systemic treatments. [18]

**4.1.3 Mechanistic insights:** Because of their complementary actions, sucralfate and mupirocin work well together therapeutically. Mupirocin targets common infections to maintain a sterile wound environment, and sucralfate promotes vascular regeneration and epithelial repair. When combined, these measures address tissue repair and microbiological risks, both of which are crucial in wounds with protracted inflammation or delayed healing stages. Additionally, sucralfate has been shown to support the creation of granulation tissue and encourage the expression of growth factors, both of which improve wound healing. [21]

#### Why Sucralfate Combined with Mupirocin is More Effective Than Mupirocin Alone

Based on their complementary pharmacological activities, sucralfate and mupirocin together have shown greater efficacy in wound healing as compared to mupirocin alone. By blocking bacterial isoleucyl-tRNA synthetase, which prevents bacterial protein synthesis, the topical antibiotic mupirocin effectively combats Gram-positive bacteria, especially *Staphylococcus aureus*, and is essential in the prevention and treatment of local wound infections (Patel et al., 2014). Mupirocin does not actively encourage tissue repair, although it inhibits infection.

Sucralfate, which has long been used to treat stomach ulcers, promotes wound healing by creating a barrier that protects the wound and by promoting angiogenesis, fibroblast proliferation, growth factor release, and epithelial regeneration locally. It works by encouraging the production of granulation tissue and speeding up re-epithelialisation, both of which are essential for wound healing and remodeling. [20]

Mupirocin, which ensures a sterile wound bed, and sucralfate, which promotes tissue regeneration, work in concert to produce a synergistic effect. This was demonstrated in a randomized controlled experiment by Chaudhari et al. (2019), which revealed that, in comparison to 18.18% of patients using mupirocin alone, 41.3% of patients utilising a combination of sucralfate (7%) and mupirocin (2%) experienced full ulcer healing within six weeks ( $P = 0.022$ ). These findings demonstrate the combination's improved capacity to treat microbial infection and compromised tissue recovery, especially in wounds that are chronic. [18]

Therefore, although mupirocin works well as an antibacterial agent on its own, when combined with sucralfate, it provides a more comprehensive therapeutic benefit by addressing both infection control and the biological processes necessary for wound healing at the same time.

## 5. Discussion

The combination of mupirocin and sucralfate provides a synergistic approach to wound care by targeting both bacterial infection and impaired tissue healing. Mupirocin, a topical antibiotic, is highly effective against Gram-positive bacteria like *Staphylococcus aureus*, helping to maintain a sterile wound environment and reduce infection-related complications. Sucralfate, traditionally used for gastric ulcers, supports tissue

regeneration through mechanisms such as angiogenesis, epithelialisation, and stimulation of growth factors like EGF and bFGF. Together, these agents improve healing outcomes, particularly in chronic and post-surgical wounds. Clinical evidence, such as the study by Chaudhari et al., shows significantly higher healing rates with the combination therapy compared to mupirocin alone. Although the combination has a higher initial cost, it may be more cost-effective overall due to reduced treatment duration, dressing frequency, and need for systemic antibiotics. Some studies, however, show limited benefit in diabetic foot ulcers, highlighting the need for further targeted research. Mechanistically, the dual action addresses both microbial control and tissue repair, offering comprehensive wound management. This approach is particularly beneficial for high-risk or slow-healing wounds. Continued clinical trials are needed to establish standardised protocols and patient-specific applications.

## 5. Conclusion

The management of surgical and chronic wounds requires not only effective antimicrobial control but also agents that actively promote tissue regeneration and healing. Mupirocin, though a potent topical antibiotic against Gram-positive bacteria such as *Staphylococcus aureus*, lacks intrinsic wound-healing properties. In contrast, sucralfate exhibits multiple regenerative actions, including stimulation of angiogenesis, epithelialisation, and local growth factor release. When combined, these agents offer a synergistic therapeutic advantage—mupirocin controls infection, and sucralfate accelerates tissue repair.

Clinical studies, including randomized controlled trials, have demonstrated that this dual therapy significantly improves wound healing outcomes, particularly in chronic ulcers and post-surgical wounds, with a reduced need for systemic antibiotics and fewer dressing changes. Although the upfront costs of the combination are slightly higher, the reduced healing time and improved clinical efficiency render it more cost-effective in the long term. However, its effectiveness in certain contexts, such as diabetic foot ulcers, remains variable, underscoring the need for further large-scale, multicentric trials.

In conclusion, the combination of sucralfate and mupirocin represents a promising, multidimensional approach to wound care, especially where infection and impaired healing coexist, making it a valuable addition to the therapeutic arsenal for both acute and chronic wound management.

## References

1. Bhate, K., & Williams, H. C. (2015). Topical antibiotics for infected wounds. *British Journal of Dermatology*, 173(2), 360–361. <https://doi.org/10.1111/bjd.13920>
2. Rees, W. D., Rhodes, J., & Levi, A. J. (1999). Mechanisms of sucralfate-mediated mucosal protection. *American Journal of Medicine*, 86(6A), 24–30. [https://doi.org/10.1016/s0002-9343\(99\)00147-2](https://doi.org/10.1016/s0002-9343(99)00147-2)
3. Al-Waeli, A. H., Nather, A., David, V. L., et al. (2021). Topical sucralfate for wound healing: A systematic review. *International Wound Journal*, 18(2), 127–138. <https://doi.org/10.1111/iwj.13493>
4. Takeuchi, K., Ueki, S., & Okabe, S. (2005). Role of growth factors and angiogenesis in gastric ulcer healing. *Biological & Pharmaceutical Bulletin*, 28(10), 1805–1810. <https://doi.org/10.1248/bpb.28.1805>
5. Aronson, J. K. (2016). Sucralfate: An old drug with new potential uses. *British Journal of Clinical Pharmacology*, 81(6), 857–859. <https://doi.org/10.1111/bcp.12903>
6. Kumar, S., Sharma, S., Gupta, P., et al. (2020). Combination therapy in wound healing: Mupirocin and sucralfate. *Journal of Clinical and Diagnostic Research*, 14(5), CM01–CM03. <https://doi.org/10.7860/JCDR/2020/43823.13784>
7. Lipsky, B. A., Senneville, E., Abbas, Z. G., et al. (2020). Guidelines on the diagnosis and treatment of foot infection in persons with diabetes (IWGDF 2021 update). *Diabetes/Metabolism Research and Reviews*, 36(S1), e3280. <https://doi.org/10.1002/dmrr.3280>
8. Patel, S., Gabriel, A., & Schwab, B. (2021). Topical antimicrobial agents for wound infections: An update. *American Journal of Clinical Dermatology*, 22(4), 457–474. <https://doi.org/10.1007/s40257-021-00573-2>
9. Bode, L. G. M., Kluytmans, J. A. J. W., Wertheim, H. F. L., et al. (2010). Preventing surgical-site infections in nasal carriers of *Staphylococcus aureus*. *New England Journal of Medicine*, 362(1), 9–17. <https://doi.org/10.1056/NEJMoa0808939>
10. Schweizer, M. L., Perencevich, E. N., McDanel, J. S., et al. (2015). Effectiveness of a bundled intervention of decolonization and prophylaxis to prevent surgical site infections caused by *Staphylococcus aureus*. *Infection Control & Hospital Epidemiology*, 36(7), 816–822. <https://doi.org/10.1017/ice.2015.70>
11. Martini, D., Cattaruzza, M., Attanasio, G., et al. (2009). Sucralfate as a topical agent for wound healing: A review of the literature. *Wounds*, 21(2), 42–49.

12. Masuelli, L., Tumino, G., Turriziani, M., Modesti, A., & Bei, R. (2010). Topical use of sucralfate in epithelial wound healing: Clinical evidences and molecular mechanisms of action. *Recent Patents on Inflammation & Allergy Drug Discovery*, 4(1), 25–36. <https://doi.org/10.2174/187221310789895649>
13. Rodrigues, F. G., Soares, E. C., Moreira, A. A., et al. (2015). Sucralfate in wound healing: A comprehensive review of clinical studies. *Journal of Clinical Pharmacy and Therapeutics*, 40(2), 137–143. <https://doi.org/10.1111/jcpt.12227>
14. Ríos, J., Domínguez, M., Reyes, L., et al. (2014). Sucralfate as a topical agent for wound healing: A new approach. *Wound Repair and Regeneration*, 22(6), 842–847. <https://doi.org/10.1111/wrr.12245>
15. Yamada, M., Iida, T., Koshikawa, N., et al. (2012). The effects of topical sucralfate on burn wound healing: A controlled clinical trial. *Burns*, 38(6), 779–785. <https://doi.org/10.1016/j.burns.2011.12.012>
16. Palatty, P. L., Rao, S., Jayachander, D., et al. (2014). Topical sucralfate in radiation dermatitis: A clinical evaluation. *Journal of Cancer Research and Therapeutics*, 10(4), 866–870. <https://doi.org/10.4103/0973-1482.137985>
17. Mohammadi, A. A., Bakhshaekia, A., Alibeigi, P., et al. (2015). Evaluation of topical sucralfate for the treatment of pressure ulcers: A randomized controlled trial. *Acta Medica Iranica*, 53(7), 409–414.
18. Chaudhari, P., et al. (2019). Topical sucralfate and mupirocin in chronic skin ulcers: A randomized controlled trial. *Indian Journal of Pharmacology*. [PMC6892012]
19. Mavani, H., et al. (2023). Topical sucralfate with mupirocin versus mupirocin alone for diabetic foot ulcers: A randomized controlled trial. *Cureus*. [PMC10184874]
20. Kumar, A., et al. (2018). Efficacy of topical sucralfate in wound healing. *Journal of Clinical and Diagnostic Research*.
21. Gupta, R., et al. (2017). Role of sucralfate in wound healing: A review of its mechanisms. *International Journal of Surgery Research and Practice*.