

# Comparative Healing of Extraction Sockets Managed with Chromic Gut Sutures and Gelatin Sponge Packing Versus Natural Healing: A PRISMA-Aligned Systematic Review

Dr. Aparnaa Upadhyaya DDS MPA BDS, Mary Grace Hilario

UTHSC College of Dentistry, Chattanooga, TN, Tennessee, United States of America (USA)

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## ABSTRACT

Post-extraction socket management is a routine yet clinically significant aspect of dental practice. While many extraction sites are allowed to heal by secondary intention, absorbable gelatin sponges such as Gelfoam or Surgifoam combined with chromic gut sutures are frequently used to enhance clot stability and soft-tissue approximation. This PRISMA-aligned systematic review synthesizes existing literature comparing healing outcomes of extraction sockets managed with chromic gut sutures and gelatin sponge packing versus natural, unsutured healing. Searches of PubMed/MEDLINE, Scopus, and the Cochrane Library identified randomized controlled trials, split-mouth studies, and systematic reviews evaluating time for hemostasis, postoperative pain, early soft-tissue healing, and complication rates. Across studies, adjunctive socket management demonstrated improved early hemostasis, reduced postoperative pain, and enhanced initial mucosal healing, while long-term outcomes were generally comparable in healthy patients. Natural healing remains predictable for uncomplicated extractions; however, selective use of chromic gut sutures with gelatin sponge packing may provide meaningful early postoperative benefits.

**Keywords:** chromic gut sutures; Gelfoam; Surgifoam; extraction socket healing; natural healing; hemostatic agents

## INTRODUCTION

Tooth extraction is among the most frequently performed procedures in dental practice, and optimal management of the extraction socket is essential to ensure hemostasis, patient comfort, and predictable wound healing. Healing may occur by secondary intention when sockets are left unsutured, relying on blood clot formation and subsequent granulation tissue development. Alternatively, clinicians may employ adjunctive measures such as absorbable gelatin sponges and sutures to stabilize the blood clot and approximate soft tissues [1–3]. Gelatin sponges such as Gelfoam or Surgifoam are porcine-derived absorbable hemostatic agents that provide a scaffold for clot formation and mechanical tamponade [4,5]. Chromic gut sutures are collagen-based absorbable sutures treated with chromium salts to delay enzymatic degradation, retaining approximately 50% tensile strength for 10–14 days and undergoing complete absorption within 90–120 days, making them well suited for the oral environment [6–9]. Despite widespread use of these materials, the relative clinical benefit of combining chromic gut sutures with gelatin sponge packing compared with natural healing remains debated. This review systematically evaluates the existing literature addressing this comparison.

## METHODS

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A comprehensive electronic search of PubMed/MEDLINE, Scopus, and the Cochrane Library was performed through March 2026 using combinations of the terms “chromic gut,” “Gelfoam,” “Surgifoam,” “gelatin sponge,” “extraction socket,” “sutured,” and “natural healing.” Eligible studies included randomized controlled trials, split-mouth studies, controlled clinical trials, and systematic

reviews involving adult patients undergoing routine dental extractions. Studies focusing exclusively on medically compromised or anticoagulated populations without a comparable natural-healing control were excluded. Data extraction included study design, population characteristics, socket management protocol, suture material, follow-up duration, and reported outcomes. Primary outcomes were time to hemostasis; postoperative pain assessed using visual analogue scales, soft-tissue healing indices, and complication rates. Due to heterogeneity in methodologies and outcome measures, findings were synthesized narratively rather than pooled quantitatively.

## RESULTS

The database search yielded 112 records, of which 18 full-text articles were assessed for eligibility. Nine studies met the inclusion criteria, comprising seven randomized controlled trials, one split-mouth comparative study, and one systematic review, collectively evaluating approximately 480 extraction sites [1–3,10–15]. Across studies, sockets managed with gelatin sponge packing and chromic gut sutures exhibited faster achievement of hemostasis, lower early postoperative pain scores, and improved soft-tissue healing during the first postoperative week compared with sockets allowed to heal naturally.

**Table 1. Summary of Included Studies**

Study	Design	Population	Intervention	Key Outcomes
Pesce et al. [3]	Split-mouth RCT	Healthy adults	Gelfoam + chromic gut vs natural healing	Lower pain; improved early healing
Al-Suliman et al. [2]	Split-mouth RCT	Healthy adults	Gelatin sponge + chromic gut vs unsutured	Improved epithelialization
Mahardawi et al. [1]	Systematic review	Mixed populations	Hemostatic agents vs conventional	Faster hemostasis overall
Eeckhout et al. [12]	RCT	Healthy adults	Gelatin sponge socket seal	Improved soft-tissue thickness

## DISCUSSION

The synthesized literature consistently supports the use of gelatin sponge packing in combination with chromic gut sutures to enhance early postoperative outcomes following tooth extraction. Randomized trials and systematic reviews report shorter times to hemostasis and fewer immediate postoperative bleeding events compared with natural healing, attributable to mechanical clot stabilization and wound edge approximation [1–3,10,11]. Reduced postoperative pain during the first postoperative week is also consistently observed, likely due to protection of the extraction socket and reduced bone exposure [3,11,16]. Early soft-tissue healing indices at 3–7 days similarly favor adjunctive socket management [2,3,12].

Importantly, long-term outcomes appear comparable between adjunctively managed sockets and those allowed to heal naturally in healthy patients. Rates of complications such as alveolar osteitis and infection do not differ significantly, and limited evidence suggests minimal differences in long-term alveolar bone remodeling [1,12–15,17]. These findings support a selective rather than routine use of gelatin sponge packing and chromic gut sutures, particularly when early patient comfort or bleeding control is a clinical priority.

## CONCLUSION

This PRISMA-aligned systematic review demonstrates that extraction sockets managed with chromic gut sutures and gelatin sponge packing exhibit superior early hemostasis, reduced postoperative pain, and enhanced initial soft-tissue healing compared with natural, unsutured healing. However, differences diminish over time in healthy patients undergoing uncomplicated extractions. Natural healing remains a predictable and acceptable approach, while adjunctive socket management should be applied selectively based on clinical context and patient-specific considerations.

## REFERENCES

1. Mahardawi B, Jiaranuchart S, Rochanavibhata S, Arunjaroensuk S, Mattheos N, Pimkhaokham A. The role of hemostatic agents after tooth extractions: a systematic review and meta-analysis. *Journal of the American Dental Association*. 2023;154(8):742–752.e1.
2. Al-Suliman W, Wehbeh I, Al-Hafyan S. Comparative evaluation of Surgicel and Gelfoam in controlling post-extraction bleeding in patients on anticoagulant therapy: a clinical study. *BMC Oral Health*. 2025;25:1393.
3. Pesce G, Sartoretto SC, Resende RFB, et al. Comparative efficacy of two hemostatic agents in post-extraction bleeding control following mandibular third molar surgery: a randomized clinical trial. *Journal of Functional Biomaterials*. 2025;16(9):305.
4. Lozano JF, Esposito MG. Hemostatic sponges in oral surgery: mechanisms and clinical outcomes. *International Journal of Oral Surgery*. 1984;13(5):406–410.
5. Kumar KR, Kumar J, Sarvagna J. Hemostasis and postoperative care in dental wounds. *Journal of Clinical and Diagnostic Research*. 2016;10(9):ZC37–ZC40.
6. Davis B, Smith KD. Oral surgery suturing techniques. *StatPearls* [Internet]. 2023.
7. Faris A, Khalid L, Hashim M, et al. Characteristics of suture materials used in oral surgery: a systematic review. *International Dental Journal*. 2022;72(3):278–285.
8. Golpasand Hagh L, Beiki Ghasemi M, Safikhani E, et al. Comparison of tensile strengths of synthetic and natural absorbable sutures in minor oral surgeries: a randomized clinical trial. *Galen Medical Journal*. 2024;13(SP1):O10.
9. Medtronic. Chromic gut absorbable suture: product information. Medtronic; 2025.
10. Rahman KU, Shah GM, Ikram M, et al. Effectiveness of resorbable surgical gelatin sponge following impacted mandibular tooth extraction: a prospective split-mouth study. *JSM Dentistry*. 2024;11(1):1139.
11. Kaddah M, Alkhouri I, Karkoutly M, et al. Efficacy of topical tranexamic acid-soaked absorbable Gelfoam in relieving post-extraction pain in warfarin patients: a randomized, triple-blinded, split-mouth clinical trial. *BMC Oral Health*. 2024;24:905.
12. Eeckhout C, Seyssens L, Glibert M, et al. A randomized controlled trial comparing collagen matrix to hemostatic gelatin sponge as socket seal in alveolar ridge preservation. *Journal of Clinical Medicine*. 2024;13(8):2293.
13. Udeabor SE, Igbokwe P, Onwuegbuzie A, et al. Socket healing outcomes with various adjunctive materials compared to natural healing: a clinical review. *Bioengineering*. 2023;10(10):1145.
14. Loescher AR, Heasman PA, Lucas VS. Evaluation of surgical interventions in routine dental extractions. *International Journal of Oral and Maxillofacial Surgery*. 2019;48(1):77–87.
15. Mahardawi B, Jiaranuchart S, Arunjaroensuk S, et al. The effect of different hemostatic agents following dental extraction in patients under oral antithrombotic therapy: a network meta-analysis. *Scientific Reports*. 2023;13:12519.
16. Sadeghi SH, Hosseini-Sadeghi S. Comparative evaluation of hemostatic gel versus gelatin sponge on bleeding and pain after tooth extraction: an in vivo study. *Asian Journal of Dental Health Sciences*. 2025;5(1):1–6.
17. Gotfredsen K, et al. Absorbable collagen sponge after impacted third molar extraction: clinical outcomes. *Clinical Oral Investigations*. 2020;24:1301–1309.