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Research Article

Comparison of Antibacterial Suture with Conventional Silk Suture in Minor Oral Surgical Procedure and Exodontia

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Abstract
Background:
Post-operative healing in minor oral surgeries and exodontia relies heavily on effective wound closure and minimizing bacterial contamination. Sutures, while essential, can promote microbial adhesion and biofilm formation, contributing to surgical site infections (SSIs). This study evaluates the efficacy of triclosan-coated polyglactin 910 sutures compared to conventional silk sutures in such procedures.
Materials and Methods:
A randomized, split-mouth, prospective case-control study was conducted on 100 patients undergoing minor oral surgical procedures. Each patient received both suture types at comparable sites. Clinical evaluation was performed over a 7-day post-operative period.
Results:
On the 7th post-operative day, the triclosan-coated suture group showed significantly reduced analgesic use (p = 0.030), improved soft tissue healing (p = 0.0013), higher patient satisfaction (p = 0.013), greater operator satisfaction (p = 0.018), and significantly less microbial accumulation (p = 0.0002) than the silk suture group.
Conclusion:
Triclosan-coated polyglactin 910 sutures are a reliable alternative to conventional silk sutures in minor oral surgeries. They enhance healing, reduce infection risk, and improve both patient and operator satisfaction.

Keywords: *Vicryl plus sutures, Polyglactin 910 sutures, Silk sutures, Surgical Site Infections (SSIs), Visual Analogue Scale (VAS), Colony Forming Units (CFU), Triclosan Sutures, Oral Surgery.*

1. INTRODUCTION

Sutures for wound closure are a recognized source of Surgical Site Infections (SSIs), whereby the surface promotes microorganism adhesion and biofilm formation.(4) This biofilm establishes an immunity from both antimicrobial treatment and the host immune system. Once this biofilm develops there is an increased chance of SSI developing.(5)

Successful healing after tooth extractions and minor oral surgeries relies on primary wound closure and infection control. Postoperative infection rates after third molar extractions are about 10% in healthy individuals and up to 25% in immunocompromised patients (Bouloux et al., Cochrane Review).(1)

While antibiotics are often used, their routine use is debated. Surgical site infections (SSIs) are influenced by patient and surgical factors but can be reduced through proper technique, antisepsis, and prophylaxis. Braided sutures may harbor microbes and promote biofilms. (2)

To reduce SSI risk, triclosan-coated sutures have been introduced, offering broad-spectrum antimicrobial action suitable for the oral cavity's high bacterial load. [3]

AIM:

The aim of the present study was to compare the efficacy of polyglactin 910 sutures coated with triclosan and silk sutures in minor oral surgical procedures and exodontia.

OBJECTIVES:

To clinically compare triclosan-coated polyglactin 910 sutures and conventional silk sutures in terms of postoperative pain (VAS), wound healing and satisfaction (Modified Hollander Scale), incidence of infection (suppuration/purulent discharge), and microbial accumulation (colony-forming units after 48 hours of culture).

2. MATERIALS & METHODS

Study Design

This was a prospective, randomized, split-mouth case-control study approved by the Institutional Ethical Committee. The study was conducted at the Department of Oral and Maxillofacial Surgery, CDSRC, Ahmedabad, from December 2021 to March 2024. A total of 100 patients contributing to 200 sites, undergoing bilateral or contralateral extractions or minor surgical procedures requiring suturing were selected through randomized sampling.

2.1 Inclusion Criteria

1. Patients providing informed consent and willing to attend follow-ups.
2. ASA Class I (systemically healthy) individuals.
3. Patients undergoing:
    - Simultaneous extractions in both or contralateral arches.
    - Orthodontic extractions.
    - Surgical removal of bilaterally impacted third molars.
    - Other minor oral surgeries involving tissue approximation.

2.2 Exclusion Criteria

1. Patients refusing the procedure or follow-up.
2. Patients undergoing unilateral surgeries.
3. Immunocompromised patients.
4. Patients with uncontrolled systemic diseases.
5. Pregnant females.
6. Patients with a history of drug abuse or moderate-to-heavy alcohol intake.

3. PROCEDURE

A detailed case history was recorded for each patient prior to surgery. The purpose and nature of the study, as well as the surgical procedure, were thoroughly explained, and written informed consent was obtained. Prophylactic antibiotic therapy was initiated one day before the procedure, consisting of Amoxicillin 500 mg administered three times daily. All surgical interventions were conducted under strict aseptic conditions.

Local anaesthesia was administered using 2% Lignocaine Hydrochloride with Adrenaline (1:80,000 concentration) to achieve adequate anaesthesia during the surgical procedure. The dental procedures including surgical extractions and other minor interventions were systematically carried out in a sequential manner, treating one arch at a time to maintain clear distinction between the sites receiving different suture materials.

Suturing was performed at the conclusion of each procedure using two distinct suture types. The control site was sutured using braided silk sutures and the study site was sutured using triclosan-coated polyglactin 910 sutures. To ensure the validity and objectivity of the study outcomes, the allocation of suture type to the surgical site was randomized for each patient. This randomization helped eliminate selection bias and facilitated a more reliable comparison of clinical outcomes between the two suture materials.

Importantly, the study was independently conducted without any financial support, sponsorship, or supply of materials from any suture manufacturer. This eliminated the potential for conflict of interest and strengthened the neutrality and credibility of the study findings.

Postoperative management included a five-day course of antibiotics and analgesics. Patients were recalled on the seventh postoperative day for suture removal and clinical evaluation. This timing was selected to ensure that the effects of antibiotics and analgesics did not influence the assessment of healing parameters. On follow-up, each surgical site was evaluated for pain, infection, wound healing, and microbial accumulation.

For microbiological analysis, sutures were collected under sterile conditions at 7th post-operative day. In cases involving minor oral surgery, three sutures were removed from the distal-most aspect of the surgical site; in cases of intra-alveolar extraction, one suture was collected. Equal numbers of sutures were retrieved from both suture types to maintain consistency in microbial sampling.

The collected sutures were immediately placed into separate sterile containers, each containing 5 mL of saline, and transported to the pathology laboratory. Each suture was then inoculated into Streptococcus mitis (S. mitis) culture media and incubated under standard conditions for 48 hours. Following incubation, bacterial colonies were quantified using a transparent grid paper (1 × 1 cm squares) corresponding to the diameter of the petri dish.

POST-OPERATIVE ASSESSMENT

On the seventh postoperative day, pain was assessed using the Visual Analog Scale (VAS), infection was evaluated based on clinical signs, and wound healing was measured using the Modified Hollander Wound Healing Scale.

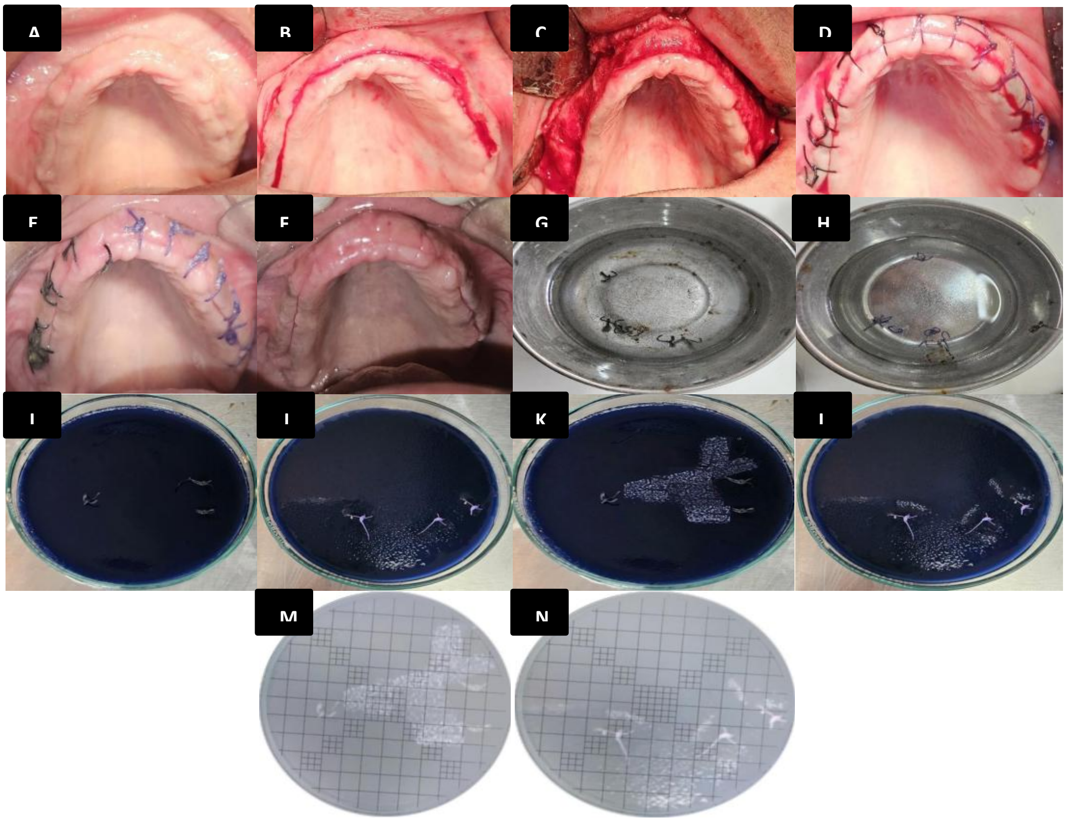
ID	Step-off borders (Edges not on same plane)	Contour irregularities (Wrinkled skin near the wound)	Margin Separation (Gap between the sides)	Edge inversion (Wound not properly everted)	Excessive distortion (Swelling or infection)	Patient satisfaction score (1-10)	Operator satisfaction score (1-10)
A							
B							
C							
D							
E							

Incision attribute	Score if absent	Score if present
Step-off borders	0	1
Contour-irregularities	0	1
Margin separation	0	1
Edge inversion	0	1
Excessive distortion	0	1
Overall appearance	0 (satisfactory)	1 (unsatisfactory)
Total Hollander score	**0 (best)**	**6 (worse)**

Microbial accumulation was assessed by culturing removed sutures in *Streptococcus mitis* media for 48 hours, followed by colony counting using a standard formula.

Colony Count = $y \times 10^{-d} \times (1/v)$,

where *y* represents the number of colonies observed, *d* is the dilution factor, and *v* is the volume plated (in mL). This method enabled a quantitative assessment of microbial colonization associated with the two different suture types.



A. PREOPERATIVE INTRAORAL PHOTOS

B. INTRAOPERATIVE PHOTO- INCISION

C. INTRAOPERATIVE PHOTO- FLAP REFLECTION

D. SUTURING-

1. 1ST QUADRANT- CONTROL SITE-SILK SUTURE;
2. 2ND QUADRANT- STUDY SITE- TRICLOSAN COATED POLYGLACTIN 910 SUTURE

E. 7TH POSTOPERATIVE DAY PHOTOS-

PRIOR TO SUTURE REMOVAL – 1ST QUADRANT-CONTROL SITE; 2ND QUADRANT-STUDY SITE

F. AFTER SUTURE REMOVAL

G. SUTURES KEPT IN SALINE AND SENT TO PATHOLOGY LABORATORY-SILK SUTURES

H. SUTURES KEPT IN SALINE AND SENT TO PATHOLOGY LABORATORY-TRICLOSAN COATED POLYGLACTIN 910 SUTURE

I. SUTURES INOCULATED IN S.MITIS MEDIA AND PLACED IN INCUBATOR FOR 48 HOURS-SILK SUTURES

J. SUTURES INOCULATED IN S.MITIS MEDIA AND PLACED IN INCUBATOR FOR 48 HOURS- TRICLOSAN COATED POLYGLACTIN 910 SUTURE

K. MICROBIAL ACCUMULATION ASSESSED AFTER 48 HOURS OF INOCULATION-SILK SUTURES

L. MICROBIAL ACCUMULATION ASSESSED AFTER 48 HOURS OF INOCULATION-

TRICLOSAN COATED POLYGLACTIN 910 SUTURE

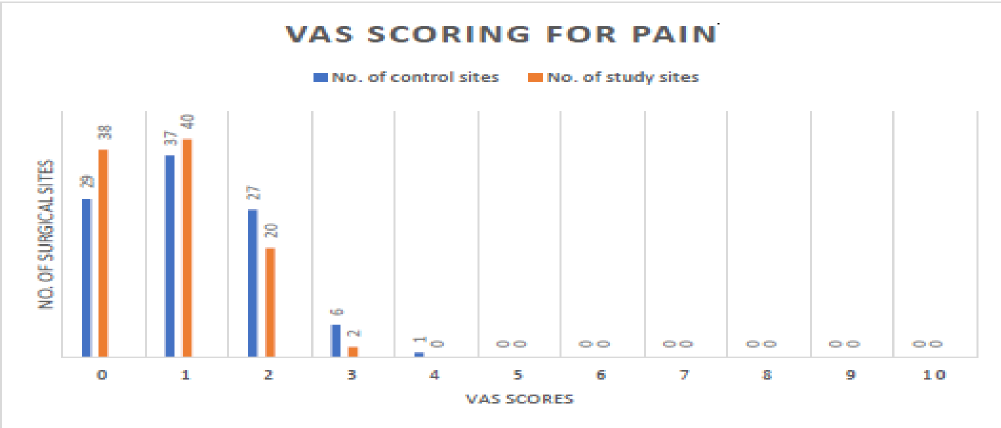
M. COLONY COUNT FOR SILK SUTURES

N. COLONY COUNT FOR TRICLOSAN COATED POLYGLACTIN 910 SUTURES

RESULTS

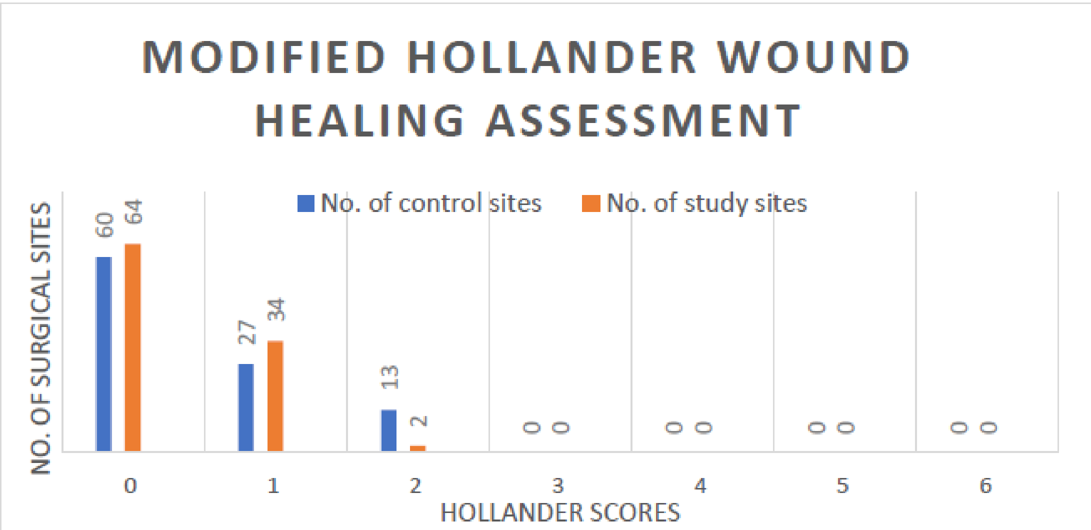
A total of 100 patients (60 males, 40 females; aged 10–80 years) were included in the study, contributing to 200 surgical sites. Procedures included orthodontic extractions (n=48)**,** surgical third molar extractions (n=27)**,** alveoloplasty (n=14)**,** multiple extractions (n=10), and surgical cyst enucleation (n=1)**.** Silk sutures (control) were used in 100 sites and triclosan-coated polyglactin 910 sutures (study group) in the remaining 100, randomly distributed across upper and lower arches.

Pain**,** assessed using the VAS scale**,** showed a significantly lower mean score in the study group **(**0.86 ± 0.804**)** compared to the control group **(**1.13 ± 0.939**) (**p=0.030**).**



Infection was absent at all sites. Mild bleeding was noted during suture removal in two study sites after lower third molar extractions.

Wound healing**,** evaluated using the Modified Hollander Scale**,** showed no overall significant difference between groups **(**p=0.159**),** although significantly better healing was observed in the lower arch with triclosan-coated sutures **(**p=0.0013**).**



Patient satisfaction scores were significantly higher in the study group **(**9.24 ± 0.75**)** compared to the control **(**8.86 ± 1.05**) (**p=0.013**).** Similarly, operator satisfaction was higher for the study group **(**9.43 ± 0.623**)** than the control **(**8.61 ± 0.941**) (**p<0.05**).**

Microbial accumulation after 48 hours of culture showed a significantly higher mean colony count in the silk group **(**221.27 ± 128.24**)** compared to the triclosan group **(**157 ± 111.57**) (**p=0.0002**),** with more colonies observed from sutures in the lower arch**.**

The collected data was tabulated using excel sheet and analysed using Mann Whitney Test and student t test to evaluate the efficacy between the two sutures. The data was subjected to descriptive analysis for mean, range and standard deviation of all variables.

6. DISCUSSION

Sutures are threads or strands of fibrous material used to approximate tissues and ligate blood vessels, commonly employed in the closure of surgical or traumatic wounds. In oral surgeries, sutures face unique challenges due to constant tissue movement, presence of saliva, and microbial flora. Suture materials are classified based on characteristics such as absorbability, filament type, and origin (synthetic vs. natural). Ideal suture materials should be sterile, non-allergenic, inexpensive, and offer high tensile strength without triggering significant tissue reactions. [(53) (54) (55)]

Surgical Site Infections (SSIs), defined by CDC as infections occurring within 30 to 90 days post-surgery, are influenced by factors like tissue handling, anatomical site, and suture material. Antibacterial sutures, primarily coated with triclosan, have shown efficacy in reducing microbial adhesion and colonization. Triclosan disrupts bacterial lipid synthesis, impeding colonization and promoting healing. Literature has consistently supported its effectiveness in reducing SSIs and enhancing postoperative outcomes. [(57)]

In the present split-mouth, randomized prospective study involving 100 patients (ages 10–80), conventional silk sutures were compared with triclosan-coated polyglactin 910 sutures across 200 surgical sites. Both sutures were removed after 7 days. Sites were assessed for postoperative pain, wound healing, microbial colonization, and both patient and operator satisfaction.

Our findings, showing a mean pain score of 0.86 ± 0.804 in the antibacterial group versus 1.13 ± 0.939 in the silk group, are in agreement with these studies and suggest that the use of triclosan-coated sutures contributes to improved postoperative comfort through effective microbial control and enhanced healing response. The reduced postoperative pain observed in sites sutured with triclosan-coated polyglactin 910 sutures compared to silk sutures can be attributed to the antibacterial properties of triclosan, which significantly reduce bacterial colonization at the wound site, thereby minimizing local inflammation and associated discomfort. Unlike silk, which is a braided non-absorbable material prone to microbial accumulation due to its multifilament structure, triclosan-coated sutures inhibit bacterial adhesion and biofilm formation, promoting a cleaner healing environment. This reduction in microbial load results in decreased inflammatory response and faster tissue healing, ultimately lowering pain perception. Supporting literature, including studies by A. Kaur et al. (2020), A. Chithra et al. (2021), and S. Chaganti et al. (2023), has consistently shown significantly lower pain scores in patients where antibacterial sutures were used. [(38)(47) (49)]

Although no cases of surgical site infection (SSI) were encountered in our study, the observation of mild bleeding at two lower third molar sites during suture removal both associated with silk sutures may indicate slightly greater local inflammation compared to sites sutured with triclosan-coated polyglactin 910 sutures. The absence of infection in our sample could be attributed to strict adherence to aseptic protocols and the routine use of prophylactic antibiotics. However, extensive literature supports the role of antibacterial sutures in reducing SSI risk. Studies such as those by S. Perez et al. (2016), M. Renko et al. (2017), and I. Ahmed et al. (2019) have consistently shown a lower incidence of SSIs in groups using triclosan-coated sutures compared to conventional ones. Although our findings did not demonstrate any infections, they align with existing evidence that antibacterial-coated sutures, by reducing microbial colonization and local inflammation, offer a clinical advantage in minimizing the risk of postoperative infections.[(38)(47)(49)(65)]

The improved wound healing observed in sites sutured with triclosan-coated polyglactin 910 sutures, as indicated by a lower mean wound healing score (0.38 ± 0.527) compared to silk sutures (0.53 ± 0.717), can be attributed to the antibacterial properties of triclosan that reduce microbial colonization, local inflammation, and tissue irritation, thereby promoting more favourable healing conditions. Even in the lower arch where healing is typically slower due to food lodgement, saliva, and tongue interference triclosan-coated sutures demonstrated better healing outcomes, with a significantly lower mean score (0.551 ± 0.570) than silk (0.833 ± 0.79), confirming a statistically significant difference ($p=0.0013$). Literature supports these findings; F. Jawed et al. (2012) reported increased inflammatory cell infiltration and delayed fibroblast activity around silk sutures, contributing to poorer healing. Additionally, Xavier and Wahab (2022) observed occurrences of dry socket only in silk-sutured cases, and Pandey and Sequeira (2024) found significantly enhanced soft tissue healing in antibacterial suture groups. These findings collectively validate that triclosan-coated sutures, by minimizing tissue irritation and enhancing the healing cascade, offer a clear clinical advantage in achieving faster and more predictable wound healing in oral surgical procedures.[(49)(59)(66)]

Patient satisfaction scores were significantly higher in the antibacterial group, likely due to reduced pain and inflammation. Operator satisfaction was also higher due to better cosmetic results and improved healing. Though silk sutures showed better knot security, handling characteristics of both sutures were comparable. The results of our study corroborate with literature wherein antibacterial sutures are better accepted by the patients as compared to silk sutures. It has to be taken into consideration that since the duration and severity of pain and signs of inflammation were lower in the triclosan coated surgical sites, there was a better patient satisfaction score seen for the same. [38] [63]

Microbial colonization assessed via S. mitis culture revealed significantly fewer colonies associated with triclosan-coated sutures. These findings corroborate previous studies by Banche et al. (2007), Perez et al. (2016), Karde et al. (2019), and Etemadi et al. (2023). The reduced bacterial adherence is crucial for preventing complications, particularly in high-risk or immunocompromised patients. The results of our present study are in accordance with the literature and suggest that antibacterial sutures play a major role in reduction of microbial accumulation at the surgical site as compared to the conventional silk sutures. This reduced microbial accumulation in turn reduces the chances of inflammation at the operated site, thereby promoting a faster wound healing and a higher patient satisfaction. [38] [39] [64] [69]

Overall, the present study confirms that triclosan-coated sutures provide better outcomes in terms of pain, healing, satisfaction, and microbial resistance compared to silk sutures. Future studies involving electron microscopy could further validate bacterial species-specific efficacy of antibacterial sutures, reinforcing their use in complex or high-risk oral surgeries, including those involving grafts or implants.

7. CONCLUSION

This study concludes that triclosan-coated antibacterial sutures offer clear advantages over conventional silk sutures in minor oral surgeries, including reduced postoperative pain, better wound healing, and fewer surgical site infections due to lower microbial colonization. Although silk offers slightly better knot security, the clinical benefits of antibacterial sutures particularly in high-risk cases outweigh their higher cost, making them a preferable choice for optimal postoperative outcomes.

8. REFERENCES

1. Yue, E. K., Siew, A. L., Mohan, M., & Menon, R. K. (2021). Prevalence of postoperative infection after tooth extraction: A retrospective study. *International Journal of Dentistry, 2021,* 1–5.
2. Hoshino, S., Yoshida, Y., Tanimura, S., Yamamuchi, Y., Noritomi, T., & Yamashita, Y. (2013). A study of efficacy of antibacterial sutures for surgical site infection: A retrospective controlled trial. *International Surgery, 98*(2), 129–132. https://doi.org/10.9738/INTSURG-D-13-00009.1
3. Leaper, D., Wilson, P., Assadian, O., Edmiston, C., Kiernan, M., Miller, A., Bond, S., & Yap, J. (2017). The role of antimicrobial sutures in preventing surgical site infection. *Annals of the Royal College of Surgeons of England, 99*(6), 439–443. https://doi.org/10.1308/rcsann.2017.0108
4. Bustamante, M., Cainzos, M., Preito, L., Castineira, A., Garcia, A., Fernandez, A., Gonzalez, L. M., Flores, A., Diz, R., & Fernandez, C. (2021). Evaluation of the effect of triclosan coated sutures in the prevention of surgical site infections in a Spanish hospital setting: A prospective, observational study. *Infection Prevention in Practice, 3*(3), 100148. https://doi.org/10.1016/j.infpip.2021.100148
5. Ahmed, I., Boulton, A. J., Rizvi, S., Carlos, W., Dickenson, E., Smith, N. A., & Reed, M. (2019). The use of triclosan coated sutures to prevent surgical site infections: A systematic review and meta-analysis of the literature. *BMJ Open, 9*(9), e029727. https://doi.org/10.1136/bmjopen-2019-029727
6. Ayman, B., Nedaa, A., Albaraa, B., Rami, K., Shaima, A., Habnan, A., Naif, A., Adeeb, A., Rayan, A., Waad, A., & Mohammad, A. (2022). [Title missing]. *International Journal of Nursing Sciences, 2*(8), 154–158.
7. Chandra, A., Yadav, O. P., Narula, S., & Dutta, A. (2016). Epidemiology of periodontal diseases in Indian population since last decade. *Journal of International Society of Preventive & Community Dentistry, 6*(2), 91–96. https://doi.org/10.4103/2231-0762.178742
8. Muffly, T. M., Tizzano, A. P., & Walters, M. D. (2011). The history and evolution of sutures in pelvic surgery. *Journal of the Royal Society of Medicine, 104*(3), 107–112. https://doi.org/10.1258/jrsm.2010.100291
9. Schiappa, J., & Van, H. R. (2012). From ants to staples: History and ideas concerning suturing techniques. *Acta Chirurgica Belgica, 112*(5), 395–402. https://doi.org/10.1080/00015458.2012.11680851
10. Racey, G. L., Wallace, W. R., Calvaris, C. J., & Marguard, J. V. (1978). Comparison of a polyglycolic-polylactic acid suture to black silk and plain cat gut in human oral tissues. *Journal of Oral Surgery, 36*(10), 766–770.
11. Kathju, S., Nistico, L., Tower, I., Lasko, L. A., & Stoodley, P. (2014). Bacterial biofilms on implanted suture material are a cause of surgical site infection. *Surgical Infections, 15*(5), 592–600. https://doi.org/10.1089/sur.2013.159
12. Pratten, J., Nazhat, S. N., Blaker, J. J., & Boccaccini, A. R. (2004). In vitro attachment of *Staphylococcus epidermidis* to surgical sutures with and without Ag-containing bioactive glass coating. *Journal of Biomaterials Applications, 19*(1), 47–57. https://doi.org/10.1177/0885328204042170
13. Storch, M. L., Rothenburger, S. J., & Jacinto, G. (2004). Experimental efficacy study of coated Vicryl Plus antibacterial suture in guinea pigs challenged with *Staphylococcus aureus*. *Surgical Infections, 5*(3), 281–288. https://doi.org/10.1089/sur.2004.5.281

14. Ford, H. R., Jones, P., Gaines, B., Reblock, K., & Simpkins, D. L. (2005). Intraoperative handling and wound healing: Controlled clinical trial comparing coated Vicryl Plus antibacterial suture (coated polyglactin 910 suture with triclosan) with coated Vicryl (coated polyglactin 910 suture). *Surgical Infections, 6*(3), 313–321. https://doi.org/10.1089/sur.2005.6.313
15. Edmiston, C. E., Seabrook, G. R., Goheen, M. P., Krepel, C. J., Johnson, C. P., Lewis, B. D., Brown, K. R., & Towne, J. B. (2006). Bacterial adherence to surgical sutures: Can antibacterial-coated sutures reduce the risk of microbial contamination? *Journal of the American College of Surgeons, 203*(4), 481–489. https://doi.org/10.1016/j.jamcollsurg.2006.06.025
16. Gómez-Alonso, A., García-Criado, F. J., Parreño-Manchado, F. C., García-Sánchez, J. E., García-Sánchez, E., Parreño-Manchado, A., & Zambrano-Cuadrado, Y. (2007). Study of the efficacy of coated Vicryl Plus antibacterial suture (coated polyglactin 910 suture with triclosan) in two animal models of general surgery. *Journal of Infection, 54*(1), 82–88. https://doi.org/10.1016/j.jinf.2006.01.014
17. Ming, X., Rothenburger, S., & Yang, D. (2007). In vitro antibacterial efficacy of Monocryl Plus antibacterial suture (poliglecaprone 25 with triclosan). *Surgical Infections, 8*(2), 201–208. https://doi.org/10.1089/sur.2006.041
18. Ming, X., Nichols, M., & Rothenburger, S. (2007). In vivo antibacterial efficacy of Monocryl Plus antibacterial suture (poliglecaprone 25 with triclosan). *Surgical Infections, 8*(2), 209–214. https://doi.org/10.1089/sur.2006.042
19. Suárez Grau, J. M., De Toro Crespo, M., Docobo Durántez, F., Rubio Chaves, C., Martín Cartes, J. A., & Docobo Pérez, F. (2007). Prevención de la infección quirúrgica utilizando sutura reabsorbible antibacteriana (Vicryl Plus) en lugar de la sutura reabsorbible convencional en hernioplastias. Estudio experimental en animales [Prevention of surgical infection using reabsorbable antibacterial suture (Vicryl Plus) versus reabsorbable conventional suture in hernioplasty: An experimental study in animals]. *Cirugía Española, 81*(6), 324–329. https://doi.org/10.1016/S0009-739X(07)71724-4
20. Marco, F., Vallez, R., Gonzalez, P., Ortega, L., de la Lama, J., Lopez-Duran, L., & Carver, J. (2007). Study of the efficacy of coated Vicryl Plus antibacterial suture in an animal model of orthopedic surgery. *Surgical Infections, 8*(3), 359–365. https://doi.org/10.1089/sur.2006.051
21. Pasternak, B., Rehn, M., Andersen, L., Agren, M. S., Heegaard, A. M., Tengvall, P., & Aspenberg, P. (2008). Doxycycline-coated sutures improve mechanical strength of intestinal anastomoses. *International Journal of Colorectal Disease, 23*(3), 271–276. https://doi.org/10.1007/s00384-007-0381-1
22. Marzo, G., Loffredi, R., Marchetti, E., Di Martino, S., Di Pietro, C., & Marinelli, G. (2008). In vitro antibacterial efficacy of Vicryl Plus suture (coated polyglactin 910 with triclosan) using zone of inhibition assays. *Oral Implantology (Rome), 1*(1), 43–48.
23. Justinger, C., Moussavian, M. R., Schlueter, C., Kopp, B., Kollmar, O., & Schilling, M. K. (2009). Antibacterial coating of abdominal closure sutures and wound infection. *Surgery, 145*(3), 330–334. https://doi.org/10.1016/j.surg.2008.11.007
24. Mingmalairak, C., Ungbhakorn, P., & Paocharoen, V. (2009). Efficacy of antimicrobial coating suture coated polyglactin 910 with triclosan (Vicryl Plus) compared with polyglactin 910 (Vicryl) in reducing surgical site infection of appendicitis: Double blind randomized control trial, preliminary safety report. *Journal of the Medical Association of Thailand, 92*(6), 770–775.
25. Storch, M., Scalzo, H., Van Lue, S., & Jacinto, G. (2002). Physical and functional comparison of coated Vicryl Plus antibacterial suture (coated polyglactin 910 suture with triclosan) with coated Vicryl suture (coated polyglactin 910 suture). *Surgical Infections, 3*(Suppl 1), S65–S77. https://doi.org/10.1089/109629602761000488
26. Zhang, Z. T., Zhang, H. W., Fang, X. D., Wang, L. M., Li, X. X., Li, Y. F., Sun, X. W., Carver, J., Simpkins, D., Shen, J., & Weisberg, M. (2011). Cosmetic outcome and surgical site infection rates of antibacterial absorbable (polyglactin 910) suture compared to Chinese silk suture in breast cancer surgery: A randomized pilot study. *Chinese Medical Journal, 124*(5), 719–724.
27. Leaper, D., Assadian, O., Hubner, N. O., McBain, A., Barbolt, T., Rothenburger, S., & Wilson, P. (2011). Antimicrobial sutures and prevention of surgical site infection: Assessment of the safety of the antiseptic triclosan. *International Wound Journal, 8*(6), 556–566. https://doi.org/10.1111/j.1742-481X.2011.00838.x
28. Galal, I., & El-Hindawy, K. (2011). Impact of using triclosan-antibacterial sutures on incidence of surgical site infection. *American Journal of Surgery, 202*(2), 133–138. https://doi.org/10.1016/j.amjsurg.2010.06.019
29. Laas, E., Poilroux, C., Bézu, C., Coutant, C., Uzan, S., Rouzier, R., & Chéreau, E. (2012). Antibacterial-coated suture in reducing surgical site infection in breast surgery: A prospective study. *International Journal of Breast Cancer, 2012,* 819578. https://doi.org/10.1155/2012/819578
30. Justinger, C., Slotta, J. E., & Schilling, M. K. (2012). Incisional hernia after abdominal closure with slowly absorbable versus fast absorbable, antibacterial-coated sutures. *Surgery, 151*(3), 398–403. https://doi.org/10.1016/j.surg.2011.08.012
31. Matalon, S., Kozlovsky, A., Kfir, A., Levartovsky, S., Mazor, Y., & Slutzky, H. (2013). The effect of commonly used sutures on inflammation-inducing pathogens: An in vitro study. *Journal of Cranio-Maxillofacial Surgery, 41*(7), 593–597. https://doi.org/10.1016/j.jcms.2012.11.033

32. Hoshino, S., Yoshida, Y., Tanimura, S., Yamamuchi, Y., Noritomi, T., & Yamashita, Y. (2022). A study of efficacy of antibacterial sutures for surgical site infection. Journal of Infection and Chemotherapy, 28(3), 399–404. https://doi.org/10.1016/j.jiac.2021.11.002
33. Justinger, C., Slotta, J. E., Ningel, S., Gräber, S., Kollmar, O., & Schilling, M. K. (2013). Surgical-site infection after abdominal wall closure with triclosan-impregnated polydioxanone sutures: Results of a randomized clinical pathway facilitated trial (NCT00998907). *Surgery, 154*(3), 589–595. https://doi.org/10.1016/j.surg.2013.03.007
34. Okada, N., Nakamura, T., Ambo, Y., Takada, M., Nakamura, F., Kishida, A., & Kashimura, N. (2014). Triclosan-coated abdominal closure sutures reduce the incidence of surgical site infections after pancreaticoduodenectomy. *Surgical Infections, 15*(3), 305–309. https://doi.org/10.1089/sur.2013.088
35. Daoud, F. C., Edmiston, C. E., & Leaper, D. (2014). Meta-analysis of prevention of surgical site infections following incision closure with triclosan-coated sutures: Robustness to new evidence. *Surgical Infections, 15*(3), 165–181. https://doi.org/10.1089/sur.2013.148
36. Chen, X., Hou, D., Tang, X., & Wang, L. (2015). Quantitative physical and handling characteristics of novel antibacterial braided silk suture materials. *Journal of the Mechanical Behavior of Biomedical Materials, 50,* 160–170. https://doi.org/10.1016/j.jmbbm.2015.06.013
37. Takeno, S., Yamashita, K., Yamashita, Y., Yamada, K., Hoshino, S., Yamauchi, Y., & Noritomi, T. (2016). Results of a propensity score matching analysis of the efficacy of abdominal fascia and skin closure using PDS® Plus antibacterial (polydioxanone) sutures on the incidence of superficial incisional surgical site infections after gastroenterologic surgery. *Surgical Infections, 17*(1), 94–99. https://doi.org/10.1089/sur.2014.227
38. Sala-Pérez, S., López-Ramírez, M., Quinteros-Borgarello, M., Valmaseda-Castellón, E., & Gay-Escoda, C. (2016). Antibacterial suture vs silk for the surgical removal of impacted lower third molars: A randomized clinical study. *Medicina Oral, Patología Oral y Cirugía Bucal, 21*(1), e95–e102. https://doi.org/10.4317/medoral.20929
39. Sethi, K. S., Karde, P. A., & Joshi, C. P. (2016). Comparative evaluation of sutures coated with triclosan and chlorhexidine for oral biofilm inhibition potential and antimicrobial activity against periodontal pathogens: An in vitro study. *Indian Journal of Dental Research, 27*(5), 535–539. https://doi.org/10.4103/0970-9290.195631
40. Masood, R., Hussain, T., Umar, M., Azeemullah, Areeb, T., & Riaz, S. (2017). In situ development and application of natural coatings on non-absorbable sutures to reduce incision site infections. *Journal of Wound Care, 26*(3), 115–120. https://doi.org/10.12968/jowc.2017.26.3.115
41. Obermeier, A., Schneider, J., Harrasser, N., Tübel, J., Mühlhofer, H., Pförringer, D., Deimling, C. V., Foehr, P., Kiefel, B., Krämer, C., Stemberger, A., Schieker, M., Burgkart, R., & von Eisenhart-Rothe, R. (2018, January 9). Viable adhered *Staphylococcus aureus* highly reduced on novel antimicrobial sutures using chlorhexidine and octenidine to avoid surgical site infection (SSI). *PLoS ONE, 13*(1), e0190912. https://doi.org/10.1371/journal.pone.0190912
42. Carella, S., Fioramonti, P., Onesti, M. G., & Scuderi, N. (2019, February). Comparison between antimicrobial-coated sutures and uncoated sutures for the prevention of surgical site infections in plastic surgery: A double-blind control trial. *European Review for Medical and Pharmacological Sciences, 23*(3), 958–964.
43. Karde, P. A., Sethi, K. S., Mahale, S. A., Mamajiwala, A. S., Kale, A. M., & Joshi, C. P. (2019, May–June). Comparative evaluation of two antibacterial-coated resorbable sutures versus noncoated resorbable sutures in periodontal flap surgery: A clinico-microbiological study. *Journal of Indian Society of Periodontology, 23*(3), 220–225. https://doi.org/10.4103/jisp.jisp_402_18
44. Syukri, D. M., Nwabor, O. F., Singh, S., Ontong, J. C., Wunnoo, S., Paosen, S., Munah, S., & Voravuthikunchai, S. P. (2020, July). Antibacterial-coated silk surgical sutures by ex situ deposition of silver nanoparticles synthesized with *Eucalyptus camaldulensis* eradicates infections. *Journal of Microbiological Methods, 174,* 105955. https://doi.org/10.1016/j.mimet.2020.105955
45. Sneha, K. R., Steny, P. S., & Sailaja, G. S. (2021). Intrinsically radiopaque and antimicrobial cellulose-based surgical sutures from mechanically powerful *Agave sisalana* plant leaf fibers. *Biomaterials Science, 9*(23), 7944–7961. https://doi.org/10.1039/D1BM00977B
46. Jayaindhraeswaram, J., Senthil Nathan, P., & Arun, M. (2021). Comparison of microbial accumulation in silk and antibacterial suture following third molar surgery. *International Journal of Dentistry and Oral Science, 8*(7), 3442–3445. https://doi.org/10.19070/2377-8075-21000699
47. Kaur, A., et al. (2021, January). [Title not provided]. *International Surgery Journal, 8*(1), 103–110. https://doi.org/10.18203/2349-2902.isj20205791
48. Adkins, J. M., Ahmar, R. A., Yu, H. D., Musick, S. T., & Alberico, A. M. (2022, February). Comparison of antimicrobial activity between bacitracin-soaked sutures and triclosan-coated suture. *Journal of Surgical Research, 270,* 203–207. https://doi.org/10.1016/j.jss.2021.08.011
49. Xavier, S. A., & Wahab, A. (2022). Comparison of chlorhexidine-coated polyglycolic acid sutures with silk sutures during third molar surgery: A prospective, randomized, double-blind clinical study. *International Journal of Health Sciences, 6*(S4), 3609–3616. https://doi.org/10.53730/ijhs.v6nS4.9440
50. Lou, C. W., Hung, C. Y., Wei, M., Li, T., Shiu, B. C., & Lin, J. H. (2023, April 28). Antibacterial surgical sutures developed using electrostatic yarn wrapping technology. *Journal of Functional Biomaterials, 14*(5), 248.

https://doi.org/10.3390/jfb14050248
51. Shrestha, P., Zhang, Y., Chen, W.-J., & Wong, T.-Y. (2020). Triclosan: Antimicrobial mechanisms, antibiotic interactions, clinical applications, and human health. *Journal of Environmental Science and Health, Part C: Toxicology and Carcinogenesis, 38*(3), 245–268. https://doi.org/10.1080/26896583.2020.1797642
52. Sandeep, S., Reshmi, P., Nilesh, M., & Anish, D. (2015, February). Triclosan-coated sutures: An overview of safety and efficacy in reducing surgical site infections. *International Surgery Journal, 2*(1), 1–7. https://doi.org/10.5455/2349-2902.isj20150201
53. Gowtham, K., Anandh, B., Srinivasan, K., & Umar, M. (2020). Suture materials in dental surgeries: A review. *Annals of SBV, 9*(1), 30–32. https://doi.org/10.5005/jp-journals-10085-8114
54. Dart, A. J., & Dart, C. M. (2017). [Chapter]. In *Comprehensive Biomaterials II* (Vol. 7, pp. 746–771). Elsevier. https://doi.org/10.1016/B978-0-12-803581-8.09995-9
55. Cromb, M. M. (2023). Sutures, sharps, and instruments. In J. A. Rothrock (Ed.), *Alexander's care of the patient in surgery* (17th ed., pp. 174–198). Elsevier.
56. Jessica, R., & Faiz, T. (2024, January). Sutures and needles. In *StatPearls*. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK539879/
57. Wormald, J. C. R., Claireaux, H. A., Baldwin, A. J., Chan, J. K., Rodrigues, J. N., Cook, J. A., Prieto, A. D., Clarke, M. J., & Costa, M. L. (2022). Antimicrobial sutures for the prevention of surgical site infection. *Cochrane Database of Systematic Reviews, 2022*(6), CD014719. https://doi.org/10.1002/14651858.CD014719.pub2
58. Madhulaxmi, M., et al. (2020). [Title not provided]. *International Journal of Research in Pharmaceutical Sciences, 11*(SPL4), 2254–2258. https://doi.org/10.26452/ijrps.v11iSPL4.4425
59. Javed, F., Al-Askar, M., Almas, K., Romanos, G. E., & Al-Hezaimi, K. (2012, May). Tissue reactions to various suture materials used in oral surgical interventions. *ISRN Dentistry, 2012,* 762095. https://doi.org/10.5402/2012/762095
60. Katz, S., Izhar, M., & Mirelman, D. (1981). Bacterial adherence to surgical sutures: A possible factor in suture-induced infection. *Annals of Surgery, 194*(1), 35–41. https://doi.org/10.1097/00000658-198107000-00007
61. Banche, G., Roana, J., Mandras, N., Amasio, M., Allizond, V., Giacchino, F., Cuffini, A. M., & Carlone, N. A. (2007). Microbial adherence on various intraoral suture materials in patients undergoing dental surgery. *Journal of Oral and Maxillofacial Surgery, 65*(8), 1503–1507. https://doi.org/10.1016/j.joms.2006.09.022
62. Slots, J., & Ting, M. (2015). *Atlas of oral microbiology: From healthy microflora to disease* (pp. 95–107). Wiley-Blackwell.
63. Chithra, A., Kudva, A., Srikanth, G., Shukla, A., Singla, N., & Singh, A. (2021). Evaluation of efficacy of absorbable antibacterial suture over silk suture in the closure of extraction socket of impacted mandibular third molars: A randomized controlled study. *International Journal of Clinical Dentistry, 14,* 333–343.
64. Chaganti, S., Kunthsam, V., Velangini, S. Y., Alzahrani, K. J., Alzahrani, F. M., Halawani, I. F., Alshahrani, M., Ashi, H., Baeshen, H. A., & Patil, S. (2023, September). Comparison of bacterial colonization on absorbable non-coated suture with triclosan- or chlorhexidine-coated sutures: A randomized controlled study. *European Review for Medical and Pharmacological Sciences, 27*(18), 8371–8383. https://doi.org/10.26355/eurrev_202309_34474
65. Rintala, M., Päivänsalo, N., Tammela, T., Hurme, M., Peltola, T., & Koskela, S. (2017, January). Triclosan-containing sutures versus ordinary sutures for reducing surgical site infections in children: A double-blind, randomised controlled trial. *The Lancet Infectious Diseases, 17*(1), 50–57. https://doi.org/10.1016/S1473-3099(16)30426-4
66. Pandey, V., & Sequeira, J. (2024). Comparison of antibacterial-coated and noncoated suture material in closure of extraction socket: A clinical and microbiological study. *World Journal of Dentistry, 15*(2), 121–126. https://doi.org/10.5005/jp-journals-10015-2334
67. Gupta, A., Rao, N., Sharma, S., & Shrivastav, A. (2022, February). Silk vs. antibiotic sutures in minor oral surgical procedures. *Indian Journal of Applied Research, 12*(2). https://doi.org/10.36106/ijar
68. Krishna, S., Bhaskaran, R., Kumar, S. P., Krishnan, M., & Lakshmanan, S. (2023, November 24). Microbiological evaluation of four different suture materials used for the surgical removal of impacted lower third molars: A single-center prospective comparative study. *Cureus, 15*(11), e49370. https://doi.org/10.7759/cureus.49370
69. Milad, E., Rahgozar, S., Tajmiri, G., & colleagues. (2022, July–December). Microbiological evaluation of the antibacterial vicryl suture in the mandibular third molar extraction surgery. *Journal of Orofacial Sciences, 14*(2), 120–127. https://doi.org/10.4103/jofs.jofs_120_21

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