

Research Article

Comparative Study of Conventional Suture Knot Versus Buried Knot Technique in Oral and Maxillofacial Surgery: A Randomized Clinical Trial

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Abstract

Objective: To compare postoperative wound healing, infection rate, wound dehiscence, patient discomfort, food debris and plaque accumulation between conventional external knot suturing and buried knot suturing techniques in oral and maxillofacial surgical procedures. **Methods:** A prospective randomized clinical trial conducted in the Department of Oral and Maxillofacial Surgery over a period of 40 days. A total of sixty patients undergoing oral surgery require incision closure, All participants of research were randomly placed in two groups. Group A (n=30) Patients surgical incision (site) closure done using conventional interrupted sutures with exposed knots, whereas Group B (n=30) Patients have surgical incision (site) closure done using buried knot sutures. Clinical parameters including Suturing time, patient comfort, wound healing, wound infection; wound dehiscence, pain score, plaque accumulation around sutures, and healing index were assessed on postoperative days 7, 14, 30, and 40. The Statistical analyses was performed using SPSS version 25, with $p < 0.05$ considered statistically significant. **Results:** Buried knot sutures shows lower postoperative discomfort, plaque, food debris accumulation and infection rates as compared with conventional suture knot. Wound healing were better in the buried suture knot group at postoperative days 14 and 30. The incidence of wound dehiscence were also low in Group B, although the difference was not statistically significant. Patient discomfort and foreign-body sensation were also much reduced in the buried knot suture group (Group B). **Conclusion:** The buried knot suturing technique shows a better healing, reduced plaque and food debris retention, foreign body sensation and lower postoperative infection rates compared with conventional exposed knot suturing but a little bit more time consuming. Buried knot closure may be considered a preferable alternative for intraoral wound closure in oral and maxillofacial surgery.

Keywords

Buried Knot, Conventional Knot, Maxillofacial Surgery, Patient Comfort, Wound Healing, Surgical Site Infection, Foreign Body Sensation, Suturing Technique

1. Introduction

A better surgical site closure remains a crucial determinant of successful outcomes in any surgical practice and especially in oral and maxillofacial surgery. Sutures not only facilitate

tissue margins approximation but also influence postoperative healing, infection rates, and patient comfort. Conventional interrupted sutures typically leave knots exposed within the oral

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cavity, creating potential sites for plaque food debris accumulation and bacterial colonization.

The surgical procedures in the oral cavity presents unique challenges during healing due to its constant exposure to saliva, food debris, and a diverse microbial environment. Surgical knots may provide a reservoir for bacterial adherence, increasing the risk of local inflammation and delayed wound healing. Recent advancement in wound closure techniques have focused on minimizing knot-related complications with improving patient comfort.

The buried knot suturing technique place the knots beneath the mucosal surface, thereby reducing direct exposure to the oral environment. This may decrease bacterial colonization and enhance wound healing. Despite its theoretical advantages, limited evidence exists comparing buried knot and conventional knot techniques in oral and maxillofacial surgery.

The present study aimed to compare the clinical outcomes of conventional knot suture and buried knot suture.

2. Materials and Methods

2.1. Study Design

A prospective randomized clinical trial was conducted over a period of 40 days at the Department of Oral and Maxillofacial Surgery in DHQ Teaching hospital timergara dir lower.

2.2. Sample Size

Total sixty (60) participants were included and randomly placed into two groups:

- 1) Group A: Surgery with Conventional knot sutures (n=30) done.
- 2) Group B: Surgery with Buried knot sutures (n=30) done.

2.3. Inclusion Criteria

- 1) Patients aged 18–60 year both male and female.
- 2) Patients requiring intraoral surgical site closure following oral and maxillofacial surgical procedures.
- 3) Patients willing for consent.

2.4. Exclusion Criteria

- 1) Uncontrolled diabetes mellitus.
- 2) Immunocompromised patients.
- 3) Smokers.
- 4) Patients receiving radiotherapy or chemotherapy.
- 5) Patients with poor oral hygiene.

2.5. Surgical Technique

All oral surgical procedures were performed under aseptic surgical protocols.

Group A: Incision closed with conventional knots using resorb able suture (viral 3-0).

Group B: Incision closed with buried knots placed beneath the mucosal surface using resorb able suture (viral 3-0).

2.6. Outcome Measures

- 1) Surgical site infection.
- 2) Wound dehiscence.
- 3) Pain assessment using Visual Analog Scale (VAS).
- 4) Plaque accumulation around sutures.
- 5) Healing assessment using Landry Wound Healing Index.

2.7. Follow-up

Patients were evaluated on postoperative days:

- 1) 7th Day
- 2) 14th Day
- 3) 30th Day
- 4) 40th Day

2.8. Statistical Analysis

All concern data were analyzed using SPSS Version 25. Independent t-test and Chi-square test were applied. Statistical significance was set at $p < 0.05$.

3. Results

Demographic Characteristics: Total sixty patients otherwise healthy included in the study. There was no significant difference between groups regarding age and gender distribution ($p > 0.05$).

Table 1. Baseline Characteristics.

Variable	Conventional Knot	Buried Knot	p-value
Mean Age (years)	32.2 ± 8.	31.6 ± 7.9	0.78
Male	17	14	0.80
Female	13	16	0.80

Table 2. Postoperative Complications.

Outcome	Conventional knoy	Burried Knot	p-value
Infection	8 (26%)	1 (3.3%)	0.04
Dehiscence	4 (13.3%)	1 (3.3%)	0.16
Plaque Accumulation	12 (40%)	2 (6.7%)	0.01

Table 3. Mean Healing Scores.

Follow-up day	Conventional Knot	Buried Knot	p-value
7 th Day	3.2 ± 0.6	3.5 ± 0.5	0.08
14 th Day	3.8 ± 0.5	4.4 ± 0.4	0.002
30 th Day	4.2 ± 0.4	4.8 ± 0.3	0.001
40 th Day	4.8 ± 0.3	4.9 ± 0.2	0.19

Patients in the buried knot group have significantly lower pain and foreign-body sensation during the first postoperative week.

4. Discussion

Successful surgical site healing usually depends on meticulous tissue handling, margin approximation along with minimizing bacterial contamination. This study demonstrated a better clinical outcome with buried knot sutures as compared to conventional exposed knot sutures. The findings of the present study demonstrate that the buried knot suturing technique provides superior postoperative outcomes compared with the conventional exposed knot technique. Patients treated with buried knots experienced lower rates of surgical site infection, reduced plaque and food debris accumulation, improved wound healing scores, and better postoperative comfort [4, 7]. These findings are consistent with the growing body of evidence suggesting that minimizing the exposure of suture knots to the oral environment reduces bacterial colonization and promotes more favorable wound healing outcomes [3, 5, 8].

The oral cavity presents a unique challenge for wound healing because of its warm, moist environment and the presence of a diverse microbial flora. Exposed suture knots act as plaque-retentive sites and facilitate bacterial adhesion, increasing the likelihood of local inflammation and delayed tissue repair. Previous clinical studies have demonstrated that bacterial colonization of suture materials is strongly influenced by knot configuration, surface characteristics, and the duration of suture exposure within the oral cavity [9-11]. By positioning the knot beneath the mucosal surface, the buried knot technique reduces direct contact with saliva, food particles, and oral microorganisms, thereby limiting microbial accumulation and decreasing the inflammatory response.

The reduced infection rate observed in the buried knot group may be attributed to the elimination of exposed knot surfaces that act as plaque and food debris-retentive areas. The knot will be a bunch and also not clean properly also will provide a shelter for microbes, buried knot will don't have such a structure exposed to oral cavity and also have reduced bacterial accumulation, colonization and improved healing were observed.

The significantly lower plaque accumulation observed in the buried knot group in the present study supports previous

investigations evaluating microbial adherence on different suture materials. Yaman et al. reported that postoperative bacterial colonization was significantly influenced by suture design and surface characteristics, with exposed braided sutures demonstrating greater microbial adherence than less exposed or monofilament configurations [1]. Similarly, randomized clinical studies evaluating various suture materials in oral implantology have shown that minimizing bacterial retention on sutures contributes to improved healing and reduced postoperative complications [5]. The lower plaque accumulation observed in the buried knot group supports the hypothesis that exposed knots serve as sites for food debris retention and bacterial colonization. This finding is theoretically and clinically important because oral surgical wounds are continuously challenged by food debris, saliva and microbial contamination.

Patient comfort is another important determinant of successful postoperative recovery. Exposed knots frequently produce irritation of the oral mucosa, foreign-body sensation, and discomfort during mastication and speech. In the present study, patients in the buried knot group consistently reported less discomfort during the first postoperative week. Comparable observations have been reported in randomized clinical trials evaluating knotless and barbed sutures for intraoral wound closure, where reduced tissue irritation and improved patient satisfaction were noted when exposed knots were eliminated [1, 2, 6].

An important finding of the present study was the significantly lower incidence of postoperative surgical site infection in the buried knot group. Although the overall infection rate following oral and maxillofacial surgery remains relatively low, bacterial contamination of exposed suture knots may serve as an initiating factor for localized wound infection. Previous randomized controlled trials have demonstrated that reducing exposed foreign material within the oral cavity contributes to lower bacterial colonization and improved wound healing [1, 9, 10]. These observations further support the concept that knot placement, in addition to suture material selection, plays an important role in postoperative wound management.

Although wound dehiscence occurred less frequently in the buried knot group, the difference did not reach statistical significance. This finding is likely related to the relatively small sample size and limited duration of follow-up. Larger multicenter randomized clinical trials may better determine whether buried knot placement provides a measurable reduction in wound dehiscence following oral and maxillofacial surgical procedures [5, 8].

Another practical consideration is the additional operative time required to perform buried knot suturing. The technique requires greater surgical precision and familiarity compared with conventional interrupted sutures. However, the slight increase in suturing time may be justified by the reduction in postoperative complications and the improvement in patient comfort observed in the present study. As surgeons become more experienced with the technique, the difference in operative time is expected to decrease [2, 6].

The strengths of the present study include its prospective randomized design, standardized surgical protocol, uniform postoperative evaluation schedule, and assessment of multiple clinically relevant outcome measures. Nevertheless, several limitations should be acknowledged. The study was conducted at a single institution with a relatively limited sample size and short follow-up period. Future multicenter randomized trials with larger patient populations, longer observation periods, and microbiological evaluation of bacterial colonization are recommended to further validate the clinical advantages of buried knot suturing in oral and maxillofacial surgery [1-11].

5. Conclusion

Buried knot suturing demonstrates better clinical outcomes as compare to conventional knot suturing in oral and maxillofacial surgery. The technique results in reduced infection rates, decreased plaque, food debris accumulation, improved wound healing, and enhanced patient comfort. Buried knot closure should be considered a valuable alternative for intraoral wound management.

Abbreviations

DHQ	District Head Quarter
SPSS	Statistical Package for the Social Science
VAS	Visual Analog Scale

Author Contributions

Abubakar Saddique: Conceptualization, Methodology, Writing – original draft

Zubair Ahmad: Investigation, Formal Analysis

Shahab Ud Din Khan: Writing – original draft

Conflicts of Interest

The author have no conflict of interest.

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