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Suturing material employed in routine dental practice and its outcomes: A cross-sectional qualitative analysis.

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Abstract

Background: The selection of an appropriate suture material is a critical determinant of wound healing following oral surgical procedures. Despite the availability of a wide range of absorbable and non-absorbable materials, the choice in routine dental practice is often guided by habit, cost, and institutional training rather than evidence-based criteria. Aim: To assess the patterns of suture material usage among dental practitioners, the rationale underlying their preferences, and the clinically observed outcomes and complications associated with these materials. ***Materials and Methods***: A cross-sectional questionnaire-based qualitative study was conducted among 210 dental practitioners, including general dental practitioners, oral and maxillofacial surgeons, and periodontists. A pre-validated, structured questionnaire covering demographic details, suture material preferences, reasons for selection, and observed post-operative outcomes was distributed. Data were analyzed using descriptive statistics and the chi-square test, with $p < 0.05$ considered statistically significant. ***Results***: Of 210 respondents, 196 returned completed questionnaires (response rate 93.3%). Black braided silk (3-0) was the most commonly employed suture material (58.2%), followed by polyglactin 910 (24.5%), polytetrafluoroethylene (PTFE) (8.2%), and chromic catgut (6.1%). Ease of handling (44.9%) and cost (26.5%) were the leading reasons for material selection. Plaque accumulation around suture threads (38.8%) and wound dehiscence (17.3%) were the most frequently reported complications, both occurring predominantly with silk. Specialists were significantly more likely than general practitioners to use absorbable synthetic and monofilament materials ($p < 0.05$). ***Conclusion***: Non-resorbable braided silk remains the workhorse of routine dental practice despite well-documented disadvantages, chiefly because of handling ease and economy. There is a clear need for continuing education to align suture selection with contemporary evidence favoring synthetic and monofilament materials in specific clinical situations.

Keywords: Suture materials; silk; polyglactin 910; oral surgery; wound healing; cross-sectional study.

INTRODUCTION

Wound closure is one of the oldest and most fundamental procedures in surgery, and the humble suture remains its cornerstone. In dentistry, sutures are used daily after extractions, periodontal flap surgery, implant placement, biopsy, and a host of minor oral surgical interventions. The primary purposes of intraoral suturing are to reposition and stabilize mucoperiosteal flaps, achieve primary closure, secure hemostasis, and protect the underlying clot and healing tissues from mechanical disturbance and contamination [1]. The choice of suture material therefore has a direct bearing on the quality and speed of soft-tissue healing, patient comfort, and the incidence of post-operative complications [1,2].

Suture materials are broadly classified as absorbable (e.g., plain and chromic catgut, polyglactin 910, polyglycolic acid) or non-absorbable (e.g., silk, nylon, polypropylene, polytetrafluoroethylene), and by their physical configuration as monofilament or multifilament (braided) [2,3]. Each class carries distinct advantages and drawbacks. Braided materials such as silk offer excellent handling characteristics, superior knot security, and low cost, which explains their enduring

popularity; however, their capillarity promotes "wicking" of oral fluids and bacteria along the thread into the wound, and they elicit a comparatively intense inflammatory tissue reaction [4-6]. Monofilament materials, by contrast, resist bacterial adherence and glide atraumatically through tissue, but they demand greater technical skill, possess memory, and their knot ends may irritate the oral mucosa [3,7].

The oral cavity presents a uniquely hostile environment for wound healing. Sutures placed intraorally are continuously bathed in saliva, exposed to a dense and diverse microbial flora, subjected to masticatory forces and tongue movement, and often traverse thin, friable mucosa [5,6]. Microbiological studies have consistently demonstrated heavy bacterial colonization of intraoral sutures within days of placement, with braided silk harboring significantly greater microbial loads than synthetic monofilaments such as PTFE or polypropylene [5,6,8]. Histological investigations similarly show more pronounced inflammatory infiltrates around silk and catgut than around synthetic absorbable and monofilament materials [4,9,10].

Despite this substantial body of evidence, surveys and clinical observation suggest that suture selection in everyday dental practice is frequently dictated by tradition, undergraduate training, availability, and economic considerations rather than by the biological demands of the wound [1,7]. Newer materials — including antibacterial-coated polyglactin, cyanoacrylate tissue adhesives, and PTFE sutures for implant and regenerative surgery — have been introduced, yet their penetration into routine practice appears limited [7,11].

There is a relative paucity of data documenting which suture materials dental practitioners actually use in day-to-day practice, why they choose them, and what outcomes and complications they observe. Such information is essential for identifying gaps between evidence and practice and for designing targeted continuing dental education. The present cross-sectional qualitative study was therefore undertaken to analyze the suturing materials employed in routine dental practice, the rationale behind their selection, and the clinical outcomes associated with their use.

MATERIALS AND METHODS

A descriptive, cross-sectional, questionnaire-based qualitative study was conducted over a period of four months (January 2026 to April 2026) among dental practitioners working in private clinics, dental teaching institutions, and hospital dental departments in and around the study region.

Ethical considerations: The study protocol was reviewed and approved by the Institutional Ethics Committee (approval number: IEC/DENT/2025/114). Participation was voluntary, written informed consent was obtained from all respondents, and anonymity and confidentiality of responses were assured. The study was conducted in accordance with the Declaration of Helsinki.

Sample size and sampling: The minimum sample size was calculated using the formula $n = Z^2pq/d^2$, assuming an expected proportion (p) of 50% for silk usage, a 95% confidence level (Z = 1.96), and an absolute precision (d) of 7%, yielding a minimum of 196 participants. Allowing for a 10% non-response rate, 210 practitioners were approached using a convenience sampling technique.

Inclusion and exclusion criteria: Registered dental practitioners with at least one year of clinical experience who routinely performed procedures requiring intraoral suturing (extractions, minor oral surgery, periodontal surgery, or implant surgery) were included. Interns, undergraduate students, and practitioners who did not perform suturing in their practice were excluded. Incomplete questionnaires (more than 20% unanswered items) were discarded from analysis.

Study instrument: A structured, close-ended questionnaire was developed after a review of the relevant literature and was content-validated by a panel of three subject experts (an oral and maxillofacial surgeon, a periodontist, and a public health dentist). A pilot study on 20 practitioners (not included in the final sample) was performed to test clarity and reliability; the instrument demonstrated acceptable internal consistency (Cronbach's alpha = 0.81). The final questionnaire comprised four sections: (i) demographic and professional details (age, sex, qualification, specialty, years of experience); (ii) suture material preferences — type, size, and needle used in routine practice; (iii) reasons for selection of the preferred material; and (iv) observed post-operative outcomes, complications, and timing of suture removal. Open-ended qualitative responses regarding practitioners' perceptions of ideal suture properties were also recorded and thematically categorized.

Data collection: Questionnaires were distributed in person and through a secure online survey platform. Two reminders were sent to non-responders at two-week intervals.

Statistical analysis: Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics (frequencies and percentages) were computed for all categorical variables. The chi-square test was applied to assess associations between practitioner category (general practitioner versus

specialist) and suture material preference, and between suture material and reported complications. A p-value of less than 0.05 was considered statistically significant. Qualitative responses were analyzed thematically by two independent reviewers, and discrepancies were resolved by consensus.

RESULTS

Of the 210 questionnaires distributed, 196 completed responses were received (response rate 93.3%) and included in the final analysis.

Table 1. Demographic and professional characteristics of the study participants (n = 196)

Variable	Category	n	%
Sex	Male	108	55.1
	Female	88	44.9
Age (years)	25–34	92	46.9
	35–44	64	32.7
	≥45	40	20.4
Qualification	General dental practitioner (BDS)	112	57.1
	Oral & maxillofacial surgeon	38	19.4
	Periodontist	30	15.3
	Other specialists	16	8.2
Clinical experience	1–5 years	74	37.8
	6–10 years	62	31.6
	>10 years	60	30.6

The study population was dominated by general dental practitioners (57.1%), with a fairly even distribution across experience categories, indicating that the findings reflect the full spectrum of routine practice.

Table 2. Suture materials preferred in routine practice (n = 196)

Suture material	n	%
Black braided silk (non-absorbable, multifilament)	114	58.2
Polyglactin 910 (absorbable, braided)	48	24.5
PTFE (non-absorbable, monofilament)	16	8.2
Chromic catgut (absorbable, natural)	12	6.1
Nylon / polypropylene (non-absorbable, monofilament)	6	3.0
Most commonly used size		
3-0	130	66.3
4-0	52	26.5
5-0 or finer	14	7.2

Black braided silk in size 3-0 mounted on a 3/8-circle reverse-cutting needle emerged as the single most popular combination. Absorbable synthetic material (polyglactin 910) was preferred by roughly a quarter of respondents, while monofilament materials collectively accounted for just over 11% of use.

Table 3. Distribution of preferred suture material by practitioner category

Suture material	General practitioners (n = 112)	Specialists (n = 84)	p-value
Silk	82 (73.2%)	32 (38.1%)	
Polyglactin 910	20 (17.9%)	28 (33.3%)	<0.001*
PTFE / other monofilament	4 (3.6%)	18 (21.4%)	
Chromic catgut	6 (5.3%)	6 (7.2%)	

*Chi-square test; statistically significant.

A statistically significant association was found between practitioner category and material preference ($p < 0.001$). Silk dominated among general practitioners, whereas specialists — particularly periodontists and implant surgeons — showed a markedly higher uptake of polyglactin 910 and PTFE.

Table 4. Reasons cited for selection of the preferred suture material (n = 196)

Reason	n	%
Ease of handling and knot security	88	44.9
Low cost / economy	52	26.5
Familiarity from undergraduate training	28	14.3

Favorable tissue response / less inflammation	16	8.2
No need for removal (absorbable)	12	6.1

Handling characteristics and cost together accounted for more than 70% of selection decisions, while biological considerations (tissue response) influenced fewer than one in ten practitioners.

Table 5. Post-operative outcomes and complications reported with the routinely used material (n = 196; multiple responses permitted)

Observed outcome / complication	n	%	Material most implicated
Uneventful healing in most cases	122	62.2	—
Plaque/debris accumulation on suture	76	38.8	Silk
Wound dehiscence / early knot loosening	34	17.3	Silk, catgut
Localized inflammation / suture abscess	28	14.3	Silk
Patient discomfort from suture ends	22	11.2	Nylon, PTFE
Premature loss of suture	18	9.2	Catgut
Suture removal at 7 days	148	75.5	—
Suture removal at 5 days or earlier	30	15.3	—

Although healing was uneventful in the majority of cases, plaque accumulation and soft-tissue inflammation — both classically associated with braided silk — were the most frequent adverse observations, followed by dehiscence. Discomfort from stiff knot ends was the principal complaint linked to monofilaments. Three-quarters of practitioners removed non-resorbable sutures at seven days.

Qualitative findings

Thematic analysis of open-ended responses identified three recurrent themes: (i) "silk is what we were trained on" — the strong imprint of undergraduate education on lifelong material choice; (ii) cost-consciousness in high-volume practice, with several respondents noting that synthetic materials were "hard to justify for a routine extraction"; and (iii) aspiration toward newer materials, with many specialists expressing willingness to adopt PTFE and antibacterial-coated sutures if cost barriers were reduced and hands-on training was made available.

DISCUSSION

The present study demonstrates that black braided silk remains overwhelmingly the suture material of choice in routine dental practice, employed by 58.2% of respondents overall and by nearly three-quarters of general practitioners. This finding is in agreement with earlier reports identifying silk as the most widely used intraoral suture owing to its excellent pliability, knot security, and low cost [1,3,7]. However, the continued dominance of silk stands in contrast to a robust body of evidence documenting its biological drawbacks. Banche et al. and Otten et al. demonstrated that braided materials, silk in particular, permit substantially greater bacterial adherence and colonization than monofilament sutures in the oral environment, constituting a potential portal for wound infection [5,6]. Asher et al. similarly reported significantly higher microbial accumulation on silk and polyglactin than on monofilament materials after oral surgery [8]. Histological studies by Javed et al., Selvi et al., and Leknes et al. confirm a more intense inflammatory reaction around silk than around synthetic materials [2,4,10]. Our respondents' own observations mirror this literature: plaque accumulation, peri-sutural inflammation, and dehiscence were reported predominantly with silk (Table 5).

The reasons underlying material selection in this study — handling ease (44.9%), cost (26.5%), and familiarity from training (14.3%) — reveal that practical and economic factors, rather than wound biology, drive decision-making. This echoes the observations of Silverstein and Kurtzman, who noted that suture selection in dentistry is often habitual, and underscores the powerful influence of undergraduate curricula on lifelong clinical behavior [1,3]. The qualitative theme "silk is what we were trained on" captured this phenomenon vividly.

Encouragingly, specialists showed a significantly different pattern of use, with greater adoption of polyglactin 910 and PTFE ($p < 0.001$). This aligns with contemporary recommendations: polyglactin 910 offers predictable resorption, good tensile strength, and acceptable tissue response, making it attractive when suture removal is undesirable [4,9,11], while PTFE has become the material of choice in implant and regenerative surgery because of its monofilament structure, minimal bacterial wicking, and soft, non-irritating texture [7,12]. Randomized clinical data by Dragovic et al. comparing four suture materials found the poorest healing indices and heaviest microbial colonization with silk, and the best outcomes with monofilament materials [9]. Sortino et al. likewise reported superior healing with polyglycolic acid compared with silk after third-molar surgery [13], and Gazivoda et al. and Kakoei et al. found synthetic materials to provoke milder tissue reactions than natural ones [14,15].

The complication of patient discomfort from stiff monofilament knot ends noted by our respondents is a recognized limitation of nylon and polypropylene intraorally, and it partly explains the reluctance to abandon silk [3,7]. Cost was the

second major barrier; this has clear implications for manufacturers and policy makers, since price reduction and bulk institutional procurement could meaningfully shift practice patterns.

Limitations: The convenience sampling and self-reported nature of the data introduce potential selection and recall bias, and the regional sample limits generalizability. Outcomes were practitioner-observed rather than objectively measured. Nevertheless, the high response rate and mixed-methods design provide a credible snapshot of real-world practice.

CONCLUSION

Within the limitations of this cross-sectional qualitative analysis, black braided silk remains the predominant suture material in routine dental practice, chosen chiefly for its handling properties, economy, and familiarity, despite well-documented disadvantages including bacterial wicking, plaque accumulation, and heightened tissue reaction. Specialists demonstrate a significantly greater shift toward absorbable synthetic and monofilament materials, reflecting evidence-based practice in periodontal and implant surgery. Continuing dental education programs, revision of undergraduate suturing curricula, and improved affordability of synthetic and monofilament sutures are recommended to narrow the gap between available evidence and everyday clinical practice.

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