

Preference And Usage Of Different Suture Materials In Practising Oral And Maxillofacial Surgeons: An Original Research

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Abstract

Aim: The purpose of the present research was to assess the preference of various suture materials amongst many oral and maxillofacial surgeons.

Methodology: Descriptive study was conducted among 200 oral surgeons. A survey was designed and distributed with questions intending to answer the preference of various type of suture materials amongst participants. The collected results were averaged (mean \pm standard deviation) for all parameters.

Results: 136 participants completed the survey. Mostly oral surgeons (89.4%) preferred 3 most commonly used absorbable suture materials (catgut, Dexon and Vicryl rapide). Vicryl sutures gave more tensile strength in oral wound healing according to 65.3% of participants.

Conclusion: Most oral surgeons preferred usage of absorbable sutures over non-absorbable ones which provides more patient compliance, less wound dehiscence.

Keywords: Oral surgical procedures; sutures; treatment outcome

INTRODUCTION

The suture indicates the repairing surgical act that allows to approximate the wound edges, keeping them united until the healing process will confer to the same wound the intrinsic force sufficient to maintain itself, without the necessity of a mechanical support.¹Moreover, the surgical suture, isolating the healing centre, promotes the cicatrization process, controls the haemostasis, stabilizes the tissues on the requested position, has an opening function, it protects the wound by an external contamination and improves the patient comfort. A suture material should have an ideal characteristic such as comfortable in handling,

incite small amount of tissue reaction, should not promote bacterial growth, tensile strength has to be high, should be able to hold knots effectively, ease in sterilization, should have no electrolytic, capillary, allergenic or carcinogenic action and should be absorbed after serving its function. There is no single suture encompassing all these properties and different sutures are required depending upon the tissue involved.² The choice of the suture material is based on the biological interaction of the materials employed, the tissue configuration, and the biomechanical properties of the wound. Sutures are found in different colors which indicators the usage of it in certain cases for distinguishing the different anatomical structures. The colour enhances suture visibility, even if steeped in blood, making stitch removal easier. For a instead, in vascular surgery to differentiate between artery and suture strings, sutures appear in bright colours.³ A suture material is also elastic to enhance the material to regain its initial length after stretching. This helps to stretch oedematous tissue, at the same time its original length and shape on remission of the oedema is maintained.⁴ During placement of suture in tissue the suture material should pass smoothly through it and has to function as a coefficient of friction. This capacity is known as suture glide.⁵ The suture material which has a high coefficient of friction allows a saw effect as they pass through the tissues. Therefore, these two criteria have an inversely proportional relationship where a low coefficient of friction will always be the preference although there is a disadvantage (high tendency of slipping).⁶ Classification of suture material has 3 major categories. It started with absorbable or non-absorbable, monofilament or multifilament and whether they are made from natural or synthetic material.⁷ Braided or multifilament sutures have a number of strands woven together whereas the non-braided sutures cause less reactivity in the body.³ They are less prone to becoming infected due to its minimal grooves and rough surface which allows tissues to adhere. However, it has a disadvantage to loosen at the surgical knot with the lack of grip.⁸ Absorbable sutures such as catgut and poly glycolic acid are mostly used in internal tissues; absorption is usually caused by the enzymatic degradation of natural sutures or by hydrolysis of synthetic materials, as opposed to non-absorbable sutures, like nylon and silk, which are preferably used for tissues that need stabilisation for a longer periods and must be removed by the operator.⁹ Monofilament suture material is made of a single strand which provides less tissue resistance and less likely to harbour microorganisms than multifilament sutures. However, crushing of the suture can lead to undesirable and premature suture failure. As reported, silk is one of the most cost-effective suture materials currently used.¹⁰ However, the primary drawback of this type of suture is the patient's discomfort in having sutures removed and the hassle of an additional visit to the clinic. Adhesives are being offered as a replacement for traditional suturing procedures as health care advances. Cyanoacrylates are powerful adhesives that are biocompatible, are biodegradable, and do not interfere with the healing process. It does, however, have minor stiffness and a variety of toxic effects that are still being investigated.¹¹ There are many suturing materials now available in the dental market. However, the selection of suture material for maxillofacial surgery is often based on personal choices rather than scientific data and has not been extensively investigated.

AIM OF THE PRESENT STUDY

The purpose of the present research was to assess the preference of various suture materials amongst many oral and maxillofacial surgeons.

METHODOLOGY

This descriptive study was conducted among 200 oral surgeons. The study protocol was approved by Ethics Committee. Survey was created in English language was prepared in Google Forms and were sent through e-mail accounts to the dentists to increase participation. The participants were asked to specify the choice of their suture type (absorbable or non-absorbable, monofilament or braided multifilament, and thread diameter [3-0, 4-0, 5-0, 6-0, and 7-0]), needle shape (circular shaped, reverse cutting, or cutting), accumulation of micro-organisms. The statistical analysis was performed using the Statistical Package for the Social Sciences software (IBM Corp, released 2013, Version 22.0, Armonk, New York). The collected results were averaged (mean \pm standard deviation) for all parameters.

RESULTS

In total, 136 participants completed the survey. Approximately, 41.2% of the specialists reported having 5 or more years of experience. About 42.6% of the participants reported that they perform mostly implant surgeries. In total, 58.9% of the participants reported performing surgical interventions more than three times in a week. In the survey, no clinician selected the 7–0 suture diameter. Mostly oral surgeons (89.4%) preferred 3 most commonly used absorbable suture materials (catgut, Dexon and Vicryl rapide). Vicryl sutures gave more tensile strength in oral wound healing according to 65.3% of participants. Most amount of inflammatory accumulation as well as bacterial colonization was more in non-absorbable sutures according to 92% of participants. 59.2% participants felt that compliance of patients is important in maintaining the hygiene in the surgical wound area and coming back for suture removal in around 7 days.

Table 1: Questionnaire used in the present study

S.No.	Questionnaire variables
1	Years of oral surgery experience – less than 5 years, more than 5 years
2	Major surgical interventions performed in a week- less than 3, more than 3
3	Preference based on absorbability of sutures- absorbable, non- absorbable
4	Bacterial colonization is most evident in- absorbable, non- absorbable
5	Patient compliance affects your decision of suture materials – yes, no
6	Which absorbable suture is preferred- vicryl, dexon, catgut

Table 2: Statistical variable data collected through questionnaire

Question no.	Mean \pm SD	P value
1	1.38 \pm 0.53	1.23
2	1.29 \pm 0.49	1.09
3	1.04 \pm 0.15	0.18
4	0.93 \pm 0.07	0.03
5	1.12 \pm 0.57	1.02
6	1.01 \pm 0.133	0.05

*P value less than 0.05 is statistically significant

DISCUSSION

Resorbable suture materials are most often the surgeon's primary choice in modern dento alveolar surgery. They eliminate the need for post-operative suture removal, reducing patient anxiety and usually result in less tissue inflammation. Sortino et al found that silk sutures exhibited a high degree of aerobic bacterial accumulation like *Streptococcus viridans*, *Neisseria saprofitia*, *Corynebacterium* and *Staphylococci* than poly glycolic acid sutures.¹² Pathogenic bacteria were also found such as *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Streptococcus pyogens*, and *Enterobacterium*. Asher et al concluded that neither the type of surgery (implant vs periodontal surgery) nor antibiotic taking significantly influence bacterial accumulation. However, nylon sutures showed significantly lower CFU levels compared to silk, coated polyglactin, and polyester sutures.¹³ Lekens et al found that bacterial plaque was detected in 10 of 11 silk and 4 of 11 expanded poly tetra fluo roethylene (ePTFE) suture channels at 7 days and 8 of 10 and 4 of 11 suture channels at 10 days. A clinical study was conducted by Lekens et al., to assess the inflammatory response against 2 sutures (braided silk suture and ePTFE sutures) in histological sections. They concluded that braided silk sutures cause more extensive inflammatory tissue reaction than ePTFE sutures.¹⁴References suggested that inflammatory tissue reaction is strongest with catgut. Our research results showed the highest level of inflammatory response in the observation period – on the postoperative days 3, 7, 14 and 21 – with Dexon, then with catgut, and the lowest with Vicryl rapide. Search for ideal suture material does not imply only biological

compatibility, but also good clinical behaviour – resistance to traction, dimensional stability, low memory effect, good knot security and good flexibility with mild capillary effect.

CONCLUSION

It seems that most of the oral surgeons preferred Vicryl rapide with having the best properties of the available absorbable suture materials for application in oral surgery.

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