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# TYPES OF SUTURES IN ORAL SURGERY

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2021

# GOALS OF **suturing**

wound edge apposition;

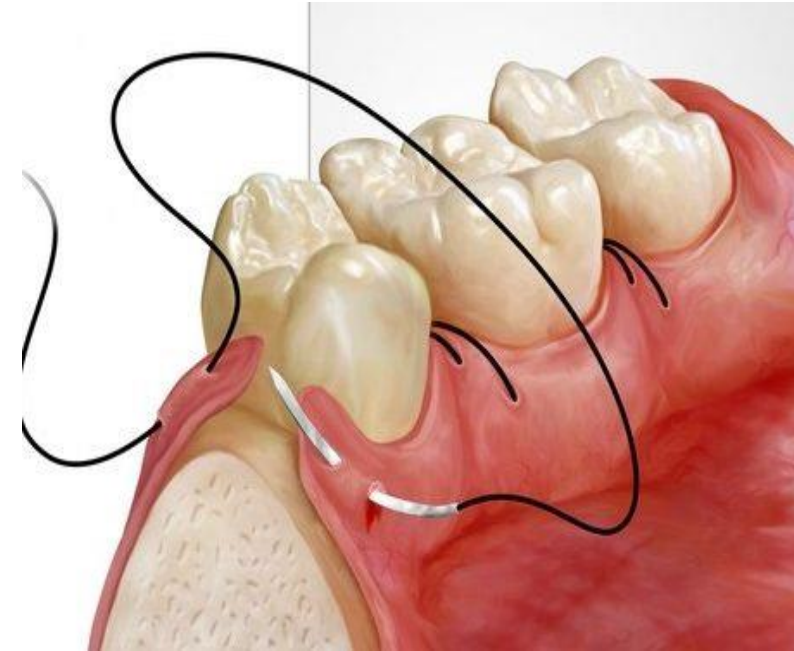
provide adequate tension;

maintain hemostasis;

aid in wound healing;

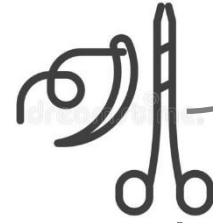
avoid wound infection;

produce aesthetically pleasing scar by approximating skin edges.





# CLASSIFICATION OF suture materials



Biological characteristics

Physical structure

Origin

ABSORBABLE

NON-ABSORBABLE

MULTIFILAMENT

MONOFILAMENT

SYNTHETIC

NATURAL Nylon

PTFE (polytetrafluorethylene)



Polygalactin 910



Polyglycolic Acid



Polyester braided



Monocryl



PDS II (polydioxanone)



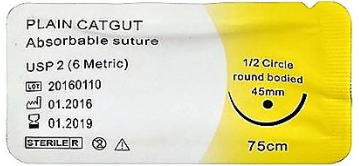
Polyglycolic Acid (PGA)



Nylon



Polyglecaprone 25



Plain catgut



Dexon



Plain catgut Vicryl



Silk



Silk

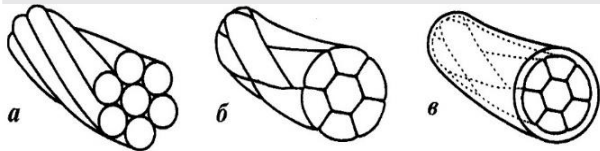


## Suture Materials

### Monofilament



### Multifilament



## Absorbable

Monocryl  
(polyglecaprone)  
Fast absorbing gut  
Chromic gut  
PDS II (polydioxanone)

Polyglycolic Acid  
Polygalactin 910  
Polygalactin 910 – rapid

## NON-ABSORBABLE

Nylon  
Polyamide  
Polypropylene  
Polyester

Silk  
Lenin  
Cotton  
Polyamide braided  
Polyester braided

# RESEARCH

"MEDLINE", "PubMed" and "CYBERLENINKA" databases

The research is based on already confirmed analyzes of individual authors and their collaborators in the period from 2003 to 2018.

**2003**

**Vestardis and Yukna**

Polygalactin 910

**2005**

**Leknes et al.**

Silk and PTFE  
(polytetrafluoroethylene)

**A. V. Dryga et al.**

Polysorb, Maxon and Vicryl

**2007**

**Banche et al.**

Silk, nylon, polyester and  
polyglucapron 25

**2008**

**Sortino et al.**

Silk and PGA (polyglycolic acid)

**2010**

**Yilmaz et al.**

Silk, Catgut, and polyglucapron 25

**Shahla Kakoei et al.**

Catgut (plain gut) and silk

**Pons-Vicente D. Et al.**

Silk and polyester sutures  
coated with Teflon

**2018**

**D. A. Abyldaev et al.**

Cotton, linen and silk

**Volodko V. A.**

Vicryl and Vicryl plus

**2011**

**Jae- Seok Kim et al.**

Nylon

**Aim of the research :**

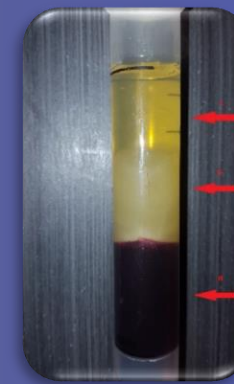
- ❖ to examine the reaction of the tissue to different suturing materials,
- ❖ to determine the speed of wound healing and the incidence of complications after their use
- ❖ to prove which of them is most suitable for oral surgery procedure.

# Study review

| Authors et al./year          | Subjects             | Type of procedure                                    | Suture material  | Main results   |
|------------------------------|----------------------|--|--|--|
| Leknes et al. / 2005         | Human                | periodontal surgery                                  | Silk and PTFE - polytetrafluoroethylene (monofilament, non-resorbable)   | <ul style="list-style-type: none"> <li>A stronger inflammatory reaction of the tissue was observed in silk sutures compared to PTFE sutures.</li> </ul>  |
| Shahla Kakoei et al / 2010   | Animal (albino mice) | surgical intervention on oral mucosa (buccal mucosa) | Catgut (plain gut) and silk  | <ul style="list-style-type: none"> <li>In the first two postoperative days - the silk sutures showed a significantly greater inflammatory response to the surrounding tissue than the catgut sutures.</li> <li>However, in the next four days, a larger amount of fibrous tissue was observed around the catgut sutures compared to the silk sutures.</li> </ul> |
| D. A. Abyldaev et al. / 2018 | Human                | oral-surgical intervention                           | Cotton, linen and silk (natural, multifilament, non-resorbable)  | <ul style="list-style-type: none"> <li>Cotton, linen, silk as multifilament sutures induce infection and subsequent inflammation much more often than monofilament sutures.</li> <li>Silk has been shown to have a particularly inhibitory effect on macrophages, affecting mainly the adhesion of these cells.</li> </ul>                                       |
| Banche et al. / 2007         | Human                | dentoalveolar surgery                                | Silk (resorbable)<br>nylon (monofilament, non-resorbable)<br>polyester (multifilament, non-resorbable)<br>and polyglucapron 25                             | <ul style="list-style-type: none"> <li>Bigger amount of adherent bacteria was observed around non-resorbable sutures than on resorptive ones.</li> <li>Resorbable silk and polyglucapron 25 showed the lowest amount of adherent bacteria.</li> </ul>  |
| Yilmaz el al. /2010          | Animal               | surgical intervention on oral mucosa (buccal mucosa) | Silk (natural, multifilament, non-resorbable),<br>Catgut (natural, monofilament, resorbable)<br>and polyglycapron 25 (synthetic, monofilament, resorbable) | <ul style="list-style-type: none"> <li>Reactions to silk and catgut are similar in animals with diabetes and in healthy individuals.</li> <li>More positive effects on tissue healing with polyglucapron 25 compared to others.</li> </ul>   |
| Pons-Vicente O. et al./2010  | Human                | Implantology   | Silk and polyester sutures coated with Teflon  | <ul style="list-style-type: none"> <li>The results showed that there is a larger accumulation of plaque on the silk threads.</li> <li>The intraoperative manipulation with the silk sutures was more uncomfortable, and the patients comfort was worse compared to the polyester sutures coated with Teflon.</li> </ul>  |

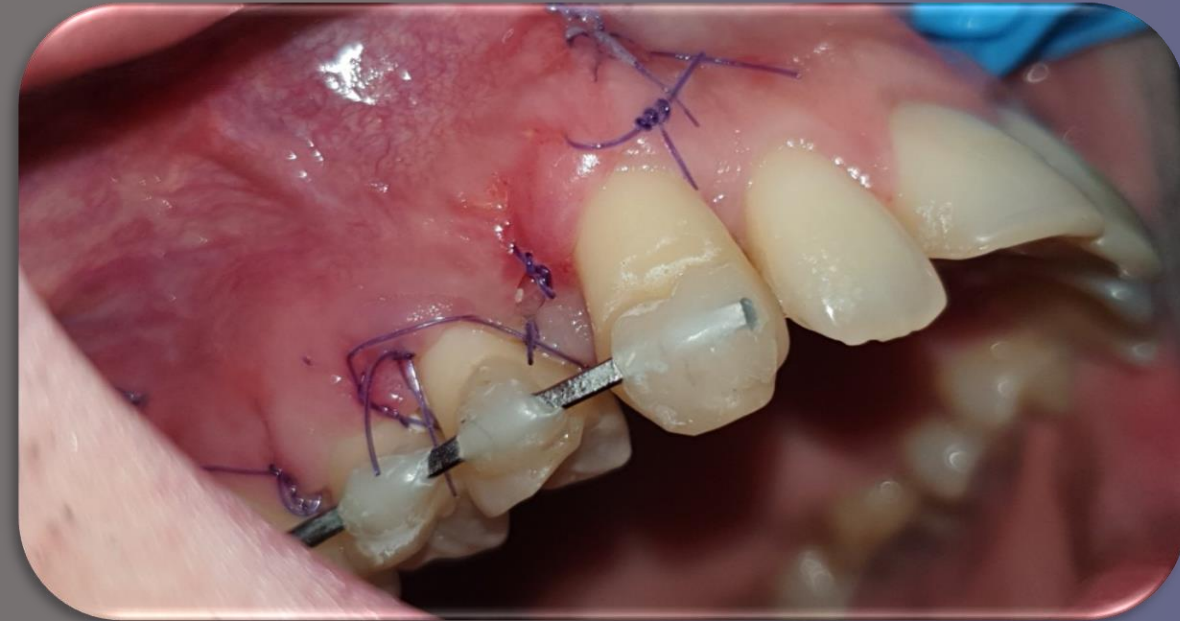


# Clinical cases



## Clinical case No. 1:

- Loss of bone tissue on the canine and first premolar
- Bone augmentation was performed with PRF and PRF membrane
- Suture material: absorbable suture material



## Clinical case No.2:

- Extraction of the radix on second premolar
- Bone augmentation was performed with PRF and PRF membrane
- Suture material: Non-absorbable

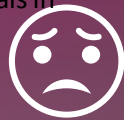


# DISCUSSION

## INFLAMMATION

Studies conducted to determine the reactions of oral tissues caused by suturing materials have shown that they cause an inflammatory reaction, which is most pronounced in silk and cotton, and minimally expressed in others including nylon, ePTFE polyester, polyglecaprone 25, PGA.

( Effects of polyglecaprone 25, silk and catgut suture materials on oral mucosa wound healing in diabetic rats: an evaluation of nitric oxide dynamics. *Yilmaz N, Inal S, Muğlali M, Güvenç T, Baş B Med Oral Patol Oral Cir Bucal. 2010 May 1; 15(3):e526-30.*; Banche G, Roana J, Mandras N, et al. Microbial adherence on various intraoral suture materials in patients undergoing dental surgery. *Journal of Oral and Maxillofacial Surgery. 2007;65(8):1503–1507*)



## BACTERIAL ADHERENCE

- Confirmed results indicate the inflammatory tissue reaction caused by the adherent bacteria on the suturing material.
- Bacterial adhesion to nylon and polyglecaprone 25 compared to bacterial adhesion to silk is 5 to 8 times higher than nylon.
- Literary data indicate that bacterial dental plaque deposition is present 10 to 11 times on silk sutures and 4 to 11 times on ePTFE.



## SYSTEMIC DISEASES

Systemic diseases such as poorly controlled diabetes mellitus and cardiovascular disease can cause an oral inflammatory reaction.

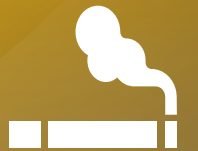
Therefore, an inflammatory tissue reaction that is primarily provoked by suturing materials may falsely suggest that it is caused by a systemic disease.



## OTHER PROVOKING FACTORS

Other provoking factors that can contribute to the occurrence of oral inflammation are smoking and the use of other tobacco products.

However, there is still a lack of clinical studies that could reliably support this hypothesis.





# CONCLUSION

it is evident that different suturing materials used in oral surgery cause a wide variety of tissue reaction, depending on several factors:

- the surface characteristics of the material and
- the amount of bacterial adherence.

This research emphasizes the need for careful selection of suturing material during oral surgery.

## Characteristics of ideal suturing material:

- high tensile strength to hold the wound margins appropriately till healing is complete;
- should not be allergic or cause any tissue inflammation;
- have least capillarity so that the material does not soak up much of the inflamed tissue fluid surrounding the wound and further exaggerate infection;
- should have good knotting properties;
- easy to sterilize;
- to be visible in the surgical field;
- to have an affordable price.