ORIGINAL RESEARCH PAPER

Pharmacology

KEY WORDS: micro screw, prophylaxis, stability, orthodontics, pharmacology.

PHARMACOLOGICAL PROPHYLAXIS PROTOCOLS IN THE INSTALLATION OF MICRO SCREWS AND THEIR RELATIONSHIP WITH PRIMARY STABILITY

Francisca Keith Alvarez* Faculty of Dentistry, Universidad San Sebastián, Santiago, Chile. *Corresponding Author

Javiera Scheu Faculty of Dentistry, Universidad Mayor, Santiago, Chile.

Camila Delgado Faculty of Dentistry, Universidad del Desarrollo, Concepción, Chile.

Flavia Rosenberg Faculty of Dentistry, Universidad Mayor, Santiago, Chile.

ABSTRACT

SUMMARY: Anchoring in orthodontics is a constant challenge, so the use of micro screws as an absolute anchor has increased. An adequate installation of the micro-screw is an important part for the success of the procedure, so the objective of this review is to compile the existing protocols in the use of pharmacological prophylaxis associated with the installation of micro-screws and relate it to its stability. The literature review indicates that there are no conclusive protocols on the use of local or systemic pharmacology in relation to the use of micro screws, nor their direct association with stability, so they should consider the patient's own characteristics to individualize cases and not apply a standard protocol of pharmacological prophylaxis.

DEVELOPING

The need for anchoring in orthodontics has been a constant challenge, so the implementation of micro screws as a temporary anchoring device (ADT) has been increasing, this is mainly due to the fact that the skeletal anchor is considered an absolute anchor that only reduces its effectiveness if stability fails (1). Since its high effectiveness and ease in the installation technique was evident, the micro screws are preferred as an anchoring device during orthodontic treatments, however, when considering a relatively new technique, they have not been established protocols regarding pharmacological prophylaxis.

All the studies reviewed generally incorporate healthy patients systemically into their sample, thus reducing the risk of associating the stability of the micro screw with a systemically based disease. Then the patient's selection takes into account the general condition, and is contraindicated in patients with uncontrolled periodontal disease (1).

The planning of the installation of a micro screw depends on the initial diagnosis, physical examination of the oral cavity, proximity of noble structures and aesthetic factors. Although it is a simple technique, however the risk of root perforation is high, so a useful tool as a complementary examination is computed tomography (CT) and panoramic or periapical radiography.

The considerations that we must take before the surgical technique are: choice of safe areas, areas with good access, adequate cortical, avoid damaging dental structures (1).

Screw insertion is through the attached or keratinized gum, since it is necessary that it does not swell around the screw head and the probability of tissue hyperplasia and inflammation is lower in this area than in non-adhered gum (1, two). Inflammatory can occur in two stages:

1. Post surgery (for loss of tissue continuity)
2. Postload (by cracking between screw head and soft tissue)

The inflammation of the tissues around the micro screw is critical for its stability, since there is no bone integration to the bone, but the union occurs through a mechanical interdigitation between the micro screw and the surrounding bone.

This inflammatory process spreads through the soft tissues causing degeneration of the bone around the implant, taking this phenomenon into account, preventing the inflammation of the soft tissues, takes real importance at the time of the installation of a TAD (3).

RESULTS TABLE

Selected article	Local prophylaxis	Systemic prophylaxis	conclusions
Gutiérrez Labaye, et al. Microtornillos: Una revisión.	0.12% chlorhexidine gel or mouthwash. Before and after the installation of the micro screw.	no	Does not require the use of antibiotics
Jan yczek, et al. Influence of antibiotic prophylaxis on the stability of orthodontic microimplants: A pilot randomized controlled trial	no	Prophylactic antibiotic or as a treatment in some cases.	It declares that the use of antibiotics is not necessary, since the stability of the micro screw is not altered with its use
Spyridon N. Papageorgiou,et al.	0.2% mouthwash or application with CHX 2% silk	no	It does not involve pharmacology in its results.
Shunsuke Uesugi, et al. Prognosis of primary and secondary insertions of orthodontic miniscrews: What we have learned from 500 implants	CHX mouthwash 0.12% post surgery as treatment	Post surgery antibiotic as a treatment	It does not involve pharmacology in its results.

Nikolaos Topouzelis et al. Clinical factors correlated with the success rate of miniscrews in orthodontic treatment	CHX 0.12% pre and post treatment x 2 weeks	no	It does not involve pharmacology in its results.
Marco Migliorati et al. On the stability efficiency of anchorage self-tapping screws: Ex vivo experiments on miniscrew implants used in orthodontics	saline Sodium- Chloride 0.9%, with the addition of ATB in powder format.	no	It does not involve pharmacology in its results.
B. Giuliano Maino Success of miniscrews used as anchorage for orthodontic treatment: analysis of different factors	0.3% chx gel 1 week after installation	no	It does not involve pharmacology in its results.
Amir Mohammadi et al. Influence of perioperative chlorhexidine mouthwash regimen on immediate failure rate of orthodontic miniscrews	Use of CHX 0.12% 2 times a day for 1 week	no	The use of CHX is inconclusive in the failure rate of miniscrews
Emel Sari et al. Microbiological Evaluation of 0.2% Chlorhexidine Gluconate Mouth Rinse in Orthodontic Patients	CHX 0.2% mouthwash for 2 weeks	no	The use of CHX 0.2% decreases S.mutans levels, but not of lactobacillos
Takashi itakaki et al. clinical study of temporary anchorage devices for orthodontic treatment	Antiseptic mouthwashes without identifying them	Only requires antibiotics if periimplantitis occurs	It does not involve pharmacology in its results.
Gaurav jasoria Et al. miniscrew implants as temporary anchorage device in orthodontics: a comprehensive review.	CHX mouthwash 0.12%	no	It does not involve pharmacology in its results.

Miyawaki identified that the main cause of failure in the stability of micro screws is inflammation and poor oral hygiene.

This establishing that soft tissue inflammation around the micro screw is the predominant factor in the loss of primary stability (1).

The success rate ranges from 75% to 94%, and on the contrary the failure rate is 8% to 10%, that is, approximately 1 in 10 devices fail.

Being the most common causes: milling too long, poorly refrigerated or irrigated, too much vertical pressure, lateral movements during the insertion of the micro screw, excessive tensile force, local irritation and superinfection of the mucosa.
Most authors agree that inflammation around the micro screw significantly affects the success rate (4,5).

The failure is presented clinically as mobility in the micro screw and cannot be used as a temporary anchoring device (1, 3). That is why they propose to control the predisposing factors of failure at the local level, which directly involve the peri-implant tissues, through pharmacological prophylaxis, in order to maintain the integrity of the tissues and stability of the micro screw, mainly the primary stability that is directly involved. in the failure of the micro screw (1,6).

Depending on the results of various studies, the use of prophylaxis can be divided between local and systemic.

As for local prophylaxis: it is used topically and is in general chlorhexidine (CHX) in its different presentations, the most typical is in 0.12% mouthwash and also in gel (2,7).

S. mutans decreases considerably with CHX, but not lactobacilli, CHX gel 0.7% is also used for 7 days after the placement of the micro screw (8).

According to Amir Mohammadi, using CHX decreases the failure rate in the stability of micro screws, versus other studies say that its use does not matter and does not even use it within its protocol (3).

Although some articles report a local reduction of bacteria and therefore a decrease in the risk of inflammation, their direct participation in the primary stability of the micro screw cannot be conclusive.

Regarding systemic prophylaxis, it is typically performed with antibiotics, it can be with a single dose before application or with a dose of therapy.

According to meta analysis of Esposito M, et al. a single preoperative prophylactic dose increases the success rate from 92% to 96% in implants,

while according to Jan Łyczek, he declares that the use of antibiotics is not necessary, since the stability of the micro screw is not altered with its use (5,3).

Everyone agrees that poor hygiene causes inflammation of the peri-implant tissues and even the reabsorption of surrounding bone thanks to the periodontal pathogens that are established.

The inflammation of the tissues around the micro screw is critical for its stability. Periodontal pathogens are attempted to be controlled with the use of pharmacological prophylaxis, either with a local or systemic application.

CONCLUSIONS

After reading the articles, it can be concluded that there is great controversy in the use of this prophylaxis in the installation of micro screws, since there is no common agreement and the results of the studies are very heterogeneous with each other, in addition to not justifying the use of the prophylaxis they apply, nor its influence on stability.

Finally, there are no objective results regarding the pharmacological prophylaxis directly related to the stability of the micro screw, but it can influence indirectly.

According to the different results and the lack of evidence, it can be determined that the information collected is inconclusive to establish a protocol of pharmacological prophylaxis against the installation of micro screws.

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