

Local Periodontal Treatment with Antibiotics: Periodontal Mouthguard

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Abstract: ***Introduction:** in periodontics, treatment with antibiotics is done in two ways: systemic and local. There are no protocols to apply the antibiotic locally with a removable prosthesis. We propose the use of a modified sports mouthguard to locally apply the antibiotic in the treatment of gingivitis and periodontitis. **Material and methods:** a dental vacuum forming machine is used to make a periodontal mouthguard with a 0.40 mm soft vinyl thermoplastic plate. **Results:** periodontal mouthguard. **Conclusions:** it is advisable to fill the periodontal mouthguard with an antibiotic gel and use it in the mouth 1-2 hours a day, with periodic maintenance controls.*

Keywords: mouthguard, periodontal, treatment, local

1. Introduction

In periodontics, treatment with antibiotics is done in two ways: systemic and local (with rinsing and subgingival irrigation). With respect to local antibiotic application systems, previous authors have classified them into[1]:

- a) Non-resorbable release systems:
 - Fibers of cellulose acetate.
 - Acrylic strips.
 - Fibers based on polymers (ethylene vinyl, polyethylene, polypropylene, polyurethane).
- b) Resorbable release systems:
 - Natural materials: collagen that carries tetracyclines.
 - Synthetic materials: gels and polymers (polylactic/glycolic, polycaprolactone) that can incorporate minocycline, doxycycline, ofloxacin, tetracycline, metronidazole, etc.

The way to apply the antibiotic in the periodontal pocket is usually direct. However, there are no established protocols to apply it through a removable prosthesis. There are different types of removable prosthesis that could be used for this purpose, among which are:

- a) The Michigan-type occlusal splints, that are used to treat some temporomandibular joint diseases[2,3].
- b) The mouthguards used to prevent dental injuries during sports in which there may be violent clashes such as football, rugby, boxing or hockey [4] and a "temporary prosthesis" has also been described, which has a probe attached to a pressure gauge to measure pressures below that prosthesis [5].
- c) Until now none of the previous prostheses has been used in the periodontal treatment, but if its shape is modified they could serve for that purpose.

We must clarify that when some authors talk about "periodontal splint" they do not refer to the use of a Michigan splint, but to fix some teeth with others to stabilize their mobility, that is, to make a splinting of teeth[6].

On the other hand, it has been proposed a "individual tray of surgical and periodontal irrigation CIQ" to perform a

selective, fixed, direct and lasting irrigation on the most important pathological points. It has micro irrigators that are placed at a 45 degree angle pointing to the entrance of periodontal pockets. The patient takes the individual tray home to do the treatment and irrigation through that some tray [7].

In this work, a simpler prosthesis than the previous one is proposed, with modified mouthguards to make local application of antibiotics in periodontal disease.

2. Material and methods

A periodontal mouthguard has been made with the same manufacturing technique as a sports mouthguard[8-11]. Then some modifications have been made in the extension of its margins and without reinforcements of metal. A plaster model from the patient's mouth is placed in a dental vacuum forming machine. A 0.40 mm soft vinyl thermoplastic plate is placed over it and it adapts to the model with heat and vacuum. The margins are marked with a marker and then cut with scissors. These edges are polished and softened with heat.

3. Results

The periodontal mouthguard is shown in figures 1 and 2.

4. Discussion

In the periodontal treatment it is important that the antibiotic reaches the site of action (periodontal pocket and adjacent tissues). There the antibiotic must maintain a minimum effective concentration to produce the desired effect. When radicular scraping and smoothing is done and the antibiotic is applied locally in the pockets, the improvement is greater. This local application of the antibiotic offers advantages, since it reduces the risk of side effects, requires a lower dose of antibiotics and decreases the chances of developing bacterial resistance[1]. Periodontal maintenance controls are of great importance[7]. It has also been described that when a periodontal patient uses an occlusal splint to avoid clenching-bruxism, the periodontal pockets improve [12].

The Michigan type occlusal splints [2,3] have been discarded for periodontal use, since they only partially cover the teeth, without reaching the gums and are made of rigid material. Mouthguards are more suitable, because they are made of more flexible material and are cut at the height of the gum that we want. Patients will require an adaptation period [13].

In sports, there are authors who advise mouthguards of 0.60 mm thick with metallic reinforcement[11] but in periodontal treatment it is more advisable to be thinner and without metallic reinforcement. In this way it is more adaptable to the gum.

To avoid dental sensitivity to cold during skiing, mouthguards have been used with a gel based on potassium nitrate and sodium fluoride, for topical fluoridation. In this case, the margins of the mouthguard extended 3 mm over the gingival neck[10]. To be used in the periodontal treatment, the margins of the mouthguard must cover the gum. For this reason it is more advisable to extend it to the vestibular margins of the mouth.

According to previous authors [1], the use of local antibiotic in the periodontal pocket may not be in the proper concentration or have a non-uniform release. Despite these drawbacks, a periodontal mouthguard can be easily used at home by the patient and direct contact of the antibiotic with the gum could improve gingivitis and periodontitis.

5. Conclusions

To use the periodontal mouthguard it is advisable to fill it with an antibiotic gel and place it 1-2 hours a day in the mouth. The gel should not exceed outside the mouthguard, keeping in direct contact with the gum. Subsequently, periodic maintenance controls would be made.

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Table 1: There are qualities described of the sports mouthguards[4,8] that the periodontal mouthguards should also have.

- Comfort	- Adaptable to the oral environment
- Softness	- Conservation after long use
- Do not irritate	- That does not deteriorate
- Non-allergic	- Do not leave unpleasant flavors
- Non poisonous	- Hardness, flexibility and adequate resistance
- Retentive	- Adequate margin height
- Easy manufacturing	- What support bites
- Affordable cost	- Removable (to clean and disinfect)
- That does not adsorb water	- Do not interfere breathing, swallowing or phonetics



Figure 1: Dental vacuum forming machine, to make the periodontal mouthguard.



Figure 2: Periodontal mouthguard finished.

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