

# Recent Concepts In Full Mouth Disinfection

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## **ABSTRACT:**

*The non-surgical periodontal treatment is focused on scaling and root planing, and in an attempt to get better results, the Full-Mouth Disinfection protocol (FMD) is introduced with the aim to perform scaling and root planning within 24 hours, with chlorhexidine solutions and gels(1). The aim of this investigation is to review the literature that exists about FMD, specifically the technique variations, clinic and microbiologic results in chronic periodontitis and clinic and microbiologic results in aggressive periodontitis. Different techniques are applied to this protocol, being the use of manual instruments with an adjunct chlorhexidine therapy for two weeks. The results in chronic periodontitis are similar to those found in the quadrant-based scaling and root planing. The clinical results in aggressive periodontitis show an improvement in pocket depth, bleeding and clinical attachment level, in comparison with the traditional treatment method, when used in conjunction with antibiotic therapy. Microbiologic results in chronic periodontitis show a reduction in pathogen levels the first months post-treatment, but there isn't a long-term significant difference. Microbiological results in aggressive periodontitis show an significant reduction in levels of pathogens.(2)*

**KEYWORDS:** Full mouth disinfection, scaling and root planning, chronic periodontitis.

## **INTRODUCTION:**

Periodontal disease is an inflammatory condition caused by several factors, like the proliferation of subgingival bacteria. Periodontitis is the result of a combination of factors like microbial infection and the host response to it, modified by the systemic risk factors and the patient's habits(1) . The periodontopathogenic microorganisms are the principal etiological agents, finding a close relationship with Porphyromonas gingivalis, Bacteroides forsythus y Aggregatibacter actinomycetemcomitans(3) . According to The American Academy of Periodontology (AAP) periodontal disease classification in 1999, periodontitis can be classified as chronic, aggressive and as a manifestation of systemic diseases. Chronic periodontitis is identified as being prevalent in adults, though it can be present in young patients; the observed destruction is consistent with the local factors (Dental plaque and calculus), and it has a slow to moderate rate of destruction. On the other hand, on aggressive periodontitis, the patient is healthy in all aspects, and the observed destruction is inconsistent with the quantity of bacterial deposits and there's a rapid loss of attachment and bone loss . In the European Workshop of Periodontology in 2017 by the European Federation of Periodontology (EFP) and AAP, a new classification of periodontal diseases was proposed, dividing the periodontitis in four stages depending on severity of the condition; and grades depending on the extent of the disease, taking into consideration the patient's susceptibility to disease and risk factors (4). The main objective of periodontal treatment consists of the reduction or elimination of microbial load, the removal of dental plaque and calculus. The most effective treatment for this is the mechanical debridement through non-surgical methods. The traditional non-surgical treatment for periodontitis is the scaling and root

planing by quadrants (SRP-Q) in a range of one or two weeks between each. However, microorganisms exist in other oral niches, like saliva, tongue, cheeks and tonsils, and these can migrate from these sites back to the subgingival space, contaminating the already treated quadrants. To avoid this cross contamination, Quirynen proposed the Full-Mouth Disinfection technique (FMD), which varies from the traditional SRP-Q in that the scaling and root planing are done in two appointments within 24 hours, and the use of chlorhexidine rinses for two weeks are implemented. The purpose of this is to lower bacteria counts and avoid cross contamination. The aim of the present study is to realize a literature review about the applications and variations of the FMD technique, clinic and microbiological results in chronic and aggressive.

#### **MATERIALS AND METHODS:**

A search of literature was made, including original articles, narrative and systematic reviews, and case reports in the database of PubMed and Google Scholar, with the keywords “periodontitis”, “Full-Mouth disinfection” and “FMD”

#### **Full Mouth Disinfection:**

FMD technique was described by Quirynen in 1995, with the intention of performing the scaling and root planing in one or two visits in a 24-hour range. This with the goal of avoiding the possibility of cross contamination between treated and untreated quadrants. FMD is performed with manual instruments, taking approximately one hour in each quadrant. After instrumentation, optimal disinfection is sought by first brushing the back of the tongue for 60 seconds with a 1% chlorhexidine gel. Afterwards, two rinses are made with a 0.2% chlorhexidine solution for one minute (gargling during the last 10 seconds to reach the tonsils). Subsequently, subgingival irrigation of all periodontal pockets is performed for 10 minutes in 3 intervals with a 1% chlorhexidine gel. This step is repeated eight days after the intervention. Additionally, patients are instructed to use 0.2% chlorhexidine mouthwash twice daily for two weeks. Indications of oral hygiene are given, including interdental plaque control with interdental brushes or toothpicks, and brushing the back of the tongue twice a day(5).

#### **Recent advancements of FMD**

##### **Full-mouth scaling**

In 2000, Quirynen et al, proposed full-mouth scaling (FMS), a variation of the FMD protocol without chlorhexidine. This was then compared with the traditional treatment by quadrants, using manual instruments. Benefits were found in both groups (FMS and FMD) in terms of periodontal pocket reduction and clinical attachment gain compared to SRP-Q. However, no significant difference was observed between the two test groups. A decrease in motile microorganisms and spirochetes in the FMD group was also found, but without differences after 2 months postoperatively .

##### **Use of antiseptics**

In 2006, Quirynen considered the use of Amine Fluoride/stannous fluoride in the FMD protocol instead of chlorhexidine. Similarly, Wang studied the possibility of using povidone-iodine in the FMD protocol, finding that there is a reduction of antibodies against *P. gingivalis* and *actinomyces comitans*. It is suggested that povidone-iodine can be a reliable alternative to chlorhexidine(6).

##### **Use of antibiotics**

Azithromycin, Metronidazole and Amoxicillin have been the most used. Gomi et al., compared a control group of SRP-Q and a FMD protocol with the Azithromycin test group. Microbiological parameters were lower in the test group for the first two postoperative months. Cionca et al investigated the use of a combination of Amoxicillin with Metronidazole alongside the FMD protocol. They concluded that the test group with antibiotics had better results in clinical parameters, such as pocket depth reduction and elimination of bleeding. They also observed that there was a reduced need for complementary surgical treatment. Regarding microbiological effects, they observed the

elimination of *Aggregatibacter actinomycetemcomitans* in the experimental group three months after treatment. They also observed lower levels of *Porphyromonas gingivalis* and *Tannerella forsythia*. In a similar study, it was found that the effects of Amoxicillin and Metronidazole were maintained for six months. Preus in his studies using monotherapy of Metronidazole, he finds that the results showed significant differences, however, the-analyzes are not enough to recommend the use of metronidazole in patients with severe chronic periodontitis, due to the risks to adverse effects for the patient.

#### **Use of ultrasonic scalers**

The use of ultrasonic scalers instead of manual instruments has also been studied in the literature. The benefits are limited compared to conventional treatment, though it is completed in a significantly shorter time(7)(1) .

#### **Clinical outcomes in chronic and aggressive periodontitis**

Some authors prefer the FMD protocol over the traditional SRP-Q because they found a clinical improvement in terms of pocket depth, clinical attachment levels and bleeding on probing, arguing that part of the therapy's success is the use of antiseptics, such as chlorhexidine, and reduced chair time . Currently, most authors agree that the results regarding clinical attachment level, pocket depth and bleeding on probing are better after periodontal treatment, finding improvements in moderate pockets (4-6mm) using the FMD, though there's not a significant difference between the use of the FMD protocol and the traditional SRP-Q treatment in deeper pockets (> 6mm) . Patients with aggressive periodontitis have a lesser benefit after periodontal therapy than a patient with chronic periodontitis. However, some authors believe that the use of FMD has a benefit in non-surgical treatment, causing an improvement in pocket depth reduction and clinical attachment level. It should be mentioned that, in these patients, in addition to using the FMD technique, oral antibiotics are indicated. Other authors compare the FMD technique with and without antibiotic therapy and agree that while there is improvement in attachment levels, pocket depth reduction, and bleeding on probing, there is no significant difference comparing both treatments . Also, the variation of the technique using ultrasonic scalers is used to perform full-mouth scaling in a single session, without the use of antibiotics, in patients with aggressive periodontitis, smokers and non-smokers. Good clinical results are observed in both groups, finding a reduction in pocket depth and in bleeding. There is a slight improvement in the non-smoking group compared to smokers.

#### **Microbiological results:**

The FMD treatment results in significant reductions of pathogenic species months after therapy, especially reductions of *Tannerella forsythia*. Studies discuss the eradication of *P. gingivalis* and the reduction of spirochetes and motile organisms up to eight months post- FMD treatment. Together with Metronidazole, a significant effect was observed in patients with *P. gingivalis* and *T. forsythia*, finding a smaller number of these microorganisms at 3 to 12 months post-treatment. The use of FMD can also be used to treat peri-implant mucositis, compared to traditional scaling of the implant's surface. In both treatments there is a significant reduction of the microbiome, but without a significant long-term change . The key pathogens in aggressive periodontitis are *Aggregatibacter actinomycetemcomitans*, *Tannerella forsythia*, *Treponema denticola*, *Prevotella intermedia* and *Porphyromonas gingivalis*, and these are found in all oral niches. After completing non-surgical periodontal therapy with FMD technique, a reduction in the prevalence of *A. actinomycetemcomitans*, *T. denticola*, *T. forsythia*, *Parvimonas micra* and *T. socranskii*, pathogens found in the biofilm related to the disease was observed for the first three months after therapy. An increase of these microorganisms was observed twelve months post-treatment. "Non Periodontal" species, such as *S. gordonii* and *S. oralis*, also tended to increase in numbers, creating a microbiome compatible with periodontal health. In one study, *A. actinomycetemcomitans* was not detected in a culture biofilm at nine and twelve months after FMD treatment with the use of antibiotics. The plaque control and oral hygiene, in addition to the instrumentation of root surfaces in the supportive periodontal therapy could have had an effect in the reduction of certain pathogenic species. In this study, no significant difference was observed between the group using and not using antibiotics.

## CONCLUSION:

FMD is an option to perform non-surgical periodontal treatment in a shorter operative time. It is a treatment without risks to the patient and may be more comfortable for them when they have no time disposal for four visits in a four to six weeks lapse of time. The results are like those of the traditional treatment, and there is no significant variation in clinical or microbiological changes(8). In case of aggressive periodontitis, good results are observed, and FMD can be a good option to treat these patients.

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