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study

Full-mouth or quadrant-wise instrumentation in treating stage III and IV periodontitis?

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Background

The concept of one-stage disinfection as an answer to the problem of the rapid recolonisation of recently treated pockets by periodontal pathogens from yet-to-be-treated pockets was introduced more than 25 years ago. The goal of this protocol was to minimise the risk of recontamination by performing all the root planing within 24 hours combined with a thorough disinfection of all oropharyngeal niches using chlorhexidine.

Since then, several clinical studies have been published comparing one-stage with quadrant-wise instrumentation. The results of these studies are heterogeneous, and they often failed to replicate the results of the original study. One reason given for this is that studies that really replicate the original full-mouth disinfection protocol are scarce. Most studies adopted a one-stage instrumentation protocol rather than a one-stage disinfection protocol (with chlorhexidine rinsing and tonsil spraying before the procedure, repeated subgingival irrigation with chlorhexidine gel, and rinsing with chlorhexidine for two months).

As well as improving the results of subgingival instrumentation using chemical means, more recently it has been suggested that the mechanical removal of the subgingival biofilm could be improved by using air-polishing with low-abrasive powders (such as erythritol).

Aim

This multicentre randomised clinical trial aimed to evaluate the clinical benefits of full-mouth versus quadrant-wise subgingival instrumentation (Q-SRP) in stage III and IV periodontitis. Three different full-mouth protocols were investigated: full-mouth scaling (FMS), full-mouth disinfection (FMD), and FMD with adjuvant erythritol air-polishing (FMDAP).

Materials & methods

A randomised, prospective, blinded, four-arm, parallel-group, multicentre trial, with a six-month follow-up.

Patient characteristics:

- Untreated periodontitis, stage III or IV.
- Regardless of smoking status.
- Exclusion criteria: scaling and root planing (SRP) in the preceding 12 months, use of antimicrobial rinsing solutions or intake of systemic antibiotics within the previous four months; systemic diseases with known interactions with periodontal diseases or with need for antibiotic prophylaxis; intake of drugs with possible impact on clinical symptoms of periodontal diseases; and pregnancy.

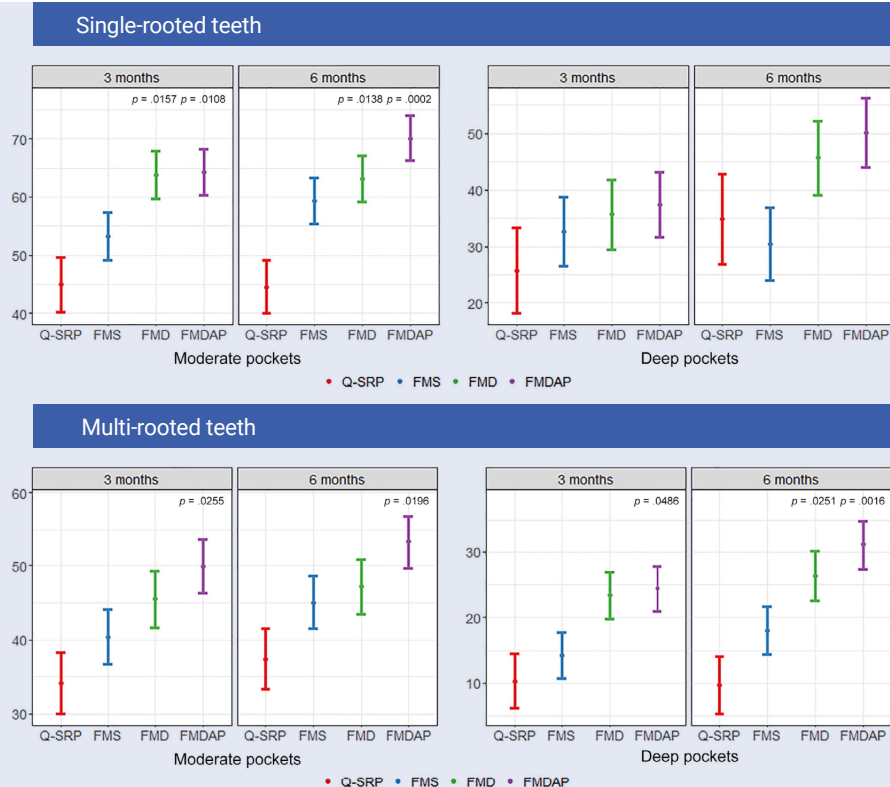
Study course:

- Step 1 of periodontal therapy (supragingival instrumentation and oral hygiene instruction) before randomisation.
- Randomisation in four groups with at least 45 patients per group:
 - Q-SRP: one-week interval between each session.
 - FMS: full-mouth SRP within 24 hours.
 - FMD: full-mouth SRP within 24 hours, with additional application of chlorhexidine according to the protocol of Quirynen et al., 1998.
 - FMDAP: FMD, combined with the use of subgingival erythritol air-polishing using Airflow and Perioflow.
- SRP was performed after local anaesthesia and carried out using ultrasonic scalers and Gracey curettes.

Study outcomes:

- Pocket probing depth (PPD), plaque index (PI), bleeding on probing (BoP), gingival index (GI), and clinical attachment loss (CAL) were evaluated.
- Additionally, the percentage of closed pockets (proportion of sites changed from PPD >4mm to residual PPD ≤4mm without BoP) was calculated.
- Accumulated chair time was assessed as well as the treatment efficiency (time needed to obtain the closure of one pocket).

Figure:
Proportion of closed pockets (%) after 3 and 6 months for moderate pockets with initial PPD 5-6mm and deep pockets with initial PPD >6mm at single-rooted and multi-rooted teeth; p values indicate significant differences compared to Q-SRP.



Results

- A total of 190 patients were randomised, and the data of 172 patients could be analysed.
- Significant mean PPD reduction was observed in all groups.
- FMDAP led to the highest mean PPD reduction and was the only full-mouth protocol that led to significantly better PPD reduction compared to Q-SRP, both for moderate (PPD 4-6mm) and deep pockets (PPD >6mm) pockets.
- FMD showed significantly better PPD reduction compared to Q-SRP only for deep pockets (PPD >6mm).
- Significant CAL gain was observed in all groups, without statistically significant differences between them.
- PI, GI, and BoP were reduced in all groups, but without statistically significant intergroup differences.
- The following percentages of pocket closure were observed: 38% for Q-SRP, 46% for FMS, 49% for FMD, and 55% for FMDAP.
- FMDAP was the only full-mouth protocol that led to significantly better pocket closure compared to Q-SRP (both for single- and multi-rooted teeth).
- FMD showed significantly better pocket closure compared to Q-SRP only for single-rooted teeth.
- Chair time was longer for Q-SRP compared to all full-mouth protocols, but only in relation to FMS was this statistically significant.
- The time to achieve one closed pocket was significantly less for all full-mouth protocols compared to Q-SRP (6.3 minutes for FMDAP, 8.5 minutes for FMD, and 9.5 minutes for FMS versus 17.8 minutes for Q-SRP).

Limitations

- There was a significant number of dropouts in the Q-SRP group.
- Follow-up was limited to six months.
- Chlorhexidine staining in the FMD and FMDAP groups impaired the blinding of the assessors.
- Evaluation time after treatment was not the same for Q-SRP and for the other groups, because of the time needed to perform the whole procedure.

Conclusions & impact

- Of the examined protocols, FMDAP led to the highest PPD reduction and pocket closure, and it was the most efficacious treatment.
- FMD also showed statistical benefits in terms of PPD reduction and pocket closure compared to Q-SRP.
- All the full-mouth protocols were more efficacious than Q-SRP based on the time needed to achieve one closed pocket.
- An important problem with Q-SRP is the multiple appointments leading to extended treatment time and a greater risk of postponing and/or cancelling one of the appointments.
- Full-mouth disinfection protocols thus seem easier to apply in a daily practice in terms of organisation and treatment completion and lead to better treatment outcomes. The use of air-polishers during initial non-surgical treatment should thus be further studied.



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