Subgingival air-polishing with erythritol during periodontal maintenance: Randomised clinical trial of twelve months


The objective of supportive periodontal therapy (SPT) is to remove newly formed bacterial deposits from residual pockets thus maintaining periodontal health. A variety of hand and ultrasonic instruments can be used. Air-polishing devices that produce a jet of compressed air containing low abrasive agents via a nozzle, and which can be inserted to the top of the pocket may also be employed for this purpose.

To evaluate the efficacy of repeated sub-gingival air-polishing containing erythritol powder with 0.3% chlorhexidine in residual pockets of >4 mm over 12 months.

Study Aims:

50 maintenance patients (≥3 months following completion of comprehensive periodontal treatment), with contra-lateral residual pockets >4 mm (at least one per quadrant) were included in this single-centre, randomised clinical trial. Clinical measurements (PD, PI, BOP, REC, root hypersensitivity) and microbial sampling were performed 3-monthly, while treatment was provided at 0, 3, 6, and 9 months (providing that PD>4 mm). One site per patient was assigned to sub-gingival air-polishing with erythritol powder containing 0.3% chlorhexidine (test side) and the other site to ultrasonic debridement (control). The presence of PD >4 mm at 12 months was the primary end-point.

Methods:

A reduction in number of sites with PD >4mm was achieved from 4.6 to 3.6 in test sites and 4.8 to 3.9 in control sites (p<0.001). Likewise, changes in BOP were statistically significant (0-12 months) for both groups. However, none of the changes were significantly different between groups. Patients’ pain/discomfort perception was judged to be lower at test sites. No difference was found in bacterial detection frequencies (0-12 months) in both groups. When comparing test and control sites, lower frequencies of Aa count>1000 cells/ml were observed in test sites. Two control site samples recorded Aa at 100,000 cells/ml while none of the test sites did.
Conclusions, impact and limitations:

**Limitations:**
- The potential advantage of the air polishing might be attributed to the addition of 0.3% chlorhexidine.
- Intra-individual comparisons of local therapy may have crossover effects in different sites in the same dentition.
- The sample size in the present study may be insufficient to detect a true difference in prevalence of PD>4 after a period of 12 months.
- Finally, this was an industry-supported rather than an independent study.

**Conclusions:**
- The primary endpoint, the reduction of sites with PD>4 mm, was achieved to a similar degree in both protocols.
- Continued improvement was observed throughout the 12 months observation period.
- Patients in the air polishing group reported less pain than in the ultrasonic group.
- At 12 months, the Aa count was significantly lower in the air-polishing group.

**Impact: What can we learn as practitioners?**
- Following cause related therapy residual pockets may demonstrate continued improvement where continuous SPT is provided.
- Both instruments may have utility in a periodontal maintenance programme.
- The slightly greater improvement in the bacterial count for the air-polishing device might be attributed to the incorporation of chlorhexidine into the regimen.