ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 6, Issue – 6, December - 2023, Page No. : 76 - 85

The comparative clinical effectiveness of supragingival air polishing during periodontal maintenance with ultrasonic instrumentation – A Review

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Citation of this Article: Mancy Modi, Gaurav Shetty, Yash Advani, Yashashree Chande, "The comparative clinical effectiveness of supragingival air polishing during periodontal maintenance with ultrasonic instrumentation – A Review", IJDSIR- December - 2023, Volume – 6, Issue - 6, P. No. 76 – 85.

Type of Publication: Review Article

Conflicts of Interest: Nil

Abstract

Introduction: The purpose of this study is to evaluate the clinical effectiveness of subgingival air polishing versus subgingival debridement using ultrasonic instruments during periodontal care.

Materials and procedures: A methodical exploration of digital repositories was carried out to locate works from January 1, 2000, to December 21, 2018. Two reviewers independently carried out the data extraction, risk of bias assessment, and publication selection. "Is subgingival air polishing more likely to result in better clinical outcomes than ultrasonic debridement for patients in the periodontal maintenance phase?" was the problem-intervention-comparison-outcomes issue that was addressed.

Results: Six studies were included out of the 435 papers that were found. Overall, the primary cause was that, for the study design, personnel blinding was nearly impossible to accomplish, even though none of them was deemed to have a low risk of bias. The data from the included studies could not be consolidated due to the heterogeneity. With the exception of one study that demonstrated UD was superior than subgingival air polishing, the majority of the included research indicated no statistical difference in pocket depth reduction. Based on the available data, no treatment was shown to be more beneficial than the other in terms of gingival regression and clinical attachment loss. It was reported that subgingival air polishing was more comfortable than ultrasonic debridement.

Conclusion: Due to a lack of data, the clinical effectiveness of subgingival air polishing in comparison to ultrasonic debridement for periodontal care is still unclear. Neither subgingival air polishing nor ultrasonic

debridement have demonstrated a better clinical outcome to date.

Keywords: Ultrasonic, CAL, PPD,

Introduction

Air polishing is one of the dental treatments done to quickly and effectively remove unwanted stains that are present on the front and back of the teeth. air polishers are more effective in removing stains. Using air polishers prior to scaling reduces plaque and stains that may interfere with visibility during scaling, especially if biofilm levels are high. Periodontitis is a highly prevalent oral disease affecting a large proportion of the adult population globally and is also a major cause of tooth loss .Elimination of pathogens contained in the subgingival biofilm has become the essential goal of treatment strategy. in the maintenance phase, management of patients requires long-term follow-up and supportive periodontal therapy to mechanically remove microbial plaque to prevent reinfection and disease recurrence. In clinical practice, both subgingival air polishing)and ultrasonic debridement (UD) are widely used powerdriven methods for SPT. The use of ultrasonic devices is highly acceptable in the maintenance phase and has been proven to have similar clinical effects to the use of hand instrumentation with less time consumption. Subgingival air polishing is also indicated as an alternative for periodontal maintenance, especially since the introduction of low abrasive glycine powder air polishing and has been reported efficacious and safe in several studies. In recent years, it has been demonstrated that has comparable clinical and microbiologic outcomes to scaling and root planing (SRP) with favorable patient tolerance.

Materials And Methods

Selection Criteria

Inclusion Criteria

Studies including patients with periodontitis who were in the maintenance phase after completing initial periodontal therapy and who were otherwise in good systemic health. research where the comparison or intervention groups were UD and SubGAP. studies where primary and secondary outcomes, as well as any other relevant variables, were included in the outcome evaluation. Research where clinical attachment level (CAL) and pocket probing depth (PPD) were the main outcomes. Research where patient tolerance, plaque index (PlI), gingival recession (GR), bleeding index (BI), gingival index (GI), and soft-tissue inflammation (BoP, GI, or gingival index) were the secondary outcomes.

Exclusion Criteria

Research on individuals with specific medical conditions (such as pregnancy) or who have taken any medications (such as antibiotics or anti-inflammatory meds) in the month before to the study.

Selection of Data: The search approach yielded titles and abstracts, which were then separately examined by two reviewers, J. Z. and J. Liu. If required, full text publications were retrieved and their eligibility was evaluated based on the inclusion and exclusion criteria. By talking or consulting with the third reviewer (J. Li), a consensus was obtained.

Data Extraction: Using pre-made data-extraction forms, the first author's name, the year of publication, the number of patients included, the age range or median age, and the primary outcomes were taken from the included studies.

Risk of Bias Assessment: Every included study was evaluated in accordance with the Cochrane Handbook

for Systematic Reviews of Interventions' recommended methodology. The instrument tackles seven categories of bias, including the creation of random sequences, hiding allocation, blinding personnel and participants (performance bias), blinding result evaluation, insufficient outcome data, biased reporting, and additional causes of bias. Each study was independently categorized by two reviewers (J.Z. and J.Liu) as having a low, high, or uncertain risk of bias. The inconsistencies in the evaluation results were addressed through consensus-building discussions or by seeking the advice of two specialists: a periodontist (B.C.) and a methodologist (J.Li).

Results

Study Qualities With the use of the developed search techniques, 435 references were found. Following the removal of 180 duplicates, two independent reviewers (J.Z. and J.Liu) evaluated 255 references. Furthermore, 241 titles or abstracts were first disqualified due to inappropriate research, studies involving animals, studies conducted in vitro, and studies that were not written in either Chinese or English.Eight of the fourteen full-text publications that were subsequently eliminated for various reasons were not included in the final review based on the inclusion or exclusion criteria. Six studies in total were incorporated into the systematic review.

Research Heterogeneity: A preliminary assessment of the included studies indicated significant variation in the study population, study design, products utilized, statistical analysis, and follow-up duration. All of the research were published after 2010 and examined the clinical results of periodontal maintenance by SubGAP and UD using split-mouth randomized clinical trials (RCTs). Two of the investigations (18, 19) employed a split-mouth quadrant design. The individuals' dentition was split into two halves in the other four investigations, and each half received SubGAP and UD treatment. The problem-intervention-comparison-outcomes criteria was met by the treatment groups whose data were gathered. While smoking was not included in the exclusion criteria in two of the investigations, three studies made it clear that smokers were not included in the study. A maximum of 30% of participants in one study were smokers. Furthermore, concerning the subject inclusion requirements, Zhao et al.'s study had PPD of less than 5 mm at every location, but four of the included studies mandated that residual pocket probing depths be greater than 4 mm in each group. In each investigation, several tools and air-polishing powders were utilized and reported.In five out of the six tests, nozzles made specifically for SubGAP were used.However, as every PPD in the experiment was smaller than 5 mm, supragingival air-polishing tools were also employed in one research. Moreover, sodium bicarbonate, erythritol, glycine, and trehalose powders were utilized in the air-polishing process. For this review, the sodium bicarbonate group's statistics were not removed. Furthermore, it should be mentioned that, with the exception of two trials that administered medication every three months to sites whose PPD was greater than 4 mm, intervention was only carried out once, at the start of the clinical study. Furthermore, all the trials had significantly varying follow-up periods: three weeks, sixty days, three months, six months, and twelve months.

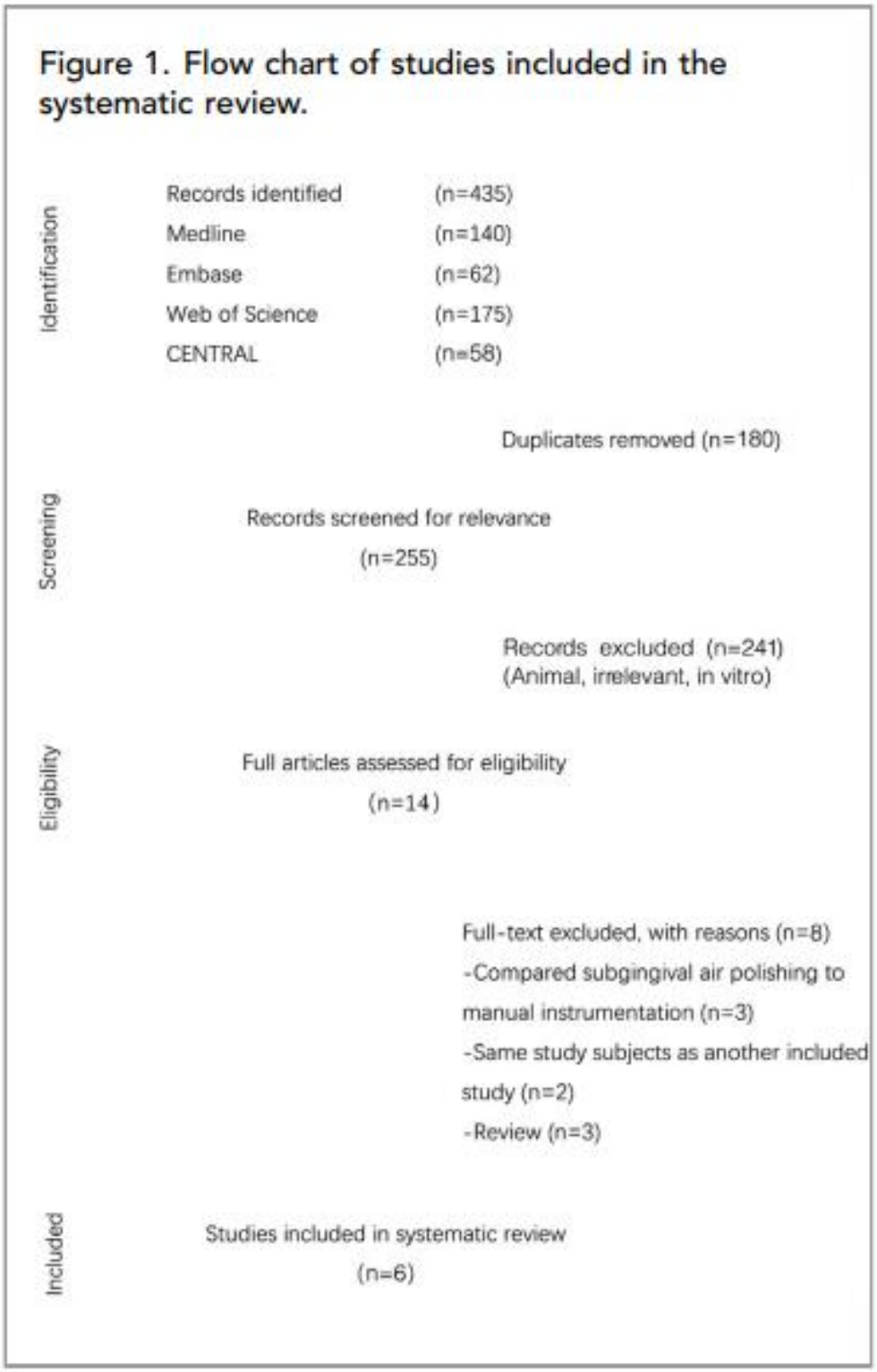


Figure 1. Flow chart of studies included in the systematic review.

Table 1. Characteristic of included studies.

No.	Source	Design	Participants (F/M) Age (M ± SD, range)	Intervention	Follow-up	Outcome	PPD (mm) SubGAP (M ± SD)	PPD (mm) UD (M ± SD)	CAL (mm) SubGAP (M ± SD)	CAL (mm) UD (M ± SD)	PLI (score 0—3) SubGAP (M ± SD)	PLI (score 0—3) UD (M ± SD)	VAS (cm) SubGAP (M ± SD)	VAS (cm) UD (M ± SD)	BoP (%) SubGAP (M ± SD)	BoP (%) UD (M ± SD)
1	Simon et al. 2015	Quadrant split-mouth design RCT	n = 10, 6/4 20~40	Test: SubGAP Control: UD	3 weeks	PLI, GI					Baseline: 1.213 ± 0.084; 3 weeks: 1.171 ± 0.061 n = 10, not mentioned all sites or study sites	Baseline: 1.179 ± 0.087; 3 weeks: 1.086 ± 0.081 n = 10, not mentioned all sites or study sites				
2	Kargas et al. 2015	Quadrant split-mouth design RCT	n = 25, 15/10 52.5 ± 9.54	Test: SubGAP Control: UD	1, 3, 6 months	PPD, GR, CAL, GI, PLI	Baseline: 4.78 ± 0.50; 1 month: 4.44 ± 0.50; 3 months: 4.40 ± 0.55; 6 months: 4.52 ± 0.45, n = 25, all sites	Baseline: 4.66 ± 0.50; 1 month: 3.88 ± 0.50; 3 months: 3.84 ± 0.35; 6 months: 4.00 ± 0.40, n = 25, all sites	Baseline: 5.42 ± 0.65; 1 month: 5.42 ± 0.65; 3 months: 5.38 ± 0.60; 6 months: 5.40 ± 0.55, n = 25, all sites	Baseline: 5.12 ± 0.55; 1 month: 4.98 ± 0.55; 3 months: 4.76 ± 0.55; 6 months: 4.82 ± 0.55, n = 25, all sites	Baseline: 1.12; 1 month: 0.48; 3 months: 0.52; 6 months: 0.64, n = 25, all sites	Baseline: 0.96; 1 month: 0.56; 3 months: 0.44; 6 months: 0.50, n = 25, all sites				
3	Müller et al. 2014	Split-mouth design RCT	n = 50, 21/29 58.5	Test: SubGAP Control: UD	12 months	PPD, BoP, GR, VAS	Baseline: 5.20 ± 0.40, n = 50, study sites; 12 months: 4.50 ± 1.00, n = 49, study sites	Baseline: 5.40 ± 0.60, n = 50, study sites; 12 months: 4.40 ± 1.10, n = 49, study sites			Baseline: 0.40 ± 0.20 n = 50, study sites; 12 months: 0.30 ± 0.10, n = 49, all sites	Baseline: 0.40 ± 0.20, n = 50, study sites; 12 months: 0.30 ± 0.10, n = 49, all sites	Instant: 2.04 ± 2.17	Instant: 4.86 ± 2.92	Baseline: 58 ± 50, n = 50, study sites; 12 months: 31 ± 47, n = 49, study sites	Baseline: 48 ± 50, n = 50, study sites; 12 months: 27 ± 45, n = 49, study sites
4	Kruse et al. 2018	Split-mouth design RCT	n = 44, 18/26 59.68 ± 11.18	Test: SubGAP Control: UD	3, 6 months	PCR, SBI, BoP, PPD, CAL, VAS	Baseline: 5.52 ± 0.93, n = 52, study sites; 3 months: 4.25 ± 1.12, n = 48, study sites; 6 months: 3.66 ± 0.81, n = 44, study sites	Baseline: 5.55 ± 0.90, n = 52, study sites; 3 months: 4.11 ± 1.08, n = 48, study sites; 6 months: 3.68 ± 0.86, n = 44, study sites	Baseline: 6.93 ± 1.50, n = 52, study sites; 3 months: 5.80 ± 1.65, n = 48, study sites; 6 months: 5.30 ± 1.52, n = 44, study sites	Baseline: 7.27 ± 1.80, n = 52, study sites; 3 months: 6.00 ± 1.73, n = 48, study sites; 6 months: 5.84 ± 1.71, n = 44, study sites			Instant: 2.33 ± 2.14	Instant: 4.91 ± 2.65	Baseline: 86.36, n = 52, study sites; 3 months: 59.09, n = 48, study sites; 6 months: 40.91, n = 44, study sites	Baseline: 88.64, n = 52, study sites; 3 months: 63.64, n = 48, study sites; 6 months: 34.09, n = 44, study sites
5	Wennström et al. 2001	Split-mouth design RCT	n = 20 6/14 40 (40~71)	Test: SubGAP Control: UD	2 weeks, 2 months	PPD, RAL, BoP, MGI	Baseline: 5.80 ± 0.70, day 14: 5.00 ± 0.71, day 60: 4.50 ± 0.67, n = 20, study sites	Baseline: 5.70 ± 0.62, day 14: 5.10 ± 0.79, day 60: 4.40 ± 0.93, n = 20, study sites	Change day 14: −0.20 ± 0.73, change day 60: −0.60 ± 0.69, n = 20	Change day 14: 0.00 ± 0.71, change day 60: −0.60 ± 1.03, n = 20			Median value: 0.75	Median value: 1.5	Baseline: 100, day 14: 40, day 60: 25, n = 40	Baseline: 100, day 14: 42, day 60: 30, n = 40
6	Zhao et al. 2015	Split-mouth design RCT	n = 23 8/15 49.9 (28~72)	Test: SubGAP Control: UD	12 weeks	PPD, CAL, GR, PLI, SI, VAS	Baseline: 2.48 ± 1.17; 12 weeks: 2.33 ± 0.90, n = 23, all sites	Baseline: 2.46 ± 0.99; 12 weeks: 2.37 ± 1.18, n = 23, all sites			Baseline: 0.58 ± 0.76, 12 weeks: 0.50 ± 0.74, n = 23, all sites	Baseline: 0.61 ± 0.80, 12 weeks: 0.46 ± 0.71, n = 23, all sites	Instant: 1.70 ± 1.30	Instant: 3.30 ± 1.80		

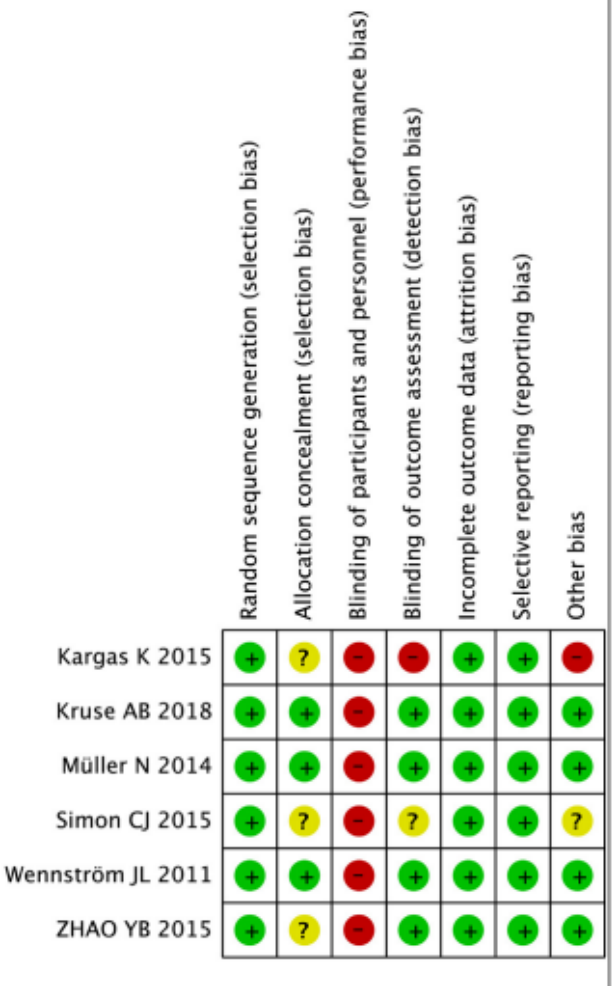
F, female; M, male.

(continued)

Methodological Quality of Included Studies: Figure 2 displays the overall results of the risk of bias evaluation. Every study that was included defined itself as randomized and gave information about the procedures used for randomization. Allocation concealment was discussed in three investigations; in the remaining three, its nature was left ambiguous. Four out of the six studies that were included in the analysis had detailed protocols for the use of SubGAP and ultrasonic devices in intervention. However, because the studies used diverse

mechanical interventions and split-mouth designs, none of the research blinded participants or staff. Examiner blinding was not used in one trial, but it was clearly present in four. Every study had withdrawals and predetermined results. With respect to other biases, one study (18) did not specify whether the study sites were the only sources of statistics, while the statistical results of the Kargas et al. study included both study sites and other sites.

Figure 2. The risk of bias assessment of the included studies.



Discussion

Six RCTs were included in the systematic review based on strict criteria. Because of the significant degree of heterogeneity among the included studies, our review made it impossible to synthesize the data and prevented meta-analysis. Split mouth designs were employed in all of the studies that were part of the systematic review, which helped to control subject effects but also made methodological and statistical issues more complex. In terms of evaluating the risk of bias, the absence of participant and staff blinding was the primary cause of bias. Furthermore, in order to lessen the bias in clinical trials, researchers should concentrate on explaining the intervention method to patients and blinding the outcome assessment process because blinding personnel was nearly impossible.

Table 2. Characteristics of PPD change reported in included studies.

Study	Statistical analysis	Examination time	SubGAP (mm), mPPD ± SD	UD (mm), mPPD ± SD
Wennstrom et al. 2011	Site	2 weeks	5.00 ± 0.71	5.10 ± 0.79
Kargas et al. 2015	Subject	1 month	4.44 ± 0.50[a]	3.88 ± 0.50
Wennstrom et al. 2011	Site	2 months	4.50 ± 0.87	4.40 ± 0.55
Kargas et al. 2015	Subject	3 months	4.40 ± 0.55[a]	3.84 ± 0.35
Zhao et al. 2015	Site	3 months	2.33 ± 0.90	2.37 ± 1.18
Kruse et al. 2018	Site	3 months	4.25 ± 1.12	4.11 ± 1.08
Kruse et al. 2018	Site	6 months	3.66 ± 0.81	3.68 ± 0.86
Kargas et al. 2015	Subject	6 months	4.52 ± 0.45[a]	4.00 ± 0.40
Müller et al. 2014	Site	12 months	4.50 ± 1.00	4.40 ± 1.10
Müller et al. 2014	Subject	12 months	2.80 ± 0.50	2.70 ± 0.50

mPPD, mean pocket probing depth.
[a]Statistically significant differences between SubGAP and UD.

Table 3. Characteristics of inflammation of soft tissue in included studies.

Study	Outcome	Statistical analysis	Examination time point	SubGAP	UD
Zhao et al. 2015	BI (mean ± SD)	Site	3 months	0.96 ± 0.70	0.98 ± 0.78
Wennstrom et al. 2011	BoP (%)	Site	2 weeks	5.00 ± 0.71	5.10 ± 0.79
Wennstrom et al. 2011	BoP (%)	Site	2 months	4.50 ± 0.87	4.40 ± 0.93
Müller et al. 2014	BoP (%)	Site	12 months	31 ± 47	27 ± 45
Müller et al. 2014	BoP (%)	Subject	12 months	15 ± 6	14 ± 6
Kruse et al. 2018	BoP (%)	Site	3 months	59.09[a]	63.64
Kruse et al. 2018	BoP (%)	Site	6 months	40.91[a]	34.09
Simon et al. 2015	GI (mean ± SD)	Site	3 weeks	1.18 ± 0.07	1.14 ± 0.06
Kargas et al. 2015	GI (mean)	Subject	1 month	0.38	0.40
Kargas et al. 2015	GI (mean)	Subject	3 months	0.50	0.28
Kargas et al. 2015	GI (mean)	Subject	6 months	0.58	0.38

[a]Statistically significant difference between SubGAP and UD.

Table 4. Characteristic of GR in included studies.

Study	Statistical analysis	Examination time	SubGAP (mm), mGR ± SD	UD (mm), mGR ± SD
Kargas et al. 2015	Subject	1 month	0.98 ± 0.65	1.10 ± 0.65
Kargas et al. 2015	Subject	3 months	0.98 ± 0.55	0.92 ± 0.55
Kargas et al. 2015	Subject	6 months	0.88 ± 0.50	0.82 ± 0.45
Zhao et al. 2015	Site	3 months	0.65 ± 1.07	0.67 ± 1.07
Müller et al. 2014	Site	12 months	1.00 ± 1.00	0.80 ± 1.10
Müller et al. 2014	Subject	12 months	0.90 ± 0.70	0.90 ± 0.70

mGR, mean gingival recession.

Table 5. Characteristics of PII in the included studies.

Study	Statistical analysis	Examination time	SubGAP, M ± SD	UD, M ± SD
Simon et al. 2015	Site	3 weeks	1.171 ± 0.061[a]	1.086 ± 0.081
Kargas et al. 2015	Subject	1 month	0.48	0.56
Kargas et al. 2015	Subject	3 months	0.52	0.44
Kargas et al. 2015	Subject	6 months	0.64	0.5
Zhao et al. 2015	Site	3 months	0.500 ± 0.740	0.460 ± 0.710
Müller et al. 2014	Subject	12 months	0.300 ± 0.100	0.300 ± 0.100

[a] Statistically significant differences between SubGAP and UD.

Conclusion

Due to a lack of data, it is still unclear whether SubGAP or UD is more clinically effective in maintaining periodontal health. Neither UD nor SubGAP have demonstrated a better clinical outcome to date. Before any firm recommendations be made, more excellent, carefully thought out, and lengthy clinical trials are needed.

References

1. Chapple IL. Time to take periodontitis seriously. BMJ (Clinical Research ed) 2014;348:g2645.
2. Batchelor P. Is periodontal disease a public health problem? Br Dental J 2014;217:405-9
3. Kassebaum NJ, Bernabe E, Dahiya M, Bhandari B, Murray CJ, Marcenes W. Global burden of severe periodontitis in 1990- 2010: a systematic review and meta-regression. J Dental Research 2014;93:1045-53.

4. Kargas et al. 2015 Subject 1 month 0.48 0.56 Kargas et al. 2015 Subject 3 months 0.52 0.44 Kargas et al. 2015 Subject 6 months 0.64 0.5 Zhao et al. 2015 Site 3 months 0.500 6 0.740 0.460 6 0.710 Müller et al. 2014 Subject 12 months 0.300 6 0.100 0.300 6 0.100 a Statistically significant differences between SubGAP and UD. The Journal of EVIDENCE-BASED DENTAL PRACTICE - 2019 9
5. Zhang Q, Li Z, Wang C, et al. Prevalence and predictors for periodontitis among adults in China, 2010. Glob Health Action 2014;7:24503.
6. Eke PI, Dye BA, Wei L, et al. Update on prevalence of periodontitis in adults in the United States: NHANES 2009 to 2012. J Periodontology 2015;86:611-22.
7. Bartold PM, Van Dyke TE. Periodontitis: a host-mediated disruption of microbial homeostasis. Unlearning learned concepts. Periodontol 2000 2013;62:203-17.
8. Trombelli L, Franceschetti G, Farina R. Effect of professional mechanical plaque removal performed on a long-term, routine basis in the secondary prevention of periodontitis: a systematic review. J Clinical Periodontology 2015;42(suppl 16):S221-36.
9. Krishna R, De Stefano JA. Ultrasonic vs. hand instrumentation in periodontal therapy: clinical outcomes. [Review]. Periodontol 2000 2016;71(1):113-27. 2016.
10. Petersilka GJ, Steinmann D, Haberlein I, Heinecke A, Flemmig TF. Subgingival plaque removal in buccal and lingual sites using a novel low abrasive air-polishing powder. J Clinical Periodontology 2003;30:328-33.
11. Petersilka GJ, Tunkel J, Barakos K, Heinecke A, Haberlein I, Flemmig TF. Subgingival plaque removal at interdental sites using a low-abrasive air polishing powder. J Periodontology 2003;74:307-11.
12. Flemmig TF, Hetzel M, Topoll H, Gerss J, Haeberlein I, Petersilka G. Subgingival debridement efficacy of glycine powder air polishing. J Periodontology 2007;78:1002-10.
13. Buehler J, Amato M, Weiger R, Walter C. A systematic review on the effects of air polishing devices on oral tissues. Int Journal Dental Hygiene 2016;14:15-28.
14. Hägi TT, Hofmänner P, Salvi GE, Ramseier CA, Sculean A. Clinical outcomes following subgingival application of a novel erythritol powder by means of air polishing in supportive periodontal therapy: A Randomized, Controlled Clinical Study. Quintessence Int 2013;44:753-61.
15. Hägi TT, Hofmänner P, Eick S, et al. The effects of erythritol airpolishing powder on microbiologic and clinical outcomes during supportive periodontal therapy: six-month results of a Randomized Controlled Clinical Trial. Quintessence Int 2015;46:31-41.
16. Buehler J, Amato M, Weiger R, Walter C. A systematic review on the patient perception of periodontal treatment using air polishing devices. Int J Dental Hygiene 2016;14:4-14.
17. Wennstrom JL, Dahlen G, Ramberg P. Subgingival debridement of periodontal pockets by air polishing in comparison with ultrasonic instrumentation during maintenance therapy. J Clinical Periodontology 2011;38:820-7.
18. Müller N, Moëne R, Cancela JA, Mombelli A. Subgingival airpolishing with erythritol during periodontal maintenance: randomized clinical trial of twelve months. J Clinical Periodontology 2014;41:883-9.

19. Simon CJ, Venkatesh PML, Chickanna R. Efficacy of glycine powder air polishing in comparison with sodium bicarbonate air polishing and ultrasonic scaling - a double-blind clinico-histopathologic study. Int J Dental Hygiene 2015;13:177-83.
20. Kargas K, Tsalikis L, Sakellari D, Menexes G, Konstantinidis A. Pilot study on the clinical and microbiological effect of subgingival glycine powder air polishing using a cannula-like jet. Int J Dental Hygiene 2015;13:161-9.
21. Lu H, He L, Zhao Y, Meng H. The effect of supragingival glycine air polishing on periodontitis during maintenance therapy: a randomized controlled trial. Peer J 2018;6:e4371.
22. Zhao Y, He L, Meng H. Clinical observation of glycine powder air-polishing during periodontal maintenance phase. Zhonghua Kou Qiang Yi Xue Za Zhi 2015;50:544-7.
23. Kruse AB, Akakpo DL, Maamar R, et al. Trehalose powder for subgingival air-polishing during periodontal maintenance therapy: a randomized controlled trial. J Periodontology 2019;90: 263-70.
24. Lesaffre E, Garcia Zattera MJ, Redmond C, Huber H, Needleman I. Reported methodological quality of split-mouth studies. J Clinical Periodontology 2007;34:756-61.
25. J GC, Armitage G, Berglundh T, et al. A new classification scheme for periodontal and peri-implant diseases and conditions - introduction and key changes from the 1999 classification. J Clinical Periodontology 2018;45(suppl 20):S1-8.
26. Lang NP, Bartold PM. Periodontal health. J Periodontology 2018;89(suppl 1):S9-16.
27. Cobb CM, Daubert DM, Davis K, et al. Consensus Conference Findings on Supragingival and Subgingival Air Polishing. Compend Contin Educ Dent 2017;38:e1-4.
28. Drago L, Del Fabbro M, Bortolin M, Vassena C, De Vecchi E, Taschieri S. Biofilm removal and antimicrobial activity of two different air-polishing powders: an in vitro study. J Periodontology 2014;85:e363-9.
29. John MT. Health outcomes reported by dental patients. J Evid Based Dental Pract 2018;18:332-5