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COMPARATIVE EVALUATION OF GLYCINE POWDER AIR POLISHING AND PROPHYLACTIC PASTE IN REDUCTION OF PLAQUE ACCUMULATION IN GINGIVITIS PATIENTS- A RANDOMIZED CLINICAL TRIAL

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ABSTRACT

Background and Objectives: Glycine air polishing has been proved to be safe, comfortable and time-saving. Whether it could substitute ultrasonic scaling to remove dental plaque biofilm during periodontal therapy remains unclear. The aim of this study was to compare and evaluate the efficacy of Glycine powder air polishing (GPAP) over prophylactic paste polishing in reduction of plaque retention in treatment of gingivitis. **Materials and Methods:** In this randomized controlled clinical trial, 30 subjects were randomly assigned to two groups with 15 subjects in each group, Group A- Scaling + Glycine powder air polishing, Group B- Scaling + Prohylactic paste polishing. Clinical parameters like Plaque index (PI) and Gingival index (GI) were assessed at baseline and at 14 days. Statistical analysis was carried out using SPSS software 2.0. **Results:** Significant improvement in plaque and gingival index scores were noted in Scaling + Glycine powder air-polishing group. **Conclusion:** GPAP results in clinically significant improvement in plaque and gingival index scores when compared to Prophylactic paste. Supragingival glycine air polishing had a reliable effect in removing dental plaque biofilm when used as an adjunct to scaling.

KEYWORDS: Glycine powder, Air polishing, Prophylactic paste, Gingivitis.

INTRODUCTION

An air polisher provides an alternative method of removing supragingival extrinsic stain and deposits from the teeth. Air polishing was first introduced to the dental profession in the late 1970s. The first air polishing device (APD), the Prophy Jet Marck IV™, was marketed by Dentron, Incorporated (Corpus Christi, Texas). Since that time, a variety of APDs have been developed. Previous studies have indicated that with proper use, air polishing can provide a safe, efficient and contemporary approach to plaque biofilm and stain removal.[1]

During the initial or supportive periodontal therapy, polishing devices such as rotating rubber cups with polishing paste or air powder polishing devices are frequently used for professional supragingival plaque removal.[2] The advantages of air polishing when compared to rubber–cup polishing include less time, less operator fatigue, and more efficient stain removal.[3]

Recent developments in air polishing powders include the use of glycine, calcium sodium phosphosilicate (Sylc™; OSspray, London, UK), calcium carbonate (Prophypearls™; KaVo, Charlotte, NC) and aluminum trihydroxide (Jet–Fresh™; DENTSPLY, York, Penn). Manufacturers of glycine, calcium sodium phosphosilicate and calcium carbonate claim these powders are less abrasive than traditional sodium bicarbonate–based powders. Glycine is a naturally–occurring amino acid. It is water soluble with a non-salty taste.[4] In past reviews on air polishing, studies indicated some gingival bleeding and a salty taste followed use, but no significant gingival trauma within a week or 2 after treatment.[1]

As with sodium bicarbonate air polishing, Glycine powder air polishing has also been shown to remove plaque more efficiently than hand instruments.[5] It was suggested that Glycine powder air polishing(GPAP) may replace hand instruments as well as sonic and ultrasonic scalers for subgingival plaque biofilm removal in shallow pockets.[1]

In addition, glycine–based powder is the only abrasive that has been studied for its ability to clean plaque biofilm in subgingival pockets <5 mm. In vivo studies have indicated that it is safe and caused no substantial gingival damage.[5] Hence this study was conducted to compare and evaluate the efficacy of Glycine powder air polishing over prophylactic paste polishing in reduction of plaque retention in treatment of gingivitis.

MATERIAL AND METHODOLOGY

Study population: This study was a randomized controlled clinical trial carried out at, Sri Hasanamba Dental College and Hospital, Hassan, India. The study protocol was approved by the ethical committee of the institution. The trial was a single centre study conducted at the department of Periodontology. The patients were explained about the study and a written informed consent was obtained from all the patients prior to the intervention.

Study design: A total of 37 patients were assessed for eligibility for the study, out of which 7 patients were excluded (5 did not meet inclusion criteria and 2 were lost to follow up). Thus, thirty patients were included in the study. They were divided into two groups randomly using the chit method- Group A received Scaling followed by Glycine powder air polishing (test group) and Group B received Scaling followed by Prophylactic paste polishing (control group).

The inclusion criteria for the study were –[a] Willingness to comply with the study protocol, [b] Subjects who are diagnosed with chronic generalized gingivitis, [c] Subjects in the age range of 18-55 years, [d] Systemically healthy individuals. The exclusion criteria were- [a] Subjects who are smokers, [b] Pregnant and lactating women, [c] Patients under antibiotic therapy in the past 6 months, [d] Patients who have undergone any periodontal therapy within the previous 6 months, [e] Unable or not willing to comply with the study protocol.

At the baseline, standardized oral hygiene procedures were performed on all patients. Post scaling, the tooth surfaces were polished with the polishing method of their respective group. Same set of oral hygiene maintenance instructions were given to the patients. The patients were recalled after 14 days from baseline and the clinical parameters were recorded. The clinical measurements were taken in the form of Plaque index (Sillness and Loe, 1964) and Gingival index (Loe H and Silness J, 1963).

STATISTICAL ANALYSIS

Statistical analysis was done using SPSS software version 20 and Microsoft excel version 2007. Independent student t test was used to compare PI and GI scores between two groups at different time intervals. Student paired 't' test was used to compare the mean PI and GI scores between different time intervals within each study group. The level if significance (P- value) was set at $p<0.05$.

RESULTS

Table 1 shows demographic data. In Group A there were 46.7% males and 53.3% females and the mean age was 25.533 ± 7.5. In Group B, there were 53.3% males and 46.7% females and the mean age was 26.666 ± 7.5.

Table 2 shows the Plaque index values for both the groups. The plaque index for Group A at baseline was 1.379 ± 0.358 and 0.615 ± 0.139 at 14th day. The plaque index difference was 0.764 ± 0.276. The plaque index for Group B at baseline was 1.268 ± 0.340 and 0.721 ± 0.121 at 14th day. The plaque index difference was 0.547 ± 0.297 which was statistically significant. ($p<0.05$).

Table 3 shows the Gingival index values for both the groups. The gingivalindex for Group A at baseline was 1.356 ± 0.314 and 0.568 ± 0.108 at 14th day. The gingival index difference was 0.787 ± 0.241. The gingival index for Group B at baseline was 1.204 ± 0.288 and 0.661 ± 0.150 at 14th day. The plaque index difference was 0.543 ± 0.210 which was statistically significant. ($p<0.05$).

Table 1: Frequency distribution of age and gender.

Group	Male	Female	Mean age
Group A	7 (46.7%)	8 (53.3%)	25.533 ± 7.5
Group B	8 (53.3%)	7 (46.7%)	26.666 ± 7.5

Table 2: Plaque index scores for both the groups.

TIME	GROUP A	GROUP B	P VALUE
PI Baseline	1.379 ± 0.358	1.268 ± 0.340	0.393
PI 14 Days	0.615 ± 0.139	0.721 ± 0.121	0.035
PI Difference	0.764 ± 0.276	0.547 ± 0.297	0.048*
PI- Plaque index *P value: level of significance at $p < 0.05$ was considered statistically significant			

Table 3: Gingival index scores for both the groups.

TIME	GROUP A	GROUP B	P VALUE
GI Baseline	1.356 ± 0.314	1.204 ± 0.288	0.181
GI14 Days	0.568 ± 0.108	0.661 ± 0.150	0.062
GI Difference	0.787 ± 0241	0.543 ± 0.210	0.006*
GI- Gingival index *P value: level of significance at $p < 0.05$ was considered statistically significant			

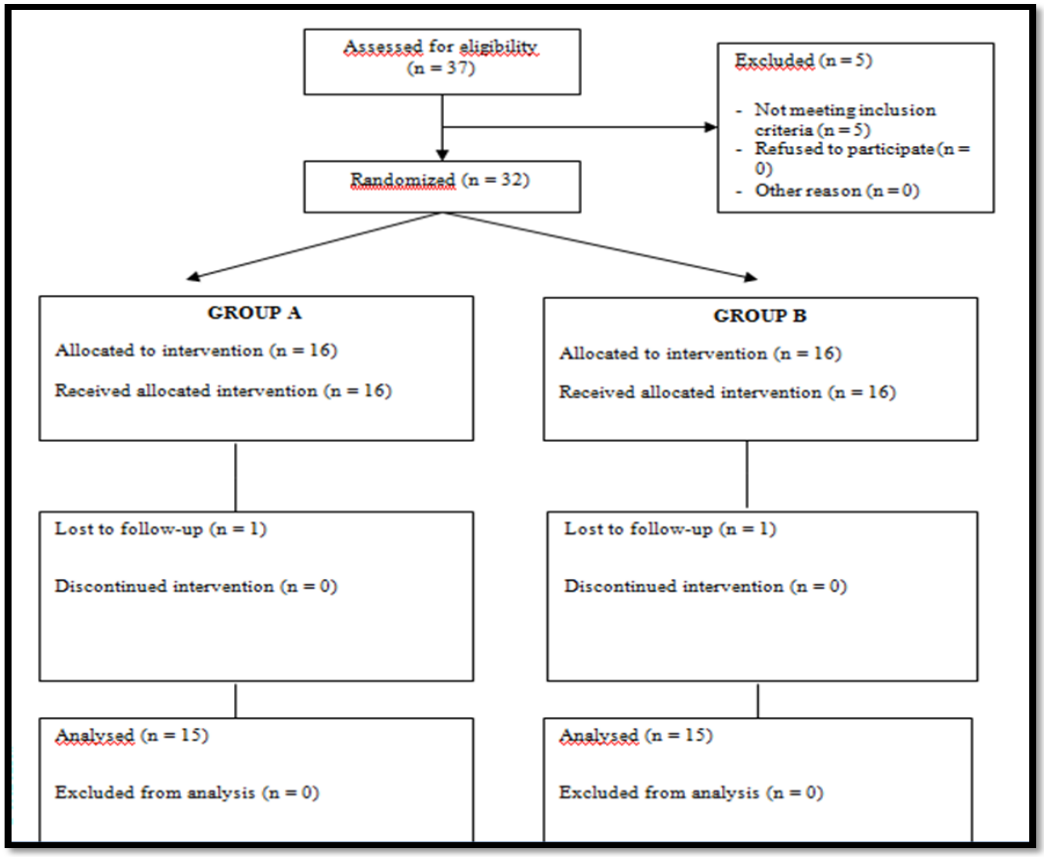

Figure 1: Study design diagram.

DISCUSSION

This study was a randomized clinical trial where a total of 30 subjects (15 in each group) were selected and Full mouth scaling was done with Glycine powder air polishing in Group A and Prophylactic paste polishing in Group B. The present study investigates the clinical effectiveness of GPAP over Prophylactic paste polishing and the data suggest that Glycine powder air polishing show superior results in terms of reduction in Plaque retention and improvement in Gingival index.

The results of this study are in accordance to a study conducted by Petersilka et al in 2003 wherein it was concluded that air-polishing powder is superior to curettes in removing subgingival plaque from pockets of 3-5 mm depth in supportive periodontal therapy and offers greater patient comfort.[5]

Prophylaxis paste with a smaller particle size, such as those found in fine paste, will increase tooth surface cleanliness, luster and smoothness, making the surface more resistant to subsequent stain, plaque and calculus formation. In a study conducted by Braun A et al, the effectiveness of air-polishing was compared to the rubber cup polishing for bacterial plaque and stain removal and it demonstrated that either method is equally effective but reported that both methods caused some gingival trauma.[6]

However, Garcia-Godoy et al have reported air polishers to be more effective for plaque and stain removal in pits and fissures.[7] The present study investigates the clinical effectiveness of GPAP over Prophylactic paste polishing and the data suggest that Glycine powder air polishing show superior results in terms of reduction in Plaque retention and improvement in Gingival index over Prophylactic paste polishing.

CONCLUSION

The findings of this study suggest that GPAP, as an additional approach to nonsurgical periodontal treatment, may be beneficial in the short-term improvement of subclinical gingival inflammation, as measured by Gingival index and Plaque index. It can also be concluded that glycine powder air polishing is superior to prophylactic paste polishing in reduction of plaque retention and improvement in gingival parameters.

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