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Adjunctive glycine powder air-polishing for the treatment of peri-implant mucositis: an observational clinical trial

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Topic: Treatment of technical and biological complications

Abstract

Background. Peri-implant infectious complications are a group of diseases with a great prevalence in the population. Peri-implant mucositis could be successfully treated with antimicrobial treatments, preventing the evolution in irreversible peri-implantitis
Aim/Hypothesis. The aim of this study was to compare professionale oral hygiene and professional oral hygiene and glycine air-powder system for the treatment of peri-implant mucositis.
Material and Methods. After the application of inclusion and exclusion criteria, patients were divided in two groups: in control group patients were treated with professional oral hygiene maneuvers while in the test group glycine air-powder system was adjuncted to professional oral hygiene. Probing depth, bleeding index and plaque index were measured at baseline, and 3 months and 6 months after the treatment.
Results. A total of 30 patients (15 per group) were selected for the study. InPOH e SGA group, PD was, 2.86 ± 0.37 mm and 3.00 ± 0.36 mm at baseline, 2.90 ± 0.53 mm and 2.62 ± 0.50 mm after 3 months, 2.96 ± 0.56 mm and 2.41 ± 0.54 mm after 6 months, respectively, significantly lower in SGA group in the last follow-up visit. In both groups both PI and BI decreased over time
Conclusions and clinical implications. The present reports showed that both techniques were useful for the treatment of peri-implant mucositis. In the test group (with glycine powder), a significant reduction of probing depth was observed. Air-abrasive system with glycine powder can be considered as viable treatment option for peri-implant mucositis as an adjunct to professional oral hygiene maneuvers. Moreover, glycine may have an important effect on the mucosal health, with a consequent reduction of probing depth.

Background and Aim

Theapplication of implant-retained prostheses for the solution of complete edentulism has been demonstrated to be an effective treatment option even in cases of severe bone atrophy (1, 2).
However, in medium and long-term studies, the occurrence of technical and biological complications was described, affecting the success rate of the prostheses and influencing implant survival rates (3). Peri-implant mucositis and peri-implantitis represent the most common biological complications affecting implant surrounding hard and soft tissues (4). Peri-implant mucositis are frequent adverse events. The incidence of peri-implant mucositis ranged from 50% to 90% of implants after 8-10 years (5, 6). It is characterized by mild soft tissue inflammation in absence of any radiologic or clinical sign of bone resorption. On the other hand peri-implantitis has been described to affect up to 36.6% of implants (7) and is characterized by pathologic peri-implant bone loss (4, 8). While peri-implant mucositis is reversible, often peri-implantitis could cause implant loss as the result of bone resorption process.
Scientific literature showed a high predictability of the use of local antimicrobials as chlorhexidine (rinses or gel) for the treatment of peri-implant mucositis and peri-implantitis (9). Air-abrasive devices with bioactive powders were also used in the treatment of peri-implantitis aiming at a mechanical submucosal debridement of bacterial biofilm, without interfering with the microscopical architecture of the titanium surface (9).
The aim of this observational clinical trial was to compare standard professional oral hygiene maneuvers versus treatment with adjunctive air-abrasive device with glycine powder for the treatment of peri-implant mucositis in patients with mandibular full-arch implant-supported restoration. The null hypothesis both treatments are equally useful for the treatment of peri-implant mucositis.

TABLE 2. Probing depth

	Baseline	3 months	6 months	ANOVA
POH group	2.9 ± 0.4 [CI 95%: 2.8 – 3.2]	2.9 ± 0.5 [CI 95%: 2.7 – 3.3]	3.0 ± 0.6 [CI 95%: 2.8 – 3.4]	NS
SGA group	3.0 ± 0.4 [CI 95%: 2.8 – 3.2]	2.6 ± 0.5 [CI 95%: 2.3 – 2.8]	2.4 ± 0.5 [CI 95%: 2.2 – 2.8]	< 0.05
t-Test (POH vs SGA)	NS	NS	< 0.05	

TABLE 3. Plaque and bleeding index

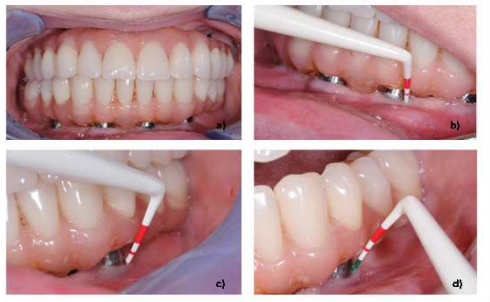
		Baseline		3 months		6 months	
	Values	*POH*	*SGA*	*POH*	*SGA*	*POH*	*SGA*
BI	*0*	0	0	9	12	9	13
	1	12	11	6	2	6	1
	2	3	4	0	1	0	1
	3	0	0	0	0	0	0
PI	*0*	0	0	7	10	5	12
	1	10	10	6	4	9	2
	2	5	5	2	1	1	1
	3	0	0	0	0	0	0

Methods and Materials

The patients included in this investigation were treated following the principles established by the Helsinki Declaration as modified in 2000 (21). The research project was approved by the Review Board of the IRCCS Istituto Ortopedico Galeazzi in Milan, Italy. All patients were informed about the study protocol and signed an informed consent form before entering the study.

Inclusion and exclusion criteria
Patients were included considering the following eligibility criteria:
- patients with mandibular full-arch implant-supported rehabilitations
- bleeding on probing or spontaneous bleeding with local swelling (code 1, 2 or 3 as described in previously published report (10)
- plaque accumulation at the implant-abutment level (code 1, 2 or 3 as described in previously published report (10)
- implant probing depth ≤ 3.5 mm
- peri-implant bone resorption < 3 mm evaluated through the use of standardized radiographs, taken with the use of a individualized radiograph holder
Exclusion criteria were:
- documented allergy or intolerance towards the components of the products used in the study
- antibiotic treatment within six months before the beginning of the study
- topical antimicrobial treatment within four weeks before the beginning of the study
-presence of active infection with suppuration

FIGURE 1. Patient treated with glycine powder. a) and b) before treatment. c) after 3 months and d) after 6 months



Clinical procedure
All clinical procedures were performed by a registered dental hygienist, in one single visit, trained for 3 years in the use of devices and products used in the study.
Professional oral hygiene (POH) only group (control): patients were treated with standard professional oral hygiene maneuvers including debridement of plaque and calculus from the abutment and prosthetic surface using manual teflon curettes followed by polishing.
Professional oral hygiene and submucosal glycine application (SGA) through air-abrasive device (Handy AirFLow® with insert PerioFlow®, EMS, Nyon, Switzerland) (test): after the described before oral hygiene maneuvers glycine powder was applied submucosal on each side of the implant abutment (mesial, distal, buccal, and lingual) using a tip to avoid a damage of surrounding tissues, for no more than five second for each side.
Oral hygiene instructions were provided at baseline, and repeated in each follow-up visit three monhs and six months after intervention. No antibacterial treatment was performed in the follow-up visits.

Outcomes
The primary outcomes were:
- bleeding index (BI) as used in previously published reports (10, 11). The codes were assigned as follows: i) code 0: no bleeding; ii) code 1: bleeding on probing without swelling; iii) code 2: bleeding on probing with redness and swelling; iv) code 3: spontaneous bleeding
- plaque index (PI) as used in previously published reports (10, 11). The codes were assigned as follows: i) no plaque accumulation; ii) plaque accumulation revealed using a probe; iii) moderate accumulation of visible plaque or calculus; iv) high accumulation of visible plaque or calculus
-probing depth (PD) measured using a plastic probe (Colorvue® Hu-Friedy®, Rotterdam, Belgium with University of North Carolina markings) with a probing force of 0,25 N

Results

A total of 30 patients (15 per group) were selected for the study in the period between 2012 and 2013. The last follow-up visit was performed in 2013. All the patients attended the last follow-up visit. A diagram of patients' flow is presented in Figure 1. Patients baseline characteristics are presented in Table 1. At baseline the two groups appeared statistically comparable.
In Table 2 data about PD over time are shown. In POH group, PD was 2.86 ± 0.37 mm at baseline, 2.90 ± 0.53 mm at the 3 months follow-up and 2.96 ± 0.56 mm at the 6 months follow-up without any significant difference among different time frames. In SGA group, PD was 3.00 ± 0.36 mm at baseline, 2.62 ± 0.50 mm at the 3 months follow-up and 2.41 ± 0.54 mm at the 6 months follow-up with a statistically significant difference among the different time frames (p=0.02203). At 6 months there was a stastically significant difference between the two groups (p=0.00103) being significantly lower in the test group.
Frequencies of BI and PI are presented in Table 3. In POH group, nine patients after three months and nine after 6 months did not present any sign of bleeding and none in both follow-up visits presented moderate bleeding. In the same group PI decreased significantly over time. In SGA group 12 patients after three months and 13 after 6 months did not present any sign of bleeding and only one in both follow-up visits presented moderate bleeding (Figure 2; Figure 3). At the 6 months follow-up plaque index was significantly lower in the test group (p=0.00439). As a consequence also bleeding index was lower in the test group than in control group 6 months after treatment (p=0.02245).

TABLE 1. Baseline characteristics of the sample

Characteristic	POH group	SGA group	Total	Difference
	n = 15	n = 15	n = 30	
Gender (M/F)	6 / 9	6 / 9	12 / 18	*NS*
Age (mean ± SD) years	64.8 ± 12.5	63.3 ± 9.3	64.0 ± 10.9	*NS*
Diabetes (n)	0	0	0	*NS*
Cigarettes (mean ± SD)	5.5 ± 2.6	4.3 ± 2.3	5.1 ± 3.0	*NS*
Periodontitis	0	0	0	*NS*
Alcool consumption (n glass / day)	0.7 ± 0.9	0.5 ± 0.9	0.6 ± 0.9	*NS*
PI (median)	1	1	1	*NS*
BI (median)	1	1	1	*NS*
PD (mean ± SD) mm	2.9 ± 0.4	3.0 ± 0.4	2.9 ± 0.4	*NS*

Conclusions

It can be postulated that the use of glycine powder through air-abrasion device as an adjunct to professional oral hygiene could result in a beneficial effect for the treatment of peri-implant mucositis if compared to sole professional oral hygiene through Mechanical devices.

References

1.Patzelt SB, Bahat O, Reynolds MA, Strub JR. The All-on-Four Treatment Concept: A Systematic Review. Clin Implant Dent Relat Res. 2013:
2.Chen YF, Pan CY, Wang WC, Lan TH. Modern therapy for severe alveolar ridge atrophy. J Craniofac Surg. 2013; 24: e472-5.
3.Papaspyridakos P, Chen CJ, Chuang SK, Weber HP, Gallucci GO. A systematic review of biologic and technical complications with fixed implant rehabilitations for edentulous patients. Int J Oral Maxillofac Implants. 2012; 27: 102-10.
4.Lindhe J, Meyle J. Peri-implant diseases: Consensus Report of the Sixth European Workshop on Periodontology. J Clin Periodontol. 2008; 35: 282-5.
12.Roos-Jansaker AM, Lindahl C, Renvert H, Renvert S. Nine- to fourteen-year follow-up of implant treatment. Part II: presence of peri-implant lesions. J Clin Periodontol. 2006; 33: 290-5.
5.Fransson C, Wennstrom J, Berglundh T. Clinical characteristics at implants with a history of progressive bone loss. Clin Oral Implants Res. 2008; 19: 142-7.
6.Koldsland OC, Scheie AA, Aass AM. Prevalence of peri-implantitis related to severity of the disease with different degrees of bone loss. J Periodontol. 2010; 81: 231-8.
7.Heitz-Mayfield LJ. Peri-implant diseases: diagnosis and risk indicators. J Clin Periodontol. 2008; 35: 292-304.
8.Muthukuru M, Zainvi A, Esplugues EO, Flemmig TF. Non-surgical therapy for the management of peri-implantitis: a systematic review. Clin Oral Implants Res. 2012; 23 Suppl 6: 77-83.
9.Sahm N, Becker J, Santel T, Schwarz F. Non-surgical treatment of peri-implantitis using an air-abrasive device or mechanical debridement and local application of chlorhexidine: a prospective, randomized, controlled clinical study. J Clin Periodontol. 2011; 38: 872-8.
10.Corbella S, Del Fabbro M, Taschieri S, De Siena F, Francetti L. Clinical evaluation of an implant maintenance protocol for the prevention of peri-implant diseases in patients treated with immediately loaded full-arch rehabilitations. Int J Dent Hyg. 2011; 9: 216-22.
11.De Siena F, Francetti L, Corbella S, Taschieri S, Del Fabbro M. Topical application of 1% chlorhexidine gel versus 0.2% mouthwash in the treatment of peri-implant mucositis. An observational study. Int J Dent Hyg. 2013; 11: 41-7.

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