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Impact of compliance during periodontal maintenance therapy on oral health-related quality of life: A 6-year follow-up

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ABSTRACT

Objective: To evaluate the effects of compliance during periodontal maintenance therapy (PMT) in the oral impact on daily performance (OIDP) measures, as well as to determine and compare the periodontal condition of acceptable and irregular compliers.

Material and methods: From a 6-year prospective cohort study with 268 individuals under PMT, 232 individuals had complete periodontal clinical data and OIDP questionnaires completed between T1 (data was recorded after the first PMT appointment) and T2 (final data at the last PMT appointment), were determined to be eligible. Individuals were divided into two groups: 124 acceptable compliers (AC) and 108 irregular compliers (IC). Full-mouth periodontal examination and questionnaires were evaluated in 2 times, at T1 and T2.

Results: At T2, the periodontal status of the AC group was significantly better than the IC group. The IC group also presented with higher OIDP scores (63.31 ± 19.11) compared to the AC group (57.72 ± 15.30, $p = 0.005$). On analyzing the OIDP dimensions independently, both groups (AC and IC) presented with high scores in the functional, psychological and social performances; however, the impacts were significantly higher in IC group.

Conclusion: The AC group presented with better periodontal conditions and lower OIDP, compared to the IC group. The discomfort and dissatisfaction with appearance, showed more influence on these daily impacts.

Clinical significance: Acceptable compliers showed lower scores of OIDP when compared to erratic ones. Thus, clinicians could take the chance to gain advantage from the positive impacts of acceptable compliance in the OHRQL for subsequent patient-centred motivation during PMT.

1. Introduction

Periodontal Maintenance therapy (PMT) is defined by the American Academy of Periodontology (AAP) [1] as "Procedures performed at selected intervals to assist the periodontal patient in maintaining oral health." It includes an update of the medical and dental histories, radiographic review, periodontal evaluation, supra and subgingival scaling and root planing where indicated, polishing of the teeth, and a review of the patient's plaque control efficacy. Several studies have highlighted the importance of PMT in preserving the homeostasis of periodontal tissues obtained after active periodontal therapy (APT) [2–12].

However, a classic problem during PMT is compliance and regular return of individuals during recall visits. Many studies reported a low rate of adherence and compliance (˜50%) of individuals under PMT [5–9]. Thus, different criteria for interval time between recalls have been extensively discussed [11–16]. Studies confirmed that individual risk factors and disease severity are primary determinants for establishing interval time between recalls [3,6,7,11–16]. Although a high controversy regarding the ideal interval time still exist, there is a wide range of recommended periods in the published literature, including 3–6 months [5–7,17,18], 12 months [16], and even as long as 18 months [16,19].

In the last two decades several studies have measured the impact of oral health-disease on quality of life [20–26]. These measures of oral quality of life, which were initially designated as socio-dental indicators

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or subjective oral health indicators are now more usually referred to as measures of oral health-related quality of life (OHRQL) [26].

In Periodontology, interesting studies have investigated the effect of periodontal therapy and PMT [6,22–25] on measures of OHRQL of periodontally susceptible individuals [22–25].

Among the several instruments or questionnaires used to measure quality of life [26], the most widely used is the Oral Impacts on Daily Performance (OIDP) [20,21]. Studies using the OIDP demonstrated that physical, psychological, and social performance reflecting OHRQL and well being of individuals can be affected by problems of oral origin [6,21–26].

Different social, behavioral, cultural, and economic factors have been pointed as determinants of the pattern of compliance during PMT [6,13–16]. In this scenario, few studies [6,24] have focused on the influence of the pattern of compliance during PMT on the OHRQL. Thus, we hypothesized *a priori* that higher scores of OIDP are the related to irregular patterns of compliance and worse periodontal clinical conditions.

Therefore, the aim of the present study was to evaluate the effects of compliance during periodontal maintenance therapy (PMT) in the oral impact on daily performance (OIDP) measures, as well as to determine and compare the periodontal condition of acceptable (AC) and irregular (IC) compliers.

2. Materials and methods

2.1. Study design and sampling strategy

Participants of the present prospective study were selected from an open cohort study with 268 individuals under a PMT program, who were monitored in a private dental clinic in Belo Horizonte city, Brazil over 6 years of consecutive recall visits (from August 2006 to February 2016). The study was approved by the local ethical committee (protocol #060/05) and informed consent was obtained from all patients. This study is reported in accordance with the STROBE statements guidelines.

At first, individuals with good general health who underwent APT (comprised of non-surgical and/or surgical procedures) were included in the study sample according to the following criteria: (a) diagnosis of moderate to advanced chronic periodontitis [27] (excluding any possibility of aggressive periodontitis cases); prior to APT, the presence of least 4 sites with probing depth (PD) $\geq$5 mm and clinical attachment loss (CAL) $\geq$3 mm, bleeding on probing (BOP) and/or suppuration, and radiographic evidence of bone loss; (b) completion of APT in a period of less than 4 months prior to entry into the PMT program; and (c) at least 14 teeth in the oral cavity [6]. It is noteworthy that, based on the new classification of periodontal disease, an update in periodontal status was performed and individuals were currently classified with moderate to severe periodontitis [28].

From the 6-year prospective open cohort study with 268 individuals under PMT, a convenience sample of 232 individuals had complete periodontal clinical data and Oral Impacts on Daily Performance (OIDP) [20] questionnaires completed between T1 (data was recorded after the first PMT appointment) and T2 (final data at the last PMT appointment, *e.g.*, after 6 years in PMT). Individuals who attended at least one PMT visit within 12 months were considered acceptable compliers (AC group, n = 124), and those with at least one visit in 18 months were considered irregular compliers (IC group, n = 108) [19]. A post hoc study power calculation, considering a significance level of 0.05 and an effect size of 0.35, retrieved a study power of 0.73.

2.2. Data collection

Parameters of plaque index (PI), [29] PD, CAL, and BOP were recorded for all present teeth at 4 periodontal sites (mesial, distal, buccal, and lingual) with a manual periodontal probe (PCPUNC15BR and PQ2NBR, Hu-Friedy®, Chicago,USA.). Specifically, oral hygiene of each sextant was determined by means of plaque index using disclosing agents. The Quigley & Hein index plaque modified by Turesky et al. [29] was used for this purpose and also included the evaluation of interproximal sites.

Description of data collection and periodontal clinical procedures during all PMT visits were previously reported by Lorentz et al. [5] and Costa et al. [6].

The following variables were also collected: frequency of tooth brushing and dental floss/daily, sex, age, co-habitation status, family income, educational level, smoking [30], alcohol use, and diabetes [31].

2.3. Periodontal monitoring

In each recall visit, the following procedures were performed: i) interviews where demographic, biological and behavioral variables of interest were collected and confirmed through patient questionnaires, paying particular attention to those variables likely to change over time; ii) periodontal assessment through the evaluation of clinical parameters described elsewhere [5]; iii) application of disclosing agents and oral hygiene instructions, using the Bass technique and dental floss; iv) mechanical debridement, when appropriate, including coronal prophylaxis and fluoride application. Two trained and calibrated periodontists (FOC and EJPL) performed all the interviews, examinations, and clinical periodontal procedures. Evaluations of PD and CAL were performed and repeated within a 1-week interval for 10 individuals randomly selected from study groups at baseline and at T2. The kappa coefficients for intra- and inter-examiner agreement, as well as intraclass correlation coefficients, were greater than 0.89.

2.4. Determination of the recurrence of periodontitis and retreatment needs

Sites determined as having retreatment needs were those with recurrence of periodontitis: PD $\geq$4 mm and CAL $\geq$3 mm, together with the persistence and/or presence of BOP and/or SU, during any of the subsequent recall evaluations [32,33] PD changes were first re-treated with non-surgical procedures through mechanical subgingival debridement. After periodontal re-evaluation (45–60 days), sites with persistent PD $\geq$5 mm and CAL $\geq$3 mm underwent surgical procedures performed preferably by Widman modified flap surgery [33].

2.5. Oral health-related quality of life data

The OHRQL data was obtained by the OIDP questionnaire at T1 and T2 by three trained examiners (FOC, EJPL and EMD).

OIDP is focused on measuring daily activities including eating, speaking, cleaning the teeth, smiling, sleeping, maintaining emotional balance, working/studying, doing physical activity, and going out. It measured the impact of oral status on individuals' routines by analyzing the frequency and severity of responses. The occurrence of difficulties in performing the activities was recorded dichotomously (yes/no), and the frequency was indicated by duration. Occurrence ranged from "less than once a month" or "interval up to five days in total" (score 1) to "all or almost every day" or "interval of more than three months in total" (score 5). The severity ranged from "no severity" (score 0) to "extremely severe" (score 5). The maximum score is 200 and is determined by multiplying frequency by severity, with a higher score indicating a worse quality of life [20,21]. Validation studies of OIDP in the Portuguese language showed that the scores have a significant association with self-reported health measurements [34,35].

2.6. Statistical analysis

Statistical analysis included a descriptive characterization of the sample according to variables of interest. Group comparisons by means of Chi-squared, Student *t* tests were performed when appropriate.

Table 1
Characterization of the sample regarding variables of interest at T2.

N	ACCEPTABLE COMPLIERS (AC) n = 124	ERRATIC COMPLIERS (IC) n = 108	TOTAL SAMPLE n = 232
Sex			
Women	64 (51.6)	50 (46.2)	114 (49.1)
Men	60 (48.4)	58 (53.8)	118 (50.9)
Age			
Up 50 years*	51 (41.1)	45 (42.0)	96 (41.4)
More 50 years	73 (58.9)	63 (58.0)	136 (58.6)
Family income*			
< 5 BMS	50 (40.3)	69 (64.0)	89 (38.4)
≥ 5 BMS	74 (59.7)	39 (36.0)	143 (61.6)
Educational level			
< 8 years	59 (47.6)	48 (44.0)	107 (32.2)
≥ 8 years	65 (52.4)	60 (56.0)	125 (67.8)
Co-habitation status			
With companion (family/ friends)	80 (64.5)	77 (71.2)	157 (67.8)
Without companion	44 (35.5)	31 (28.8)	75 (32.2)
Smoking		24 (22.2)	
Current smoking	22 (17.8)		46 (19.8)
Non-smoking/Former-smoking	102 (82.2)	84 (77.8)	186 (80.2)
Diabetes			
Yes	10 (8.0	11 (11.0)	21 (9.0)
Alcohol Use			
No/occasional	46 (37.0)	42 (39.0)	88 (37.9)
Frequency of toothbrush and dental floss /daily) (mean SD) †	3.2 (± 0.4)	2.9 (± 0.5)	3.0 (± 0.5)
Times since APT (mean SD)	61.9 (± 2.8)	61.3 (± 3.2)	61.6 (± 2.8)
Number PMT visits (mean SD)†	5.7 (± 0.5)	4.1 (± 0.7)	4.9 (± 0.6)

Chi-squared test.
* , $p < 0.05$ or.
† Student-test for independent samples, $p < 0.05$; BMS = Brazilian minimum salary (˜300 U$).

Multiple comparisons were adjusted by Bonferroni correction post-hoc test.

In relation to the OIDP data, the normality of data was tested through the Kolmogorov-Smirnov test. Since data distribution was too asymmetric and deviations from normal distribution were too high, non-parametric tests were used. Thus, for statistical analysis, Mann-Whitney test, and Wilcoxon test were used reporting means, standard deviation and medians with inter-quartile intervals (Q1-Q3). All tests were performed using statistical software (SPSS, version 16.0, Chicago, IL, USA). Results were considered significant if a p-value lower than 5% was attained ($p < 0.05$).

3. Results

Characterization of AC and IC groups in relation to variables of interest is presented in Table 1. Significant differences were reported between AC and IC groups only for family income and age showing a very homogeneous study sample. In relation to the PMT data, significant differences were observed regarding the mean of recall visits [AC 5.7 (± 0.5) and IC 4.1(± 0.7)] and the frequency of tooth brushing and dental flossing/daily [AC 3.2 (± 0.4) and IC 2.9 (± 0.5)].

Periodontal condition of the sample at T1and T2 is presented in Table 2. In general, no significant differences were observed in relation to the parameters BOP, PD, PI and CAL among groups at T1. As a result, both groups were determined to be homogeneous after APT. Nevertheless, differences between AC and IC groups were observed at T2. However, it is emphasized that the IC group exhibited a higher mean of PI, BOP, PD, and CAL, and higher lost teeth than AC groups.

The oral impact on daily performance, evaluated through OIDP total, for AC and IC groups is summarized in Table 3. In general, it could be observed that individuals in IC group showed higher impacts on daily performance (OIDP = 63.31 ± 19.11) when compared to AC individuals (OIDP = 57.72 ± 15.30) ($p = 0.005$). Moreover, significant differences between T1 and T2 were only reported for IC group ($T1 < T2$, $p = 0.001$).

When analyzing the OIDP dimensions independently, IC individuals also presented higher scores of OIDP in questions related to functional performance (eating and enjoying food; speaking and pronouncing words, $p < 0.001$), psychological performance (emotional stability; $p = 0.001$), and social performance (contact with people; $p < 0.001$) when compared to AC individuals (Table 4).

Table 5 presents the causes of the difficulties in carrying out the daily activities due to “problems with my teeth” at T1 and T2. When comparing AC and IC at T2, it was observed that AC individuals reported “discomfort” (50.0%) more often, followed by “dissatisfaction with appearance” (19.3%), others (12.9%), impaired function (9.7%) and “pain” (8.1%), while IC individuals reported “discomfort” (53.4%), “dissatisfaction with appearance” (19.5%), “impaired function” (10.6%), “pain” (9.1%), and “others” (7.4%).

4. Discussion

The present study showed that most individuals responded favorably to procedures during PMT. However, the IC group exhibited higher PI, mean of BOP, PD, CAL, and tooth loss. Thus, results are consistent with previous studies’ [5,6,14] showing that in IC individuals, the disease can recur and lead to tooth loss. Additionally, better oral health status was associated with lower impacts on daily performance and vice-versa. Moreover, individuals from IC group also presented higher scores of OIDP in questions related to functional performance (eating, enjoying food, speaking and pronouncing words), psychological performance (emotional stability), and social performance (contact with people) when compared to individuals from AC group

The main focus of many initial studies [13–15,36–38] in PMT was to evaluate the effectiveness of periodic oral prophylaxes after APT. In this scenario, significant differences were observed between IC and AC for all the periodontal clinical parameters studied, *e.g.*, IC presented higher PI, BOP PD CAL and tooth loss than AC. Similar to some previous studies [16,19], the present study showed a beneficial effect of PMT on periodontal clinical parameters in individuals with recall intervals up to 12 months when compared to individuals with longer interval times.

In the present study, differences between AC and IC were observed in relation to toothbrushing and dental flossing daily frequency, age and family income (IC < AC). Due to the high PI scores in both IC and AC gropus, it can be hypothesized that the daily frequency of toothbrushing and dental flossing in AC (3.2 ± 0.4) and IC (2.9 ± 0.5) groups seems to be insufficient or that those self-reported data on oral hygiene habits present some information bias. In the sense, high scores of PI at T2 reflects a need for further and intensive efforts to control the dental biofilm during PMT. This issue is critical to the effectiveness of PMT programs [5–8]. Moreover, a similar result was reported in previous studies that investigated the importance of motivation for oral hygiene, considering that individuals have difficulty maintaining new habits over time [5,6,14].

Another possible explanation of the high scores of PI reported in present study could be related to the inclusion of proximal sites [15] during examination. These high scores are similar to those reported by previous studies [3,5,7,13–15].

It is the consensus that PMT is necessary [1], however, there is no robust data to support a specific PMT frequency of recall visits for the best possible outcomes [16]. Some important studies [36–38] indirectly approached the issue of optimum PM recall intervals without really comparing PM interval times. Thus, recent systematic reviews [9,12,16,39] have concluded that there is weak evidence for setting a

Table 2
Periodontal status of AC and IC groups at T1 and T2.

Periodontal Parameters	T1		T2	
	AC (n = 124)	IC (n = 108)	AC (n = 124)	IC (n = 108)
Probing depth				
Mean (mm)	2.4 ± 0.7	2.6 ± 0.5	3.5 ± 4.2	4.4 ± 3.9
Sites with PD ≥ 5 mm	1.7 ± 0.6	1.9 ± 0.7	4.3 ± 0.5	5.8 ± 0.9
Clinical attachment loss				
Mean (mm)	3.5 ± 0.5	3.8 ± 0.7	3.9 ± 0.8	4.9 ± 1.7
Sites with CAL ≥ 5 mm	9.8 ± 1.9	10.1 ± 1.6	8.4 ± 1.7	13.8 ± 1.8
Bleeding on probing	26.3 ± 9.2	27.8 ± 6.4	28.9 ± 5.1	32.4 ± 6.2
Plaque Index	36.6 ± 6.4	38.1 ± 7.3	40.3 ± 5.2	45.2 ± 7.34
Mean number of lost teeth	3.8 ± 0.4	4.0 ± 0.6	4.31 ± 1.2	5.2 ± 1.7

Baseline comparisons between AC and IC: significant difference on bleeding on probing ($p < 0.05$; Student-*t*-test for independent samples).
Final examination comparisons between AC and IC: significant difference on all variables ($p < 0.05$; Student-*t*-test for independent samples).
AC comparisons between baseline and final examinations: significant difference on all variables except mean of affected sites with clinical attachment level ≥ 5 mm ($p < 0.05$; Student-*t*-test for dependent samples).
IC comparisons between baseline and final examinations: significant difference on all variables.
($p < 0.05$; Student-*t*-test for dependent samples).
Multiple comparisons adjusted by Bonferroni correction ($p = 0.02$).

Table 3
Comparative analysis of IC and AC groups, and between assessment times in relation to the questionnaires OIDP.

	Group	Times		P
		T1	T2	
OIDP	**AC (N = 124)**	57.00 (27.10) [56.28 ± 16.44]	61.00 (29.14) [57.72 ± 15.30]	0.582 T1 = T2
	IC (N = 108)	56.30 (28.30) [53.69 ± 17.51]	66.20 (21.00) [63.31 ± 19.11]	**0.001** T1 < T2
	p	0.100†	**0.005**†	

Median (Q3 - Q1), [Mean ± s.d.]; the probability of significance (p) refers to the Mann-Whitney test for comparisons between groups and the Wilcoxon test for the comparison between times (T1 and T2). Significant p-values are shown in bold.
† IC > AC.

Table 4
OIDPTotal and Dimensions Among AC and IC groups at T2.

	Total sample (N = 232)		p
	AC (N = 124)	IC (N = 108)	
OIDP (total)	57.72 ± 15.30	63.31 ± 19.11	**0.017**
OIDP dimensions			
Functional performance (0.001)†	70.8 ± 15.34	81.2 ± 15.15	< **0.001**
Eating and enjoying food	79.5 ± 14.44	87.9 ± 8.05	< **0.001**
Speaking and pronouncing words	65.6 ± 18.52	77.8 ± 8.23	< **0.001**
Cleaning teeth	87.2 ± 7.28	86.8 ± 8.41	0.121
Psychologic performance (0.048)†	45.06 ± 15.12	58.4 ± 16.31	0.415
Sleeping and relaxing	36.1 ± 14.42	35.6 ± 13.06	0.293
Emotional stability	58.8 ± 11.78	60.5 ± 17.82	**0.001**
Smiling	60.3 ± 18.45	69.2 ± 19.33	0.061
Social performance (0.029)†	38.5 ± 13.42	39.4 ± 12.61	0.509
Working	36.7 ± 13.02	35.89 ± 15.13	0.107
Contact with people	61.5 ± 10.25	62.8 ± 15.02	< **0.001**

*Student *t*-test for independent samples.
† Bonferroni correction (P value) for each dimension. Significant p-values are shown in bold.

particular fixed recall interval for PMT visits.

Compliance with PMT care is clearly an essential prerequisite for long-term periodontal stability and maintenance of a functional dentition, yet the levels of compliance are often below 50% [6,11]. There is little doubt that compliance with supportive periodontal care is a complex issue of multifactorial etiology [11,39]. A positive correlation between compliance and age and socioeconomic level was reported, while a negative correlation with smoking [39] and neurotic personality traits [6] was also reported.

The timely question of the cost-effectiveness of maintenance periodontal care has been discussed in several studies [9–11,41,42]. Crucially, the maintenance of a tooth through regular supportive periodontal care is considerably cheaper than extraction and replacement with dentures, implants or bridges. Therefore, for patients with periodontitis, supportive periodontal care is the most cost-effective option. Indeed, for those patients who decide on not to enroll in maintenance programs, the cost of lifelong supportive periodontal care will equate approximately to the cost of extraction and replacement of only three or four teeth [11]. For that reason, one suggested approach is to stress the financial benefits of supportive periodontal care to patients, with the view of using this as a potential 'lever' to improve compliance [42].

Based on our previous PMT studies [5–7,33], we believe that recall visits at short interval times may compromise adherence to maintenance therapy over the years for different reasons. Considering this assumption, a interval time for recall visits up to 12 months was the one in which the majority of our cohort individuals followed during PMT without further worsening the periodontal clinical condition and, therefore, it was determined to be reasonable in clinical practice. Moreover, Rosén et al. [19] suggested that recall intervals extended to a year might be acceptable for the purpose of reducing periodontal disease progression in individuals with a history of limited or moderate susceptibility to the disease. An interesting topic for future studies would be the evaluation of the effects of different recall frequency stratifications on clinical outcomes and OHRQL.

In the past decades, researchers have mainly evaluated the clinical signs of oral diseases, not taking into account individuals' perception regarding their oral health. Currently, great importance is given to this perception or evaluation, since these subjective indicators can provide information that complement clinical examination, evaluate the impact on quality of life, and predict potential therapeutic decisions, especially in PMT programs that involve long time monitoring periods [6].

Symptoms of periodontal disease includes redness of the gums, bleeding on brushing, loosening of the teeth and halitosis, all of which can become significant oral health problems from an individual's point of view [40]. Cross sectional studies have shown that the impact of oral health on the quality of life among periodontal patients is high [6,22–25,43]. In this context, of the different instruments available to measure OHRQL, OIDP was chosen because it also measures negative impacts (model "disease-preventing-dysfunction-failure"), which are

Table 5
Identification of causes of difficulties to perform activities due to problems with teeth, using OIDP questionnaire - T1 and T2.

		Groups					
		T1			T2		
		AC (N = 124)	IC (N = 108)	p	AC (N = 124)	IC (N = 108)	p
Causes	**Discomfort**	75 (60.6%)	68 (62.9%)	NA	62 (50.0%)	58 (53.4%)	NA
	Pain	12 (9.7%)	10 (9.2%)	NA	10 (8.1%)	10 (9.1%)	NA
	Impaired function	12 (9.7%)	9 (8.4%)	NA	12 (9.7%)	11 (10.6%)	NA
	Dissatisfaction with appearance	15 (12.0%)	13 (12.0%)	NA	24 (19.3%)	21 (19.5%)	NA
	Others	10 (8.0%)	8 (7.5%)	NA	16 (12.9%)	8 (7.4%)	NA

NA = not aplicable.

common in periodontally compromised individuals [43].

The OHRQL is based on a hierarchy of needs, being the mouth essential to satisfying human biological and social needs in terms of survival, socialization and self-realization. So the mouth and its health are an integral and punctual part of the overall health [40].

Thus, results from the present study showed that both AC and IC groups presented high scores in the functional, psychological and social performances. The main causes of the limitations were discomfort, dissatisfaction with appearance, impaired function and pain. These results demonstrated a similarity in the sample, regardless of the causes of difficulties to perform activities due to problems with the teeth. However, these impacts were significantly higher among IC individuals. Similar findings were reported in studies using OIDP in periodontally susceptible individuals [22,23,25,40,43]. This highlights an important role of PMT procedures, which not only maintains the periodontal health but also positively impacts the OHRQL.

Controversial findings [21,44,45] were reported in relation to the magnitude of OIDP correlations and socio-demographic variables, such gender and oral-health status. Among these variables, higher age has been associated with lower OIDP scores. However, results from the present study demonstrated that both groups had significantly more individuals aged > 50 years.

Some limitations can be attributed to the present study such as the bias information on oral hygiene habits and the profile of the studied sample (highly educated subjects from mid-high economic strata and private dental clinic). However, the 6-year follow-up monitoring period, the prospective design, the homogeneous sample, and the standardization of periodontal procedures during PMT can minimize the impact of these limitations.

In this sense, clinicians could take the chance to gain advantage from the positive impacts of acceptable compliance in the OHRQL for subsequent patient-centred motivation during PMT. It is expected that this knowledge can be reverted in benefits to the periodontal clinical practice, especially in regards to the control and treatment of periodontally susceptible individuals.

5. Conclusion

It was concluded that AC individuals presented better periodontal condition, as well as lower oral impacts on daily performance, when compared to IC individuals. Discomfort and dissatisfaction with appearance showed more influence on these daily impacts.

In this manner, these findings can be used to stimulate adherence and compliance, especially in PMT that demands long life monitoring and constant, reflecting an improvement in OHRQL.

Declarations of interest

None.

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