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Effectiveness of Nonsurgical Periodontal Therapy Delivered by Undergraduate Students: A Longitudinal Study

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ABSTRACT

The present study aimed to investigate the outcomes of non-surgical treatment of patients with chronic periodontitis by undergraduate dental students at King Saud University. Participants with severe or moderate chronic periodontitis who were over 18 years of age were eligible to participate. 33 patients formed the study sample and underwent non-surgical treatment under the supervision of skilled periodontists from undergraduate students. The mean numbers of teeth and dental sites with probing pocket depth less than 5 mm at the re-examination and maintenance visits were significantly higher ($P < 0.01$), while the mean number of teeth with probing pocket depths ≥ 5 mm was significantly lower ($P < 0.001$). In addition, the mean plaque values and gingival bleeding indices improved significantly (PI; $P < 0.01$, BOP; $P < 0.001$). Compared with the first inspection, there was no detectable change in the number of teeth during re-examination and maintenance visits. Nonsurgical periodontal treatment by undergraduate students was successful in improving the periodontal health in individuals with mild to severe chronic periodontitis.

Keywords: Nonsurgical periodontal therapy, Undergraduate students, Chronic periodontitis, Periodontal health

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Introduction

Restoring and maintaining periodontal health and function is the ultimate objective of periodontal therapy, and both surgical and nonsurgical methods can help achieve this [1-4]. Scaling and root planning (SRP), oral hygiene education (OHI), and patient motivation are all components of non-surgical periodontal treatment [5]. Its objective is to move the microbial flora to a more advantageous habitat and eradicate or lessen the suspected periodontal pathogens [6]. Chronic periodontitis has been successfully treated with nonsurgical periodontal treatment [7-9]. Nevertheless, several factors have been shown to influence its performance, including site-specific characteristics (e.g., tooth type and endodontic treatment), defect-related factors (e.g., infra-bony defects and significant interproximal bone loss), and patient-related factors (e.g., smoking and disease severity) [10–13]. Graduates enrolled in postgraduate studies in periodontology, known as periodontists, provide nonsurgical periodontal treatment for chronic periodontitis at King Saud University's College of Dentistry's Department of Periodontics and Community Dentistry (PCS). Dental students in the fourth and fifth academic years of the bachelor's program's undergraduate clinical courses are closely monitored by skilled periodontists. According to the findings of another German investigation, chronic periodontitis may be effectively treated with nonsurgical root debridement carried out by students who had received comprehensive training [14]. Walter *et al*. [15] have claimed accomplished nonsurgical treatment in undergraduate courses at the University of Basel in Switzerland. To the best of our knowledge, no comparable research has been conducted among Saudi

university undergraduate dentistry students. Thus, the goal of the current longitudinal research was to evaluate the results of nonsurgical therapy for chronic periodontitis among King Saud University undergraduate students at the College of Dentistry.

Materials and Methods

This study was approved by the Research Ethics Committee of King Saud University (IRB Research Project No. E-18-3153). Participants were recruited from female patients who received nonsurgical periodontal therapy by the 4th and 5th-year undergraduate students, at the Girls University Campus of the College of Dentistry, King Saud University during 2018 and 2019. Informed consent was obtained from the included patients after explaining the study's nature. Inclusion criteria were > 18-year-old patients with moderate or severe chronic periodontitis [16], complete clinical, periodontal, and radiographic documentation, complete nonsurgical SRP, at least one periodontal reevaluation visit 6 weeks after completion of the nonsurgical therapy, and one periodontal maintenance visit at least 3 months after completion of nonsurgical treatment [17]. At the initial visit, an oral examination including periodontal charting and radiographic interpretation was carried out. The recorded periodontal parameters were plaque index (PI) [18], bleeding on probing (BOP; scored as present or absent) [19], and probing pocket depth (PPD). The number of all teeth, as well as several molars (except wisdom), were recorded. Following periodontal examination, diagnosis [16], and prognosis [20, 21], the enrolled patients received OHI and several weekly sessions of nonsurgical SRP under local anesthesia if needed. Hand instruments (Hu-Friedy; Hu-Friedy® Inc) and/or sonic scalers were used for root debridement in one quadrant or one side of the dentition per session with intervals of 1-2 weeks between sessions. The instrumented teeth had to exhibit hard and smooth root surfaces as detected with a fine manual probe and they were finally rinsed with chlorhexidine (0.2%). At each visit, the patient's oral hygiene level was reassessed and reinforced if needed. All the clinical assessments and treatments were verified by experienced periodontists. Patients were scheduled by their treating dental students for periodontal reevaluation and maintenance visits. At these visits, the periodontal parameters were reassessed, the patient's oral hygiene was reinforced and root debridement was carried out where necessary. The collected data were analyzed statistically using the SPSS v.20. Means and standard deviations were calculated. The differences in the parameters between the initial visit and reevaluation and maintenance visits were evaluated with a paired t-test at a significance level of < 0.05.

Results and Discussion

Only 33 patients, with a mean age of 31.2 ± 6.1 years, met the inclusion criteria and made up the research sample out of the 40 screened; all patients had at least one recall, and 27 had several reevaluations. 26 patients had systemic disorders (diabetes mellitus, hypertension, hypotension, hypothyroidism, and asthma), according to their medical histories. Following a periodontal assessment, 17 patients were diagnosed with both localized and generalized severe chronic periodontitis, and 16 patients were diagnosed with moderate chronic periodontitis. The characteristics of the subjects before therapy are shown in **Table 1**.

Table 1. Characteristics of the study subjects before treatment (n = 33)

Parameter	Mean ± SD
Age (Years)	31.2 ± 6.1
Number of teeth/patient	28.3 ± 2.12
Number of molars /patient (except 3rd molars)	7.9 ± 1.3
Number of tooth sites /patient	202 ± 18.4
PI (%)	46.2 ± 14.5
BOP (%)	64.2 ± 28.4

Over the study period, the mean PI reduced significantly from the initial examination (46. 2 ± 14.5) to the reevaluation visit (26.1 ± 12.3) ($P < 0.001$) and maintenance visit (23.8 ± 10.2) ($P < 0.01$). Similarly, the initial mean of BOP (46.2 ± 14.5) was improved significantly at both reevaluation (34.8 ± 13.3) and maintenance visits (31.7 ± 12.1) ($P < 0.001$) **(Figure 1)**. Regarding the changes in the probing pocket depth following nonsurgical therapy, the mean number of teeth and tooth sites per patient with PPD < 5 mm increased significantly after scaling and root planning from initial visit to reevaluation and maintenance visits ($P < 0.01$) **(Figures 2 and 3)**. In addition, the mean number of teeth and tooth sites per patient with PPD ≥ 5 mm at the initial visit decreased significantly at reevaluation and maintenance visits ($P < 0.001$) **(Figures 2 and 3)**. Considering the number of teeth, no significant differences were found in the total number of teeth and molars between the initial examination and the reevaluation and maintenance visits ($P = 0.3$) **(Figure 4)**.

From the initial assessment (46.2 ± 14.5) to the reevaluation visit (26.1 ± 12.3) ($P < 0.001$) and

maintenance visit (23.8 ± 10.2) (P < 0.01), the mean PI decreased considerably during the research. Similarly, both the reevaluation (34.8 ± 13.3) and maintenance visits (31.7 ± 12.1) showed a substantial improvement in the original mean of BOP (46.2 ± 14.5) (P < 0.001) **(Figure 1)**. The mean number of teeth and tooth sites per patient with PPD < 5 mm rose substantially after scaling and root planing from the first visit to re-examination and maintenance visits (P < 0.01), about changes in the probing pocket depth after nonsurgical treatment **(Figures 2 and 3)**. Furthermore, Re-examination and maintenance visits showed a substantial decrease (P < 0.001) in the mean number of teeth and tooth sites per patient with PPD ≥ 5 mm at the initial visit **(Figures 2 and 3)**. There were no appreciable variations in the total number of teeth and molars between the first assessment and re-examination and maintenance visits when taking tooth count into account (P = 0.3) **(Figure 4)**.

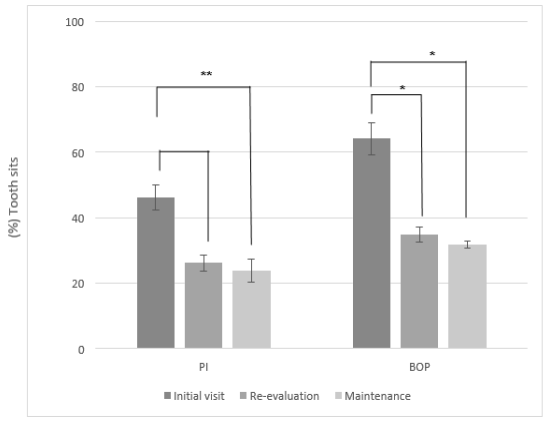

Figure 1. PI (%) and BOP (%) (mean ± SD) at initial, reevaluation, and maintenance visits.
*: P < 0.001, **: P < 0.01

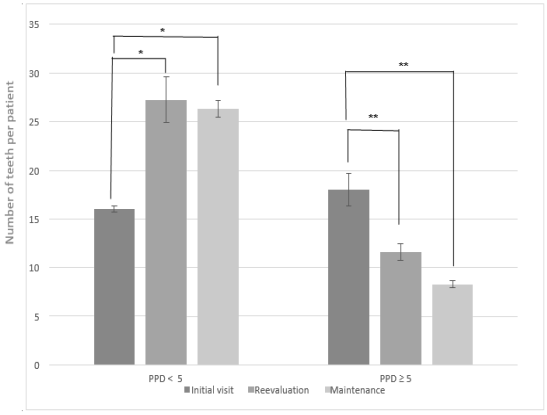

Figure 2. Number of teeth per patient with PPD of < 5 mm and ≥ 5 mm (mean ± SD) at initial, re-evaluation, and maintenance visits. *: P < 0.001, **: P < 0.01

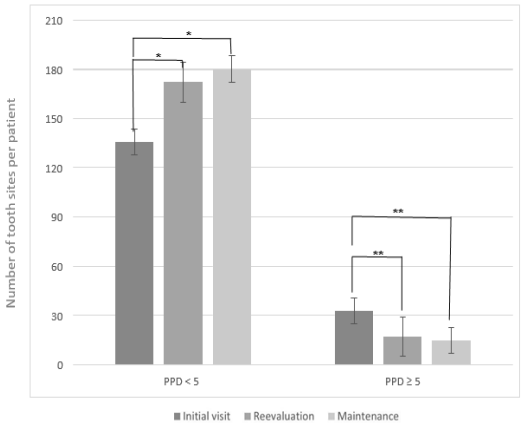

Figure 3. Number of tooth sites per patient with PPD of < 5 mm and ≥ 5 mm (mean ± SD) at initial, re-evaluation, and maintenance visits.
*: P < 0.001, **: P < 0.01

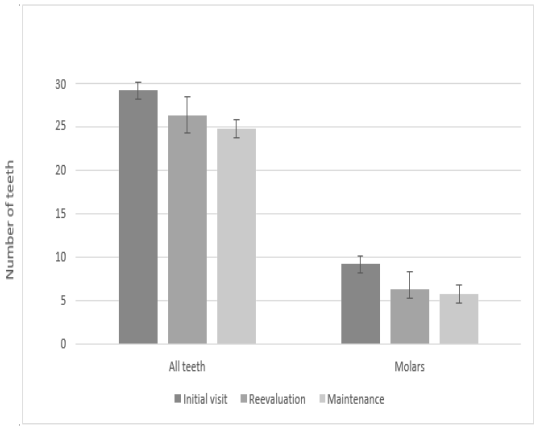

Figure 4. Number of teeth and number of molars per patient (mean ± SD) at initial, re-evaluation, and maintenance visits.

This study included adult patients over the age of 18 with a diagnosis of severe or moderate chronic periodontitis, to evaluate the results of nonsurgical periodontal therapy administered by undergraduate students.

After receiving nonsurgical periodontal treatment, the individuals' gingival health and dental hygiene greatly improved. Additionally, teeth with intermediate (4-6 mm) and deep (> 6 mm) periodontal pockets had a substantial decrease, although the frequency of probing pocket depths less than 5 mm rose. Furthermore, the quantity of both anterior and posterior teeth might be preserved. According to reports, the dentist's degree of expertise had a substantial impact on the number of calculus-free root surfaces after SRP alone in teeth with moderate and deep periodontal pockets [22]. Therefore, the level of expertise a dentist has influenced the results of their treatments. Furthermore, the incidence of periodontal disease and tooth death

was successfully decreased by maintaining a closely watched plaque management program [23]. According to Van der Weijden *et al*. [24], about one-third of adult patients with periodontitis achieved the success objective of having no pockets deeper than 5 mm as a result of aggressive nonsurgical periodontal treatment. However, smoking, tooth type, furcation involvement, and the degree of periodontal disease all affected the result.

In the literature, there aren't many studies that evaluate the effects of periodontal treatment during undergraduate training in terms of decreased BOP and fewer areas with deeper probing. Successful nonsurgical periodontal treatment for individuals with severe periodontitis was reported by Vouros *et al*. [13] in undergraduate courses. Students who have received systematic training may effectively treat patients with periodontitis, as proven by Rühling *et al*. [14]. Undergraduate dentistry students' nonsurgical treatment of patients with severe periodontitis greatly improved their periodontal diseases, according to Walter *et al*. [15].

Conclusion

In patients with moderate to severe chronic periodontitis, the results of this research showed that nonsurgical periodontal therapy administered by undergraduate students can significantly lower dental plaque and gingival bleeding scores as well as probing pocket depths at six weeks and at least three months following treatment.

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Conflict of Interest: None

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Ethics Statement: An ethical approval no. E-18-3153 was obtained from the King Saud University Institutional Ethical Committee.

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