Original Study

# OUTCOMES OF NONSURGICAL PERIODONTAL THERAPY BY UNDERGRADUATE DENTAL STUDENTS AT KING SAUD UNIVERSITY, A LONGITUDINAL STUDY

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**ABSTRACT**

This study aimed to assess the outcomes of nonsurgical therapy of chronic periodontitis patients performed by undergraduate dental students at King Saud University. Subjects who were >18 years old and had severe or moderate chronic periodontitis were eligible for the study. 33 patients constituted the study sample and received nonsurgical periodontal therapy by undergraduate students who were supervised by experienced periodontists. At reevaluation and maintenance visits, the mean values of plaque and gingival bleeding indices were significantly improved (PI; $p < 0.01$, BOP; $p < 0.001$), the mean number of teeth and tooth sites with probing pocket depth <5mm were significantly increased ($p < 0.01$) whereas the mean number of those with ≥5 mm probing pocket depth were significantly decreased ($P < 0.001$). No significant difference was reported in the number of teeth at reevaluation and maintenance visits in comparison to the initial examination. It was concluded that nonsurgical periodontal treatment carried out by undergraduate students was effective in the improvement of the periodontal health of patients with moderate and severe chronic periodontitis.

**Key words:** Nonsurgical periodontal therapy, Undergraduate students, Chronic periodontitis, Periodontal health.

## Introduction

The ultimate goal of periodontal therapy is to reestablish and maintain periodontal health and function, which can be achieved by surgical and nonsurgical treatments [1-4]. The non-surgical periodontal therapy includes patient motivation, scaling and root planing (SRP), and oralhygiene instructions (OHI) [5]. Its goal is to eliminate or reduce the putative periodontal pathogens and shift the microbial flora to a more favorable environment [6]. It has been found that nonsurgical periodontal therapy can effectively treat chronic periodontitis [7-9]. However, several factors are reported to affect its success including patient-related factors (e.g. smoking and disease severity); defect-related factors (e.g. infrabony defects and severe interproximal bone loss); and site-specific factors (e.g. endodontic treatment and tooth type) [10-12]. At the Department of Periodontics and Community Dentistry (PCS) of the College of Dentistry, King Saud University, the nonsurgical periodontal therapy of chronic periodontitis is performed by periodontists, graduates attending the postgraduate programs in periodontology, and dental students in the undergraduate clinical courses of the bachelor curriculum ($4^{th}$ and $5^{th}$ academic years), who are thoroughly supervised by experienced periodontists. Few studies have been published regarding the outcomes of nonsurgical periodontal therapy performed by undergraduate students. Vouros *et al.* [13] demonstrated successful treatment outcomesin patients with moderately and severely advanced periodontitis who were treated by senior undergraduate students at the Aristotle University of Thessaloniki in Greece. Another study conducted in Germany concluded that nonsurgical root debridement performed by systematically trained students was successful in treating chronic periodontitis [14]. Successful nonsurgical therapy in the undergraduate courses of the University of Basle in Switzerland was also reported by Walter *et al.* [15]. Up to our knowledge, no similar studies were carried out among undergraduate dental students at Saudi Universities. Therefore, the present longitudinal study aimed to assess the outcomes of nonsurgical treatment of chronic periodontitis by undergraduate students at the College of Dentistry, King Saud University.

## 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. Informedconsent 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, andone periodontal maintenance visit at least 3 months after completion of nonsurgical treatment [17]. At the initial visit, oral examination including periodontal charting and radiographic interpretation was carried out. The recorded periodontal parameters wereplaque index (PI) [18], bleeding

on probing (BOP; scored as present or absent) [19], and probing pocket depth (PPD). The number of allteeth, as well as number of molars (except wisdoms), 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 being detected with a fine manualprobe and they were finally rinsed with chlorhexidine (0.2%). At each visit, thepatient's oral hygiene level was reassessed and reinforced if needed. All the clinicalassessments and treatments were verified by experienced periodontists. Patients were scheduled by their treating dental students for periodontal reevaluation andmaintenance 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 paired t-test at a significance level of <0.05.

**Results and Discussion**

Out of 40 patients screened, only 33 fulfilled the inclusion criteria and constituted the study sample. The patients' mean age was 31.2 ± 6.1 years. All patients were recalled at least once and 27 of them had been reevaluated more than once. The medicalhistory revealed that 26 patients had systemic diseases (diabetes mellitus, hypertension, hypotension, hypothyroidism, asthma). Upon periodontal examination, localized and generalized severe chronic periodontitis were diagnosed in 17 patients and 16 patientswere diagnosed with moderate chronic periodontitis. **Table 1** represents the subjects' characteristics before treatment.

**Table 1.** Characteristics of the study subjects prior to 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 initial examination (46.2 ± 14.5) to 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 <5mm 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 thetotal number of teeth and molars between the initial examination and the reevaluation and maintenance visits (p= 0.3) **(Figure 4)**.

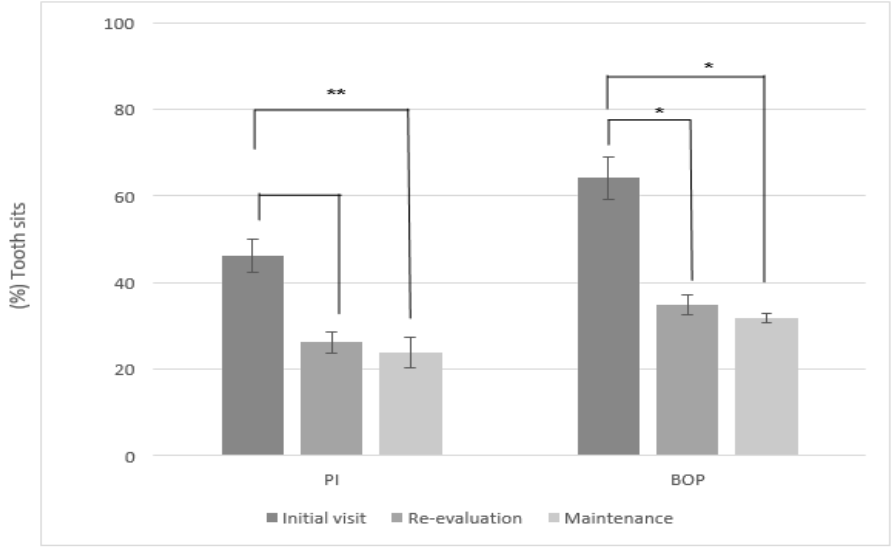


**Figure 1.** PI (%) and BOP (%) (mean ± SD) at initial, reevaluation, and maintenance visits.
*: $p$< 0.001, **: $p$< 0.01

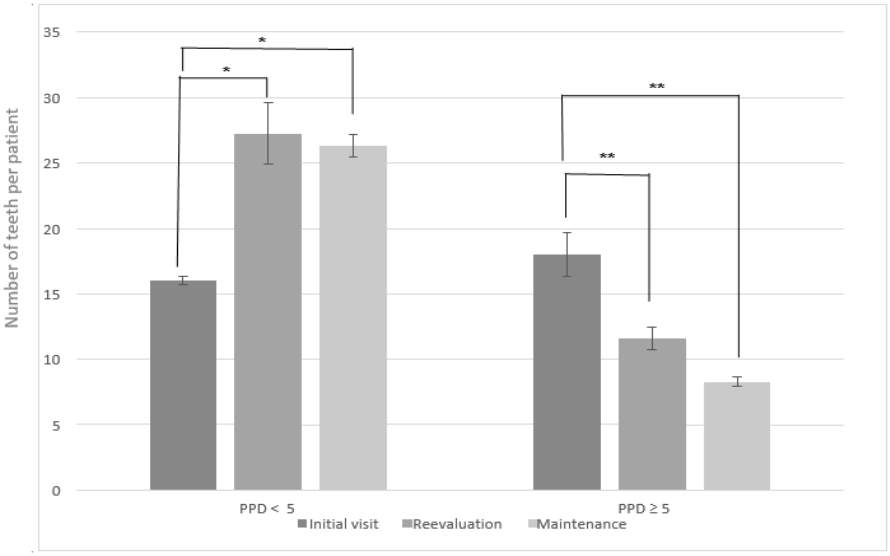


**Figure 2.** Number of teeth per patient with PPD of < 5 mm and ≥ 5 mm (mean ± SD) at initial,re-evaluation, and maintenance visits. *: $p < 0.001$, **: $p < 0.01$

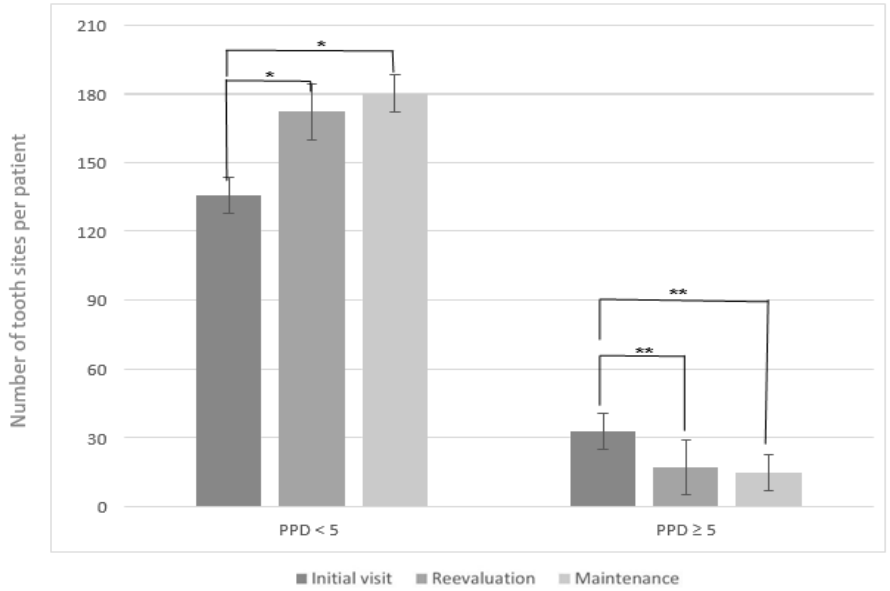


**Figure 3.** Number of tooth sites per patient with PPD of <5 mm and ≥5 mm (mean ± SD) atinitial, re-evaluation, and maintenance visits. *: $p < 0.001$, **: $p < 0.01$

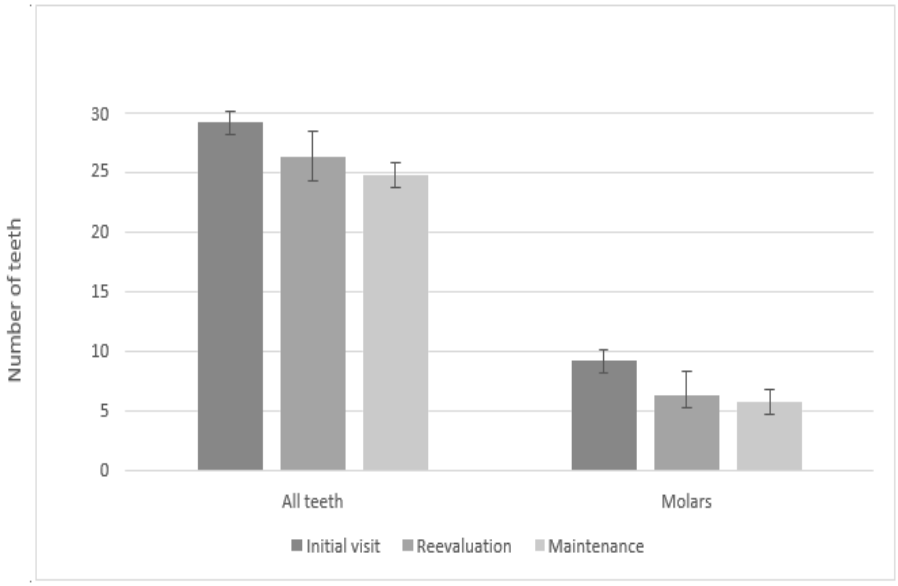


**Figure 4.** Number of teeth and number of molars per patient (mean ± SD) at initial, re-evaluation, and maintenance visits.

This study aimed to assess outcomes of nonsurgical periodontal therapy performed by undergraduate students. The study included adult patients who were older than 18 years of age and had been diagnosed with severe or moderate chronic periodontitis.

The subjects showed significantly improved oral hygiene and gingival health following nonsurgical periodontal therapy. In addition, the number of probing pocket depths less than 5 mm increased while teeth having moderate (4-6mm) and deep (>6mm) periodontal pockets significantly decreased. In addition, the number of anterior and posterior teeth could be maintained. It has been reported that in teeth with moderateand deep periodontal pockets, the number of calculus-free root surfaces following SRP alone was significantly influenced by the level of the dentist's experience [22]. Hence, the degree of a dentist's experience affects the treatment outcomes. In addition, the maintenance of a carefully monitored plaque control program was effective in reducingthe incidence of tooth mortality and periodontal disease [23]. Van der Weijden *et al.* [24] showed that active nonsurgical periodontal therapy in adult patients with periodontitis led to about one-third of the cases in the success endpoint of no pockets deeper than 5mm. However, the outcome depended on the severity of periodontal disease, smoking, furcation involvement, and tooth type.

Few studies in the literature assessed the outcomes of periodontal therapy during undergraduate training in terms of reduction in BOP and diminished numbers of sites with increased probing depths. Vouros *et al.* [13] documented successful nonsurgical periodontal therapy in the undergraduate courses for patients with severe periodontitis. Rühling *et al.* [14] also demonstrated that systematically trained students can successfully treat periodontitis patients. Walter *et al.* [15] reported that nonsurgical therapy performed by undergraduate dental students for patients with severe periodontitis significantly improved their periodontal conditions.

## Conclusion

The findings of this study demonstrated that nonsurgical periodontal therapy performed by undergraduate students for patients with moderate and severe chronic periodontitis can achieve a marked reduction in dental plaque and gingival bleeding scores as well as probing pocket depths at 6 weeks and at least 3 months after 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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