

## Original Article

# The effect of yoga in stress reduction for dental students performing their first periodontal surgery: A randomized controlled study

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## ABSTRACT

**Context:** The dental students experience a lot of stress, which increase when they perform their first surgical procedure. Yoga as an anxiolytic tool in anxiety reduction has been practiced over centuries in India.

**Aim:** To assess the efficacy of yoga in reducing the state trait anxiety of dental students before their first periodontal surgery performance.

**Settings and Design:** A randomized controlled study using a two-way split plot design (pre-post-test) was conducted in the department of periodontics, Pacific Dental College, Udaipur, India.

**Materials and Methods:** One hundred clinical dental students who were ready to perform their first periodontal surgery were selected. Students were randomly assigned to two groups and were given a 60-min session on stress reduction. Group A, yogic intervention group, were instructed to do yoga and their performances were monitored for a period of one week and Group B, control group, were given a lecture on stress reduction without any yoga instructions. The investigator who was unaware of the groups had taken the state trait anxiety score of the students three times a) before assigning them to each group, b) prior to the surgical procedure and c) immediately after the performance of surgery.

**Statistical Analysis Used:** Analyses of variance (ANOVA) by SPSS V.16.

**Results:** The statistical results showed a significant reduction in the VAS and state trait anxiety of Group A compared to Group B (ANOVA;  $P < 0.001$ ).

**Conclusions:** This study concludes that Yogic breathing has a significant effect on the reduction of state trait anxiety level of dental students.


**Key words:** Dental students; periodontal surgery; stress; yoga.

## INTRODUCTION

Yoga is one of the many different techniques for achieving relaxation.<sup>[1]</sup> Yoga has its origin in ancient India and in its original form consisted of a system of spiritual, moral and physical practices.<sup>[2]</sup> The most central and common aspects of yoga practice today are different bodily postures

(asanas) and breathing exercises (pranayamas)<sup>[3]</sup> that aim to focus the mind, achieve relaxation and increase wellness.<sup>[4]</sup> Various health benefits of yoga have been described in previous studies. Several studies reported beneficial effects of yoga on anxiety, stress reduction and general well-being.<sup>[5-8]</sup> In general, dental students experience more stress than the general population.<sup>[9,10]</sup> Kieser<sup>[11]</sup> reported that clinical dental students are most anxious about surgical procedures, which negatively impacts their physical and mental health.<sup>[12]</sup> O'Shea *et al.*,<sup>[13]</sup> suggested that having a calm manner, smiling, being friendly to the patient, and giving emotional support to the patient throughout treatment by dental students can decrease patient anxiety. Freeman.R.1985 reported that dental students show difficulty to adhere to these behaviors due to their anxiety<sup>[9,14]</sup> which in turns exacerbates

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patients' distress during procedures.<sup>[15]</sup> Schwartz *et al.*,<sup>[16]</sup> and Howard *et al.*,<sup>[17]</sup> suggested various stress reduction programs for dental students. Malathi and Damodaran<sup>[18]</sup> studied the effect of yoga on reducing stress in first-year medical students. In the medical literature, few studies have examined stress-management interventions.<sup>[14,16,17,19]</sup> The objectives of this paper is to evaluate the effect of Yoga intervention in reducing dental students' anxiety prior to and during a periodontic surgical procedure.

## MATERIALS AND METHODS

The study was carried out in Pacific Dental College and Hospital, Udaipur, Rajasthan, India, which is a private dental school affiliated with the Rajasthan University of Health Sciences, Jaipur, India. Ethical clearance was obtained from the ethical committee and the dean of the college prior to initiating the study. Data collection took place in June 2010 in the first academic term for the year 2010-2011. The sample includes one hundred clinical undergraduate dental students (males 56%, females 44%). Given the structure of dental education at this institution, none of these students had performed a periodontal surgery procedure at the initiation of the study.

### Measures

- Socio-demographic form elicited information of gender, age and whether they had performed any prior dental procedures.
- Visual analog scale (VAS)<sup>[20]</sup> consists of 100-mm horizontal lines with end-point anchors such as *not anxious* and *very anxious*. The student was required to make a vertical mark on the line to indicate their response to a question.<sup>[21]</sup> This includes, i) during the baseline assessment, "how anxious do you *expect* to be when you perform your first periodontal surgery?"; ii) immediately prior to the procedure, "how anxious are you currently?"; and iii) following the procedure "how well were you able to relax yourself during the procedure?"<sup>[14]</sup>
- Spielberger state-trait anxiety inventory (STAI). The STAI<sup>[22]</sup> is a forty-item Likert-type questionnaire designed to assess individual differences in the experience of anxiety. The trait form of the inventory assesses an individual's general anxiety level, and the state form of the inventory assesses the individual's anxiety specific to the time of completion of the survey. Each form consists of twenty items with total scores that range from a minimum of twenty to a maximum of eighty.<sup>[14,22,23]</sup>

### Procedures

One hundred clinical undergraduate dental students were invited to attend a 1-h information session about the study.

All students who participated in the information session were reviewed and signed a consent form. Students then completed a baseline assessment that consisted of the demographic form (which contained the baseline VAS ratings), the STAI-trait and STAI-state. Upon completion of these baseline measures, students were randomly assigned, on an alternating basis to match the size of the groups, to Group A and Group B. Students in Group A and Group B i.e., ( $n=50$ ; 28 males, 22 females; mean age 22 years) met with a researcher during a normal clinical posting separately for 60 min training. During the discussion, Group A students received a 60-min training (yoga postures *asanas*, 15 min, regulated breathing *pranayamas*, 20 min, exercises for the joints *sithilikarana vyayama*, 10 min, and guided relaxation 15 min)<sup>[24]</sup> to manage stress and anxiety while Group B received a lecture on the relation among stress, anxiety, and health. Group A received a cassette tape that contained step-by-step directions for deep breathing and were instructed to listen to the tapes, practice the strategies at least once a day, and utilize the strategies as needed prior to and during their periodontal surgical procedure. Group B received cassette tapes containing ocean wave sounds, but no further instructions about how or when to use the tapes. Both groups were instructed not to tell or share information about their training with the participants in the other group. Thus, the two groups spent equivalent time with researchers in similar formats and both received audiotapes; however, Group A learned specific strategies to use to decrease anxiety and Group B did not. Most of the students stayed in single rooms and those in the shared room belonged to the same intervention group. Students of both the groups were advised to report at two recreational rooms daily at the same time to use the tape and the yoga procedure for one week.

Following the 1-h training for one week, which were conducted simultaneously, varying amounts of time passed until each of the subject's first periodontal surgical procedure. The first periodontal surgical procedure was defined as the administration of local anesthetics and placement of an incision and performing a surgical procedure which need suturing for wound closure. The average span of time between the session and the procedure was 10.5 days (range=5-16 days) for Group A; likewise, this period averaged 11.5 days (range=4-15 days) for Group B. Thus, both groups averaged equally long periods of time between the initial group sessions and performing the procedure.

Immediately prior to their first periodontal surgical procedure, dental student participants in both groups completed a VAS that assessed their level of anxiety and the STAI-state. A questionnaire survey was conducted among the students to assess the usefulness of the one-week session.

After performing the procedure, students in both groups completed two VASs: One assessed students' level of distress and the other asked about their perception of their ability to relax. The researcher who did the statistical analysis was unaware of the grouping criteria.

### Statistical analysis

Statistical analysis was carried out using two-way split plot ANOVA with time (pre-test, post-test) as the within subject factor and Group (A and B) as between subject factor, and with stress and STAI-T as the dependent variables.

### RESULTS

A total of 100 students were randomly assigned into two groups of 50 students, using *a priori* sample size calculator to obtain an alpha level of 0.05, anticipated effect size (Cohen's *d*), 0.8 with a desired statistical power level of 0.95. Age of the study population ranged from twenty one to twenty three years with a mean age of  $22.22 \pm 0.581$  years. Gender distribution of the study population was 56(56%) males and 43 (43%) females. No significant difference was found between the number of males and females ( $P=0.328$ ) and the age ( $P=0.743$ ).

As shown in Table 1, students predicted that they would be anxious prior to their first periodontal surgical procedure. The scores between the two groups at baseline were compared with Student's *t* test and the data were not significant ( $P>0.05$ ), suggesting that random assignment was successful and there were no significant differences between the groups prior to the intervention. Following the students' first periodontal surgical procedure performance, statistical analyses were conducted to assess for differences between groups that might be attributable to the yogic breathing intervention. Statistically significant differences were found between groups on the VAS anxiety and STAI-

state ratings of anxiety.

There was a significant difference between groups on the anxiety variable ( $P<0.05$ ). Compared to the base line values, Group A showed a reduced VAS ( $59.42 \pm 15.09$ ) and STAI-S ( $34.140 \pm 3.98$ ) than Group B (VAS  $82.66 \pm 11.97$  and STAI-S  $49.840 \pm 6.188$ ) just before the performance of the surgical procedure. Students in Group A ( $46.18 \pm 8.22$ ) rated themselves as better able to relax during and after the procedure than did Group B ( $63.56 \pm 10.21$ ). Anxiety was assessed at several times with the STAI and VASs [Table 2]. The pre- and post-treatment ratings of anxiety show a statistically significant reduction of anxiety in Group A compared to Group B.

In Group A, 46 (80.7%) students reported that they listen to the tape and practiced lessons compared to Group B where only 11 (19.3%) students attempted to listen to the tape once the one-week stress management session was over.

### DISCUSSION

All the one hundred students were assessed for their general, state and expected anxiety levels using STAI-S, STAI-T and VAS. Anxiety levels were monitored at baseline, immediately prior to, and following their first periodontal surgical procedure. In this study, a significant reduction of stress was observed in Group A just prior to the performance of their first surgical procedure compared to their base line stress values. This gives them a much control over the situation and was able to relax during and after the procedure. On the other hand, Group B showed increased stress level just prior to their first surgical performance than their baseline values, which in turn affect their relaxation following the surgical procedure, i.e., they scored more on VAS and STAI-S compared to Group A. Our observations were similar to the efficacy of

**Table 1: Dental students' anxiety at the baseline level compared with Student's *t* test**

	n	Group A		Group B		F	P
		Mean $\pm$ SD	Range	Mean $\pm$ SD	Range		
VAS anxiety	50	78.860 $\pm$ 15.358	34-90	81.50 $\pm$ 12.241	47-90	2.217	0.140
STAI-trait	50	37.960 $\pm$ 7.819	23-59	41.160 $\pm$ 8.219	24-57	0.013	0.908
STAI-state	50	39.320 $\pm$ 8.367	25-60	41.860 $\pm$ 8.745	24-59	0.015	0.901

**Table 2: Students' ratings of their STAI-trait and VAS anxiety**

	Group A Mean $\pm$ SD	Group B Mean $\pm$ SD	ANOVA	
			F	P
VAS anxiety				
Base line	78.860 $\pm$ 15.35	81.50 $\pm$ 12.241	0.903	0.344
Before the periodontal surgery	59.42 $\pm$ 15.09	82.66 $\pm$ 11.97	72.732	0.00
After the surgery	46.18 $\pm$ 8.22	63.56 $\pm$ 10.21	98.162	0.000
STAI-state				
Base line	39.320 $\pm$ 1.183	41.860 $\pm$ 8.745	2.202	0.141
Before the periodontal surgery	34.140 $\pm$ 3.989	49.840 $\pm$ 6.188	227.309	0.000
After the surgery	25.420 $\pm$ 2.949	36.260 $\pm$ 11.748	40.041	0.000

yogic breathing technique which was used as an anxiolytic tool in different situations.

Several studies in the medical literature showed a high incidence of stress and anxiety among medical and dental students. The institutions in the developed countries offer various counseling and stress management programs to students to cope with the situations. Among many North American medical schools, several have established policies and programs to provide treatment services and wellness programs addressing students' mental health issues.<sup>[25]</sup> For example, following a short yoga intervention, students reported improvements in perceived stress and depressive symptoms.<sup>[26]</sup>

A previous study about yogic breathing on dental students during their pediatric patient management by Piazza-Waggoner *et al.*,<sup>[14]</sup> showed no significant difference between the study and control group. He explained that during their study, a gap of 80-180 days was present between the yogic intervention and the surgical performance by students. In our study, to avoid the same error, the yogic intervention was given 5-10 days before the performance of the surgical procedure and a follow up was done during the entire clinical posting. Group A students were encouraged to do the yogic breathing immediately before the procedure. This was the main reason for the highly significant difference of anxiety levels between the groups.

This study concludes that inclusion of yogic breathing in the stress reduction protocol of dental student curriculum could reduce dental students' overall anxiety, enhance their academic functioning, improve their technical performance, decrease their patients' anxiety, and ultimately benefit all aspects of their academic and professional careers. If these suggestions are implemented, the overall anxiety of dental students can be reduced, which helps them to be more successful as students, dentists and, a human being harmonious to the nature.

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