

BLOOD PRESSURE CHANGES OF DENTAL STUDENTS AFFECTED BY STRESSES IN PRACTICING DENTISTRY

Mokhalad Al-Mudares^{1*}

1. Associate Professor, College of dentistry, Ajman University of Science and Technology.

Abstract

The aim of this study was to compare magnitude of changes in blood pressure (BP) of fifth year dental students across four different dental procedures (Periodontic, Exodontic, Pedodontic and Prosthodontic) and interpret it as the amount of stress.

Blood pressure was recorded before and after each procedure, and the difference was calculated, studied and compared between male and female. The response of the BP of every student in each procedure was compared with the other procedures.

The results showed there were greater changes in BP in Exodontic and Pedodontic in both male and female. And there were no significant differences in the responses between the two genders. As a conclusion, Exodontic and Pedodontic carry greater stress in relation to the Periodontic and Prosthodontic procedures.

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Introduction

Dentistry is identified as a very stressful occupation. However, this occupation stress begins far back from dental school, as students are subjected to more stress than general population.^{1,2} In particular, dental students experience greater stress in the clinical years than the non-clinical years.³⁻⁵ Other researches showed that dental students are very anxious about patient anxiety, surgical procedures, treating children and local anesthesia.⁶⁻⁹

As long term consequences to these stressors, different studies pointed out their negative impacts on the dental practitioners and their patients; stress has been shown to appear as fatigue, tension, dizziness, sleeplessness,

tachycardia, gastrointestinal symptoms, irritability and anxiety.¹⁰⁻¹³ There are lots of researches dealing with stress in the dentistry in all aspects, but there is one previous study focused on the acute change in BP toward dental stress.¹⁴ As BP changes mark the cardiovascular reactivity to job stress;¹⁴⁻¹⁶ our purpose in the present study is to compare the BP changes in fifth year dental students across four different dental procedures (Periodontic, Exodontic, Pedodontic and Prosthodontic) and highlight the acute interpretation of stress on students' BP.

Methods

A cross-sectional observational analytic study was conducted at College of Dentistry at Ajman University of Science and Technology, Fujairah, U.A.E. It was carried out on the fifth year students through two consecutive academic years 2011/2012 and 2012/2013.

Participants

This study was conducted on 121 undergraduate final year dental students (71 male and 50 female), aged 21-26; 22.98±0.88

*Corresponding author:

Dr. Mokhalad Al-Mudares,

College of dentistry, Ajman University of Science and Technology
United Arab Emirates

E-mail: mukhallad7@yahoo.com

(range; mean±SD). They voluntarily participated in the study without any incentives, and verbal consents were obtained.

Students who didn't attend all the four sessions and those who were known to be hypertensive were excluded. Also, a number of students were excluded from the sample size, as they showed intense anxiety to unexpected complications and needed assistance from educators. The remaining sample size was 111 (66 males and 45 females).

Procedure

Each student of the 111 participants attended 4 different dental operations (Periodontic, Exodontic, Pedodontic and Prosthodontic). BP monitoring was done via a wrist clinically validated digital device placed on the left hand. Blood pressure comparison was appreciated by calculating the difference in recorded values at two chronological points, 5 minutes before the dental procedure and immediately after the end of the procedure. The recorded BP values at the two set points were the calculated mean of 3 different measurements.

Before starting monitoring the initial BP readings in each set of dental procedures, the subject had rested in a reclining position for 10 minutes with the arm placed in the level of the heart. The students were asked to avoid food, caffeine, tobacco, and alcohol for the last 30 minutes before the measurement. The same protocol was followed each time.

Statistical Analysis

The Statistical Package for Social Sciences Computer Program was used for statistical analysis (SPSS 15.0.1 for windows; SPSS Inc, Chicago, IL, 2001). Continuous variables were expressed as mean and standard deviation or as median and interquartile range in cases of non-parametric data. Differences between independent groups were tested using the Mann Whitney test and Student t test for continuous variables.

In cases in which the samples were paired, the Wilcoxon signed rank or paired t test was used. The level $P < 0.05$ was considered as cut-off value for significance. The level $P < 0.01$ was considered as cut-off value for HIGHLY significance.

Results

This study shows that systolic (SBP) and diastolic (DBP) blood pressure change in Exodontic and Pedodontic were highest in both sexes, while in the other 2 procedures Periodontic and Prosthodontic, the changes in SBP & DBP were minimal (table (1) & (2)). Charts (1) and (2) illustrate these findings.

	Full Sample (n=111)			Male (n=45)			Female (n=66)			p-value
	Median	IQR		Median	IQR		Median	IQR		
Periodontic	1.0	.0	2.0	2.0	1.0	3.0	1.0	.0	2.0	.005‡
Exodontic	5.0	3.0	6.0	5.0	4.0	7.0	4.5	3.0	6.0	.138‡
Pedodontic	4.0	3.0	5.0	4.0	3.0	5.0	4.0	3.0	5.0	.269‡
Prosthodontic	-1.0	-2.0	1.0	-1.0	-3.0	1.0	-1.0	-2.0	1.0	.472‡

	Full Sample (n=111)			Male (n=45)			Female (n=66)			p-value
	Median	IQR		Median	IQR		Median	IQR		
Periodontic	1.0	.0	2.0	1.0	.0	2.0	1.0	.0	2.0	.824‡
Exodontic	3.0	1.0	5.0	3.0	2.0	4.0	2.0	1.0	5.0	.362‡
Pedodontic	3.0	2.0	5.0	3.0	2.0	4.0	3.0	2.0	5.0	.264‡
Prosthodontic	1.0	.0	2.0	.0	-1.0	1.0	2.0	.0	3.0	.001‡

Table (3) shows the comparison between the four different procedures. The changes of SBP & DBP between the 4 procedures were not similar ($P= 0.0001$).

	Periodontic	Exodontic	Pedodontic	Prosthodontic	p-value
Change in SB	1.28±1.478	4.66±2.395	4.01±1.745	-.72±2.010	.0001
Change in DB	1.03±1.522	3.03±2.353	3.17±1.944	.93±2.017	.0001
Friedman test					

Statistical testing (wilcoxon signed rank test) was used to compare the changes of SBP and DBP between every two different procedures (table 4). These results show that the relations between exodontic or pedodontic with the 2 other procedures (periodontic and prosthodontic) regarding the changes in SBP and DBP were highly significant ($P=0.0001$). On the other hand, comparing exodontic with pedodontic regarding changes; in SBP was significant ($P=0.02$) and in DBP was insignificant ($P=0.53$). As well, comparing periodontic and prosthodontic regarding change in DBP was insignificant ($P=0.78$). The above findings are caused by less

difference in blood pressure changes between Exodontic and Pedodontic in relation to their differences with Peridontic and Prostodontic.

Table (4)
 Comparison between different procedures as regard change in BP among all cases

	Systolic BP changes				Diastolic BP changes			
	Mean	N	±SD	p-value	Mean	N	±SD	p-value
Peridontic	1.28	111	1.478	.0001	1.03	111	1.522	.0001
Exodontic	4.66	111	2.395		3.03	111	2.353	
Peridontic	1.28	111	1.478	.0001	1.03	111	1.522	.0001
Pedodontic	4.01	111	1.745		3.17	111	1.944	
Peridontic	1.28	111	1.478	.0001	1.03	111	1.522	.784
Prostodontic	-.72	111	2.010		.93	111	2.017	
Exodontic	4.66	111	2.395	.020	3.03	111	2.353	.529
Pedodontic	4.01	111	1.745		3.17	111	1.944	
Exodontic	4.66	111	2.395	.0001	3.03	111	2.353	.0001
Prostodontic	-.72	111	2.010		.93	111	2.017	
Pedodontic	4.01	111	1.745	.0001	3.17	111	1.944	.0001
Prostodontic	-.72	111	2.010		.93	111	2.017	

Wilcoxon signed rank test

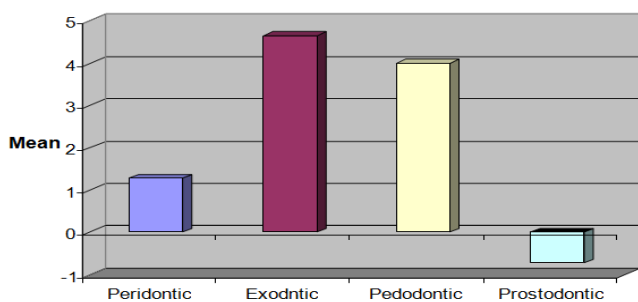


Chart (1)
 Change in Systolic blood pressure

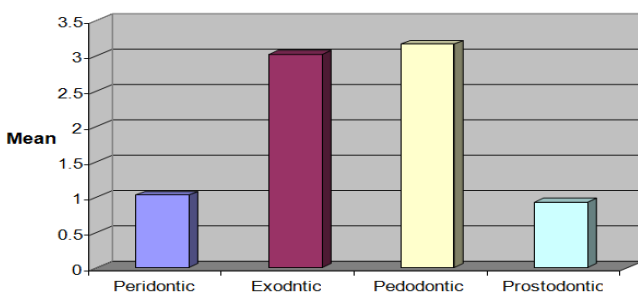


Chart (2)
 Change in Diastolic blood pressure

Discussion

The objectives of this study are to compare the magnitude of stress among the four different dental procedures. The level of the stress was evaluated in each session by the degree of change in BP measurements before

and after each session. There are many published articles discussed the relation of BP elevation in response to stress, and some explained the pathophysiological mechanisms as altering in the hypothalamic-pituitary-adrenal axis,¹⁷ and change in vagal tone.¹⁸

The results of this study show that both Exodontic and Pedodontic carried greater stress in comparison to Periodontic and Prosthodontic. There are different reasons that can explain this finding. As for Exodontic, this may need local anaesthesia which is considered by many studies as a source of stress.^{19,20} As for Pedodontic, stresses could result from the uncooperative child, child's guardian,²¹⁻²³ or from the use of the local anaesthesia as well.⁸

Our study failed to show any significance between male and female in response to stress. This was opposite to what we expected to find, as female students are more liable to have greater changes in BP to male because they are more concerned about their emotional well-being and relationship with patients. Finally, there are some published articles that are in parallel with our finding with no gender variation in response to stress^{24,25} whereas other-studies do not agree with it.^{1, 3, 9, 26-31}

There were some limitations in this study. First, instead of using 24 hours-ambulant blood pressure monitoring (AmBP) to record BP, a usual momentary recorded was used. In spite of its qualities, AmBP would be inconvenient for the dental students to use. Second, only blood pressure was measured as a gauge to the amount of stress without the heart rate.

Conclusions

This study was done to appraise the stress level among dental students in different dental procedures. And as a conclusion, in relevance to the amount of BP changes, dental procedures are considered stressful. This stress has been more evident in Exodontic and Pedodontic, while in Prosthetic and Periodontic it is less evident.

References

1. Pau AK, Croucher R. Emotional intelligence and perceived stress in dental undergraduates. *Journal of dental education.* 2003;67(9):1023-8. Epub 2003/10/02.
2. Westerman GH, Grandy TG, Ocanto RA, Erskine CG. Perceived sources of stress in the dental school environment. *Journal of dental education.* 1993;57(3):225-31. Epub 1993/03/01.

3. Sanders AE, Lushington K. Sources of stress for Australian dental students. *Journal of dental education*. 1999;63(9):688-97. Epub 1999/10/13.
4. Garbee WH, Jr., Zucker SB, Selby GR. Perceived sources of stress among dental students. *Journal of the American Dental Association* (1939). 1980;100(6):853-7. Epub 1980/06/01.
5. Yap AU, Bhole S, Teo CS. A cross-cultural comparison of perceived sources of stress in the dental school environment. *Journal of dental education*. 1996;60(5):459-64. Epub 1996/05/01.
6. O'Shea RM, Mendola P, Corah NL. Dental students' treatment of anxious patients. *Social science & medicine* (1982). 1991;32(2):229-32. Epub 1991/01/01.
7. Kieser J, Herbison P. Clinical anxieties among dental students. *The New Zealand dental journal*. 2000;96(426):138-9. Epub 2001/02/24.
8. Dower JS, Jr., Simon JF, Peltier B, Chambers D. Patients who make a dentist most anxious about giving injections. *Journal of the California Dental Association*. 1995;23(9):35-40. Epub 1995/09/01.
9. Piazza-Waggoner CA, Cohen LL, Kohli K, Taylor BK. Stress management for dental students performing their first pediatric restorative procedure. *Journal of dental education*. 2003;67(5):542-8. Epub 2003/06/18.
10. Cecchini JJ, Friedman N. First-year dental students: relationship between stress and performance. *International journal of psychosomatics : official publication of the International Psychosomatics Institute*. 1987;34(3):17-9. Epub 1987/01/01.
11. Tedesco LA. A psychosocial perspective on the dental educational experience and student performance. *Journal of dental education*. 1986;50(10):601-5. Epub 1986/10/01.
12. Wexler M. Mental health and dental education. *Journal of dental education*. 1978;42(2):74-7. Epub 1978/02/01.
13. Knudsen W. Quality of life of the dental student. *Tandlakartidningen*. 1978;70(3):183-6. Epub 1978/02/01.
14. Gortzak RA, Stegeman A, Ten Brinke R, Peters G, Abraham-Inpijn L. Ambulant 24-hour blood pressure and heart rate of dentists. *American journal of dentistry*. 1995;8(5):242-4. Epub 1995/10/01.
15. Light KC, Turner JR, Hinderliter AL. Job strain and ambulatory work blood pressure in healthy young men and women. *Hypertension*. 1992;20(2):214-8. Epub 1992/08/01.
16. Schnall PL, Schwartz JE, Landsbergis PA, Warren K, Pickering TG. Relation between job strain, alcohol, and ambulatory blood pressure. *Hypertension*. 1992;19(5):488-94. Epub 1992/05/01.
17. Lucini D, Norbiato G, Clerici M, Pagani M. Hemodynamic and autonomic adjustments to real life stress conditions in humans. *Hypertension*. 2002;39(1):184-8. Epub 2002/01/19.
18. Julius S. Autonomic nervous system dysregulation in human hypertension. *The American journal of cardiology*. 1991;67(10):3B-7B. Epub 1991/04/22.
19. Simon JF, Peltier B, Chambers D, Dower J. Dentists troubled by the administration of anesthetic injections: long-term stresses and effects. *Quintessence international* (Berlin, Germany : 1985). 1994;25(9):641-6. Epub 1994/09/01.
20. Meechan JG. Differences between men and women regarding attitudes toward dental local anesthesia among junior students at a United Kingdom dental school. *Anesthesia progress*. 2005;52(2):50-5. Epub 2005/07/29.
21. Alwin N, Murray JJ, Niven N. The effect of children's dental anxiety on the behaviour of a dentist. *International journal of paediatric dentistry / the British Paedodontic Society [and] the International Association of Dentistry for Children*. 1994;4(1):19-24. Epub 1994/03/01.
22. Kan M, Ishikawa T, Nagasaka N. A study of psychological stress created in dentists by children during pediatric dental treatment. *ASDC journal of dentistry for children*. 1999;66(1):41-8, 12-3. Epub 1999/06/09.
23. Cardoso CL, Loureiro SR, Nelson-Filho P. Pediatric dental treatment: manifestations of stress in patients, mothers and dental school students. *Brazilian oral research*. 2004;18(2):150-5. Epub 2004/08/18.
24. Ayers KM, Thomson WM, Newton JT, Rich AM. Job stressors of New Zealand dentists and their coping strategies. *Occupational medicine (Oxford, England)*. 2008;58(4):275-81. Epub 2008/02/26.
25. Acharya S. Factors affecting stress among Indian dental students. *Journal of dental education*. 2003;67(10):1140-8. Epub 2003/11/01.
26. Burk DT, Bender DJ. Use and perceived effectiveness of student support services in a first-year dental student population. *Journal of dental education*. 2005;69(10):1148-60. Epub 2005/10/06.
27. Bradley IF, Clark DC, Eisner JE, De Gruchy K, Singer DL, Hinkleman K, et al. The student survey of problems in the academic environment in Canadian dental faculties. *Journal of dental education*. 1989;53(2):126-31. Epub 1989/02/01.
28. Heath JR, Macfarlane TV, Umar MS. Perceived sources of stress in dental students. *Dental update*. 1999;26(3):94-8, 100. Epub 1999/10/21.
29. Naidu RS, Adams JS, Simeon D, Persad S. Sources of stress and psychological disturbance among dental students in the West Indies. *Journal of dental education*. 2002;66(9):1021-30. Epub 2002/10/11.
30. Rajab LD. Perceived sources of stress among dental students at the University of Jordan. *Journal of dental education*. 2001;65(3):232-41. Epub 2001/04/25.
31. Peretz B, Mann J. Dental anxiety among Israeli dental students: a 4-year longitudinal study. *European journal of dental education : official journal of the Association for Dental Education in Europe*. 2000;4(3):133-7. Epub 2001/02/13.