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Maxillofacial Surgery

# INFLUENCE OF STRESS ON VITAL SIGNS AMONG THE ORAL SURGEON DURING COMPLICATED DENTAL EXTRACTIONS AND REMOVAL OF IMPACTED TOOTH- AN OBSERVATIONAL STUDY

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**ABSTRACT** Dentistry is identified as a stressful profession since it involves more physical work in addition to the routine surgical stress. Different studies pointed out that long-term consequence of these stressors make negative impacts on the professionals. There are many stress related studies available in the dental specialty but very few studies are focused about vital changes. Here we study the basic vital changes that happen among the oral surgeon during the minor surgical procedure. The aim of this study is to evaluate the blood pressure, pulse rate and respiratory rate fluctuations among the oral surgeon during complicated dental extraction and removal of impacted tooth. The vital changes comparison were appreciated by calculating the difference in recorded values at three chronological points, 5 minutes before the dental procedure, intra operatively and immediately at the end of the procedure. The results showed there were greater changes in BP and pulse rate during complicated dental extraction and removal of impacted tooth and there was no significant differences in the respiratory rate. In order to maintain the normal vitals it is suggested to follow the proper diagnosis and treatment plan before the procedure.

**KEYWORDS :**

## INTRODUCTION

Oral and maxillofacial surgeons are subjected to higher levels of occupational stress. Stress level is more complex and distinguish at least two broad categories of stressors: physical (systemic or reactive) and psychological (emotional or processing), with marked differential brain processing[1]. The exposure to emotionally stressful situations that differ in intensity have been found to cause gradual increase in plasma levels of glucocorticoids, adrenaline, noradrenaline and prolactin which induces cardiovascular changes like increasing the heart rate and increasing blood pressure with expansion of air passages of the lungs. The nature of oral and maxillofacial surgeons practice is similar to that of other medical surgical specialties. This is because surgeons in these specialties have similar duties. They work on call, perform inpatient care, work in outpatient clinics and perform major surgical procedures under sedation and/or general anesthesia. The specialty of oral and maxillofacial surgery requires more training in the surgical planning and following ward procedures. After this rigorous training program, the practitioner works with patients who are under extreme physical and emotional distress from pain, traumatic injury, disfiguring tumors, facial deformities (both functional and aesthetic), impactions and complicated dental extraction. From minor procedures to extremely fearful procedures which will be undergone by oral and maxillofacial surgeon can be more stressful. This is supported by the study of Humphris et al[3].

To the best of our knowledge, there are many stress related studies available in the dental specialty but very few studies are focused about vital changes. The aim of this study to evaluate the blood pressure, pulse rate and respiratory rate fluctuations among the oral surgeon during complicated dental extraction and removal of impacted tooth. The goal of this study is to suggest to monitor vital changes and its influence in stress levels of oral and maxillofacial surgeons in order to improve their quality of life, which is inevitably reflected on the performances provided in their daily activities[3].

## MATERIALS AND METHODS

The study was conducted in the department of Oral and Maxillofacial Surgery, CSI College of Dental Sciences and Research, Madurai, Tamilnadu. An observational study was conducted among with the faculties and the post graduates in the Department of oral and maxillofacial surgery. Institutional Ethical committee approval (IEC NO: CSICDSR/IEC/0185/2021) was obtained prior to initiation of the study. The vital changes comparison were appreciated by calculating the difference in recorded values at three chronological points, 5 minutes before the dental procedure, intra operatively and immediately at the end of the procedure. The blood pressure, pulse rate and respiratory rate were measured by multipara monitor.

**FIGURE: 1**

Inclusion criteria for this study age ranged from 22-50 years, both male and female gender and voluntarily participated in the study. Exclusion criteria were hypertensive status, intense anxiety and Pregnancy.

## PROCEDURE

A total of 50 teeth were included in the study. That included 30 impacted teeth (Pederson difficulty index score >5) and 20 complicated dental extractions (length of the root, remaining crown structure, root canal treated, ankylosed tooth etc).

**FIGURE: 2**

Extraction of 25 teeth were done by senior oral surgeons (faculties and senior post graduates) whereas another 25 extractions was done by junior post graduates working in the Department of oral and maxillofacial surgery.

During each procedure, blood pressure, pulse rate and respiratory rate values were recorded for the faculties and the post graduates at three chronological points: 5 minutes before the dental procedure, intra operatively and immediately at the end of the procedure.

## STATISTICALANALYSIS

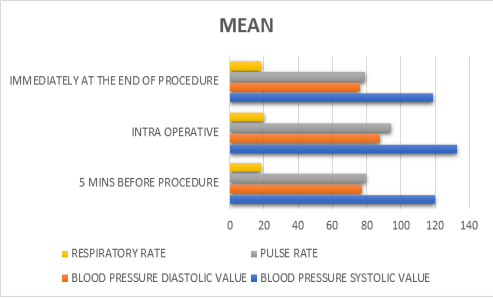
For Statistical Analysis, One way ANOVA test was used to compare the changes of systolic blood pressure (SBP) and diastolic blood pressure (DBP), pulse rate and respiratory rate.

Student paired T –test was used to compare the intraoperative measurement of SBP, DBP, pulse rate and respiratory rate between seniors and juniors.

## RESULTS

These results show that the relations between increase or decrease SBP, DBP, pulse rate and respiratory rate (Figure 3).

**FIGURE: 3**




Changes in SBP, DBP and pulse rate between 5 minutes before the dental procedure and intra operative procedure were highly significant (P=0.000). And also changes in SBP, DBP and pulse rate between intra operatively and immediately at the end of the procedure were highly significant (P=0.000) (Table 1-3). Changes in respiratory rate between 5 minutes before the dental procedure, intra operatively and immediately at the end of the procedure was less significant than blood pressure rate and pulse rate (P=0.0015) (Table 4). As well as, on comparing SBP, DBP, pulse rate, respiratory rate changes between 5 minutes before the dental procedure and immediately at the end of the procedure were insignificant { (p = .69749), (p = .89553), (p = .92383), (p = .29794)}(table 1-4). Intra operatively measured values of SBP, DBP, pulse rate and respiratory rate were insignificant (P value ≥0.05) when comparing seniors and juniors (figure 4).

**FIGURE: 4**

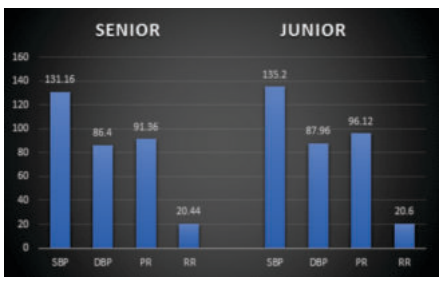



**TABLE 1 (SBP:SYSTOLIC BLOOD PRESSURE)**

| SBP Values | $V_1$ | $V_2$ | $V_3$ |
|---|---|---|---|
| N | 50 | 50 | 50 |
| Mean(M) | 119.52 | 132.86 | 118.18 |
| Std.Dev. | 7.8043 | 7.5024 | 9.3867 |

(V1 :5 minutes before the dental procedure. V2 : intra operatively. V3 : immediately at the end of the procedure, N:number of participant )

| DBP Values | $V_1$ | $V_2$ | $V_3$ |
|---|---|---|---|
| N | 50 | 50 | 50 |
| Mean(M) | 76 | 87 | 75 |
| Std.Dev. | 7.9 | 8 | 8 |

**TABLE 2 (DBP : DIASTOLIC BLOOD PRESSURE)**

| Pulse rate Values | $V_1$ | $V_2$ | $V_3$ |
|---|---|---|---|
| N | 50 | 50 | 50 |
| Mean(M) | 78 | 93 | 78 |
| Std.Dev. | 9 | 8 | 12 |
| RR Values | $V_1$ | $V_2$ | $V_3$ |
| N | 50 | 50 | 50 |
| Mean(M) | 18 | 20 | 18 |
| Std.Dev. | 1.9 | 1.3 | 1.6 |

**TABLE 3: PULSE RATE**

| Pairwise Comparisons | | | |
|---|---|---|---|
| $V_1$:$V_2$ | $M_1$ = 119.52<br>$M_2$ = 132.86 | 13.34 | ($p$ = .00000) |
| $V_1$:$V_3$ | $M_1$ = 119.52<br>$M_3$ = 118.18 | 1.34 | ($p$ = .69749) |
| $V_2$:$V_3$ | $M_2$ = 132.86<br>$M_3$ = 118.18 | 14.68 | ($p$ = .00000) |

| Pairwise Comparisons | | | |
|---|---|---|---|
| $V_1$:$V_2$ | M1 = 76.40<br>M2 = 87.06 | 10 | (p = .00000) |
| $V_1$:$V_3$ | M1 = 76.40<br>M3 = 75.68 | 0.7 | (p = .89553) |
| $V_2$:$V_3$ | M2 = 87.06<br>M3 = 75.68 | 11 | (p = .00000) |

**TABLE 4 :RESPIRATORY RATE(RR)**

| Pairwise Comparisons | | | |
|---|---|---|---|
| $V_1$:$V_2$ | M1 = 78.86<br>M2 = 93.56 | 14.7 | (p = .00000) |
| $V_1$:$V_3$ | M1 = 78.86<br>M3 = 78.08 | 0.7 | (p = .92383) |
| $V_2$:$V_3$ | M2 = 93.56<br>M3 = 78.08 | 15.4 | (p = .00000) |

| Pairwise Comparisons | | | |
|---|---|---|---|
| $V_1$:$V_2$ | M1 = 18.80<br>M2 = 20.40 | 1.4 | (p = .00015) |
| $V_1$:$V_3$ | M1 = 18.40<br>M3 = 18.90 | 0.5 | (p = .2979) |
| $V_2$:$V_3$ | M2 = 20.30<br>M3 = 18.90 | 1.4 | (p = .00015) |

The systolic blood pressure value increased intraoperatively 14 mmHg ± 2 compared to pre operative and post operative measured value. The diastolic blood pressure value increased intraoperatively 10mmHg ± 2 compared to pre operative and post operative measured value. The pulse rate increased intraoperatively 15 beats/minute ±2 compared to pre operative and post operative measured value. The respiratory rate increased 1 cycle/minute ±2 compared to pre operative and post operative measured value.

## DISCUSSION

Oral and maxillofacial surgery (OMFS) is an demanding specialty. It involves diagnosis, clinical and surgical treatment of traumatic, congenital, developmental, and iatrogenic lesions in oral and maxillofacial complex[3]. OMFS being a particularly highest challenging specialty of dentistry, oral and maxillofacial surgeons experience stress due to the nature of their work and other predisposing characteristics.

The oral and maxillofacial surgeons should overcome the problem related to interruptions in their schedule and do the procedure even more meticulously and not aggravate the patient's pain. Patient annoyance as the most stressful situation encountered by oral surgeon when handling patient under local anesthesia, followed by situations involving patients who are anxious or uncooperative, who experience significant pain, who move in the chair or who grab the dentist's hand during the extraction of tooth. Kirsi Ahola et al (2007) found that the more dental practitioners felt that situations were out of their control, the more exhausted they felt. In a totally exhausted state, one is unable to objectively review the situation and pursue opportunities for change[10]. The consequences of stress are far-reaching. Stressed dental professionals are less effective in providing care to patients, experience higher rates of stress level and are more prone to accidents. Chronic stress is associated with the development of major depressive disorder and dysthymia, a chronic mood state characterized by

depression and poor functioning, feelings of inadequacy and erosion of professional relationships. Pacifici et al (2020) discussed the relation of BP elevation in response to stress and explained the pathophysiological mechanisms as altering in the hypothalamic-pituitary-adrenal axis and change in vagal tone[7]. Increasing evidence shows that changes in vagal tone may be as important to stress-induced BP increases as sympathetic cardiac and vascular effects.[12]

In our study the SBP value increased by 14mmHg ±2 and DBP value increased by 10mmHg ±2 intraoperatively compared to pre operative and post operative measured value. The pulse rate increased intraoperatively 15beats\minute ±2 compared to pre operative and post operative measured value.The respiratory rate does not demonstrated so much value variation compared to pre operative and post operative measured value. Intraoperatively measured value of SBP, DBP, pulse rate, respiratory rate compared between senior and junior was insignificant p value $\geq 0.05$.

Comparison was not made between other dental specialties, large sample size are needed to make comparison between senior and junior, male and female oral surgeons. These are the limitations of the study.

## CONCLUSION

There is increasing blood pressure and pulse rate intraoperatively in oral surgeons during complicated dental extractions and removal of impacted tooth and no significant difference measured in respiratory rate intraoperatively in oral surgeons. The results from the present study suggest that the detrimental effects of work stress are partly mediated by increased in blood pressure and heart rate reactivity to a complicated dental extractions and removal of impacted tooth. In order to maintain the normal vitals it is suggested for the oral surgeon to enhance and practice their skills periodically, maintain destress lifestyle like practicing yoga, meditation, break in work, periodic health check up and to have definitive treatment plan and back up plan for management of difficult case.

## REFERENCES


1. Pacifici A, Pacifici L, Nuzzolese M, Cascella G, Ballini A, Santacroce L, Dipalma G, Aiello E, Amantea M, Saini R, Cantore S, Inchingolo F, Scacco S. The alteration of stress-related physiological parameters after probiotics administration in oral surgeons with different degrees of surgical experience. Clin Ter. 2020 May-Jun;171(3):e197-e208.
2. Kurtul S, Ak FK, Türk M. The prevalence of hypertension and influencing factors among the employees of a university hospital. Afr Health Sci. 2020 Dec;20(4):1725-1733
3. Alkindi M, Alghamdi O, Alnofaie H, AlHammad Z, Badwelan M, Albarakati S. Assessment of Occupational Stress Among Oral and Maxillofacial Surgeons and Residents in Saudi Arabia: A Cross-Sectional Study. Adv Med Educ Pract. 2020 Oct 12;11:741-753.
4. Ayers KM, Thomson WM, Newton JT, Rich AM. Job stressors of New Zealand dentists and their coping strategies. Occup Med (Lond). 2008 Jun;58(4):275-81.
5. Egbi, Oghenekaro & Rotifa, Stella & Jumbo, Johnbull. Prevalence of hypertension and its correlates among employees of a tertiary hospital in Yenagoa, Nigeria. Annals of African medicine.2015;14. 8-17
6. Marrelli M, Gentile S, Palmieri F, Paduano F, Tatullo M. Correlation between Surgeon's experience, surgery complexity and the alteration of stress related physiological parameters. PLoS One. 2014 Nov 7;9(11):e112444.
7. Al-Mudares, M.. (2012). Blood pressure changes of dental students affected by stresses in practicing dentistry. Journal of International Dental and Medical Research. 5. 161-164.
8. Kay MP, Mitchell GK, Del Mar CB. Doctors do not adequately look after their own physical health. Med J Aust. 2004 Oct 4;181(7):368-70.
9. Schubert C, Lambertz M, Nelesen RA, Bardwell W, Choi JB, Dimsdale JE. Effects of stress on heart rate complexity--a comparison between short-term and chronic stress. Biol Psychol. 2009 Mar;80(3):325-32.
10. LaPorta LD. Occupational stress in oral and maxillofacial surgeons: tendencies, traits, and triggers. Oral Maxillofac Surg Clin North Am. 2010 Nov;22(4):495-502.
11. Myers HL, Myers LB. 'It's difficult being a dentist': stress and health in the general dental practitioner. Br Dent J. 2004 Jul 24;197(2):89-93
12. Vrijkotte TG, van Doornen LJ, de Geus EJ. Effects of work stress on ambulatory blood pressure, heart rate, and heart rate variability. Hypertension. 2000 Apr;35(4):880-6.
13. Hornton LJ, Stuart-Buttle C, Wyszynski TC, Wilson ER. Physical and psychosocial stress exposures in US dental schools: the need for expanded ergonomics training. Appl Ergon. 2004 Mar;35(2):153-7.