ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 10, Issue, 10, pp.74201-74204, October, 2018

DOI: https://doi.org/10.24941/ijcr.32561.10.2018

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

ESTIMATION OF SALIVARY CORTISOL AMONG SUBJECTS UNDERGOING SCALING, RESTORATIVE AND BIOPSY PROCEDURES: AN IN VIVO STUDY

***[1]Dr. Sumit Singh Phukela, [2]Dr. Gaurav Setya, [3]Dr. Bhupinder Yadav, [4]Dr. Manoti Sehgal, [5]Dr. Rupinder Singh Dhall, [6]Dr. Pankaj Kumar Srivastava, [7]Dr. Ashraf Ullah and [8]Dr. Mahima Dua**

[1]Professor, Dept of Prosthodontics, Faculty of Dental Sciences SGT University Gurugram
[2]Professor, Dept of Conservative Dentistry, Faculty of Dental Sciences SGT University, Gurugram
[3]Reader Dept of Prosthodontics, Faculty of Dental Sciences, SGT University, Gurugram
[4]Senior lecturer, Deptof Prosthodontics, Faculty of Dental, Sciences, SGT University
[5]Professor, Dept of Prosthodontics, Himachal Institute of Dental Sciences,
[6]Associate Professor, Dept of Dental Surgery, G.S.V.M Medical College, Kanpur, Uttar Pradesh
[7]Professor and Head, Dept of Dental Surgery, G.S.V.M Medical College, Kanpur, Uttar Pradesh
[8]Reader, Dept of Oral Pathology, Indraprastha Dental college Sahibabad, Ghaziabad

ARTICLE INFO

Article History:
Received 19th July, 2018
Received in revised form
24th August, 2018
Accepted 05th September, 2018
Published online 30th October, 2018

Key Words:
Anxiety,
Biopsy,
Cortisol level and Fear.

ABSTRACT

Aims and objective: Anxiety, fear and pain assessment is essential in day to day Dental practice. The present study was conducted to check salivary cortisol response to stress among subjects undergoing, scaling, restorative and biopsy procedures: An In Vivo Study

Methodology: The salivary cortisol level were checked in 60 patients, out of which 30 patients were healthy patient who do not require any Dental treatment and 30 patients who underwent Scaling, Restorative And Biopsy procedures. The groups divided were as follows.

Group 1: control group with no treatment and just the saliva sample was taken.

Group 2; The patients underwent scaling

Group 3; The patients underwent Class 1 cavity preparation and thereafter restoration with Glass Ionomer restoration

Group 4; The patients underwent incisional biopsy for patients having chronic ulcers, leukoplakia, erythroplakia or lichen planus The salivary cortisol levels were checked using Salivary Cortisol Enzyme Immunoassay Kit.

Results: The salivary cortisol level was highest in Group 4 followed by Group 2, Group 3 and least in Group 1.

Conclusion: The stress level was lowest in healthy patient and highest when patient underwent incisional biopsy for patients having chronic ulcers, leukoplakia, erythroplakia or lichen planus. Dentist should try to minimize subject anxiety and stress to great extent.

Citation: ***Dr. Sumit Singh Phukela, Dr. Gaurav Setya, Dr. Bhupinder Yadav et al.*****, 2018.** "Estimation of Salivary Cortisol among subjects undergoing Scaling, Restorative and Biopsy procedures: An In Vivo Study", *International Journal of Current Research*, 10, (10), 74201-74204.

INTRODUCTION

The Dental environment is a source of stress for any patient (Mufti *et al.,* 2017; Patil *et al.,* 2015). The stress control is essential in patients to elude the loss of motivation for Dental procedures. Enget *et al.* (2014) stated that the stress disturbances are the common mental disturbances. Buchanan *et al.* 2014 proved that the stress ripostes are not invariably hostile. Hannibal and Bishop, 2014 reported extended stress reaction may develops cortisol dysfunction and wide range pain. It may results in change in behavior in children and affects the Dental procedures. By downgrading stress of Dental procedures will elevate the adjustability of patients and help them to easily get their Dental procedures done (Klingberg *et al.,* 1995; Kiyoshi Ohura *et al.,* 2012). Saliva can be used as a sample for stress-releated substance measurement because its collection is not invasive and not harmful, and can be collected with little efforts than blood sampling. Stress-connected substances incorporated in saliva include chromogranin A (CgA), secretory immunoglobulin a (slgA), and salivary amylase,

Corresponding author:* **Dr. Sumit Singh Phukela,
Department of Prosthodontics, Faculty of Dental Sciences SGT University Gurugram, India.

catecholamine and cortisol (Taani *et al.,* 2005; Yamaguchi *et al.,* 2004). There is marked contrast in patients reaction to stress in children who are involved not only in a agony procedure but also a painless treatment. The anxious tense feeling while in the Dental chair and the procedure itself can develop anxiety. The outcome with application of anesthesia and with agony procedures are unavoidable. Dental scenario can be origin of stress for young patients. The stressful state may develop panic and worry in patients (Padmanabhan *et al.,* 2013). Therefore the anxiety strand is more in patients undergoing Dental treatment and this pressure vary in the consecutive visits that persue to rely upon to what they are open to, during these visits. There is connection between stress and pain but the pain rehabilitation is not dissertated. Therefore the present study was conducted to check salivary cortisol response to stress induced during scaling, restorative and biopsy procedures.

Aims and objectives

- To check salivary cortisol level in healthy patient.
- To check salivary cortisol level in patient undergoing scaling.
- To check salivary cortisol level undergoing Class 1 cavity preparation and thereafter restoration with Glass Ionomer restoration.
- To check salivary cortisol level in the patients undergoing incisional biopsy for patients having chronic ulcers, leukoplakia, erythroplakia or lichen planus
- To comparatively evaluate salivary cortisol level in patients undergoing scaling, restorative and biopsy procedures.

MATERIALS AND METHODS

There was 60 participant (30 control and 30 patients with Dental problems) who volunteered in the present study. The sample size was chosen to be 60 using the previous studies done by Gaur *et al.,* (2018). The sample size was calculated keeping a confidence interval of 95% and a power of atleast 80%. All concerned participant were being asked to give relevant Medical and Dental history.60 patients age group ranging 18-30 were included in the study. The investigation motive was prior informed to patients requesting them for accumulation of saliva sample. These patients underwent scaling, Class 1 cavity preparation and incisional biopsy for patients having chronic ulcers, leukoplakia, erythroplakia or lichen planus.

They were demarcated into 4 groups

Group 1: Control group with no treatment and just the saliva sample was taken.
Group 2: The patients underwent scaling
Group 3: The patients underwent Class 1 cavity preparation and thereafter restoration with Glass Ionomer restoration
Group 4: The patients underwent incisional biopsy for patients having chronic ulcers, leukoplakia, erythroplakia or lichen planus

The saliva was collected 5 minutes before patients sat on Dental chair for group 1 subjects, however for group 2, group 3 and group 4 subjects saliva was gathered 10 minutes after commencement of Dental procedures. All the participants were informed to accumulate saliva samples in polypropylene vials and stocked in freezer. Around 1.0 ml of non-revivifying saliva was assembled in a sterile tube and frozen latter at 20 degree centigrade for further investigation the salivary cortisol levels were checked using Salivary Cortisol Enzyme Immunoassay Kit (Salimetric TM, LLC State college PA, USA). The software used for the statistical analysis were SPSS (statistical package for social sciences).

Statistical Analysis: The statistical analysis were done using One-way ANOVA test and Post-hoc Turkey test
Level of Significance (p-value)

1. P-value < 0.05 - Significant

RESULTS

The mean cortisol level was compared among the different groups using the one-way ANOVA test with post-hoc tukey test for the inter-group comparisons. There was a significant difference in mean cortisol level between the different groups. The mean cortisol level was significantly more among Group 4 which was significantly more than group 2 which was significantly more than group 3 which was significantly more than group 1 (Table 1 and Graph 1).

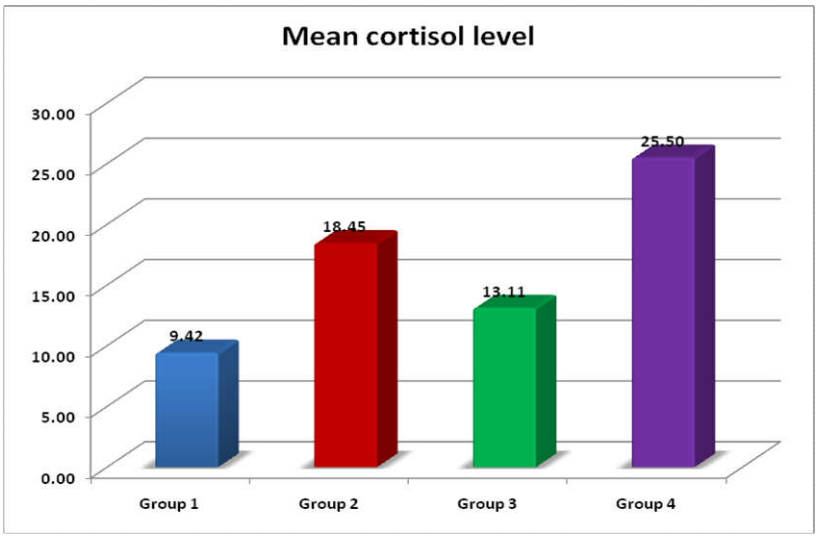
DISCUSSION

The cortisol nourishes and recalls the frightening participation of Dental treatment. Shira Meir Drexler *et al.,* in 2015, stated that there is endurance of powerful touching recall happening in fear and post traumatic pressure disarray. Lai JCL in 2014 reported that the adaptation in stress hormone, cortisol to critical psychosocial pressure is not always a result of aging. Severe pressure and raised cortisol level multiplies the possibility for depression, mental disorder, anxiety, and lesser life hopefulness. The cortisol is delivered in reaction to anxiety, pressure or stress by adrenal gland. The cortisol can also be emancipated in situations like getting up early morning, exertion and acute pressure or tension. The cortisone enables the body for attack or flying reaction by immersing it with glucose, providing an instant energy origin to large muscles. The cortisol hinder insulin release in an aim to stop glucose from being stocked approving instant release (Aronson, 2009). The present study was conducted to check salivary cortisol response to stress induced during scaling, Class 1 cavity preparation and incisional biopsy for patients having chronic ulcers, leukoplakia, erythroplakia or lichen planus. There was significant difference in cortisol level in control group compared to all study groups {group 2, group 3 and group 4}. The salivary cortisol level was highest in Group 4 (subjects with incisional biopsy for patients having chronic ulcers, leukoplakia, erythroplakia or lichen planus), followed by Group 2(subjects who underwent scaling), Group 3(subjects who underwent Class 1 cavity preparation) and least in Group 1(control). These results are similar to studies done by Padmanabhan *et al.* (2013) and Phukela *et al.* 2017. The study group (Group 2, Group 3 and Group 4) opened to Dental treatment develops in an elevation of salivary cortisol in contrast to control group with no treatment wherein just the saliva sample was taken. Dental treatment raises tension and uneasiness level which further elevates salivary cortisol. These results are similar to studies done by Phukela *et al.,* 2016.

Table 1: Comparative mean salivary cortisol level(ng/ml) for group 1,group 2,group 3 and group 4

Groups	Number	Mean	SD	F-value	p-value
Group 1	30	9.42	2.98		
Group 2	30	18.45	4.12		
Group 3	30	13.11	3.67	32.242	< 0.001*[a]
Group 4	30	25.50	5.89		
		Group 1 vs Group 2[b]			0.011*
		Group 1 vs Group 3 [b]			< 0.001*
		Group 1 vs Group 4 [b]			< 0.001*
		Group 2 vs Group 3 [b]			0.039*
		Group 2 vs Group 4 [b]			< 0.001*
		Group 3 vs Group 4 [b]			0.011*

[a]One-way ANOVA test [b] Post-hoc Tukey test * Significant difference



Graph 1. Comparative mean salivary cortisol level(ng/ml) for group 1,group 2,group 3 and group 4

Among the study groups {Group 2, Group 3 and Group 4}, Group 4 (subjects with incisional biopsy for patients having chronic ulcers, leukoplakia, erythroplakia or lichen planus) produced highest cortisol level. The cortisol level was raised more in Group 4 (subjects with incisional biopsy for patients having chronic ulcers, leukoplakia, erythroplakia or lichen planus) compared with subjects in Group 2(subjects who underwent scaling). The probable reason may be that the local anaesthesia used for these patients for carrying out Dental procedure raised stress and anxiety level in these subject resulting with raised cortisol level. The cortisol level was raised more in Group 2 (subjects who underwent scaling) compared with subjects in Group 3(subjects who underwent Class 1 cavity preparation). The probable reason may be that the fear of seeing blood while scaling raised cortisol level in these subjects. The cortisol level was raised more in Group 3 (subjects who subjects who underwent Class 1 cavity preparation) compared with subjects in control group. The probable reason may be that the vibrations and sound of airrotor handpiece during the cavity preparation raised cortisol level in these subjects.

Conclusion

- The stress level was highest when patient underwent incisional biopsy for patients having chronic ulcers followed by Group 2 (subjects who underwent scaling), Group 3(subjects who underwent Class 1 cavity preparation).
- The lowest cortisol level (stress level) was seen in healthy patients who did not got any treatment done.
- The salivary cortisol can be one of the reliable indicator of stress detector.

Strength of the study

Salivary cortisol was used as a diagnostic aid to check pressure, tension and stress levels in Dental patients. The cortisol saliva does not attach to corticosteroid binding globin as it happens in the blood

Limitations of the study The salivary cortisol level test was not done at particular time so partisanship can be there due to the diurnal variation.

Future research Direction

1. How to reduce the stress and anxiety level(may be by proper diet, enough sleep or yoga)
2. Effects of stress on health

Conflict of interest: No potential conflict of interest relevant to this article was reported.

REFERENCES

Aronson, D. 2009. Cortisol –its role in stress, inflammation and indication for diet therapy. Todays Dietician Vol 11, pg 38.

Buchanan, T. W., Preston, S.D. 2014. Stress leads to prosocial action in immediate need situations Front Behav Neurosci, 8;5

Enget, V., Plessow, F., Miller, R., Kirschbaum, C., Singer, T. 2014. Cortisol increase in emphathicstress is modulated by emotional closeness and observation modality. *Psychoneuroendocrinology Journal,* Volume 45;195-201

Gaur, A., Kumar, J.S., R. Nair Agrawal, V.M. 2018. Estimation of salivary cortisol levels and pscycological assessments in patients with oral lichen planus, *J. Indian Acad Oral Med. Radiol*., 30;14-7

Hannibal, K.E., Bishop, M.D. 2014. Chronic stress, cortisol dysfunction ,and pain a psychoneuroendocrine rationale for stress management in pain rehabilitation. *Phys. Ther*, 94(12)1816-25

Kiyoshi Ohura, Tadashige Nozaki, Mitsuko Shinohara, Kiyoshi Daito, Mie Sonomoto, Michiharu Daito, 2012. Utility of salivary biomarker for stress induced by Dental treatment. *Japanese Dental Science Review*. Vol.48(1):14-17, doi:10.1016/j.jdsr.2011.06.001.

Klingberg, G., Berggren, U., Carlsson, S.G., Noren, J.G. 1995. Child Dental fear: cause-related factors and clinical effects. *Eur. J. Oral Sci*., 103:405—12.

Lai, J.C.L. 2014. Psycosocial stress and salivary cortisol in older people; a brief review. *Aging Sci*, 2;120,doi 10.172/2329/8847.1000120.

Mufti, N., Mufti, S., Mufti, K. 2017. Stress and anxiety in patients undergoing extraction, *International Journal of Oral Care and Research,* 5(1)75-77

Padmanabhan, V., Rai, K., Hedge, A.M. 2013. Stress responses in Children during Endodontic Treatment. *J. Pediatr, Dent.,* 1;14-8

Patil, S.J., Shah, P.P. Patil, J.A., Shigli, A., Patil, A.T., Tamagond, S.B. 2015. Assessment of the changes in the stress related salivary cortisols levels to the various Dental procedures in children, *J Indian Soc Pedod Prev Dent.,* 33(2)94-99

Phukela, S.S., Ullah, A., Srivastava, P.K., Dua, M., Setya, G., Dua, A. Monika, 2017. Nervousness; Pressure Ripostes in Patients During Conventional Dental Treatment and Long Duration Dental Procedures: An in Vivo Study *J. Res. Adv. Dent.,* 6:2:61-65

Phukela, S.S., Ullah, A., Srivastava, P.K., Raina, B., Setya, G., Thareja, S.S., Pawha, R., Moon, V. 2016. Salivary Cortisol Response to Stress Induced During Periodontic, Endodontic and Prosthetic Procedures: An In Vivo Study, *J. Res. Adv. Dent.,* 5:3:234-238.

Shira Meir Drexler, Christian J Merz, Tanja C., Hamacher – Dang, Martin Tengentoff, Oliver T. Wolf, 2015. Effects of cortisol on reconsolidation of reactivated fear memories Neuropsychophrmacology,10.1038/npp2015.160.

Taani, D.Q., El-Qaderi, S.S., Abu Alhaiji, E.S. 2005. Dentalanxiety in children and its relationship to Dental caries and gingival condition. *Int. J. Dent Hyg.,* 3:83—7.

Yamaguchi, M., Kanemori, T., Kanemaru, M., Takai, N., Mizuno, Y., Yoshida, H. 2004. Performance evaluation of salivary amylase activity monitor. *Biosens Bioelectron.,* 20:491—7.

****