

**Influence of Dental Chair Backrest Inclination on Registration of Occlusal Contacts in Dentulous Patients - An in-vivo study**<sup>1</sup>Dr Divya G. Toshniwal\*, MDS, Senior Lecturer, Rural Dental College, PMT, PIMS, Loni<sup>2</sup>Dr Veena R. Saraf, MDS, Asso. Prof., Rural Dental College, PMT, PIMS, Loni<sup>3</sup>Dr. Aruna J. Bhandari, MDS former Prof., Rural Dental College, PMT, PIMS, Loni<sup>4</sup>Dr. Gangadhar S A, MDS Prof. and HOD, Tatyasaheb Korhe Dental College, Kolhapur<sup>5</sup>Dr. Sayali S. Kalantri, BDS, PG Student, Rural Dental College, PMT, PIMS, Loni**Corresponding Author:** Dr Divya G. Toshniwal, MDS, Senior Lecturer, Rural Dental College, PMT, PIMS, Loni, Dist. Ahmednagar- 413736, Maharashtra, India.**Type of Publication:** Original Research Paper**Conflicts of Interest:** Nil**Abstract**

**Background:** On the basis of clinical observations, the inclination of the dental chair backrest might alter the distribution of occlusal contact points. It has been reported that changes in the position of the body and head affect mandibular position, movement, and function, as well as the activity of the head and neck muscles. However the paucity of research in this area under clinical conditions indicates that there is an inadequate understanding of the effects on mandibular position in the body and head positions patients may assume during dental procedure.

**Aim:** To evaluate the influence of dental chair backrest inclination on registration of occlusal contact.

**Material and Method:** Fourteen participants aged between 18-30 years with a complete permanent dentition, uncompromised motor function, without tooth mobility and temporomandibular disorders were selected. To register interocclusal contacts pressure sensitive sheet (Dental Prescale, Fuji Photo Film, Tokyo, Japan) was used. Contacts were registered at 115, 130 and 150 degree inclination of dental chair backrest. The registered occlusal contacts were analysed by using analysing

computer (Nupai Occluzer, GC Corp., Tokyo, Japan). The analysis of variance was done using ANOVA, student's t-test and for multiple comparisons, Post-hoc Bonferonni statistical test was used.

**Results:** When maximum pressure (MPa) was compared at all the three above mentioned backrest inclinations of dental chair, the posterior region showed greater values than anterior and left side also showed greater values than right side. Though the values obtained had difference, it did not give statistically significant results.

**Conclusions** The change in COF was observed in all the three dental chair backrest inclination studied for each subject. Significant variation in the registered occlusal contacts at above mentioned inclinations were not observed.

**Keywords:** Occlusal analysis, Dental Chair position, Center of force

**Introduction**

The efficiency of the stomatognathic system largely depends on alignment and occlusion of dentition. Occlusal pattern greatly influence the human vital function such as

chewing, swallowing and phonetics. Occlusal contacts are controlled by temporomandibular joint (TMJ), dentition and muscles of mastication<sup>1</sup>.

It has been reported that changes in the position of the body and head affect mandibular position, movement, and function, as well as the activity of the head and neck muscles. However the paucity of research in this area under clinical conditions indicates that there is an inadequate understanding of the effects on mandibular position in the body and head positions, patients may assume during dental procedure<sup>2</sup>.

On the basis of clinical observations, the inclination of the dental chair backrest might alter the distribution of occlusal contact points; we hypothesized that a change in the inclination of the chair could lead to a different head inclination and consequently a different mandible position. In order to establish patients' posture standards for use in the clinic the present research is considered to find out the influence of dental chair backrest inclination on occlusal contact.

### Material and method

The Institutional Ethical Committee approval was obtained before the commencement of the study. The study was conducted in the Department of Prosthodontics, Rural Dental College; Loni. Sampling for 14 subjects irrespective of gender was done.

- Medically healthy, dentate subjects with age group ranging from 18 to 30 years from Rural dental college, Loni having complete permanent dentition (excluding third molars) in angles class I relationship and patient without any wasting diseases of teeth were included in the study.
- Subjects having any restorative, orthodontic treatment, TMJ disorders, compromised motor function or tooth mobility were excluded from study.

The dental chair (Gnatus Versa; Dabi Atlante) with a fixed headrest that accompanied the inclination of the backrest was used. To standardize the backrest inclination angles, a magnetic inclinometer was adapted and positioned on the axis connecting the chair's backrest to its headrest. The chair backrest was adjusted to following positions i. e. 115 degrees, 130 degrees & 150 degrees to check occlusal contacts.

### Recording procedure

The subjects were trained to bite in maximum intercuspal position (ICP). The sensor (Nupai Bite Scan, India) was inserted in to the subject's mouth in such a way as to make its support aligned centrally with the midline of the upper incisors. All the subjects were asked to occlude on the Dental Prescale pressure sensitive sheet (50H, type R), in ICP with maximum clenching level for five second at three different backrest inclination as mentioned earlier. For recording of occlusal contact at every inclination a new sensor was used.

Occlusal forces and balance were measured by a Dental Prescale system (Fuji Photo Film, Tokyo, Japan) consists of the pressure sensitive sheets (PSS) (Dental Prescale, Fuji Photo Film, Tokyo, Japan). Pressure sensitive sheets were removed and pattern of occlusal contact were evaluated by analyzing computer.(Fig.1,2,3)



Fig. 1: Analysis of occlusal contacts on PSS at 115 degrees of dental chair backrest inclination

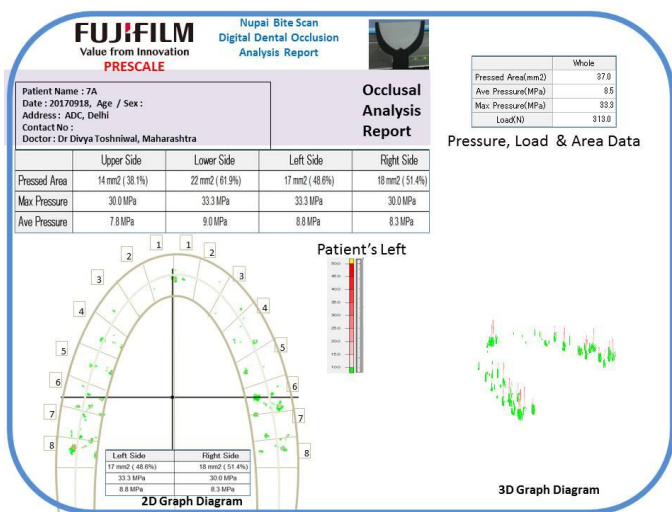


Fig. 2: Analysis of occlusal contacts on PSS at 130 degrees of dental chair backrest inclination

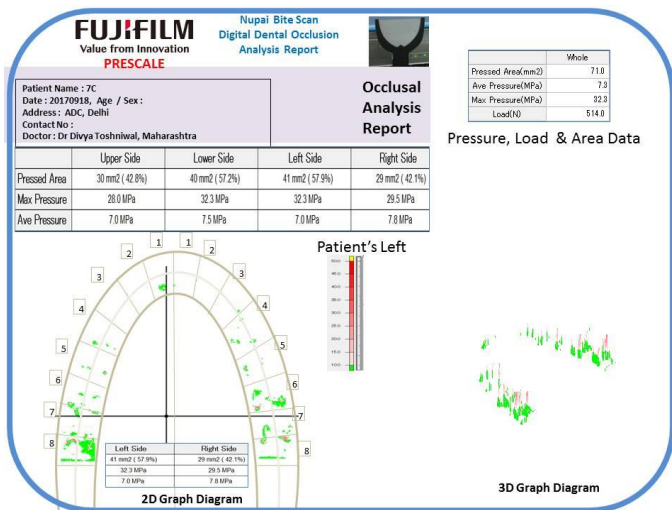


Fig. 3: Analysis of occlusal contacts on PSS at 150 degrees of dental chair backrest inclination

To exclude inter- investigator variations, all recordings were performed by the same investigator at the same time of day to avoid possible diurnal variations.

### Observation and Results

After the analysis of PSS the data were statistically analysed. The analysis of variance was done using ANOVA, student's t-test and for multiple comparisons, Post-hoc Bonferonni statistical tests.

### Discussion

Routine functional activities such as eating and drinking alter the head posture. The head extends forward by

approximately 30° during food consumption; this head posture is known as active feeding posture<sup>3</sup>. This posture shifts the mandible and its closure path anteriorly. The head is extended around 45° during drinking; this will result in the shift of mandible posteriorly<sup>4</sup>. All the dental therapeutic procedure's success ultimately depends on its harmony with occlusion.

In the 1960s Brenman and Amsterdam<sup>5</sup> demonstrated a positive correlation between head posture and occlusion using occlusograms. With the advent of computerized dental technology, several important studies added to the body of knowledge in the 1990s. Chapman<sup>6</sup> et al using the T-Scan concluded that, although head posture had no effect on the maximally intercuspated position (MIP), they did observe that initial tooth contacts were substantially influenced by head posture. Specifically, they found an anterior concentration of the occlusal contacts with the head tipped forward.

The purpose of this study was to determine what, if any, role dental chair backrest inclination plays in dental occlusal contacts registration.

### Mariana F.

Coelho in 2015<sup>7</sup> studied the influence of dental chair backrest inclination at 90°, 120° and 180° on registration of mandibular position.

Since these angulations were already been studied we have used the inclination i.e. 115, 130 and 150. Most of the dental chair companies provide the minimum inclination of the backrest of almost 110-115 degree. Exact 90 degree, inclination of the backrest, hardly can be achieved. So in this study we have used 115 degree which is the minimum as well as routinely reproducible backrest position.

Using this system we studied different variables such as maximum pressure, average pressure, load and centre of

force. 2D and 3D graph, values of bite force was obtained after the analysis of PSS.

The results obtained are supported by the study conducted by Lewis F Mc Lean, et al in 1972<sup>8</sup>, where four body positions were studied; supine, 30 Degree tilt, 60 Degree tilt, and upright. In each individual the contact registrations of the voluntary jaw closures showed little or no variation in the location and form of intercuspal contact points with the graded changes in body position. The contact points that yielded the areas of greatest translucence or of complete perforation on the wax registrations remained relatively constant at each change of position. Thus, the pattern of intercuspation registered by the wax wafer remained constant for each individual at each of the graded body positions.

### Conclusions

The average pressure in posterior region was more than anterior region in all the dental chair backrest inclination studied. By changing the dental chair backrest inclination from 115 to 130 Degree as well as 150 Degree, much variation in the registered occlusal contacts were not observed. So the clinician can choose any of these dental chair backrest inclinations for working on the patient for occlusal corrections. Though the result obtained showed no statistical correlation between the change in the backrest inclination (115, 130 and 150 degrees) and occlusal contact registration, we suggest to use identical inclination for the treatment at each stage of occlusal analysis and corrections for individual patient.

Dynamic occlusal contact relationship may yield new prospective for further research.

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