International Journal Dental and Medical Sciences Research
Volume 4, Issue 4, July-Aug 2022 pp 266-267 www.ijdmsrjournal.com ISSN: 2582-6018

Lateral cephalograms determine the freeway space: An invivo clinical study

Dr Mohd Altaf Tantray BDS, Dr. Beenish Javed BDS,
MDS Prosthodontics, senior resident the Department Of Prosthodontics, Government Dental College and Hospital, Srinagar.
MDS PG scholar Kothiwal Dental College Muradnagar

Submitted: 15-07-2022 Accepted: 27-07-2022

ABSTRACT:
Background: The contractile power of the masseter and medial pterygoid muscles affects the shape of the gonial angle of the mandible into which these muscles insert and the amount of free-way space an individual may possess.
Materials and methods: Tracings were made from the lateral cephalograms of 30 edentate subjects and the gonial angle measured in each case. Free-way space was also measured, using swallowing and phonetic method and the paired values subjected to statistical analysis.
Results: A strong inverse correlation was found to exist throughout the sample. The reduction in the gonial angle was accompanied by a predictable increase in the free-way space. By applying the processes of linear regression to the paired results, a formula was obtained which may be used to predict the best value of one variable for any given value of the other.
Conclusion: Thus, in an edentulous case, when the value of the free-way space measurement is unknown, a method is provided for predicting its best value by the determination of the patient's gonial angle through cephalometric analysis.

I. INTRODUCTION:

Freeway space (FWS), has been defined as the neutral position attained by the mandible as it is involuntarily suspended by the reciprocal coordination of the elevator and depressor masticatory muscles with the maxillary and mandibular teeth separated. The partial and complete dentures require a gap in the vertical dimension for comfort and optimum function. The reduction in the freeway space results in activation of orofacial and masticatory muscles that affects the teeth, periodontium, supporting tissues, masticatory muscles, and temporomandibular joint. However, increase in the freeway space is disadvantageous to masticatory muscles. The amount of FWS in any individual is mainly an expression of muscle function, its equilibrium, and gravity. When the elevators of mandible are in equilibrium with the depressors of the mandible and gravity, then the mandible will be theoretically at rest.

II. AIMS AND OBJECTIVES:

This study was conduct to evaluate the correlation of the FWS and corresponding gonial angle formed on the lateral cephalograms of edentulous individuals.

III. MATERIALS AND METHODS:

Thirty patients with age range of 40-60 years with normal temporomandibular functions and class I ridge relation participated in this study in the department of prosthodontics government dental college Srinagar.Lateral cephalograms of all the participants were taken with Lateral cephalograms X-ray unit [80 kvp, 15 mA, and 1 sec].
Cephalometric analysis:

All lateral cephalograms were traced with 4-H pencil. The cephalometric points, planes and angles traced are as under:

1. Points:
   i. Porion (Po)
   ii. Gonion (Go)
   iii. Menton (Me)
2. Planes:
   Mandibular plane (Go-Me)
   i. Ramal plane (Po-Go)
3. Angle:
   i. Gonion angle

The gonion angle was traced and measure in all participants of the present study.

Freeway space (FWS) determination:

The two methods of swallowing, phonetics were applied to determine the rest position of the mandible. The mean value of the

International Journal Dental and Medical Sciences Research
Volume 4, Issue 4, July-Aug 2022 pp 266-267 www.ijdmsrjournal.com ISSN: 2582-6018

two methods mentioned above was calculated and considered as the FWS of any particular person.

IV. RESULTS:

The data collected was analysed statistically. The mean value of the gonion's angle and freeway space (FWS) was found to be 124 degrees and 2.74mm respectively as shown below.

Table no. 1 mean of the gonion's angle and freeway space (FWS)

	Gonion's angle	Freeway space(FWS)
Mean value	124^0	2.74 mm

Pearson correlation test was used to determine the correlation between the gonion's angle and freeway space (FWS). Simple linear regression analysis was performed for predicting the FWS from the considered angle. The formula used was FWS (in millimeters) = 11.405 − 0.072 × (Po-Go-Me angle in degrees).

Discussion: It is believed that gonial angle correlates with function and shape of muscles of mastication mainly the medial and lateral pterygoid muscle which insert on the gonial angle. The gonial angles will be more acute when the contractile force of these muscles increases. The gonial angle will be more obtuse when the contractile force of these muscles reduces. The studies have proved that strong muscle activity correlates with the small gonial angle. The freeway space (FWS) exists as adaptive and true. The space that exists when the patient is instructed to voluntarily allow the jaw to relax is the adaptive space FWS, whereas the one present after the relaxation of the masticatory musculature is the true FWS.

The cephalometry is considered to be an effective method, as it uses specific and predetermined point of bone references to obtain exact measurements. There was negligible effect on the freeway space with small degree of variation in the gonial angle. Though there exists a very strong correlation between the predicted and measured values, for the gonial angle values >**140^0**the small value for the FWS is predicted.

V. CONCLUSION:

Within the limitations of the study, it can be concluded that there exists a strong correlation between Po-Go-Me angle and freeway space FWS. It requires further cephalometry studies to devise more methods for calculating FWS when the angle values are $>140^0$.

REFERENCES:

[1]. Potgieter PJ, Monteith BD, Kemp PL. The determination of freeway space in edentulous patients: a cephalometric approach. J Oral Rehabil 1983; 10(4):283–293.
[2]. Eriksson PO. Muscle-fibre composition of the human mandibular locomotor system. Enzyme-histochemical and morphological characteristics of functionally different parts. Swed Dent J Suppl 1982; 12(Supp):1–44.
[3]. Gillis R. Establishing vertical dimension in full denture construction. J Am Dent Assoc 1941; 28:430.
[4]. Wolff J. Blakiston's New Gould Medical Dictionary. 1st ed. Philadelphia, PA: Blakiston; 1949
[5]. Vinnakota DN, Kanneganti KC, Pulagam M, Kumar P, Reddy K. Freeway space determination using lateral profile photographs: a pilot study. J Indian Prosthodont Soc 2016;16(3):242–247
[6]. Huumonen S, Sipilä K, Haikola B, et al. Influence of edentulousness on gonial angle, ramus and condylar height. J Oral Rehabil 2010;37(1):34–38
[7]. Orthlieb JD, Laurent M, Laplanche O. Cephalometric estimation of vertical dimension of occlusion. J Oral Rehabil 2000;27(9):802–807
[8]. Konchak PA, Thomas NR, Lanigan DT, Devon RM. Freeway space measurement using mandibular kinesiograph and EMG before and after TENS. Angle Orthod 1988;58(4):343–350