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Knowledge and awareness of techniques of recording vertical dimension among dental undergraduates of north Gujarat: A questionnaire based survey

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***Abstract*---**Introduction: Vertical dimension is most important characteristic in success of any rehabilitation procedure. There are various methods available in the literature to record vertical dimension in dentulous as well as edentulous patients. This study aims to discover the knowledge and awareness among the dental undergraduates of North Gujarat regarding the techniques of recording vertical dimension. Materials and Method: A questionnaire based descriptive survey consisting of demographic data and 8 questions related to different methods of recording vertical dimension was framed on google forms. The link was generated and circulated amongst the undergraduate students of (Third Year BDS, Final Year BDS and Interns) North Gujarat utilizing digital platform such as electronic mail and social media platforms. The responses were collected and data were analyzed using SPSS 24.0.for statistical evaluation. The statistical tools used to analyze the levels of awareness among the undergraduates were frequencies and percentage analysis. For statistical evaluation, knowledge and awareness amongst undergraduate students with respect to gender, year and techniques of recording vertical dimension was kept with the

level of significance at P < 0.05 using Microsoft Excel and SPSS software version 24. Results: Undergraduate students were aware about routinely followed and preferred technique for recording vertical dimension at rest (facial measurement after swallowing and relaxing - 64%), vertical dimension at occlusion (Silverman's closest speaking space (49.3%), about freeway space (56%) and ideal freeway space (54.7%). Undergraduate students were unaware about recent advancement in technique of recording vertical dimension like lateral cephalogram, lateral profile photograph, etc. (86%). About anthropometric measurements they knew only mention measurements other than that they were unaware (89.3%). Conclusion: Undergraduate students were aware about routine methods of recording vertical dimension but they were unaware about recent advancement in techniques. Hence, some positive reforms in the existing curriculum are desirable to improve the knowledge and clinical skills.

***Keywords*---**awareness, jaw relation, knowledge, questionnaire study, survey, vertical dimension.

Introduction

According to Glossary of Prosthodontic Terms vertical dimension defines as "the distance between the two selected anatomic or marked points (usually one on the tip of the nose and the other upon the chin), one on a fixed and one on a movable member."[1] To establish vertical dimension is one of the complex procedure in rehabilitation of any prosthesis. Vertical dimension is important for esthetic, function, status of temporomandibular joint and jaw muscles.[2] Increased or decreased vertical dimension causes several problems such as esthetics, comfort, phonetics and morphological changes. If vertical dimension is registered too high or low, it will deteriorate the existing patient's condition instead of improving it.[3] To restore lost vertical dimension with prosthesis, prosthodontist needs to accurately estimate the ideal vertical dimension of the patient.[4]

There are various techniques to record vertical dimension like facial measurement after swallowing and relaxing, speech, facial expression, measurement of anatomical landmarks, profile photographs, physiologic rest position, silverman's closest speaking space and profile silhouettes, etc. Prosthodontics as a whole has progressed leaps and bounds with variety of techniques being proposed and practiced for the evaluation of vertical dimension, none of them is scientifically more accurate than other.[5] In clinical practice, a entirely precise technique of determining the exact vertical dimension of occlusion does not exist.[6]

In recent, research was done on evaluating vertical dimension by various anthropometric measurement techniques (length of index finger, length of thumb, interpupillary distance, length of year, vertical height of nose, rima oris to pupil distance, vertical height of the eyebrow to the ala of the nose, etc.), lateral profile photographs, lateral cephalograms, etc.. Each method has its own advantage and disadvantage.[5] To perform this techniques special instruments and equipments

are required, that is not available in most of the clinics.[5] In recent, these techniques are tedious, time consuming and expose patients to the radiation. So, this questionnaire type descriptive study was planned to evaluate the awareness and knowledge of recent methods/techniques and overall knowledge about vertical dimension of undergraduate students (third year, final year and interns) of North Gujarat. Null hypothesis of the study is that there is no difference in knowledge and awareness of vertical dimension between third year, final year and interns of North Gujarat. The results of this study will provide a database which can lead to some positive reforms in curriculum of Health Sciences University.

Materials and Method

Study Design: Descriptive type of study.
Study Setting: The study was conducted amongst the undergraduate students of North Gujarat in 2022 for duration of two months. Ethical approval for conducting the survey was obtained from institutional ethical committee. The purpose and process of the study were explained to all participants.
Study Population: Third Year, Final Year & Interns of North Gujarat Dental Colleges, Gujarat.
Inclusion Criteria: All the third year, final year and interns of North Gujarat dental colleges who want to participate in the study.
Exclusion Criteria: Participants who refused to participate in the study.
Study Method: Questionnaire validity was checked by the specialists in the same field. A web designed survey in Google forms was circulated among the participants and the responses were recorded.

This questionnaire survey consisted of 8 questions. 8 questions were on knowledge and awareness of techniques of recording vertical dimension among dental undergraduates of North Gujarat dental colleges. 5 demographic questions pertaining to E-mail, year, gender, participant name and college name (if attached) were included. A total of 150 participants were included in the survey.

Sample size was calculated using sample size formula for qualitative data for descriptive statistics,

$$n = \frac{4pq}{L^2}$$

10% of p = 10x
Where p = 89.5%
= 0.895
q = (1-p)
= 1-0.895
= 0.105
L = Allowable Error = (5%) = 0.05

$$n = \frac{4 \times 0.895 \times 0.105}{(0.05)^2}$$

n = 150

Sampling method

The questionnaire was send to a larger pool of participants and the collected responses were included in the analysis. The results of the survey were tabulated in Google Sheets.

Data Analysis

Data was analyzed descriptively using Microsoft Excel and SPSS Statistics for Windows version 24.0.

Results

In this study, a total of 150 BDS undergraduate students (third year, final year and interns) participated. Out of 150 participants, 72 were third year students, 44 were final year students and 34 were interns. The demographic characteristics are represented by Table 1, in which, a total of 31 males and 119 females participated in this study. The following questions were framed for the participants. (Table 2)

Table-1: Demographic Characteristics		
Participants	N	%
Third Year	72	48
Final Year	44	29.3
Interns	34	22.7
Total	150	
Gender	N	%
Male	31	20.7
Female	119	79.3

Table 2: Questionnaire

SR. NO.	QUESTIONS	
Demographic Data		
1	Name of the Participant	
2	Gender	
	I.	Male
	II.	Female
3	Year	
	I.	Third Year
	II.	Final Year
	III.	Interns
4	College	
5	E-mail	
Vertical Dimension Questions		
1	Most preferred method for recording vertical jaw relation at rest?	
2	Most preferred method for recording vertical jaw relation at occlusion?	
3	Decreased vertical dimension causes...	

4	Freeway Space…
5	Ideal freeway space should be…
6	Do you know any recent method of recording vertical dimension?
	If Yes, please mention_____
7	Which is the anthropometric measurement used for recording vertical dimension?
8	Do you know any other anthropometric measurement technique for recording vertical dimension?
	If Yes, please mention_____

Regarding most preferred method of recording vertical dimension at rest, students' preferred facial measurement after swallowing and relaxing was 64%. (Figure-1) Silverman's closest speaking space (49.3%) was preferred method for undergraduate students for recording vertical dimension at occlusion. (Figure-2)

Figure-1: Preferred method of recording vertical jaw relation at rest by students

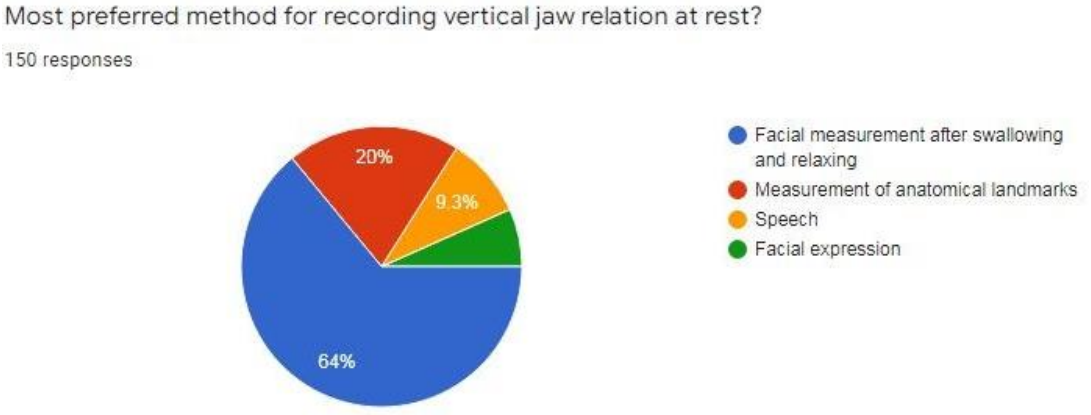
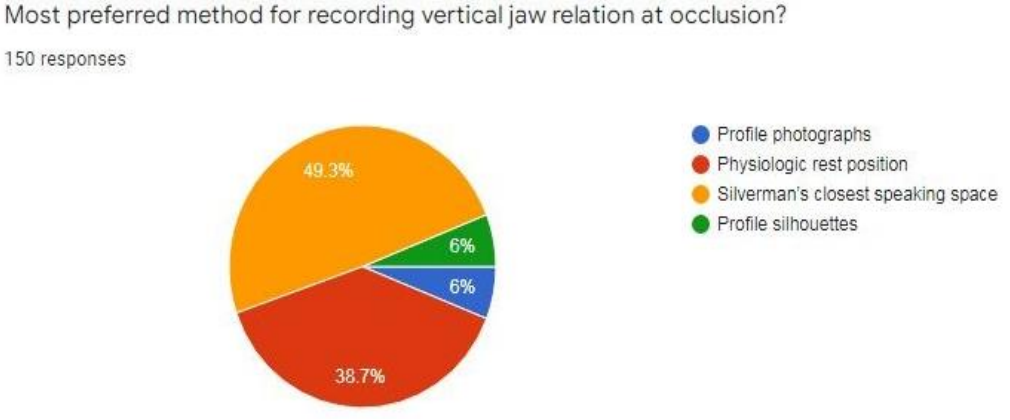


Figure-2: Preferred method of recording vertical jaw relation at occlusion by students



Undergraduate students were aware about causes of changes in vertical dimension (53.3%) (Figure-3), about freeway space (56%) (Figure-4) and ideal freeway space (54.7%) (Figure-5).

Figure-3: Causes of changes in vertical dimension

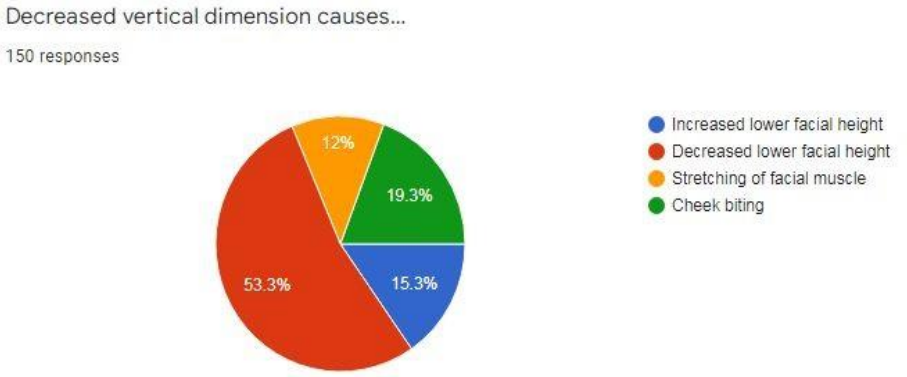


Figure-4: Freeway Space

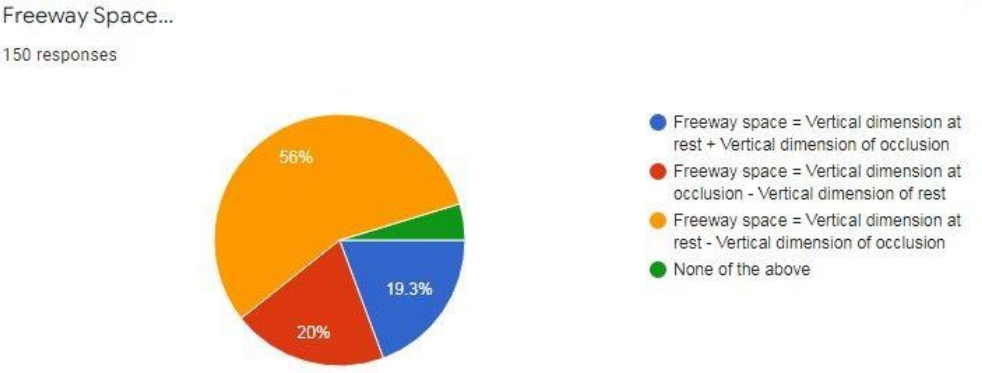
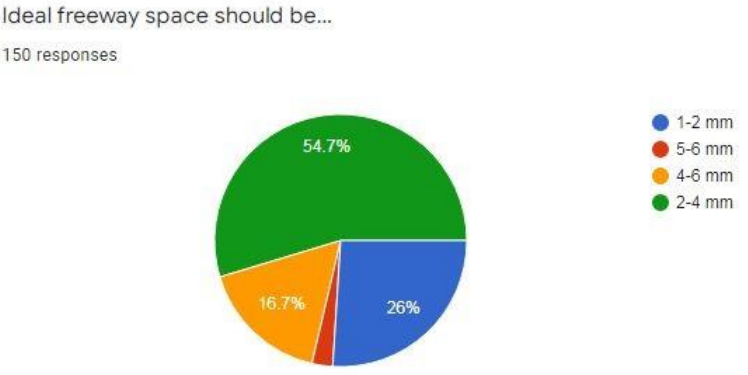


Figure-5: Ideal freeway space



86% undergraduate students were not aware about advancement in techniques used to record vertical dimension. (Figure-6) Only 2 participants knew lateral cephalogram technique for recording vertical dimension. Undergraduates

unaware about lateral profile photograph techniques, lateral cephalogram techniques and various anthropometric measurement techniques. For anthropometric measurements, 60.7% participants knew about mentioned techniques only. (Figure-7) 89.3% was unaware about other anthropometric measurements. (Figure-8)

Figure-6: Recent advancement in recording vertical dimension

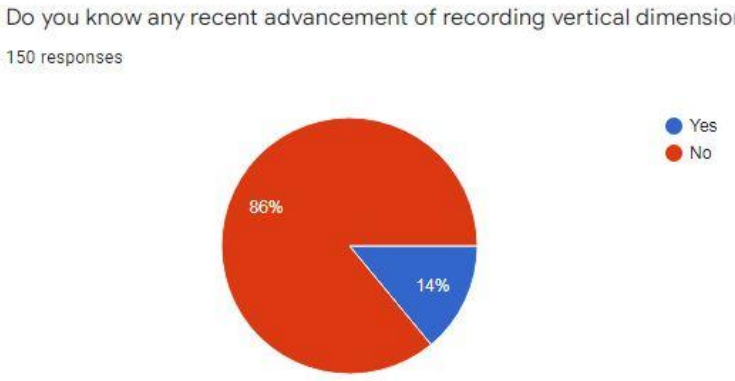


Figure-7: Anthropometric measurements in recording vertical dimension

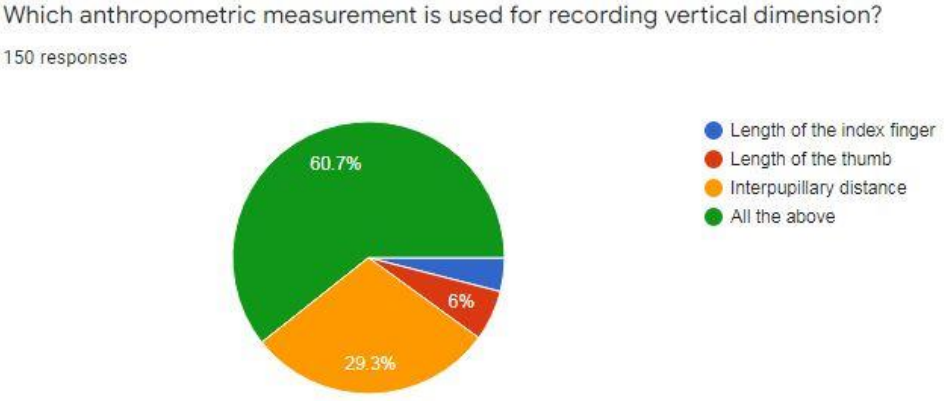
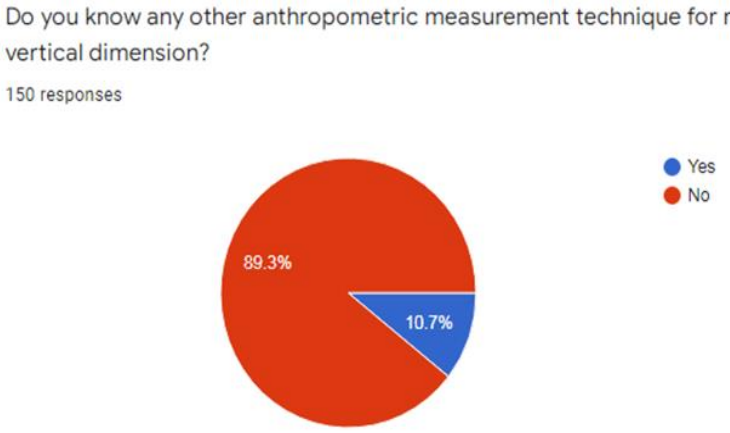


Figure-8: Students were unaware about other anthropometric measurements



Discussion

The establishment or reestablishment of maxillo-mandibular relation that have been altered is currently the focus of many studies. Importance of establishing an appropriate lower facial height cannot be overlook because if vertical dimension occlusion is altered (too high or low), it would deteriorate the existing condition of the patient. Geerts GA et al. in 2004 stated a greater variance in vertical dimension with Willis gauge technique in comparison to caliper technique.[7] Regardless of the advances in techniques and materials are being made in prosthodontics, still no accurate method of assessing the vertical dimension of occlusion in edentulous patients is available to the dentists.[8, 9] Discacciati et al. reported that beginning of dental rehabilitations, vertical dimension should be regarded as a primary and basic procedure as increased vertical dimension may lead to muscle and joint pain.[10] Decreased vertical dimension causes angular chelitis, facial distortion, temporomandibular joint damage and loss of muscle tone.[11]

It is but obvious that interns have better knowledge and clinical skills compared to third year students. Results obtained from the study of Paul MJV et al. that the interns experienced higher levels of awareness when they completed more number of complete denture cases.[12] Another limitation of the study is that only undergraduate of one college were incorporated in the study. Future studies can be done multi centric with more number of participants. Undergraduate students were aware about routinely followed techniques of recording vertical dimension. When question was asked about awareness about any recent technique for vertical dimension, only 2 participants knew lateral cephalogram technique for recording it. 86% participants' were unaware about recent advancement in techniques for recording vertical dimension. For anthropometric measurement techniques, 60.7% participants knew about mentioned techniques only. 89.3% was unaware about other anthropometric measurements. Undergraduates unaware about lateral profile photograph techniques, lateral cephalogram techniques and various anthropometric measurement techniques.

The result of this study clearly reflects that, undergraduate students' hasn't professional training of searching literature. Undergraduate students' are not clearly aware about recent advancement and newer measurement techniques of recording vertical dimension. Lateral cephalogram technique was developed using bone structures and it can be applied regardless of the presence or absence, full or in part, of teeth.[13] In spite of conflicting evidence in the literature regarding routine methods of recording vertical dimension, the use of various facial measurements or facial reference points is a popular method in clinical practice.[14] Anthropometric measurements are simple, economic, non-invasive, reliable, requires no radiographs; hence, it could be recommended for everyday practice.[3]

Findings of this study can be considered very important starting point for the planning and training in health education curriculums.[15] Evidence based approach in studies and clinics, seminars and expert lectures are incorporated in undergraduate students' curriculum to improve their knowledge and skill. This need based descriptive study very well reflects the present baseline scenario, which with future multicenter studies keeping in the account of diversity of training and cultural differences of various states of India may lead to positive reforms in curriculum of health science universities.[15] The null hypothesis of the study was rejected, as there was statistical significant difference was found between knowledge and awareness of techniques of recording vertical dimension amongst third year, final year and interns of dental students.

Conclusion

Within the limitation of this descriptive study, it can be concluded that undergraduate students are aware about routinely followed techniques/methods of recording vertical dimension but they were unaware about recent/newer advancement.
There is also a constant need to organize continuing education programs, expert lectures and workshops to sensitize and improve the knowledge of undergraduate students' on a regular basis.

Conflict of interest
Nil

Acknowledgement
Nil

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References

1. Glossary of Prosthodontics Terms. 9th ed. J Prosthet Dent 2017; 117: 1-105.
2. Owall B. Denture wearers' awareness of their vertical dimension. Gerodontology 1983; 2: 21-5.

3. Ladda R, Bhandari AJ, Kasat VO, Angadi GS. A new technique to determine vertical dimension of occlusion from anthropometric measurements of fingers. Ind. J. Dent. Res. 2013; 24: 316-20.
4. Alhajj MN, Khalifa N, Abduo J, Amran AG, Ismail IA. Determination of occlusal vertical dimension for complete dentures patients: an updated review. J. Oral. Rehabil. 2017; 44: 896–907.
5. Ladda R, Kasat VO, Bhandari AJ. A new technique to determine vertical dimension of occlusion from anthropometric measurement of interpupillary distance. J. Clin. Exp. Dent. 2014; 6: e395-9.
6. Delic Z, Simunovic SM, Perinic GR, Vukovojac S, Rajic Z, Kuna T. Evaluation of craniometric methods for determination of vertical dimension of occlusion. Coll. Antropol. 2000; 1: 31–5.
7. Raval HJ, Mehta SP. Anthropometric measurements: A boon for recording vertical dimension of occlusion. Int. J. Health. Sci. 2022; 6: 5729-34.
8. den Haan R, Witter DJ. Occlusal vertical dimension in removable complete dentures. Ned. Tijdschr. Tandheeldk. 2011; 118: 640–5.
9. Turrell AJW. Clinical assessment of vertical dimension. J. Prosthet. Dent. 2006; 96: 79-93.
10. Discacciati JA, Lemos de Souza E, Vasconcellos WA, Costa SC, Barros Vde M.Increased vertical dimension of occlusion: Signs, symptoms, diagnosis, treatment andoptions. J. Contemp. Dent. Pract. 2013; 14: 123–8.
11. Rahn AO, Ivanhoe JR, Plummer KD. Textbook of Complete Dentures. 6th ed. Connecticut USA: People's Medical Publishing House Shelton; 2009.
12. Paul MJV, Manimaran P, Kumar CD, Simon EP, Paul V. Knowledge and Awareness of Jaw Relation among Dental Interns: A Questionnaire Survey. J. Pharm. Bioallied. Sci. 2021; 13: S1263–5.
13. Tavano KTA, Seraidarian PI, de Oliveira DD, Jansen WC. Determination of vertical dimension of occlusion in dentate patients by cephalometric analysis – pilot study. Gerodontology 2012; 29: e297-305.
14. Brar A, Mattoo KA, Singh Y, Singh M, Khurana PRS, Singh M. Clinical reliability of different facial measurements in determining vertical dimension of occlusion in dentulous and edentulous subjects. Int. J. Prosthodont. Restor. Dent. 2014; 4: 68-77.
15. Raval HJ, Mahajan N, Sethuraman R. Comparative evaluation of attitude of teaching faculties and interns of a health sciences university toward geriatric people using Kogan's attitudes toward old people scale: A cross-sectional study. SRM. J. Res. Dent. Sci. 2018; 9: 103-7.
16. Widana, I.K., Dewi, G.A.O.C., Suryasa, W. (2020). Ergonomics approach to improve student concentration on learning process of professional ethics. *Journal of Advanced Research in Dynamical and Control Systems*, *12*(7), 429-445.
17. Chang, M. O., Peralta, A. O., & Corcho, O. J. P. de. (2020). Training with cognitive behavioral techniques for the control of precompetitive anxiety. *International Journal of Health & Medical Sciences*, *3*(1), 29-34. https://doi.org/10.31295/ijhms.v3n1.121