



Analysis of types of tracing in biofunctional prosthetic system using intra oral tracers- a retrospective study

Jagadish Rajkumaar, Subhasree R*, Raj S S

Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University
162, Poonamallee High Road, Chennai-77, India

Article History:

Received on: 22 Jun 2020
Revised on: 24 Jul 2020
Accepted on: 10 Aug 2020

Keywords:

Gothic arch,
tracing techniques,
arrow points,
complete denture

ABSTRACT

The aim of the study is to access the types of gothic arch tracing achieved using intraoral tracer in a biofunctional prosthetic system (BPS). Assessing the centric relation plays an important role in the fabrication of complete denture. Gothic arch tracing is one of the methods used to achieve centric relation in complete denture patients. The types of the arrow forms include the classical pointed form, classical flat form, weak form, asymmetrical form, miniature form, vertical line extending beyond the arrow point. The variations in achieving arrow tracing for a complete denture patient depends on mandibular movements. Data collection was done from DIAS (dental hospital management system) which is an electronic record management system and details such as edentulousness, types of arrow point achieved and type of tracer used was obtained and tabulated. Further the data were analysed by statistical tests (chi-square analysis) using SPSS software (write the version). The typical arrow point tracing was common in both sexes. Females show more variation in tracing arrow types of tracing were more commonly seen in females. The chi-square analysis reveals an insight value of $p > 0.005$. The typical arrow point tracing form is seen in both males and females. Other forms like atypical, double arrow are commonly seen in females and only miniature forms are seen in males.



*Corresponding Author

Name: Subhasree R

Phone: -

Email: subhashreer.sdc@saveetha.com

ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v11iSPL3.2850>

Production and Hosted by

IJRPS | www.ijrps.com

© 2020 | All rights reserved.

INTRODUCTION

The human mandible can assume various positions to the maxilla in the horizontal plane aspect (Caldwell and Herbert, 1955). One significant relation among these positions is the centric relation plays

a vital role in the dentures (Myers, 1982). The centric relation position acts as a proprioceptive centre to guide the mandibular movements (Yurkstas and Kapur, 2005). It is also a reproducible and stable position which can be repeatedly arrived at. Hence used as a reliable guide to develop centric occlusion in patients (Keshvad and Winstanley, 2001; Yurkstas and Kapur, 2005). There are various methods to record the centric relation, the graphic method resembles gothic arches characterised by high pointed arches (Boucher, 1985; Vijayalakshmi and Ganapathy, 2016). It was introduced by Hess from Germany in 1897 and polarized by Alfred Gysi in 1910. The arrow point tracing is a one dimensional graphic tracing method (Saizar, 1963). It consists of a pen-like pointer (central bearing plate) attached to each rim (Venugopalan, 2014; Ganapathy et al., 2017). Pointer and plate together form the central bearing device when the mandible

Table 1: Shows the gothic arch tracing cross tabulation and gender

Gender	Asymmetrical form	Atypical form	Double arrow form	Miniature	Typical form	Total
Male	0 0%	4 11.1%	3 8.3%	4 11.1%	25 69.4%	36 100%
Female	5 15.2%	2 6.1%	6 18.2%	1 3.0%	19 57.6%	33 100%
Total	5 7.2%	6 8.7%	9 13%	5 7.2%	44 63.8%	69 100%
Pearsons Chi Square	0.057					

moves (Kunta *et al.*, 2017).

The characteristic pattern created on a recording plate is called arrow point tracing (Kannan and Venugopalan, 2018). It can be recorded by both intra oral arrow point tracing and the extra oral arrow point tracing (Anehosur *et al.*, 2016; Basha *et al.*, 2018; Ajay, 2017). The various forms of arrow tracings were classified as the classical (pointed form) classical, flat form, weak gothic arch tracing, asymmetrical form, miniature form, vertical lines protruding beyond the arrow point.

In typical form, which is the most commonly seen type of intra oral tracing. The TMJ is healthy and there are no condylar interferences (Ashok and Suvitha (2016); Selvan and Ganapathy (2016). The mandibular movements are not disturbed (Ashok, 2014; Ganapathy *et al.*, 2017).

In flat form and asymmetrical of tracing there is a restriction in the forward movement of the mandible either the left or right condyles is restricted in movement. Miniature Arrow Point occurs if the record bases are not seated or long term habitual position of the condyles. Double arrow tracing point occurs when the patient is not trained properly or when the vertical dimension is altered. Atypical occurs when the patient is a bruxer and the muscle pattern has altered due to the para functional habit.

In the present article we will be assessing the types of arrow points achieved using intra oral tracer in bio functional prosthetic systems.

MATERIALS AND METHODS

A Retrospective study design was done to assess the types of gothic arch tracing achieved using intraoral tracer in a bio functional prosthetic system. The inclusion criteria were both genders, patients who underwent complete denture, patients who

underwent Bio functional prosthetic complete denture. The exclusion criteria were partially edentulous patients, patients with no proper information regarding the treatment, complete denture done without using intra oral tracing method.

The total sample size was assessed based on the inclusion and exclusion criteria and a total of 66 patients who underwent bio functional prosthetic complete denture data was assessed. The patient with no proper information was excluded in the study. One patient's details were excluded in the study. The data collection was from data collection from DIAS (Dental Hospital Management System). The following details were collected and tabulated: Patient details (Age, Gender), Status of edentulism, Type of tracer used, Types of arrow point achieved.

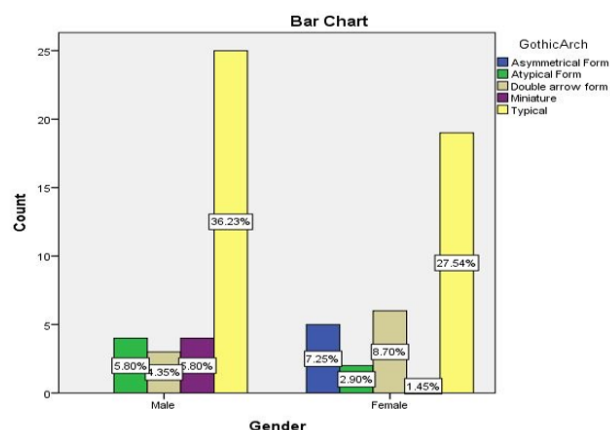


Figure 1: Bar graph depicts the correlation between the gender and the type of arrow point tracing

RESULTS AND DISCUSSION

The values of the outcome measures were tabulated and subjected to statistical analysis using SPSS soft-

ware statistics version 26. Chi square test was done to compare the gender and the type of intraoral tracing given by the patient.

The results of the present study showed that there is no statistically significant difference between the intra oral arrow point tracing and between the genders (Table 1). However, the typical arrow point was seen to be predominant (63%) in males than in females (57.6%) followed by double arrow form Figure 1 tracing was predominantly seen in females (18.2%) than in males (8.3%). Miniature and Atypical forms of intra oral tracing were more seen in males (11.1% and 11.1% respectively) than in females (3% and 6.1% respectively). X axis shows the gender and y axis shows the variations in gothic arch.

Asymmetrical type of tracing was seen in females (15.2%) than in males (0%). The non-parametric correlation between the gender arch tracing reveals negligible correlation (Spearman's Rho = -172).

Gothic arch tracing determines the patient centric relation (Shin, 2014; Jyothi, 2017; Duraisamy, 2019; Selvan and Ganapathy, 2016) and can determine proper vertical dimension. However if the tracing is not done correctly, the occlusion might alter in the patient's mouth. This is a critical step in fabricating a complete denture (Ganapathy et al., 2016; Selvan and Ganapathy, 2016). There are many variations in the intra oral tracing (arrow point tracing) ('Centric Relation Records', 2020). This will determine the condition of the patient's temporomandibular joint without interferences in the condylar path and can help in proper selection of teeth and set according to the occlusion. The correct gothic arch tracing is obtained only when the tracing point is placed perpendicular to the line from the condyle to point of tracer (Rey et al., 2015). The width and the selection of the teeth can be done based on the arch form and length of the teeth (Jain, 2018; Ariga, 2018). The oral hygiene status after the complete denture fabrication should be evaluated and depends upon the interarch spacing and the tracing achieved (Jyothi, 2017).

According to the study results females show more variations than males. There might be variations in the temporomandibular joints and the surrounding muscles. The para functional habits can also influence arrow tracing (Berrie, 2000). The variations seen in this study are atypical, miniature, asymmetrical, double arrow tracings. The facial forms can also influence the tracing design, longer the face more inclination of the tracing point.

CONCLUSION

The accurate recording of jaw relation is at most important to construct a complete denture and to restore the form, function, and appearance of the patient. To record a proper centric relation with intra oral tracers is quite challenging and technique sensitive. However minimum time investment will make the gothic arch tracing easier to record jaw relation. Within the limitations of the study, most of the patients have the typical arrow point tracing form and seen in both males and females. Other forms like atypical, double arrow are commonly seen in females and only miniature forms are predominantly seen in males. Clinical rechecking has to be followed throughout the denture construction in order to maintain the maxillomandibular relationship.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

Funding Support

The authors declare that they have no funding support for this study.

REFERENCES

- Ajay, R. 2017. Effect of surface modifications on the retention of cement-retained implant crowns under fatigue loads: An In vitro study. *Journal of Pharmacy And Bioallied Sciences*, pages 154–154.
- Anehosur, G., Kumari, V., Meshramkar, R., Nadiger, R., Lekha, K. 2016. An in vivo study to compare and correlate sagittal condylar guidance obtained by radiographic and extraoral gothic arch tracing method in edentulous patients. *European Journal of Prosthodontics*, 4(1):12–12.
- Ariga, P. 2018. Determination of Correlation of Width of Maxillary Anterior Teeth using Extraoral and Intraoral Factors in Indian Population: A Systematic Review. *World Journal of Dentistry*, pages 68–75.
- Ashok, V. 2014. Lip Bumper Prosthesis for an Acromegaly Patient: A Clinical Report. *The Journal of Indian Prosthodontic Society*, pages 279–282.
- Ashok, V., Suvitha, S. 2016. Awareness of all ceramic restoration in rural population. *Research Journal of Pharmacy and Technology*, 9(10):1691–1691.
- Basha, F. Y. S., Ganapathy, D., Venugopalan, S. 2018. Oral Hygiene Status among Pregnant Women. *Research Journal of Pharmacy and Technology*, 11(7):3099–3099.
- Berrie, R. H. 2000. Parafunctional habits causing

- temporomandibular disorders. *Journal of Oral and Maxillofacial Surgery*, 58(5):586–586.
- Boucher, C. O. 1985. Boucher's Prosthodontic Treatment for Edentulous Patients. *Mosby Elsevier Health Science*, pages 1–623.
- Caldwell, L. S., Herbert, M. J. 1955. The judgment of angular positions in the horizontal plane on the basis of kinesthetic cues. *Treating the Complete Denture Patient*, pages 67–71.
- Duraisamy, R. 2019. Compatibility of Nonoriginal Abutments With Implants: Evaluation of Microgap at the Implant-Abutment Interface, With Original and Nonoriginal Abutments. *Implant dentistry*, 28(3):289–295.
- Ganapathy, D., Sathyamoorthy, A., Ranganathan, H. 2016. Effect of Resin Bonded Luting Agents Influencing Marginal Discrepancy in All Ceramic Complete Veneer Crowns. *Journal of clinical and diagnostic research*, 10(12):67–70.
- Ganapathy, D. M., Kannan, A., Venugopalan, S. 2017. Effect of Coated Surfaces influencing Screw Loosening in Implants: A Systematic Review and Meta-analysis. *World Journal of Dentistry*, 8(6):496–502.
- Jain, A. R. 2018. Determination of correlation of width of maxillary anterior teeth using extraoral and intraoral factors in Indian population: A systematic review. *World J Dent*, 9:68–75.
- Jyothi, S. 2017. Periodontal Health Status of Three Different Groups Wearing Temporary Partial Denture. *Research Journal of Pharmacy and Technology*, pages 4339–4339.
- Kannan, A., Venugopalan, S. 2018. A systematic review on the effect of use of impregnated retraction cords on gingiva. *Research Journal of Pharmacy and Technology*, 11(5):2121–2121.
- Keshvad, A., Winstanley, R. B. 2001. An appraisal of the literature on centric relation. Part III. *Journal of Oral Rehabilitation*, 28(1):55–63.
- Kunta, M., Shetty, S., Shenoy, K. 2017. A clinicoradiographic study to compare and co-relate sagittal condylar guidance determined by intraoral gothic arch tracing method and panoramic radiograph in completely edentulous patients. *The Journal of Indian Prosthodontic Society*, 18(1):19–23.
- Myers, M. L. 1982. Centric relation records—Historical review. *The Journal of Prosthetic Dentistry*, 47(2):141–145.
- Rey, R., Fernandez, M., Weber, E. 2015. Gothic Arch Method to Establish Centric Relation. *Mededport*, 11(10038).
- Saizar, P. 1963. Centric Occlusion and Centric Relation: Balkwill's and Gysi's arches. *The Journal of the American Dental Association*, 67(4):505–512.
- Selvan, S. R., Ganapathy, D. 2016. Efficacy of fifth generation cephalosporins against methicillin-resistant *Staphylococcus aureus*-A review. *Research Journal of Pharmacy and Technology*, 9(10):1815–1815.
- Shin, S. Y. 2014. Gothic arch tracing to record centric relation for dentures. *Journal of Dental Rehabilitation and Applied Science*, pages 238–245.
- Venugopalan, S. 2014. Magnetically retained silicone facial prosthesis. *Nigerian journal of clinical practice*, 17(2):260–264.
- Vijayalakshmi, B., Ganapathy, D. 2016. Medical management of cellulitis. *Research Journal of Pharmacy and Technology*, 9(11):2067–2067.
- Yurkstas, A. A., Kapur, K. K. 2005. Factors influencing centric relation records in edentulous mouths. *The Journal of Prosthetic Dentistry*, 93(4):305–310.