

Bite Force in Tooth Supported Prosthesis

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Abstract:

Aim: To determine bite force of complete denture against tooth supported overdenture

Objective: To measure bite force of complete denture opposing tooth supported overdenture using gnathodynamometer at right maxillary first molar region .

Methodology: Five patients were selected on the basis of possession of a maxillary complete denture opposed by tooth supported mandibular overdenture and on the ability to provide a relatively consistent bite force.

Bite force data were obtained by use of a specially constructed gnathodynamometer composed of a bite element connected to a digital display. Selected patients were seated on a dental chair with head unsupported and positioned so that the Frankfort horizontal plane would be parallel to the floor. The fork was placed parallel to the arch so that biting end was positioned in the right maxillary first molar region and three consecutive reading were taken.

Conclusion: To conclude we can exclaim which is backed by scientific results and assessment of our bite force recorder to produce reliable bite force in complete denture opposing tooth supported overdenture.

Keywords: bite force, complete denture, masticatory efficiency, overdenture, tooth supported prosthesis.

I. Introduction

The craniomandibular function is determined by the complex and interrelated components comprising the morphology and biomechanics of the muscles joints ,teeth and the neuromuscular system. Bite forces which greatly differ in magnitude and direction result from different combinations of action of masticatory and cooperative muscle.

Patients with complete dentures are generally satisfied but up to 30% of the patients have complaints. They suffer from a variety of problems with their dentures ,especially with regard to the lower denture ,such as insufficient stability ,retention and pain during mastication .With time ,the resulting pain and difficulty may increase during oral functions to an extent that proper nutritional intake and the patient's ability to communicate with ease and confidence are jeopardized. Psychosocial problems are the result of diminished attractive facial appearance ,difficulties with speech and avoidance of social contacts.

For many years ,traditional complete denture designs have been modified to gain additional support and stability from a few retained and suitably prepared natural teeth. Mericske-stern et al attested to the effectiveness of such tooth supported complete dentures or overdentures as alternative to complete dentures .Roots maintained under the denture base preserves the alveolar ridge ,provide sensory feedback and improve the stability of the dentures.

Recently ,Morais et al reported that overdenture treatment with the use of implants has become popular for edentulous elderly patients who are maladaptive to complete denture. Although the biologic basis of implants installed in the bone is different from roots surrounded by a periodontal membrane ,but prosthetic concept is similar .Tactile sensation for implant is reduced because of the absence of periodontal receptors. However ,oral function with overdentures supported by roots or implants is comparable and it seems to differ in bite force depend on the presence of a periodontal membrane .

The purpose of this study was to determine bite force in upper complete denture opposing a tooth supported overdenture by using a bite force recorder which was designed and developed in the department to determine efficiency and reliability of the equipment by conducting clinical test.

Source of data

The study was conducted at KLE VK Institute of Dental Sciences, Belgaum, in the department of Prosthodontics. Five patients treated for tooth supported mandibular overdenture opposing maxillary complete denture were selected.

II. Materials and method

Gynathodynamometer bite force recorder consists of a detailed state of the art apparatus carefully selected and individually crafted using technical expertise Fig1.

It consisted of following components Fig 2

1. Metallic fork consisting of sensor
2. Electronic instrument .
3. Digital display

Several dimensions /thickness of the fork were tried and the one with optimal springness and stiffness was finally selected

Inclusion criteria

Patients in the age group of 45-50 years.

Upper complete denture opposing tooth supported mandibular Overdenture.

Abutments as canine and premolar.

Exclusion criteria

Patient in the age group less than 45 or more 50 years.

Overdenture opposing natural teeth or partially edentulous patients.

Implant supported or extension post tooth supported prosthesis.

Tmj related disorders.

III. Methodology

The selected patient on the basis of possession of a maxillary complete denture opposed by tooth supported overdenture Fig 4 and Fig 5. Rehabilitation was done respectively with the conventional upper complete denture and lower abutments as canine and first premolar reduced to receive coping and overdenture Fig 6.The patient were seated on a dental chair with head unsupported and positioned so that frankfort horizontal plane would be parallel to the floor. The fork was placed parallel to the dental arch so that biting end was positioned in the right maxillary first molar region

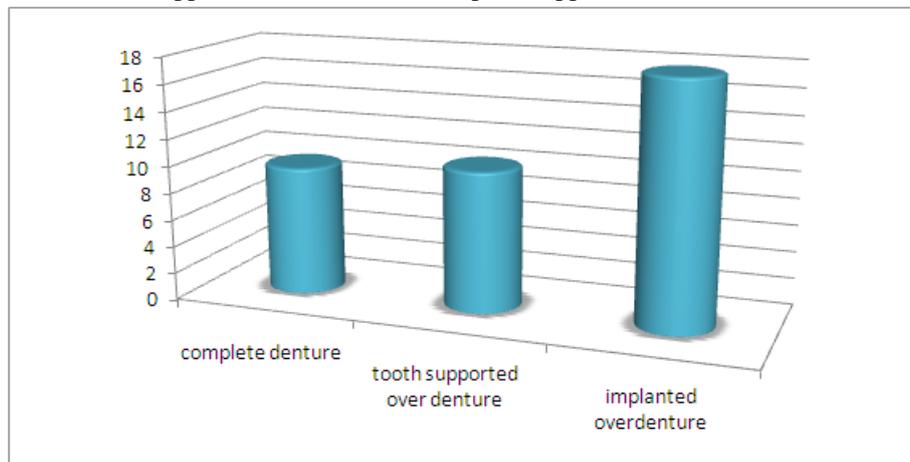
Bite force measurement

Bite force data were obtained by use of a specially constructed Gnathodynamometer. At the beginning of the test each subject was asked to bite on the fork in the order to make familiar with the equipment and no measurements made. Three consecutive recordings were taken and mean of the three recordings was taken as maximum bite force in the molar region. Collected data was stastically analysed. This comparison showed statistically significant at 5% level of significance

Table 1

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5
First reading in newtons(N)	12	11	10	11	11.5
2 nd reading	9	10	9.5	10.5	11
3 rd reading	11	10	10.5	11	9
Mean values	10.6	10.3	10	10.8	10.5

Graph : Comparison between mean differences in maximum biting forces control complete denture, tooth supported overdenture and implant supported overdenture.



IV. Discussion

In the study five patients were selected on the basis of possession of a maxillary complete denture opposed by a mandibular tooth supported overdenture. Each patient were subjected for the measurement. Results of the study showed significant increase in maximum biting force in tooth supported overdenture opposing complete denture when compared to values of conventional complete denture.

This can be explained as there is improved masticatory efficiency, support, stability more self confidence, assurance and satisfaction with their prosthesis. The study is in accordance with study done by shah comparison of tooth and implant supported, experienced greater biting force than tooth supported could be explained patient with implant exhibit voluntary reflex which make their jaw close to a much greater extent than tooth supported.

IB rosa et al the group of selected patient rehabilitated with upper and lower complete denture showed the lowest masticatory efficiency than intermediate masticatory efficiency of upper complete denture opposing lower overdenture.

V. Conclusion

This study evinced that group of individuals rehabilitated with upper complete denture opposing tooth supported overdenture showed greater values than lower baseline value of conventional complete denture and higher value implant retained overdenture.

To conclude we can exclaim the study which is backed by scientific results and assessment of our bite force recorder to produce reliable bite force in complete denture opposing tooth supported overdenture.

References

- [1]. Sarabjeet Singh ,Ashok Utreja,Navreet.An Innovative Miniature Bite Force Recorder. IJCPD May –August 2011;4(2):113-118
- [2]. Farhan Khalid,Ashraf Gebreel.Comparison Of Immediate Complete Denture ,Tooth And Implant Supported Overdenture On Vertical Dimension And Muscle Activity. Journal Of Advanced Prosthodontics May 2012 .
- [3]. Van Waas .The Influence Of Psychologic Factors On Patient Satisfication With Complete Dentures. J Prosthet Dent .1990;63: 545-548.
- [4]. Schwartz IS,Morrow .Overdentures .Principles And Procedures .Dent Clin North Am.1996;40:169-194.