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Orginal Article

Ideal Occlusal Patterns for Complete Dentures

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Abstract :

The success of complete dentures retention stability and masticatory efficiency enhanced by ideal occlusion. The purpose of this study was to evaluate the effects of ideal occlusal patterns for complete dentures. This study was evaluated in the department of prosthodontics, BSMMU. A total No. of 36 edentulous patients were studied in this department from January 2004 to December 2005 and divided into two groups. In Group-I, 21 patients were treated by Balanced Occlusion and in Group-II, 15 patients were treated by Lingualized Occlusion.Data were collected and analyzed using unpaired test and Chi-Square test P-<0.05 was considered as statistically significant. Result showed that mean percentage of retention stability and masticatory efficiency were improved 62.1% and 45.7% in Balanced Occlusion and 37.3%/ 13% in Lingualized Occlusion. So it can be concluded that Balanced Occlusion in Complete Denture gives more retention-stability and masticatory efficiency.

Keywords: ***Balanced occlusion, Lingulalised Occlusion, Retention, Stability.***

Introduction :

In a discussion of problem in occlusion it is often convenient to divide the subject into three categories of mandibular movement, and tooth contact. This study involves the third category, tooth contact patterns for complete dentures. Since all categories are closely interrelated, a brief review of current status of each is indicated.

Mandubular Position :

Both vertical and anteroposterior relations of the mandible are involved in mandibular position. No scientifically proved methods, however, have yet been established for determining the vertical dimension of occlusion. According to the results of a questionnaire on the methods for determining vertical dimension of occlusion being taught in dental schools in the United States and Canada, the most popular are the Niswonger method using interocclusal distance and the Silverman method using closet speaking space[1]. A number of other methods are available, but each presents its difficulties. Therefore, accuracy and reproducibility of methods for determining vertical dimension of occlusion are frequently less than desirable.

Needlepoint traces have been used widely for determining the anteroposterior relation of the mandible. This method may be accurate if used with discretion. Thus, a question arises concerning a potential disparity in accuracy between methods used to record vertical and anteroposterior relations. Though lively discussion continues on accuracy of recording methods for anteroposterior relations, the accuracy of recording methods for vertical relations does not receive the same attention.

Mandibular Movement :

This article is concerned with clinical methods for recording movement patterns. Currently, interocclusion records and chew-in and pantographic methods are used extensively. Interocclusion are most popular for construction of complete dentures.

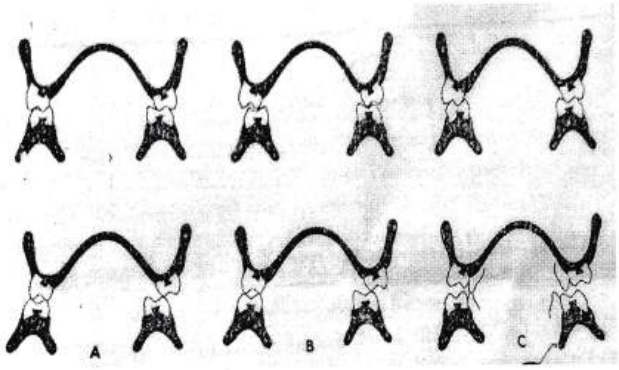

Fig.1 Occlusal patterens tested (frontal view):

A: Balanced occlusion

B: Lingualized occlusion; and

C: Cuspid-protected occlusion.

Upper figure show centric occlusion, and lower figures show right lateral movement.

Tooth contact patterns :

In this study, only tooth contact patterns in lateral movements of the mandible will be considered. Balanced occlusion in complete dentures is recognized by many dentists as a norm, and that is the belief of the authors. In 1966, we examined an artificial posterior tooth, Condyloform, which was developed by Gerber in Switzerland. Condyloform teeth were designed on basis of the pastle and mortar principle, one characteristic of theses teeth was contact between upper lingual cusps and lower central fossae in centric relation. No contact existed between upper and lower buccal cusps. Pound[2] introduced the lingualized occlusion concept in 1973. In the lingualized occlusion, centric occlusion is composed of tight contact of upper lingual cusps with the central fossae of the lower posterior teeth. Upper buccal cusps are kept approximately 1mm.from lower buccal cusps. The objective of this concept is to establish harmony between the occlusal scheme and the masticatory movement instead of border movement. Application of concepts of organic occlusion in complete dentures was recently suggested by Stuart[3] and Elkins[4].

If mandibular movements are accurately recorded and an articulator with high capability for adjustment is used, balanced occlusion may remain the norm. however, if the record of mandibular movement is incorrect or the articulator selected has limited adjustment capability, denture function and stability may be compromised by errors in occlusion. Recent studies indicate the during final closing of the jaws, the contact area of the upper and the lower teeth in mastification is quite small anteroposteriorly and buccolingulally[5,6].

Additional problems in occlusion :

Two additional aspects should be considered. First how are mandibular position, mandibular movement, and tooth contact interrelated? If a "best" tooth contact pattern could be determined from this study, the result may not influence requirements of determining mandibular position but might have considerable influence on requirements of recording mandibular movements. For example, zero degree and 30 degree cuspal angulations are available in artificial teeth. If 30 degree teeth are selected for dentures, mandibular movements must be recorded correctly and an articulator with at least semi adjustable capabilities must be used. If zero degree teeth were selected, an accurate recording procedure for mandibular movements and an adjustable articulator may not be required. A simple articulator is adequate.

Table 1. Masticatory efficiency

Mean of the weight (grams) in dry food which did not pass through the sieve. Standard deviation.

	Occlusal Patterns					
	Cuspid-Protected		*Balanced*		*Lingualized*	
	*M**	*S.D.t*	*M*	*S.D.*	*M*	*S.D.*
Subject						
A	0.17	2.05	0.16	0.81	0.06	0
B	0.19	0.47	0.20	0.94	0.22	0.81
C	0.24	0.47	0.23	0.94	0.22	0.47

Second, research by Trapozzano[7] involves 12 complete dentures on which occlusal segments of each denture were interchangeable. Balanced and no balanced occlusions were studied. Patient's preference and masticatory efficiency of each occlusal pattern were evaluated. Results indicated that two patients preferred the balanced occlusion and three chose the no balanced occlusion. The reminder of the patients did not distinguish one occlusion from another. In the masticatory efficiency study using a 100 meshes sieving method, no significant difference existed between the two occlusal patterns in any of the subject.

Materials and Methods :

In this study, wearer preference and masticatory efficiency for balanced, organic and lingualised occlusion in 36 complete denture patients were recorded.

Patient A was a man, 73 years of age; Patient B was a man, 57 of age; Patient C was woman, 71 years of age. The Niswonger method was used for determining the vertical dimensions of occlusion. A needlepoint tracing device was used to record the anteroposterior relation of the mandible to the maxillae. Protrusive and lateral interocclusal records were used to adjust a Hanau 130-28 articulator.

Thirty degree porcelain teeth were selected. The anterior teeth of the dentures and denture bases were unchanged. The posterior teeth were interchangeable, providing three patterns of occlusions. Cuspid protected balanced and lingualised occlusion were tested in that order. In transferring from cuspid-protected occlusion to balanced occlusion. It was necessary to grind away approximately 1.5 mm. of the tips of upper cannies. Although hinge exits location, pantography, an waxing of occlusal surfaces are primarily needed for cuspid-protected occlusion, arbitrary condyle points, interocclusal records and porcelain teeth were substituted.

Following placement of each denture, masticatory efficiency was measured at intervals of 3 days. The sieving method[8], in which 10 mesh screen was used, was employed for that purpose, Boiled fish paste (Kamaboko) of 2 gm was chewed so time and then the chewed material was passed through the sieve. The measurement was performed three times, under as similar conditions as possible. At the final appointment, each subject was asked to indicate an acclusal preference.

Results :

Patient's preference. A chose either the balanced or the lingualised occlusion, with cuspid-protected occlusion as his second choice. The first choice of patient B was the cuspid-protectd occlusion, and patient C preffered the balanced occlusion, followed by the lingualized and cuspid-protected occlusions.

Masticatory Efficiency : Masticatory efficiency was highest for the balanced occlusions, next highest for the lingualized occlusions and also lowest for the cuspid-protected occlusion were significant for Patient A. Masticatory efficiency was highest for the cuspid protected occlusion, next highest for the balanced occlusion, and the lowest for the lingualised occlusion for Patient B.

The percentage of improvements of retention and stability was 62.1% in Balanced Occlusion and 37.3% in Lingualized Occlusion and the difference was statistically significant.The masticatory efficiency increased 45.7% in Balanced Occlusion and it was only 13% in Lingualized Occlusion and the difference was statistically significant because of Balanced Occlusion provide vertical force and centralized on opposite teeth and provide bilateral balanced occlusion.

Conclusion :

This study showed nearly i.e. 85.7% of balanced occlusion dentures were more retentive and stable than their previous dentures. The masticatory efficiency was markedly improved in Balanced Occlusion.

After close interpretation of results of this study it was found that Balanced Occlusion offered better retention, stability and masticatory efficiency to significant of patients who had a history of instability with Lingualized Occlusion. So, Balanced Occlusion is a recommended and an ideal occlusal patterns for Complete Denture in the treatment of patients.

Further studies with a large samples are required to demonstrate this hypothesis tested in this study.

References :

1. Levin,B, and auer, J. L., Jr.: Results of a survey of complete denture procedures taught in American and Candian dental school, J. Prosthet. Dent. 22: 171-177, 1969.
2. Pound, E.: Personalized denture procedures, ed. 1,Anaheim, Calif., 1973, Denar Corp., p. 80.
3. Stuart, G. E.: The contributions of Gnathology to prosthodontics , J. Prosthet. Dent. 30: 607-608, 1973.
4. Elkins, W. E.: Gold occlusal surfaces and organic occlusion in denture construction, J. Prosthet Dent.. 30: 94-98, 1973
5. Sheppard, I. M., and Sheppard, S. M.: Denture Occlusion, J. Prosthet Dent. 20: 307-318, 1968.
6. Sheppard, S. M and Sheppard, I. M.: Incidence of Lateral Excursions During Functions With Complete Dentures, J. Prosthet Dent. 26: 258-265, 1971.
7. Trapozzano, V. R.: Tests of balanced and nonbalancde occlusions, J. Prosthet Dent. 10: 476-487, 1960.
8. Manly, R. S., and Braley, L. C.: Masticatory Performance and Efficiency, J. Dent. Res. 29: 448-462, 19.
9. Sheldon Winkles: Essentials of complete dentures.Prosthodontics 2nd eddition.A.T.B.S publisher and distributed India 2000; 229-230.
10. Pleasure MA: Anatomic versus non-anatomic teeth. J. Prosthet Dent. 1953;3;747-754.
11. Hughes GA and Regli CP: What is centric relation. J. Prosthet Dent.1961;11:16-22.
12. Stuart and Elkins: The contribution of gnathology to prosthodontics. J. Prosthet Dent. 1973;3:607-608.