

## Prevalence of Interceptive Contacts in Centric Relation in Complete Denture Wearers

P. Atashrazm<sup>1✉</sup>, MH. Dashti<sup>2</sup>, MR. Mobeinie<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Prosthodontics, School of Dentistry, Islamic Azad University, Tehran, Iran

<sup>2</sup>Assistant Professor, Department of Prosthodontics, School of Dentistry, Islamic Azad University, Tehran, Iran

<sup>3</sup>Dentist, Private Practice

### Abstract:

**Objective:** Interceptive contacts in complete denture cause some side effects. To our knowledge, however, no comprehensive reports exist on the prevalence of interceptive contacts after complete denture placement. The aim of the present study was to investigate the prevalence of interceptive contacts in inserted complete dentures and its associated factors.

**Materials and Methods:** This cross sectional study was conducted on 52 patients receiving complete denture treatment. Factors such as gender, ridge relationship and its extent, and occlusal scheme were recorded for each patient. Whether the clinical remounting had been done was also recorded. The status of interceptive contacts was determined extra-orally and qualitatively. Chi-square test served for statistical analysis. The results were considered highly significant at  $P<0.0001$  and significant at  $P<0.05$ .

**Results:** Out of 52 patients, 15 (28.8%) showed interceptive contacts. No statistically significant association was found between interceptive contacts and gender, ridge relationship, the extent of residual ridge resorption, or occlusal scheme. Clinical remount had been performed only for one of the dentures with interceptive contacts. Highly significant relationship existed between clinical remounting and absence of interceptive contacts ( $P<0.0001$ ).

**Conclusion:** Within the limits of this study, interceptive contacts were noticeable. Clinical remounting seemed to play an important role in preventing interceptive contacts.

**Key Words:** Mouth, Edentulous; Denture, Complete; Dental Occlusion, Balanced; Clinical Remount

✉ Corresponding author:  
P. Atashrazm, Department of  
Prosthodontics, School of Den-  
tistry, Islamic Azad University,  
Tehran, Iran  
p\_atashrazm@sbmu.ac.ir

Received: 19 January 2008

Accepted: 7 May 2008

*Journal of Dentistry, Tehran University of Medical Sciences, Tehran, Iran (2008; Vol: 5, No.4)*

### INTRODUCTION

Interceptive contacts or uneven contacts of teeth in centric relation cause a number of problems in complete dentures [1-5]. Although some reports exist on the presence of uneven contacts in patients with complete denture in one year or more follow up [6-8], to our knowledge, there is no exact and comprehensive report on the prevalence of interceptive contacts in complete denture wearers after placement. This lack of information can be

mainly attributed to the complexity of research on this subject as well as the misconception that the complete denture is self-adjusting [9]. Another reason may be the coincidence of interceptive contacts manifestations with those of other problems since it is often very difficult to isolate the effects of interceptive contacts as a single entity in complete denture complications [4]. There are many adverse effects associated with interceptive contacts in complete dentures, including lack of uniform

distribution of occlusal forces on the basal seat, inflammation, and ulcer in the supporting tissues, more rapid residual ridge resorption, increased patient discomfort, and the need for frequent adjustments [1-16].

Moreover, increased parafunctional movements have been attributed to the lack of even occlusal contacts [16]. The above-mentioned signs would eventually lead to the loss of denture stability and retention if the patients avoid the necessary adjunctive treatments such as reline and rebase procedures. The resultant lack of retention, stability, and support will inevitably cause a loss of confidence in dental profession [5,12].

Clinical experiences of prosthodontists show that interceptive contacts may result from a number of clinical and laboratory factors [2,4,13,14]. The complete denture wearers with good quality denture and harmonious occlusion are satisfied with not only their dentures but also with their masticatory efficiency and performance, and they adapt to their dentures much faster than those with interceptive contacts [9,12,17,18]. On the contrary, patients with uneven contacts require more subsequent visits, adapt with dentures in a longer time, are frequently dissatisfied, and may gradually become maladaptive denture wearers [2].

Research has been conducted on clinical remount procedure and its effects on the elimination of uneven contacts and on increasing success rate of complete dentures, which in

turn result in patient's satisfaction [9,12,19,20]. However, to our knowledge, the prevalence of uneven occlusal contacts after placement has not been reported.

The aim of the present study was to investigate the prevalence of interceptive contacts in inserted complete dentures and its associated factors.

## MATERIALS AND METHODS

In the year 2004, edentulous patients receiving complete denture treatment at Removable Prosthodontics Department of Dental School of Azad University (Tehran, Iran) were visited to be included in this cross-sectional study. All the patients with immediate dentures, over dentures, implant supported prostheses and single complete dentures were excluded, and finally 52 patients who had received complete denture were selected. The patients were completely informed about the nature of the investigation and all of them accepted to participate. No more than 30 days after their denture placement, the patients were recalled for data collection. The procedures were performed in accordance with ethical standards of Research Ethics Committee of Islamic Azad Dental School.

In order to locate premature occlusal contacts, it was necessary to remount the dentures on the articulator and to record orientation relation and inter-occlusal records of centric relation. Thus, a remounting cast was made for

**Table 1.** Distribution of complete dentures based on presence of interceptive contacts in terms of associated factors

Associated Factors		Interceptive contacts	
		Not-Present (N=37)	Present (N=15)
<b>Gender (N.S*)</b>	Female	19 (51.4%)	6 (40%)
	Male	18 (48.6%)	9 (60%)
<b>Ridge Relationships (N.S*)</b>	Class I	19 (51.4%)	9 (60%)
	Class II and III	18 (48.6%)	6 (40%)
<b>Ridge resorption (N.S*)</b>	Low	14 (38%)	5 (33.3%)
	High	23 (62%)	10 (66.6%)
<b>Occlusal Scheme (N.S*)</b>	Anatomic	24 (65%)	11 (73.3%)
	Semi- and Non- Anatomic	13 (35%)	4 (26.7%)

\*not significant

each complete denture. The orientation relation was recorded using face-bow (Face Bow, Teledyne, Hanau, Buffalo, NY, USA) and the centric relation was recorded using impression compound intermedia (Green Compound, Sds, Kerr, Scafati, Salerno, Italy). Maxillary and mandibular complete dentures were mounted on two-dimensional articulator (Articulator Model 96 H2 Teledyne, Hanau, Buffalo, NY, USA) by means of face-bow registration record and centric relation record, respectively [2]. In order to verify the accuracy of the original centric relation record, a second centric relation was recorded for each patient and examined on the articulator. An 8-micron ribbon articulating paper (Occlusions-Pruf - Follie, Hanel GHM Hanel, Nürtingen, Germany) was used by a calibrated prosthodontist to interpret the actual contact of teeth extra-orally and qualitatively [2]. Interceptive contact was defined as the absence of simultaneous bilateral contacts of the opposing posterior teeth in centric relation [2].

Associated factors such as gender and the extent of residual ridge resorption (low and high) based on panoramic radiography technique described and recommended by Wical and Swoope [21] were recorded. Ridge relationships (Class I, II, III) and occlusal scheme (anatomic teeth, semi and non-anatomic teeth) [22] were observed on the articulator and recorded. Whether or not the clinical remount procedure had been performed was determined based on the patients' treatment record chart. The related data were classified and presented in the form of descriptive statistics. The prevalence of interceptive contacts was determined in the sample. Chi-square and Fisher exact tests served for statistical analysis, and odds ratios were calculated. The differences were considered highly significant at  $P < 0.001$  and significant at  $P < 0.05$ .

## RESULTS

Of the 52 patients included in the study, 25

(48%) were women and 27 (52%) were men, with the mean age of 57 years ( $SD = 3.23$ ).

Table 1 shows distributions of the studied complete dentures based on interceptive contacts in terms of various associated factors. Among these patients 15 (28.8%) including 6 (40%) women and 9 (60%) men had uneven or interceptive contacts in their dentures whereas 37 (71.2%) patients did not have uneven contacts. No significant differences in presence of interceptive contacts related to gender, ridge relationship, residual ridge absorption, and occlusal scheme existed.

In 36 (69%) of the studied dentures, clinical remount procedure had been performed and in 16 (31%), had not (Table 2). Out of the 15 cases with interceptive contacts, 1 (6.6%) denture belonged to the remounted group, whereas 14 (93.4%) dentures belonged to the group without clinical remount, showing a highly significant relationship between clinical remounting and absence of interceptive contacts ( $P < 0.0001$ ) (Table 2). Based on this finding, there could be a 245 times higher probability of occurrence of interceptive contacts in those dentures in which the clinical remount procedures had not been performed (odds ratio  $> 245$ ).

## DISCUSSION

The present study showed that in 52 patients with complete dentures, 28.8% had interceptive contacts. The study also identified an important role for clinical remounting in preventing interceptive contacts.

As mentioned, to our knowledge, no exact, comprehensive, and authentic report exists on interceptive contacts after complete denture placement. For example, Landa [10] suggests that all complete dentures' occlusion, after being fabricated by laboratory, should be adjusted to avoid uncompensable and irreversible damages in the supporting tissues, but did not report about the prevalence of interceptive contacts in complete denture after insertion. In

a longitudinal study, Tallgren [8] showed that residual ridge resorption would occur in edentulous patients with complete denture throughout their lives, with a higher rate in the mandible than in the maxilla. An interesting point in Tallgren's [8] findings, also confirmed by others [6,7], was that the rate of the residual ridge resorption in the first year was ten times more than the average residual ridge resorption [6,7]. This finding may further emphasize the significance of interceptive contacts since most of the adverse effects of interceptive contacts appear primarily in the first year after insertion. This statement is in conflict with the Atwood concept that the various prosthetic factors are difficult to evaluate due to the great number of variables included [4]. Therefore, based on Tallgren's [10] findings, regular post insertion appointments to control these changes are particularly important during the first year.

The findings of the present study were only based on centric relation position. Thus, the eccentric interferences could have been more pronounced. Therefore, other studies evaluating the interceptive contacts in eccentric relations should be carried out. The research showed that the associated factors such as gender, ridge relationships, the extent of ridge resorption and occlusal schemes were not significantly associated with interceptive contacts.

There are proponents of both anatomic and non-anatomic artificial teeth. The former suggest that anatomic teeth provide the complete denture with better esthetic, masticatory performance, and ease of establishment of balanced occlusion [22]. The latter prefer the

comfort, and less technique sensitivity of non-anatomic teeth [23]. Nevertheless, Firtell et al [12] in their clinical trial showed that it was the absence of clinical remount procedure, which introduced most of the injuries, and the different occlusal schemes were not of any significance. The findings of Firtell et al [12] and the present research are also supported by Lang's statement that the choice of a posterior tooth for complete denture is an empirical and subjective procedure, and the research fails to identify a superior tooth form [24]. The quantitative study of occlusal contacts and reducing the number of visits after placement are the advantages of Firtell's et al [12] research. However, the small sample size, and phone record of some patients about their satisfaction or dissatisfaction are considered as its disadvantages.

This research displayed a significant relationship between interceptive contacts and lack of clinical remount procedure. Several studies mentioned the importance of clinical remount procedure in decreasing occlusal errors. Schlosser [13], Schuyler [14], Landa [10] and Firtell et al [12] have suggested this method for elimination of uneven contacts. However, except for Firtell et al [12], other researchers have only emphasized on this procedure without any research-based study.

Moreover, Nimmo [19] and Ansari [20] presented simple and less time-consuming methods to persuade dentists to perform clinical remount procedure. Holt [9], in a clinical trial showed the positive effects of using pressure indicator paste and clinical remounting procedure. It was shown that clinical remount procedure was more effective than pressure indi-

**Table 2.** Distribution of complete dentures based on presence of interceptive contacts in terms of clinical remount

Clinical Remount	Interceptive Contacts		P-Value	O.R
	Not-Present (N=37)	Present (N=15)		
<b>Performed</b>	35 (94.6%)	1 (6.6%)	P<0.0001	245
<b>Not-Performed</b>	2 (5.4%)	14 (93.4%)	H.S	

OR=Odds ratio, H.S=Highly significant

cator paste. The effects of pressure indicator paste have not been investigated in the present research, and further research on its effect is recommended.

The average age of the edentulous population in this study (57 years, SD=3.23) was 8 years less than those in more developed countries (65 years, SD=3.6) [25]. Because of small sample size, it is difficult to come to generalized conclusions. This finding, calls for a more restrict adherence to conventional removable prostheses fabrication concepts. The patients in less developed countries reach the edentulous state at a younger age, and consequently suffer from the inevitable sequelae of the edentulous state for a longer period. Moreover, they are less capable of seeking the more advanced treatment modalities, such as dental implant due to financial considerations.

## CONCLUSION

Within the limits of this study, interceptive contacts were noticeable. Clinical remounting seemed to play an important role in preventing interceptive contacts. Due to the negative impacts of interceptive contacts on the quality of complete denture, the subject of occlusion and occlusal refinement of complete dentures must be more emphasized in the curriculum of dental schools. Complete denture occlusion should be perfected before its placement regardless of the quality of the residual ridge, occlusal schemes, ridge relationships, and gender.

## ACKNOWLEDGMENTS

The authors would like to thank the Research Committee of Dental School, Islamic Azad University for financial support.

## REFERENCES

- 1-Ortman HR. The role of occlusion in preservation and prevention in complete denture prosthodontics. *J Prosthet Dent* 1971 Feb; 25(3):121-38.
- 2-Hickey JC, Zarb GA, Bolender CI. Boucher's prosthodontic treatment for edentulous patient. 12<sup>th</sup>

- ed. St. Louis: Mosby Co; 2004. pp. 401-14.
- 3-Winkler SH. Essentials of complete denture prosthodontics. 2<sup>nd</sup> ed, Ishiyaku Euro America: Cm publishers; 1996. pp. 22-38.
- 4-Atwood DA. Reduction of residual ridges: a major oral disease entity. *J Prosthet Dent* 1971 Sep;26(3):266-79.
- 5-Woods V. Management of post insertion problems. *Dent Clin North Am* 1964;8:735-48.
- 6-Carlsson GE, Persson G. Morphologic changes of the mandible after extraction and wearing of dentures. A longitudinal, clinical, and x-ray cephalometric study covering 5 years. *Odontol Revy* 1967;18(1):27-54.
- 7-Bergman B, Carlsson GE. Clinical long-term study of complete denture wearers. *J Prosthet Dent* 1985 Jan;53(1):56-61.
- 8-Tallgren A. The continuing reduction of the residual alveolar ridges in complete denture wearers: a mixed-longitudinal study covering 25 years. *J Prosthet Dent* 1972 Feb;27(2):120-32.
- 9-Holt JE. Research on remounting procedures. *J Prosthet Dent* 1977 Sep;38(3):338-41.
- 10-Landa JS. Trouble Shooting In Complete Denture Prosthesis. Part IV. Proper Adjustment Procedures. *J Prosthet Dent* 1960; 10(3):490-5.
- 11-Sears VH. Occlusal refinements on completed dentures. *J Am Dent Assoc* 1959 Dec;59:1250-2.
- 12-Firtell DN, Finzen FC, Holmes JB. The effect of clinical remount procedures on the comfort and success of complete dentures. *J Prosthet Dent* 1987 Jan;57(1):53-7.
- 13-Schlosser RO. Checking completed dentures for adaptation and retention and establishing balanced articulation. *J Am Dent Assoc* 1928;15:1717-23.
- 14-Schuyler CH. Fundamental principles in the correction of interceptive contacts, natural and artificial teeth. *J Am Dent Assoc* 1935;22:1193-202.
- 15-Plischka G. Articulation balance as an important stabilizer for complete denture. *Dent Labor (Munch)* 1975 Nov;23(11):1272-3.
- 16-Dubojska AM, White GE, Pasiek S. The importance of occlusal balance in the control of complete dentures. *Quintessence Int.* 1998 Jun;29(6):389-94.
- 17-Motwani BK, Sidhaye AB. The need of eccen-

- tric balance during mastication. *J Prosthet Dent* 1990 Dec;64(6):689-90.
- 18-Shinkai RS, Hatch JP, Rugh JD, Sakai S, Mobley CC, Saunders MJ. Dietary intake in edentulous subjects with good and poor quality complete dentures. *Prosthet Dent* 2002 May;87(5):490-8.
- 19-Nimmo A. Clinical remount for complete dentures. *Quintessence Int* 1988 Apr;19(4):273-7.
- 20-Ansari IH. Simplified clinical remount for complete dentures. *J Prosthet Dent* 1996 Sep;76(3):321-4.
- 21-Wical KE, Swoope CC. Studies of residual ridge resorption. II. The relationship of dietary calcium and phosphorus to residual ridge resorption. *J Prosthet Dent* 1974 Jul;32(1):13-22.
- 22-Pleasure MA: Anatomic versus non anatomic teeth. *J Prosthet Dent* 1953;3:747-54.
- 23-Jones PM. The monoplane occlusion for complete dentures. *J Prosthet Dent* 1972;85:94-100.
- 24-Lang BR, Kelsey CC, editors: Complete Denture Occlusion International Prosthodontics Workshop on complete denture occlusion. Vol 182. Ann Arbor, Michigan: University of Michigan, School of Dentistry; 1973. pp. 145-77.
- 25-Mac Entee MI. The prevalence of edentulism and disease related to dentures: A literature review. *J Oral Rehabil* 1985; 12: 195-207.