

POST INSERTION VISITS FOR REMOVABLE COMPLETE DENTURES MADE WITH AND WITHOUT FACE BOW RECORD

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ABSTRACT

Background and Objectives: Face bow record is used for recording of orientation relation in edentulous patients. Complete denture can be fabricated with or without face–bow record. Both methods of complete denture fabrication have been described. The objective of this study was to compare the numbers of post insertion appointments for occlusal adjustments in removable complete dentures made with and without face–bow record. It was an observational, retrospective study.

Methods: Complete data record of 18 patients who received removable complete dentures (RCDs) made using a face–bow transfer and 24 patients who received removable complete dentures (RCDs) without using face–bow transfer was recovered from the department of Prosthodontics at Fatima Memorial Hospital College of Medicine and Dentistry (FMH CM&D) Lahore and analyzed. Total number of post insertion appointment for occlusal adjustments were tabulated for patients treated with complete denture made with or without facebow. All the materials, instruments and techniques which may have some influence on treatment outcomes had been kept similar for dentures made with and without using face–bow.

Results: The number of post insertion visits by the patients whose dentures were made with face–bow record was significantly less as compared to the patients whose dentures were made without using face–bow record.

Conclusion: Face–bow transfer record in the fabrication of removable complete denture reduces the number of post insertion visits for occlusal adjustments and hence saves valuable time of the dentist and the patient.

Keywords: Face–bow record, Removable complete denture, Post insertion visits/appointments.

INTRODUCTION

Face–bows were developed to enable the opening and closing axis of the articulator to be similar to that of the patients' dental arches with the skull. Face–bows record these arch–skull relations of patients and enable their transfer to the articulator.¹⁻³ In technical terms, face–bow records the orientation of occlusal plane by tripod localization of two posterior and an anterior reference to relate the maxillary cast to the arbitrary or true hinge axis.⁴ Some other benefits of face–bow include possibility of introducing minor changes in the occlusal vertical dimension without the need for recording new centric relation and to support the maxillary cast while it is being mounted on articulator.^{5,6}

There are two types of facebows, the kinematic and arbitrary axis facebow. The kinematic facebow records the true center of the axis along which the condyles rotate during the hinge movement of the mandible.^{3,7} The arbitrary face–bow relates the approximate condylar axis to the maxilla.^{3,6} Use of arbitrary hinge axis is considered sufficiently accurate to create a func-

tional occlusion and prevent occlusal errors particularly when cusped teeth are used in removable complete dentures (RCD).⁸⁻¹¹

Disparity between patient's rotational axis of the mandible and the arc of closure on an articulator has been reported to produce occlusal discrepancies.¹² These discrepancies can affect diagnostic planning and the occlusal relationships of restorations once they are in functional position in patient's mouth.¹³ The inclination of the occlusal plane (OP) is considered to be one of the key factors governing occlusal balance.^{2,14} The fundamental principles of the biomechanics of complete dentures ranked balanced occlusion as a major contributing factor for adequate stability.¹⁵ Davies has suggested balanced occlusion to be the minimal criteria to ensure adequate stability in RCD.¹⁶ A review of literature on complete denture occlusion emphasized on dynamic balanced articulation instead of static balanced occlusion in consideration with a ruminatory chewing pattern seen in eccentric jaw movements.^{14,15} The use of a facebow and a semi adjustable articulator

has been recommended conventionally to create a balanced articulation for a successful RCD.^{3-5,11}

Recently, the importance of face–bow transfer procedure has been questioned by many researchers providing evidence of patient rated success of removable complete dentures (RCD) made without face–bow mounting.^{3,17,20} It is inferred from current review of literature that use of face–bow has only theoretical advantages and does not contribute towards achieving acceptable clinical result for RCDs.¹⁸ A simplified approach for making complete denture by doing jaw registration at the secondary impression stage without use of face–bow has been suggested to save time and effort without compromising the end result of RCD.¹⁷⁻¹⁹ Simplified technique of RCD fabrication has been proposed, not only because patient rated quality is found to be same as those made with face–bow but also because it reduces at least one visit for the fabrication of complete dentures.²⁰ The long-term serviceability of RCDs demands extensive attention to detail to achieve an excellent clinical result with RCDs.²¹ The need for careful occlusal adjustment at the time of denture insertion in RCD made with simplified techniques has been suggested in the literature.¹⁶ Adjustment appointments for a newly fabricated denture are discouraging for the patients and this may be one of the factors associated with complaints and unacceptability in complete denture patients.²² This prompts to devise and adopt strategies to keep the immediate post insertion adjustment after delivery of new dentures to a minimum.

This article does not intend to compare professionally rated quality or patient rated satisfaction with dentures made without face–bow records, instead it aims to compare the number of post insertion appointments for occlusal adjustment for the dentures made with or without face–bow transfer procedure.

This study was carried out to determine the feasibility and design issues for a prospective study on comparison of removable complete denture made with or without employing facebow transfer procedure to orient jaw casts or record bases, while keeping all the other fabrication techniques and detail similar in two groups.

MATERIALS AND METHODS

Setting: Prosthodontics department FMH college of Medicine and Dentistry.

Study Duration: One year (Removable complete dentures fabricated during 2015).

Sample Size: Total 42 removable complete denture patients.

Eighteen patients who received complete dentures with face–bow record.

Twenty four patients who received complete dentures without face–bow record.

Sampling Technique: Purposive, Non-probability sampling.

Sample Selection

Inclusion Criteria: Removable complete denture patients who regularly visited the department for post insertion adjustments.

Exclusion Criteria: Removable complete denture patients who did not come back after insertion of the denture for follow up.

Study Design: Observational, retrospective study.

Data Collection Procedure

Patient's record of Prosthodontics Department, Fatima Memorial Hospital College of Medicine and Dentistry (FMH CM&D) was sorted out to identify patients who had received removable complete dentures during the year 2015 according to the inclusion criteria. Additionally the following points were also considered for the purpose of standardization.

1. Patients whose dentures were made using same technique and materials except use of facebow.
2. The patients who were assessed clinically to have no orofacial motor disorders, xerostomia, hypersalivation, any type of temporomandibular joints (TMJs) disorder and psychiatric condition that would have influenced their response to treatment.
3. Patients who needed only occlusal adjustments after delivery of their dentures and did not present with any other complaints like esthetics, gagging, looseness due to faults in impression surface or under or over extended peripheries etc. associated with their dentures.

Complete dentures were constructed following the standard techniques used in the department by the under graduate students who are supervised by 2 consultant and 3 senior demonstrators closely at every step, until an adequate outcome of any particular clinical procedure is achieved students do not proceed any further. Each of the clinical and laboratory procedure is rated by the supervising staff.

Using the above considerations 42 patients were selected from the departmental record and divided into groups A and B. Group A (18 patients) had been provided complete dentures using face–bow record to mount maxillary cast on a semi adjustable articulator (Hanau, Waterpik Technologies, Inc. USA) and with balanced occlusion created using average condylar angles. Group B (24 patients) had been treated with entirely the same method except use of face–bow records to mount record bases to the same articulator. Occlusion of these patients was checked and adjusted before delivery of the denture sequentially in centric, lateral and in protrusive positions. Any disparity in complete denture fabrication was addressed and repeated until satisfactory clinical quality of the denture was assured.

Data Analysis

Number of appointments after the delivery of denture for the purpose of occlusal adjustments were noted from the patient record and tabulated. Statistical analysis was done using SPSS 17. t-Test was used to calculate the difference between number of visit for Group A and Group B.

RESULTS

The total number of patient according to inclusion criteria was 42 with 18 patients provided RCD using face-bow while 24 patients were provided RCDs without using face-bow (Table 1).

The mean age of the 42 patients in both Groups A & B was 61 ± 6.5 years and 59 ± 6 years respectively (Table 1). There were 8 females in Group A while 9 in Group B (Table 1).

Table 1: Distribution of numbers and age of patients in Group A (with face-bow) and Group B (without face-bow).

	Group A	Group B
No. of Patients	18	24
Females	8	9
Males	10	15
Min age	54	48
Max age	81	68
Mean age	61	59

MIN = Minimum, MAX = Maximum

The difference in age of the subjects in Groups A and Group B was not statistically significant $p > .05$ (Table 2). Although period of edentulousness was not a criterion for selection of patients but it was determined from the data record that all the patients entered in the study were first time denture wearers, who were edentulous from 3 months to 34 months.

The results of the study clearly showed that number of visits were less for the Group A as compared to Group B and the difference was significant $p < .05$

Table 2: Data for distribution and age of patients in Group A and Group B.

	Groups	Mean	Std. Dev	P-Value
Age	A	61.1667	6.64433	0.27
	B	59.2500	5.84770	0.37
Visits	A	1.94	0.539	0.000
	B	4.00	1.103	0.000

Table 3: Frequency of numbers of post insertion visits for occlusal adjustments in Group A and Group B.

Groups	Visits	Frequency
A	1	3
	2	13
	3	2
B	2	2
	3	6
	4	8
	5	6
	6	2

(Table 2). The mean and maximum numbers of visits for Group A were 1.94 and 2, while for the Group B these were 4 and 7 respectively (Table 3).

DISCUSSION

The results of the study showed a significant difference in number of post insertion visits for occlusal adjustment between patients who had their dentures made using face-bow transfer as compared to patients with dentures made without face-bow transfer (Table 3). The significantly less number of visits showed that there is advantage of using face-bow in reducing the number of post insertion visits.

Although it was a retrospective study but allocation of patient to a particular technique had been done randomly as all the final year BDS student need to fabricate at least 2 RCDs using facebow and at least 2 RCDs without using face – bow, instructor who allocated patient to student did not had any control on allocating patients to a particular technique or student. Since different assessors usually assessed a particular step in construction of RCD, they were unaware if face-bow had been employed for a particular patient except at the jaw registration stage. Moreover, department follows a standard procedure for fabrication of removable complete dentures from the history taking, examination, treatment planning, clinical and lab procedures until delivery of dentures. Day to day record of all the patients, type of work done, material used and time taken is noted in performers log book as well as in departmental record.

The minimum and maximum numbers of visits were not significantly different for Group A, while the number of visit showed great disparity among different patients in Group B (Table 3). This may be explained in light of the finding that the occlusal errors are roughly proportional to the shift or tilting of the hinge axis in millimeters or degrees, and an average occlusal er-

ror of more than 0.1 mm would most likely lead to the necessity of extensive selective grinding of occlusal surfaces in the patient's mouth.^{23,24}

It is important to check the occlusion and articulation of RCDs in patient's mouth despite the technique of fabrication, due to differential compressibility and displacement of denture bearing mucosa paired with probability of errors in almost all face–bows and articulators.^{3,16} However, need for scrupulous post insertion adjustment is reduced significantly where occlusion had been designed robustly on articulator and verified at try in stage with casts mounted using face–bow transfer records.²⁴ A study to assess the use of face–bow among Chinese prosthodontist in complete denture fabrication found that 97% of experienced Chinese prosthodontist seldom used a face–bow in complete denture fabrication. 39% of them thought that not using a face–bow might lower the quality of complete dentures and 94% believed that there was a difference between the quality of dentures fabricated with an adjustable articulator and those made with a simple articulator. 75% often and 8% occasionally required occlusal adjustment to eliminate the possible errors caused by not using a face–bow.²⁵

The importance of the correct positioning of the maxillary cast on articulator becomes apparent by recalling that mandible move down around an arc and not as an elevator. Thus every change in vertical causes a change in the relative transverse position of the mandible to the maxilla (centric relation).²⁴ Presumably, one would have to take a new centric record with every change in vertical, if a facebow has not been employed for orientation of occlusal plane on articulator.⁶ Fayed et al suggested that face–bow procedures should not only be advocated but also be made mandatory because of the usefulness in reducing occlusal errors especially when anatomical teeth are used.⁴ Several investigators have recognized the significance of accurately establishing the sagittal inclination of the maxillary cast on the articulator for correct RCD function and esthetics.²⁶ It has been mentioned in the literature that efforts to adjust occlusion after insertion either on chair side or laboratory remounts results in significant loss of cuspal morphology and appearance of artificial teeth which may lead to reduced masticatory efficiency.²⁷

A review of literature on current trends in complete denture techniques and teaching questions the significance of face–bow records in denture success especially in relation to the complexity of fabrication technique.^{26,28,29} Kawai et al¹⁷ found no differences in rating of satisfaction, comfort and function at 3 and 6 months following delivery by the patients in dentures made with or without face–bow techniques.

Every experienced prosthodontist would admit that complete dentures made after thorough history taking and treatment planning, employing tacit and

explicit knowledge and clinical skills have more chances of a better outcome as compared to where some compromises have been made in techniques and understanding of patient expectation from RCD. Thus the evidence that a conventional fabrication technique including face–bow registration may not result in a better clinical outcome does not implicate to abandon sound principles of RCD construction nor does this evidence indicate that dentures made using facebow transfer procedures and balanced articulation would result in unacceptable or poor quality dentures.³⁰

The results of the present study are clearly showing the reduction of post insertion visits in complete dentures made using a face–bow record. The face–bow record is about a 15 minute procedure designed to mount maxillary cast on the articulator. The elaborated procedure is a simple and not time–consuming method which ensures positive treatment results of edentulous patients with fulfillment of all basic aims of masticatory organ rehabilitation. The time spent taking a face–bow transfer may represent a small portion of the time required to accomplish adjustments on a denture where no transfer was performed. This information will allow the clinician to decide on the time they are willing to dedicate to occlusal corrections at the chair side.

Within the limitations of this study it can be **concluded** that there is a significant difference in post insertion visits of RCDs made with and without face bow record for occlusal adjustments. Face–bow transfer record in the fabrication of removable complete denture reduces the number of post insertion visits for occlusal adjustments and hence saves valuable time of the dentist and the patient.

Author's Contributions

Both authors contributed equally in the project.

Conflicts of Interest: None.

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