



The Height of Occlusal Registration Blocks before and After Jaw Registration: A Comparative Study

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Abstract

The occlusal surface of complete denture is developed according to the maxillo-mandibular relationship that is recorded during the jaw registration stage. This occlusal (articulating) surface requires the fabrication of occlusal registration blocks to facilitate recording such relationship.

Objectives: To assess the height of occlusal registration blocks made in dental laboratories by different groups compared with the recommended dimensions and to relate them with the dimensions after clinical adjustments.

Methods: A random three hundred pairs of occlusal registration blocks received in the complete denture clinic at the dental teaching center of Jordan University of Science and Technology over one academic year were measured in height before and after jaw registration of the occlusion. These blocks were divided equally and randomly between senior dental technicians and dental technology students.

Results: The height of occlusal registration blocks as received was significantly less (by 4 mm) than recommended in the literature, moreover, they were further reduced in the clinic. There was a significant difference between the two groups.

Conclusions: Students stick to the recommendations more than senior dental technicians. Occlusal registration blocks produced by laboratories are adequate for our local patients though, they are shorter compared to the literature recommendation.

Keywords: Complete denture; Dental technicians; Dental technology students

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Received Date: 20 Jul 2016

Accepted Date: 08 Aug 2016

Published Date: 11 Aug 2016

Citation:

Marashdeh M. The Height of Occlusal Registration Blocks before and After Jaw Registration: A Comparative Study. *J Dent Oral Biol.* 2016; 1(1): 1004.

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Introduction

The three surfaces of complete denture are designed independently at various stages of the denture construction. The fitting surface is developed during the secondary impression stage which determines the fine details of the denture bearing area. The polished surface is developed according to the functional relationship with the lips, tongue and cheeks. The last surface is developed according to the maxillo-mandibular relationship that is recorded during the jaw registration stage [1]. This occlusal (articulating) surface requires the fabrication of specific appliances to facilitate recording such relationship.

Occlusion Record Blocks (ORBs) which are employed in this stage consist of a denture (recording) base and a wax rim. The recording base must be rigid, accurate and stable. It is usually made of self or light-cured resin. The rim itself is usually made of base plate wax since it is easy to manipulate and convenient to use [2]. The occlusion rims are used to establish the occlusal plane level, the arch form and the jaw relationship both horizontally and vertically. There are two vertical dimensions of occlusion: one when the teeth are in occlusion and the other when the mandible is at rest position. The difference between them forms the interocclusal space (freeway space).

McGrane [3] showed that the distance from the mandibular incisal edge of unworn teeth to the labial mucosal fold next to the lower labial fraenum was 18 mm using casts poured from mucostatic type impressions. The upper distance was 22 mm using the corresponding sites with a total of 40 mm when mounted together. Many other studies found close figures to those published by McGrane [3]. Stananought [4] suggested 20 mm and 18 mm for the maxilla and the mandible respectively. Ellinger [5] using a radiographic study found that the average height in the upper jaw was 20 mm and in the mandible 16.3 mm. He suggested that the ORB height should be 24 mm and 20 mm for the upper and lower jaw respectively. Johnson and Winstanley [6,7] found that the mean maxillary block height was 18 mm and 14.3 for the mandibular one. In their clinical study, the original height

Table 1: Occlusal height of 150 ORBs fabricated by experienced dental technicians.

	Minimum	Maximum	Mean	S.D
Maxillary ORBs before adjustment	13.0	24.0	18.9	2.1
Maxillary ORBs after adjustment	18.0	23.0	20.3	1.3
Mandibular ORBs before adjustment	13.0	21.0	16.0	1.7
Mandibular ORBs after adjustment	11.0	17.0	15.0	1.3

Table 2: Occlusal height of 150 ORBs fabricated by dental technology students.

	Minimum	Maximum	Mean	S.D
Maxillary ORBs before adjustment	16.0	5.0	20.2	2.1
Maxillary ORBs after adjustment	17.0	23.0	19.8	1.3
Mandibular ORBs before adjustment	13.0	21.0	17.0	1.7
Mandibular ORBs after adjustment	14.0	19.0	16.4	1.1

of these record blocks before registration was 21.4 mm in the upper jaw and 17.6 for the lower one.

Materials and Methods

Three hundred pairs of ORBs fabricated by experienced dental technician and dental technology trainees in their final year of a 4-year bachelor program at the Dental Teaching Centre/Jordan University of Science and Technology were collected. These sets were equally and randomly divided between the two groups of technicians, 150 pairs each. This study was single blinded, so the technicians built up their ORBs according to the standard technique (22 mm for the maxillary ORBs and 18 mm for the mandibular ones). The ORBs were adjusted clinically to be parallel with Camper's plane and to an acceptable level of vertical dimension. The mandibular and maxillary heights were recorded before and after registration by the same clinician. The reference points were those used by McGrane [3]. It was from the mucosal fold next to the labial frenum to the incisal edge of the occlusal rim using a standard endodontic ruler (Moyco Union Broach, York, PA) for both the maxilla and the mandible. This study was run over one academic year.

Results

Three hundred pairs of ORBs were collected for this study over one academic year. Half of them were fabricated by experienced dental technicians. The average height of their ORBs was 18.9 mm for the maxillary jaw and 16 mm for the mandibular one (Table 1). On the other hand, the average height for the dental technology students group was 20.2 mm and 17 mm for the maxillary and mandibular jaws respectively (Table 2).

After clinical adjustments of the ORBs, the average height for the first group was 20.3 mm in the maxillary jaw and 15.1 mm in the mandibular one. Using student t-test throughout these statistical analyses to compare different groups, there was a significant difference before and after clinical adjustments of these ORBs for both jaws (p value < 0.05).

As well, there was a significant difference before and after clinical adjustments of ORBs that were fabricated by dental technology students with an average height of 19.8 mm and 16.4 mm for the maxillary and mandibular blocks respectively (p value < 0.05).

Considering the total cases of three hundred pairs, the average height of ORBs for the maxillary jaw was originally 19.6 mm and 20

mm after clinical adjustments with a no significant difference (p value > 0.05). For the mandibular ORBs, the average height was 16.5 mm adjusted to 15.8 mm with no significant difference (p value > 0.05) before and after clinical adjustments.

When comparing the ORBs fabricated by the senior technicians and the students for both jaws, there was a significant difference (p value < 0.05). The average height of ORBs in the students' group was higher than the technicians' one in both jaws (Table 1).

Discussion

There is no published literature regarding the dimensions of ORBs in Jordanian edentulous patients. This study was performed to assess the most likely required occlusal dimensions of these records using the recommended reference points to measure them [3]. The findings of this study will provide us with provisional guidelines regarding the fabrication of ORBs so the technician could save wax materials and the clinicians could save time in adjusting them during the jaw registration visit. The clinical time could be invaluable especially when jaw registration is performed by under-graduate dental students who might spend most of their clinical time doing minor adjustments for ORBs in this visit.

The guidelines which are taught in our dental school are dependent on those published by McGrane [3] where the height of ORBs is 22 mm and 18 mm for the maxillary and mandibular jaws respectively though he used mucostatic impression to record that height in dentate patients. The dental technology students showed more commitment to this rule than well-trained dental technicians though they made shorter ORBs than recommended in average. This finding is very justifiable since students are always related to what they learned with a limited experience while their senior technicians depend on their experience to fabricate proper dimensions of ORBs [8].

The total height of ORBs for both jaws was significantly less than what is taught in the dental school with a difference of 4 mm after clinical adjustments by the clinicians. These measurements are in agreement with those recommended by Johnson et al. [6]. These findings could guide us to teach the dental students and their peers of dental technology to fabricate their ORBs shorter than what they do now. By doing that, it will be reflected on the total volume of the base-plate wax material being used and consequently this will help in saving materials especially in our dental school where we provide about one thousand sets of complete denture per academic year.

The jaw registration visit is one of the challenging stages of complete denture fabrication for dental students. The majority of the work in this visit is usually spent in trimming occlusal wax rims to adjust the vertical dimension. This time could be considerably reduced if the ORBs were fabricated to the closest possible dimensions. The published dental literature is basically dealing with Caucasian people [3,5-7], while this study dealt with edentulous Jordanian patients.

Conclusions

Within the limitations of this study it can be concluded that:

1. The average height of the fabricated ORBs in our dental school is shorter than what is recommended in the dental literature.
2. The ORBs which are fabricated by dental technology students are closer to what they learned when compared to experienced technicians.

3. Northern Jordanian edentulous patients require shorter ORBs than Caucasians.

4. The average height of the maxillary ORBs should be around 20 mm when produced.

5. The average height of the mandibular ORBs should be around 16 mm when produced.

References

1. Fish W. Principles of full denture prostheses. London: Staples Press Ltd. 1948.
2. Zarb G, Bolender C, Hicky J, Carlsson G. Boucher's Prosthodontic Treatment for Edentulous Patients. Mosby Complanly. 1990.
3. McGrane H. Five basic principles of the McGrane full dentures procedure. J Fla State Dent Soc. 1949; 20: 5-8.
4. Stananought D. Laboratory Procedures for Full and Partial Dentures. Oxford: Blackwell Scientific. 1978.
5. Ellinger C. Radiographic study of oral structures and their relation to anterior tooth position. J Prosthet Dent. 1968; 19: 36-45.
6. Johnson A, Winstanley R, Wildgoose D. The Dimensions of Occlusal Registration Blocks. QJDT. 2003; 1: 44-49.
7. Johnson A, Winstanley R. The height of occlusal registration blocks before and after jaw registration. J Dent. 1997; 25: 351-352.
8. Khalil A, Khalid W, Mohammad A, Abdul-Majeed A, Mohammed S, Hussain Q. Assessment of convergence angle of full veneer preparations carried out by practitioners with different levels of experience. SDJ. 2009; 21: 37-44.