This work evaluated the influence of posterior palatal seal in the adaptation of complete denture bases. For that, 20 plaster models were made in equal dimensions and divided in 2 groups, according to the following characteristics: Group A - posterior palatal surface without depressions. Group B - presented a depression in the posterior palatal region (form of M) with approximately 1mm of depth, 35 mm of length (between the maxillary tuberosities) and 3 mm of thickness, so that the line between the hard and soft palate was the posterior limit. An acetate base, with 1.5 mm of thickness, was plasticized on the models in a vacuum plasticizer. The samples were enclosed in metallic flasks; heat-cured acrylic resin was manipulated and processed in water bath (74ºC during 9 hours). After that, each plaster model and respective resin base were fixed with instantaneous adhesive and transversally sectioned at the posterior palatal region. The adaptation level was measured on an Olympus linear comparator microscope (Japan). The data were submitted to ANOVA and Tukey’s test (5% significance). There was no significant statistical difference for the average of adaptation between group A (0.075 mm) and group B (0.071 mm). It could be concluded that posterior palatal seal did not influence in the adaptation of the complete denture bases analyzed.

Key Words
denture base, posterior seal, adaptation
Introduction

Fibromucosa and the internal surface of complete denture bases must have close contact to promote homogeneous transmission of masticatory forces, contributing for the preservation of alveolar bone. Moreover, the functioning of a complete denture is related to its adaptation: the better adaptation to oral tissues, the better retention and stability, providing greater comfort and mastigatory efficiency to the patient.

Thus, the clinical procedures of molding are important steps for the confection of complete dentures. For better clinical results, posterior palatal seal was suggested during functional molding. The technique consists in the application of a fluid wax film with 2 mm of thickness on the posterior region of the mold, corresponding to the line between the hard and soft palate. After that, the same mold is placed into alveolar ridge and pressed against the tissues of this region, providing greater retention of maxillary complete dentures.

Many studies, however, indicate that after the polymerization process of maxillary complete denture base, the highest level of missadaptation occurs in the posterior region of palate. This occurs as a consequence of several factors, such as palate geometric form, water sorption and base thickness.

The depression in the posterior region, made during the functional molding for posterior seal, could also work function as a factor of missadaptation of the base, reducing retention. The aim of this study was to compare the levels of adaptation of complete denture bases on models that simulated the application of the technique of posterior palatal seal, to levels of adaptation on models that did not simulate the application of this technique.

Materials and Methods

A mold in silicon (Zhermack, Rovigo, Italy) was made from a plaster type IV (Vel Mix Stone - Kerr Manufacturing Company, the USA) master model. The master model presented a normal ridge, without retentions (Figure 1.A). From this mold 10 standard models were confectioned (Group A) in plaster type III (Herodent Soli-Rock, Vigodent, S/A Ind. and With, Rio de Janeiro). After that, a 1 mm of depth, 35 mm of length (between the maxillary tuberosities) and 3 mm of thickness depression was made in the posterior palatal region (Figure 1.B), simulating the technique of posterior palatal seal. A new mold of silicon was confectioned on the master model and 10 models were made in plaster type III (Group B). 1.5 mm of thickness acetate bases (Bio-Art, Bio-Art Dentistry Equipment Ltda, SP) were plasticized in a vacuum plasticizer and the models with their respective bases were enclosed in metallic flasks using plaster type II (Plaster River, Bussioli ME, Rio de Janeiro) and plaster type III (Herodent Soli-Rock, Vigodent, S/A Ind. and With, Rio de Janeiro) during the enclosing process, each type of plaster was proportioned and manipulated according to manufacturer’s instructions, using a rubber bowl and a metallic spatula, during 1 minute. The plaster models and the respective acetate bases were isolated with petroleum jelly and enclosed in the inferior part of metallic flasks n.5 (Uraby) with plaster type II (plaster:water ratio 100g/50ml). After 2 hours, the flasks were placed in boiling water during 10 minutes. The flasks were opened and the acetate bases eliminated. The surfaces were cleaned with warm water and detergent to remove petroleum jelly, dried and isolated with sodium alginate (Isolak, Produtos Odontológicos Clássico, SP).

Heat-cured acrylic resin (Clássico, Produtos Odontológicos Clássico, SP) was proportioned (water:powder ratio 3:1) and manipulated according to manufacturer’s instructions. When in plastic stage, the resin was placed in the superior part of the flask, which was closed and pressed on a hydraulic press VH Soltline, 800 kgf, during 5 minutes. The excess of resin was removed and final pressure was 1250 kgf. The flasks were placed in cramps and put in an automatic polymerizing device (Termotron P-100), 74ºC±2 during 9 hours. After cooling at room temperature, the flasks were opened and carefully the bases were separated from the respective models. The excesses of resin were removed with maxi-cut drill (Maillefer), without burnishing. Resin bases were fixed in the alveolar ridge region of the respective models with instantaneous adhesive (Super Bond, Locite, SP), by 1 kgf of static load, during 1 minute. The models were fixed in a proper device for transversally sectioning, preventing movement during the procedure (Figure 2). A transversal cut was carried through the corresponding point in the posterior palatal region. The section was softly sandpapered to regularize the surfaces and to facilitate the visualization of the level of adaptation during mesurement.

Dimensional alteration in acrylic resin, responsible for the missadaptation of the complete denture base, was measured with a Olympus STM linear comparator microscope (Japan), with 0,0005 mm of accuracy. The distance between the internal surface of the resin base and the external surface of the plaster model was measured by another operator (blind experiment) in 3 points: palatine raphe and 10 mm to the right and 10 mm to the left of this line (Figure 3). The average of these three values was considered the level of adaptation of each base. Data were submitted to ANOVA and Tukey’s test, significance level of 5%. 

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Fig. 1. A and B – Master model before (A) and after posterior palatal seal (B).

Fig. 2. – Base and model placed in the device

Figure 3 – Transversal sectioning of the model and the respective base, and reference points used for measurement.

Results
Table 1 shows the average values of missadaptation of the denture bases for groups A and B, which did not present significant statistical difference (p>0.05).

Table 1- Averages and deviations of missadaptation of the bases (mm) obtained for groups A and B.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Averages</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.071 ± 0.02 a</td>
</tr>
<tr>
<td>B</td>
<td>0.075 ± 0.03 a</td>
</tr>
</tbody>
</table>

Groups with equal letters did not differ, considering 5% of significance level, by Tukey’s test.

Discussion
The purposes of posterior palatal seal during the functional molding are: complete peripheral seal, compensate dimensional alterations of acrylic resin occurred during polymerization, avoid food penetration, give more resistance, and make the posterior border of the prosthesis less evident to tongue contact. This technique is based on the presence of adipose tissue under fibromucosa of this posterior region of the palate, so that this tissue can be physiologically pressed during molding procedures. Posterior palatal seal was simulated, in this study, by making a depression on each master model. However, the most efficient and accurate way of applying this technique during clinical procedures is placing a fine pellicle of fluid wax in the mold. The localization and incorporation of a posterior palatal stamp depend on the dentist, since over-compression of tissues can be prevented, and retention quality of the mold can be verified during molding procedures.

There was no significant statistical differences for the average values of adaptation between the not sealed group (A) and the sealed group (B), demonstrating that posterior palatal seal did not influence in the adaptation of the bases on the models. On the other hand, some studies, using the same methodology, reported the influence of other factors in the adaptation of the bases, such as different methods of polymerization, different commercial names, thickness of the base, water sorption and geometry of palate.

References
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