

## FLEXIBLE DENTURES COMPLIANT WITH PHONETIC NEUTRAL ZONE

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### Abstract

**Introduction:** Any removable denture, partial or total, reduces the volume of the oral cavity. This causes a violation of one of the main functions of speech. The placement of the denture, made by the widely practiced protocol, generates a frictional noise that degrades sound and speech. This fact is extremely unfavorable for patients practicing speech-related professions.

**Purpose:** This article demonstrates a technique for shaping the phonetic neutral zone of a flexible denture.

**Material and method:** Partial flexible upper and lower dentures were made for patient M.P. 62 years old. The upper one we complied with the phonetic neutral zone. The wax composition plate was made from light-curing acrylic, which we rolled to a thickness of 0.9mm. On the place of the missing teeth, we placed an artificial masticating complex. The phonetic neutral zone was formed for 40 minutes in a casual conversation.

**Results:** The fabricated denture fully satisfied the patients requirements. The upper denture made according the phonetic neutral zone was rated excellent.

**Conclusion:** The use of flexible partial dentures has a number of positive qualities. Compliance with the phonetic neutral zone contributes to improving functional performance.

The proposed method enriches clinical practice and can be used as a method of choice.

**Key words:** flexible dentures, partial dentures, phonetic neutral zone.

**INTRODUCTION:** The usage of the partial removable dentures as a treatment method for recover defects in the dental arches has unlimited possibilities, from one missing tooth to one existent. Nowadays, the use of removable partial prostheses as a mass treatment for patients has a number of positive and negative qualities (1). As a disadvantage of the polymethylmethacrylate heat-polymerized resin, we can point

out the use of metal hooks that degrade aesthetics (2). It should be noted that, despite the precision of polymerization in the finished prosthesis, a monomer appears to be a cellular poison. Amounts can reach up to 5%, along with monomer coloring, are a basic prerequisite for allergizing the organism and becoming it to allergic reactions (3, 4).

The abovementioned undesirable effects can be avoided by using modern flexible dentures. We should also note the minimal shrinkage they have even after a long period of exploitation. In fact, their chemical nature does not allow liquids to be poured. Minimal elasticity provides the patient with rapid adaptation and comfort in the use of flexible dentures (2).

Regardless of the type of prosthesis, placed in the oral cavity, it reduces its volume and creates preconditions for the occurrence of noxious sounds and difficulties in sound articulation. These occur to an extraordinary extent when the treatment is made on the upper jaw.

The location of the defect in a dental arch is a decisive factor in the selection and positioning of the jaw junction. Two factors are important to this:

- Stability and strength of the finished prosthesis;
- No distortion of sound articulation.

In the cast-model partial prostheses, the choice and location of the junction element is largely solved. The question of plaque dentures made by classical methodology or modern flexible waits for its solution.

The zone where the tongue does not contact the rigid palate is defined as a phonetically neutral zone (PH.N.Z.). The determination of this zone has been worked by G. Georgiev and N. Popov (5, 6).

From the literature, we did not find any sources to investigate the phonetic neutral zone with partially removable dentures made of elastic resin.

**PURPOSE:** This article demonstrates a technique for shaping the phonetic neutral zone of a flexible denture.

**MATERIAL AND METHOD:** The patient M. P. at the age of 62 was approached by a request for orthopedic treatment. After the clinical examination, we found defects of the dental arches of the upper and lower jaw. The Kennedy classification corresponded to Class II, a distally unilaterally non-limiting defect for the lower jaw and Class II subclass b for the upper jaw, fig. 1.



**Fig. 1. Plaster models of upper and lower jaws**

The presence of fixable prosthetic structures of the lower jaw (bridge - splint) has been established. On the upper jaw was found a well-preserved dentition corresponding to the age of the patient. After the analysis of the clinical situation, the patient offered to make detachable partial dentures of the upper and lower jaw of flexible resin for her professional commitment. The patient set only one condition - not disturbing or worsening the speech after the insertion of the denture on the upper jaw. At the first stage, we took impressions with a standard metal tray and alginate impression material from the upper and lower jaws, fig. 2.



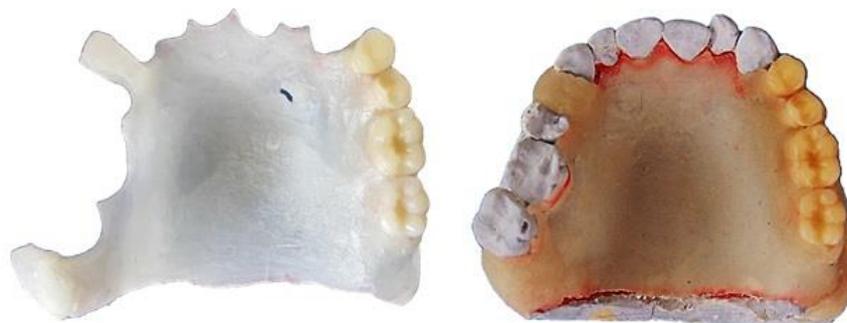
**Fig. 2. Alginate impressions from upper and lower jaws**

Laboratory models were made of dental stone to produce a hard individual impression tray of light-curing acrylic resin.

The final impression was taken with a medium viscosity polyether impression material. The final models were made of dental stone, and on them were made of wax occlusal rims. The upper jaw pattern has been used to produce an individual plate for functional dynamic palatography.

In the demonstrated case, we did not follow the classic protocol for making the plate. We used light-curing acrylic resin, whose thickness is 1.5mm. To reduce it, we rolled it to achieve a thickness of 0.9 mm. We rolled out we placed the plaque

between two pieces of rice paper, and at each size reduction we removed it to prevent sticking. The measurement of the thickness of the plate was done with a digital caliper with an accuracy of 0.00mm, The prepared resin plate was adapted to the upper jaw pattern, fig. 3.



**Fig. 3. Light-curing acrylic resin plate with arranged teeth**

At the next stage, in the missing teeth section, we placed artificial teeth, observing the rule, the centered groove to be projecting along the ridge of the alveolar ridge. We observed the formation of the dental arch to be close to parabola III degree. The placed teeth are aligned so that they do not exceed the occlusal plane. We smoothed the edges of the plate by grazing the surface to the mucosa.

At the next clinical step, we determined the ratio of the central position between upper and lower jaw with wax occlusal rims. We conducted a functional dynamic palatography test. First, we adjusted the palatal plate to the natural teeth and to the antagonists by the help of an articulation paper. To impress the phonetic neutral zone, we used a model wax for model casting (green) with 0.7 mm thickness, fig. 4. The shaping was done by casual conversation for 40 minutes. Every 10 minutes, the plate was removed and we controlled the form. In fact, after 20 minutes, the area was shaped, but we continued up to 40 minutes, fig. 5.

The next stage of the treatment was strict compliance with the protocol for making removable dentures from flexible plastic resin and insertion of the finished upper and lower dentures, fig. 6.



**Fig. 4. Wax for model casting**

**Fig. 5. Shaped wax according to Phonetic neutral zone**



**Fig. 6. Finished flexible dentures, the upper compliant to the Phonetic neutral zone.**

**RESULTS AND DISCUSSION:** The denture completely satisfied the patient and was rated as excellent.

We stopped at this size, with a minimum thickness guaranteeing the strength of the finished construction. In the literature we did not find the optimal thickness of prosthetic structures made of flexible plastics, so we have adopted a minimum size of 0.9mm according to the minimum size of a drilling tool for creating retentive forms in

the plastic teeth offered by the company producing the respective plastic. We used a profiled wax because it did not require additional shaping temperature. It also has residual resistive elasticity, which contributes to the better shaping of the form. The thickness of 0.7mm has been beneficial. In fact, we have provided an optimal thickness of the prosthetic plate,  $1.5 \div 1.6$  mm, which is reduced minimally after the cleaning and polishing of prosthesis.

**CONCLUSION:** The use of flexible plastic materials for the production of partial dentures has a number of positive qualities. Compliance with the phonetic neural zone contributes to improving functional performance.

Clinical adjustment prolongs the required clinical time.

The use of light-curing acrylic resin shortens the time to make a plate for a phonetic neutral zone. It can also be made in a dental office.

The teeth arrangement in the defect area helps to close the voice channel, thus obtaining the form of the phonetic neutral zone is as close as possible to the finished prosthesis.

The proposed method enriches clinical practice and can be used as a method of choice.

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