

# Registration of Lower Jaw Movements for Making Complete Dentures

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## **Abstract**

The method of lower jaw movements registration outside mouth, which is accomplished by making use of face arc is not exact and the methods accomplished inside the mouth cavity are too complicated. We have worked out a method of recording lower jaw movements, which is made by means of a sagittal masticatory path angle measuring instrument, data of which is indicated in the articulator constructed by us. 120 patients, diagnosis - upper and lower jaws complete adenty have been equipped with dentures. Included, 20 patients have been made two denture sets, each on identical models; one of them was made by means of placing false teeth in individual articulator where recording of lower jaw movements was made using face arc, while the second set of dentures was made by means of our method of recording lower jaw movements. The dentures masticatory efficiency has been studied by means of Rubinov's masticatory test. It has been revealed that dentures made by the method suggested by us are characterized with high masticatory efficiency and are easy to accomplish both, for a dentist and a patient.

**Keywords:** *occlusion plane, central occlusion, articulator roller, articulator*

## **Introduction**

The process of making dentures has passed a complicated way of studies, different methods and building up the appliance in connection with the problem of placing false teeth lines. Various recording appliances face arcs were suggested to record lower jaw movements outside mouth-cavity. Complicated appliances-articulators were created which enabled to make these motions in individual articulator after having recorded lower jaw mentions. Practice has shown that outside mouth recording is not precise and the appliances do not enable to reflect all the complicated complex of lower jaw movements diversity (Kopeikin, 1997).

The work objectives are to work out a relatively precise and easy to accomplish method which will enable to place false teeth according to lower jaw movements when making complete dentures to achieve various contacts between false teeth; this is the main factor for reinforcing stability of dentures and raising masticatory

efficiency. The articulator constructed by us and the appliance for measuring the sagittal masticatory path enables us to make use of our method.

## **Material and methods**

120 patients diagnose - complete adenty of the upper and lower jaws have been equipped with dentures; male-95, femade-25; age in-between -52 and 84. Initial dentures were made for 35 patients, secondary dentures were made for 85 patients. Registrations were made of the lower jaw movements under the method suggested by us; it says: after having defined the occlusion height and the central occlusion and formed the occlusion plain on wax articulator rollers of the upper jaw, we plastered models on articulator upper and lower basis frames as to have the upper basic frame placed in parallel to the occlusion plain.

The upper additional frame is connected to the upper basic frame, which sits on the rotating lower additional frame which has masticatory plain. The vertical spindle

located in the front space of the articulator is based on the rotating masticatory space. After plastering models in the area of the lower wax articulation roller, opposite the alveolar extensions we fix a metal piece vertically which is about the size of the two lower central teeth and sticks out from the lower articulator roller surface at 1/3 of the upper central teeth length recorded on the upper articulator roller. By means of a warmed metal tool (spadel) we give shape to the surface of the upper wax articulator roller in the direction of the palate as to leave the frontal area surface untouched on the side of the lips.

We place moulds in the mouth cavity of the patient asking him to shut mouth in the central occlusion position and make movements of the lower jaw to right and left. By doing this section is formed on the surface of upper articulator roller, which corresponds to the amplitude of the lower jaw side movement. The lower jaw is returned to the central occlusion position and we fix the upper and lower movable spindles of the angle measuring appliance by means of pins in the holes made previously relatively in the side area of the upper and lower articulator rollers as to coincide the line of inter-contact of spindles with the line of intercontact of articulator rollers and to coincide the initial points of spindles with the lower and upper last molar projection space. The patient is asked to move the lower jaw forward. In this position the metal piece, fixed in the lower articulator roller, slides on the surface of the upper articulator roller resting against the front area hard surface on the side of the lips, and a slit is formed in the side area of the upper and lower articulator rollers. In this position, the lower movable spindle of the angle-measuring instrument moves on the cutting made in the immobile spindle sagittally, at the same time it will make a rotating movement in respect of the pin fixed in the lower articulator roller.

As a result, the initial point of the mobile spindle moves by the trajectory passed by the lower occlusion roller sector which corresponds to the lower last molar projection. Measuring of the movement angle of the initial points of the mobile spindle in respect of the occlusion plain is made by means of rotating rod on the end of immobile spindle of the out-of-mouth measuring instrument and protractor; defining the said angle helps us to form sagittal occlusion curves. Angle measuring is done the same way on the other side. The articulator bases are removed from the mouth cavity together with the rollers and they are placed on the models plastered in the mouth cavity earlier. The masticatory pads of articulator are leaned according to the angle defined by us and we move them backward together with the upper basic frame upper jaw model; at a time, the metal piece fixed in the lower articulator roller rests again on the hard part of the upper articulator roller on the side in the direction to the lips again, while the front vertical spindle of the articulator, which was in contract with the middle part of cutting pad in the horizontal position removes as it is moved together with the upper basic

frame. Afterwards, the cutting pad is leaned as to bring in touch with the end of the vertical spindle. This way we receive trajectory of the sagittal cutting path. Control of transversal movement is made by fixing the side displacement of the vertical spindle end on the cutting pad as well, which corresponds to the displacement of the metal piece fixed in the lower articulator roller in the section formed on the upper articulator roller. After defining the trajectory of the articulator upper frame and upper jaw model sagittal and transversal displacement, we start placing false teeth. At a time, we check contacts between the upper and the lower jaws false teeth lines according to the sagittal and transversal occlusion curves.

## **Results**

Aimed at studying effectiveness of the method suggested, 20 patients who had lost all their teeth were made two sets of dentures on identical models; one of the sets is made by means of displacing false teeth in the individual articulator, where the lower jaw movements were recorded by making use of face arc; the second set of dentures were made by recording the lower jaw movements according to our method.

To establish the masticatory efficiency we made use of the Rubinov's physiological masticatory testing method, which was applied on the first day, then in a month, in 6 months and 12 months.

10 patients out of 20 had been equipped with initial complete dentures for the lower and the upper jaws and the other 10 patients had been equipped with their secondary dentures. It has been revealed that the masticatory effectiveness of the patients who had their initial dentures made by means of the face arc and individual articulator was 26,5%, at average and effectiveness of the dentures made by our method was 30,6% at average, the first day; it increased to 75,4% in a month, 84,4% in 6 months, 90% in 12 months.

Patients who had their secondary dentures made by making use of the face arc and individual articulator had masticatory effectiveness fixed as 81,9%, at average, and in case of the dentures made by our method it was 87,5%, at average, 89,7% in a month, 91,2% in 6 months, 94,7% in 12 months. Thus, the dentures made according to our method are characterized with high masticatory indexes and they are easy to make practically for both, dentists and patients.

## **Discussions**

The compulsory condition to make functionally complete dentures of full value when extending orthopedic treatment to toothless patients is to achieve steadiness of dentures on jaws, which depends on achieving articulator balance between false teeth. For this, individual data of a patient must be taken into

consideration, which are directly related to the masticatory system functional peculiarities. Before starting treatment, articulation elements peculiarities should be studied in the condition of their functioning, namely it is necessary to record the movements taking place in the lower jaw joint (articulation).

The out-of-mouth method of registering the lower jaw motions which is accomplished by means of a face arc (Horn and Opitz, 1985) is not precise as the face arc does not give the precise trajectory of the articulation head motions and the intra-mouth-cavity methods are

difficult to accomplish practically. Therefore, they were not used broadly.

The angle measuring instrument suggested here enables us to receive the sizes of the masticatory path saggital displacement, thus enabling after fixing models in the articulator to displace the lower and the upper jaw false teeth as to have numerous contacts between the teeth lines in all the phases of masticatory motions, which is the basic factor to reinforce stability of the dentures fixed on jaws and raise their masticatory efficiency.

## **References**

1. Kopeikin V N Orthopaedic stomatology. 1997; 381 (in Russ).
2. Rubinov I S On peculiarities of the methods to study the masticatory functions. Issues of Orthopaedic stomatology. 1960; 19-36 (in Russ).
3. Horn R, Opitz H. Untersuchungen zur Aschesendifferenz bei Modellmontagen in Articulator nach dem Bonwillshen Dreieck urid nach Ceesichtsbogniibentragung. Dtsch. Zahrarztl. Z. 1985; 40; N3: 218-220