Abstract

Tongue, a well developed muscular organ with a rich nerve supply in the floor of mouth, poses a strong competition to the success of the fabricated prosthesis. It plays an important role in the retention and stability of complete dentures. Functionally, it is associated with mastication and speech with complete dentures. It is important for a prosthodontist to understand the role played by this organ in various phases of complete denture therapy. This helps in careful designing of the prosthesis by the prosthodontist which aids in acclimitisation of tongue to the prosthesis, making it a success.

Keywords:
Proptosis lingualis, Augmentation prosthesis, Gagging, Glossopyrosis

Review Article

Tongue: The most disturbing element in mandibular denture- How to handle it?

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Introduction

Tongue, the powerful muscular organ attached to the floor of mouth is an important controlling factor in the pathway of success of the fabricated prosthesis. Absence of limiting joints lend the power and latitude of movement to this organ, thus strongly influencing the prosthesis in the oral cavity. Bestowed with a rich nerve supply, tongue is capable of detecting the sensations of touch, pressure, heat and cold as well as special sense of taste. The well-developed sensory capability also lends a protective feature to it, by virtue of which it “reviews” the substances in the oral cavity and has a strong tendency to remove anything foreign in the oral cavity. However, this poses a strong threat to the prosthesis in the oral cavity as tongue has a tendency to dislodge it from its place.

Many of the complaints of complete denture wearer, such as dissatisfaction with mandibular dentures are due to the strong competition posed by this muscular organ. It is strongly associated with retention, stability as well as functioning (mastication and speech) of the prosthesis. Tongue position and posture are important considerations in this respect. Proper examination of this organ at the diagnostic appointment helps in formulation of a scrupulous treatment plan as it influences all the further treatment phases starting from the impression making to adjustment phase of the complete denture therapy.

Discussion

It is important to understand the role of tongue in various phases of complete denture therapy, so that careful designing followed by proper education of the patient can help overcome the competition posed by this organ to the success of prosthesis.

The Diagnostic Appointment

At the diagnostic appointment the size, position and activity of tongue are the main points of concern.

Tongue Position

It strongly influences the prognosis of mandibular denture.

Wright classified tongue position as:

Class 1 – Tongue lies in the floor of mouth with the tip forward and slightly below the incisal edges of mandibular anterior teeth. It has the most favourable prognosis as adequate border seal can be achieved because floor of the mouth will be high enough to cover the lingual flange.

Class 2 – The tip is in a normal position but the tongue is broadened and flattened. Its not a favourable position.

Class 3 – The tongue is retracted and depressed into the floor of the mouth with the tip curled upward, downward or assimilated into the body of tongue. Its very unfavourable position as an adequate border seal can’t be achieved. An attempt to extend the flange to gain border seal results in overextension.
during tongue movements that would dislodge the denture.

**Clinical Evaluation of Tongue Position**

Clinically, tongue position can be evaluated by asking the patient to open just wide enough for a small portion of food and observing different positions of the tongue. In the normal position the tongue appears relaxed and completely fills the lower arch with its apex lightly contacting the linguals of the mandibular teeth.

The retruded position is found in 25% of the general population according to Levin. In this position, the tongue is retracted and depressed into the floor of the mouth. It allows an easier ingress of food and air under the lingual borders with the loss of peripheral seal. It is accompanied by higher floor of mouth due to more tension in all the associated lingual muscles.

**Remedy for Retruded Tongue**

1. Tongue exercises and counselling can be of help to these patients
2. A small training groove of about 2mm width and 2mm depth can be made just below the anterior central incisors on mandibular denture (lingual side). The patient is instructed to keep the tongue on groove at all times except while eating and speaking. Most patients can learn to keep the tongue in correct position with this remedy.

**Tongue Size**

After the loss of teeth, tongue expands into the space created by loss of teeth, known as *Proptosis Lingualis*. The enlarged tongue creates problem during impression making, contributes to mandibular denture instability, is crowded by denture base resulting in difficulty in swallowing. The crowded tongue always presses on the front part of palate causing soreness and tenderness. It also causes excessive pressure on the mandibular denture which pushes it forward and outward everytime the mouth is opened.

**Designing of the lingual flange (polished surface) in patients with macroglossia**

In case of patients with large sluggish tongue, proper designing of the lingual flange at the wax up stage helps increase the stability of mandibular denture providing adequate room for the tongue to perform its function of distributing the food during mastication and to relax when the mouth is at rest without disturbing the mandibular denture. This can be achieved by adding as little as wax possible, behind the incisors in the anterior region while behind the premolars, a flat or slightly concave surface should be established forming the **anterior lingual plane** and it disappears in the molar region. In the molar and retromolar region, the polished surface is designed to be slightly concave facing inwards, upwards and forwards. In patients with large sluggish tongue, posterior corner of the lingual flange
can be designed to go down and back far enough at the point of equilibrium between mylohyoid and superior constrictor on one part and tongue on the other forming a **posterior lingual rest** or **lingual shelf** for the tongue. The heavy immobile base of the tongue rests on this extension, whereas if it was not there, the tongue by shear bulk would push the denture forward and dislodge it.

Narrow posterior teeth should be selected for patients with macroglossia to provide as much as space possible for the tongue higher up at the level of occlusal plane where the tongue is the widest.

**Microglossia**

Though impression making is easy microglossia jeopardizes the lingual seal. In such cases, the mandibular denture should be planned to be made with thick lingual flanges with wider posterior teeth while retaining its characteristic shape.

**Tongue Movements And Muscular Coordination**

These should be carefully examined to determine the denture prognosis as these are important in controlling the dentures during normal physiological activities. Proper tongue movements are also important for border molding.

**Lingual Frenum Attachment**

It should be examined for favourable and unfavourable position in relation to the ridge crest. There should be adequate relief in the denture for lingual frenum so that patient is able to touch the upper lip with the tip of tongue without dislodging the mandibular denture.

In case of close attachment to the ridge, surgical intervention may be required. Denture should be made before surgery and it acts as a stent after surgery preventing future relapse.

**Surgically Resected Tongue**

Patients with surgically resected tongue should be made aware of difficulties (mastication and speech) of wearing a mandibular complete denture without normal range of tongue movements. These patients get accommodated to the altered tongue function by overclosure of the mandible. Insertion of complete dentures in these patients restoring the vertical dimension of occlusion requires an **augmentation prosthesis** for normal tongue function.

The area of loss of tongue bulk should be correspondingly augmented on the palate with baseplate wax. Additions should include evaluation with pressure indicator paste, looking for uniform tongue contact. Placing a tissue conditioner on the palatal surface of the denture can be used to create a functional impression of residual tongue during swallowing. This technique helps to achieve improvement in both mastication and articulation. The augmentation can be added at the try-in-stage. A processed maxillary base is suggested because the bulk of acrylic resin needed in the palate could cause
considerable distortion if the base and augmentation are processed together.

Patients undergoing glossectomy may not be able to curl the tongue or approximate the palate in the midline during speech. Placing a groove in the anterior palate may create the necessary air channel during speech.

**Impression Making**

Adequate retention in mandibular denture can be achieved if lingual surface is so designed that the denture maintains contact seal with tongue and floor of mouth not only at rest, but also in function. Tongue position at the time of impression making has a profound effect on the ultimate shape and success of denture. While speaking the tongue is normally in contact with the palate, but on wide opening it assumes a guarded position by reflex retraction. In this position, there is a deep lingual pouch. Tongue and floor of mouth should be in average movement during impression making. Following tongue movements help in correct shaping of the lingual flange of mandibular denture.

**Sublingual crescent area/Anterior lingual sulcus**

It is molded by asking the patient to protrude the tongue and push against the front part of palate which helps to develop the length and thickness of anterior lingual flange.

**Middle region of alveolingual sulcus**

In this region the lingual flange must slope towards tongue more or less parallel to direction of mylohyoid muscle so that the tongue rests on top of the flange and aids in stabilizing the mandibular denture. This slope of the lingual flange provides space for the floor of the mouth to be raised during function without displacing the lower denture maintaining the border seal. In this area the flange rests on soft tissues and not in contact with bone.

This region can be molded by asking the patient to protrude the tongue which activates the mylohyoid and raises the floor of mouth. It is important to remove the border molded material built up on the inside of the lingual flange as it interferes with mylohyoid muscle action.

**Posterior region of alveolingual sulcus**

It is molded by asking the patient to protrude the tongue moderately. The patient is asked to wipe the upper lip with tongue while recording this area.

**Jaw Relation Record Stage**

The occlusal plane is strongly related to the stability of the mandibular denture. The level of the occlusal plane should be kept low so that lateral borders of the tongue can rest upon the occlusal surfaces of teeth when the mouth is opened wide to receive food and thus prevent the mandibular denture from lifting.

However, if the requirements of occlusal balance make it necessary to have a
steep compensating curve or large angle of plane of orientation, the tongue cannot easily overlap the lower molars to stabilize the mandibular denture. In such cases, it is necessary to leave off the second molar, so that an adequate posterior shelf is provided distal to the first molar. This shelf should be at least 1cm in length from the distal surface of first molar to the posterior border of denture. This provides space for thick posterior part of tongue to rest upon and stabilize the denture.

**Post-Insertion Problems Related To Tongue**

**Displacement of mandibular denture**

The most common complaint of complete denture patients concerns the “looseness” of mandibular denture. Patient should be made aware of the importance of tongue position in maintaining denture retention and stability. Proper tongue position should be demonstrated to the patient while he looks in a mirror. Patient should be made to practice opening and closing while tongue assumes a normal position. Once practiced, the enhancement of mandibular denture stability reinforces the normal position.

**Trouble in speaking and eating**

Some patients have trouble in stabilizing the mandibular denture while speaking and eating. This is because tongue muscles act on denture, dislodging the same. Once the tongue muscles are trained to hold the denture, the problem is solved. Proper counselling of the patient should be done. The tongue should touch the inner surface of the mandibular denture and never be pulled away from it while eating or speaking. He should be explained that problem of speech with dentures would be solved within 7-10 days. In case of old denture wearers, this problem is solved when the muscles get adapted to the new prosthesis.

**Gagging**

Gagging, which is a protective reflex occasionally causes difficulty at the time of denture insertion. In such cases the posterior
border of maxillary denture should be carefully observed. A thick square edge irritates the pharyngeal aspect of tongue constantly when it is in its rest position and initiates gagging. A thin posterior edge, properly sealed and sinking into the compressible tissues of the palate, will not irritate the tongue. Proper counseling of the patient should be done to solve the problem. In sensitive patients, the gag reflex is easily released after placement of new dentures, but it usually disappears in a few days after adaptation to the dentures.

However, other causes such as faulty occlusion, overextended borders (posterior part of maxillary denture and distolingual part of mandibular denture), poor retention of maxillary denture must be checked if the problem persists.

Patients can be advised to suck sweets or candies which increases the flow of saliva and keeps the tongue occupied preventing it from resting against the posterior border of denture before it has learned to tolerate it thus preventing gagging with new dentures.

Glossopyrosis and glossodynia

Glossopyrosis seen in post-menopausal women may be due to reduced oestrogen levels (burning mouth syndrome). It should be diagnosed and patient educated about it. Frequently the complaint of sore tongue is due to tongue thrusting habit. The patient is usually not aware of it, the patient should be explained about the situation. It may also be due to vitamin deficiencies, diabetes, etc.

Summary and Conclusion

Thus it is both interesting and instructive to observe how the dentures are widely influenced by tongue. Though, the tongue is too mobile for one to make a useful impression of it, it is important for the patient’s comfort and the stability of the dentures that when its musculature is relaxed, it should find itself in a cavity which at least gives it room to relax, otherwise it is like a confined prisoner with an attempt to stand upright resulting in immediate springing forward of the mandibular denture, when the teeth are separated.

Though tongue is a strong competitor to the success of mandibular prosthesis, careful designing of the prosthesis helps overcome the threats posed by this strong muscular organ. For this proper diagnosis and treatment planning are important. The final consideration is that it is not an important principle to fashion every part of denture correctly whether it is the polished surface, teeth arrangement, occlusal plane etc. and to make the dentures which not only fit the ridge and occlude correctly but also adapts to the musculature of tongue, cheeks and lips; and give the tongue enough room.

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