

# Neutral zone technique with different impression materials: A Case Report

Dr. Monika Makkar<sup>1</sup>, Dr. Pragati Agarwal<sup>2</sup>, Dr Monica Malik<sup>3</sup>

<sup>1</sup>Professor Department of Prosthodontics Crown Bridge and Implantology, Swami Devi Dayal General Hospital and Dental College, Golpura, Barwala, Panchkula

<sup>2</sup>P.G student MDS 3rd year, Department of Prosthodontics Crown Bridge and Implantology, Swami Devi Dayal General Hospital and Dental College, Golpura, Barwala, Panchkula

<sup>3</sup>P.G student MDS 2nd year, Department of Prosthodontics Crown Bridge and Implantology, Swami Devi Dayal General Hospital and Dental College, Golpura, Barwala, Panchkula

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## ABSTRACT

**Providing complete denture therapy with atrophic alveolar ridges is challenging. As these patients suffers ongoing diminution of denture foundation. Modern approaches often involve implant therapy and supplementing the mechanism of prosthesis support, retention and stability. Regardless of implant therapy, Neutral zone technique is long being used for the management of severely resorbed mandibular ridges. Various materials are used in recording neutral zone, which have their own advantages and disadvantages. This article discusses the use of different impression material which is simpler and more practical.**

**Keywords:** Neutral zone, McCord's technique, tissue conditioners, resorbed mandibular ridges.

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## INTRODUCTION

Complete dentures are primarily mechanical devices, but since they function in the oral cavity, they must be fashioned so that they are in harmony with normal neuromuscular function.

All oral functions, such as speech, mastication, swallowing, smiling, & laughing, involve synergistic actions of the tongue, lips, cheeks, & floor of the mouth which are very complex & highly individual<sup>1</sup>.

Failure to recognize the cardinal importance of tooth position & flange form & contour often results in dentures that are unstable & unsatisfactory, even though they were skillfully designed & expertly constructed. Thus, coordination of complete dentures with neuromuscular function is the foundation of successful, stable dentures.

When all the natural teeth have been lost, there exists within the oral cavity a void which is potential denture space.

The **neutral zone** is the area in the potential denture space where the forces of the tongue pressing outward are neutralized by forces of the cheeks & lips pressing inward. Since these forces are developed through muscular contraction during various functions of speaking, chewing & swallowing, they vary in magnitude & direction in different individuals.

Recording neutral zone is most required for patients where there is a highly atrophic ridge. Various materials are used in recording neutral zone, which have their own advantages and disadvantages. The following is the case reports of 3 patients who presented with atrophic resorbed edentulous arches in need of stable functional denture prosthesis. The fabrication of conventional complete dentures based upon neutral zone records was planned for all the 3 patients. The use of different materials for recording neutral zone like, Impression compound [4], tissue conditioners [3] and elastomeric impression material [6], elastomeric impression materials, admix impression material respectively for the four patients.

## TECHNIQUE

### CASE REPORT 1:-

A 62 year old female patient reported with the complaint of missing teeth and wanted its artificial replacement. On examination, it was found that both edentulous maxilla and the mandible arches were edentulous were severely resorbed (fig.1).



**Fig 1: Edentulous Maxilla & Mandible**

The routine steps of primary and secondary impressions were made.

For recording the neutral zone, the record bases were fabricated on the master cast, assessed and modified for stability, extension and comfort. Before making the neutral zone impression, the patient was made comfortable in an upright position with the head supported. The impression material (Green Impression Compound; Kerr Corp) was softened in a 650 C water bath. The softened compound was kneaded and a roll was formed according to the crest and was attached to the base. The attached roll of compound was reheated in the water bath and was carried into the patient's mouth. With the record base firmly seated, the patient was asked to perform a series of actions like swallowing, speaking, sucking, pursing lips, pronouncing vowels sipping water and slightly protruding the tongue several times which simulated physiological functioning.

During function of the lips, cheeks, and the tongue, the forces exerted on the soft compound molds it into the shape of the neutral zone. After a few minutes when the compound has cooled, the record base with the compound rim (fig.2) is removed and placed in cool water bath.



**Fig 2: Establishing neutral zone using impression compound**

Maxillary rim was oriented in the patient's mouth, the height of the lower compound rim was adjusted with a sharp knife and Jaw registration was carried out. The neutral zone impression so obtained was placed on the master cast, locating grooves were cut on the master cast and silicone putty index was made covering around the impression on both the labial and lingual sides (fig.3).



**Fig 3: Making tongue, lip and cheek matrices using silicone putty.**

The compound occlusal rim was then removed from the base plate and the index is replaced. The base plate wax was poured in the groove of neutral zone. Teeth arrangement was done exactly following the index (fig.4).



**Fig 4: Selecting and arranging teeth in accordance to putty index**

The position of the teeth was checked by placing the index together around the wax try-in. Once the waxed up trial dentures were ready, they were checked in the patients mouth for aesthetics, phonetics and occlusion. This also recorded the contours of the polished surfaces of the dentures according to the neutral zone. Once the try-in was done the dentures were processed and finished (fig.5).

Care was taken during finishing and polishing of the dentures so that the contours recorded previously were unaltered. During insertion the dentures are fully checked to eliminate any Occlusal discrepancies.



**Fig 5a: Postoperative view of patient**



The dentures provided the patient with improved facial appearance, stability and retention during function — as they have been constructed in harmony with their neuromusculatures.

### CASE REPORT 2:-

A 67 year old female patient reported with the complaint of missing teeth and wanted its artificial replacement. On examination, it was found that both the upper and the lower arches were edentulous and severely resorbed (fig.1).



**Fig 1: Edentulous Maxilla & Mandible**



**Fig 1(a) Preoperative view of patient**

Similar procedures were carried out as case 1 except that after fabricating the record bases, tissue conditioner was used as a material for recording a neutral zone over the impression compound.



Fig 2(a) .



Fig 2(b)



Fig 2(c)

Fig 2: patient performing a series of actions like swallowing, speaking, sucking, pursing lips, pronouncing vowels sipping water and slightly protruding the tongue.



Fig 3: Establishing neutral zone using tissue conditioner on impression compound.





Making tongue, lip and cheek matrices using plaster of paris.



**Fig 4: Making matrices using plaster**



**Fig 5: Selecting and arranging teeth in accordance to plaster index**

The position of the teeth was checked by placing the index together around the wax try-in.



**Fig 6: Postoperative view of patient**

The dentures provided the patient with improved facial appearance, stability and retention during function.

### CASE REPORT 3:-

A 59 year old female patient reported with the complaint of missing teeth and wanted its artificial replacement. On examination, it was found that both the upper and the lower arches were edentulous and severely resorbed (fig.1).

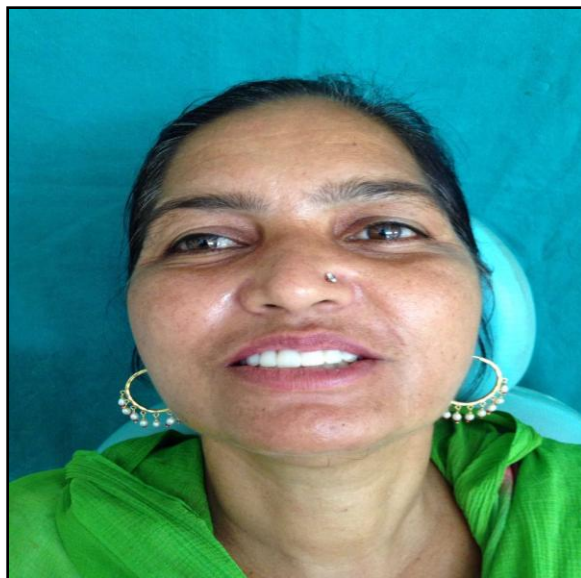


**Fig 1: Edentulous Maxilla & Mandible**

Similar procedures were followed as in case 1 and 2 except that after fabricating the record bases, The elastomeric impression material (Aquasil, Soft putty/Regular set, Dentsply DE TREY, Germany). roll was placed over the base and inserted in the mouth and patient is instructed to perform all muscle functions by sucking and swallowing movements and by producing exaggerated 'EEE' and 'OOO' sounds.



**Fig 2: Establishing neutral zone using elastomeric impression material.**



**Fig 3: Postoperative view of patient**



#### **CASE REPORT 4:-**

A 58 year old male patient reported to the department. Patient was edentulous since 30 years and he felt inefficiency in chewing and hence wants necessary treatment to be done.

On examination the maxillary and mandibular ridges were severely resorbed with shallow sulcus depth.



**Fig 1: Edentulous Maxilla & Mandible**



Similar procedures were followed as in case 1,2 and3 except that after fabricating the record bases, The McCord's impression technique(admix impression material-3parts impression material + 7parts green stick) roll was placed over the base and inserted in the mouth and patient is instructed to perform all muscle functions by sucking and swallowing movements and by producing exaggerated 'EEE' and 'OOO' sounds(fig2).

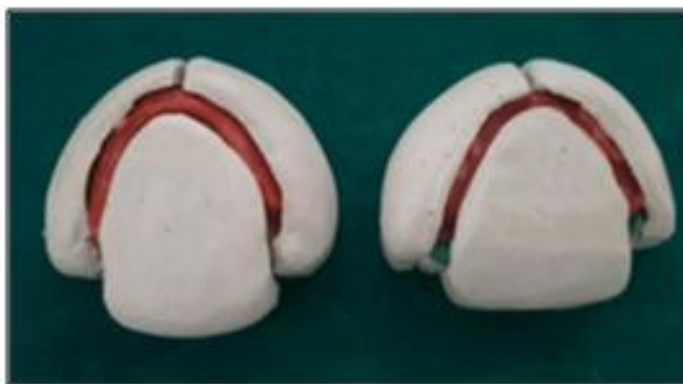


**Fig 2. Establishing neutral zone using Mc Cords impression technique.**

Plaster index were constructed (fig 3), compound rims were then removed from the record bases. The index were rearranged and wax flowed into the space to make Occlusal rims(fig 4).



**Fig3: Making matrices using plaster**



**Fig 4: Occlusal rims were made**

The teeth were arranged according to these rims and try in was performed in the patient's mouth. Try in was then evaluated with the help of indices to confirm the position of teeth in neutral zone(fig 5).



**Fig 5: Selecting and arranging teeth in accordance to plaster index**

Following this denture was flaked, processed and polished. Then denture insertion was done (fig 6).



**Fig 6: Postoperative view of patient**

#### **Clinical comparison of three impression materials used for recording neutral zone:**

Impression compound Advantages:

1. Can be reused, easy to use
2. Non-irritant and non-toxic

Disadvantages

1. Poor dimensional stability
2. Easy to distort when withdrawn from the mouth.

Elastomeric impression material

Advantages:

1. Accurate impressions, very low shrinkage
2. Very good surface detail
3. Highly elastic
4. Perfect elastic recovery
5. Dimensionally stable
6. Non-toxic and non-irritant

#### Disadvantages

Setting inhibited by latex gloves or some

3. Hydrogen release – surface bubbles – pouring time 1 h after removal from the mouth.

4. High price

#### Tissue conditioner

Difficult to manage although it records good details.

McCord's technique (Admix- impression material.

1. Less technique sensitive.

2. Cheaper than elastomeric impression material.

### DISCUSSION

Neutral zone recording is a beneficial technique during fabrication of CDs especially for the resorbed atrophic ridges where retention, support and stability is compromised.

During the cases it was observed that amongst the 4 impression material impression compound and admix material was found to be most comfortable to the patient as well as to dentist. As tissue conditioners do not have body, one finds it difficult to use even after supporting it with impression compound and elastomeric material is very much cost effective.

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