

## A Survey Based Evaluation of Dentists Knowledge and Awareness about Various Treatment Modalities Practiced in Complete Denture Patients with Resorbed Ridge: A Questionnaire Based Original Research Study

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### ABSTRACT

**Background:** Rehabilitation of severely resorbed edentulous ridge has always been challenging for dental practitioners. Over the decades, many techniques have been evolved to confront this clinical dilemma. Neutral zone is one of those techniques which gained popularity in the recent past in terms of stability and comfort. This survey-based study was attempted to evaluate dentist's knowledge and awareness about various treatment modalities practiced in complete denture patients with resorbed ridge.

**Materials & Methods:** This study was entirely executed on a cross sectional philosophies. Authors also utilized logically framed questionnaire to meet the standards of the study. A total of 150 dental clinicians, were firstly targeted and approached for the study. However, after considering their response attitudes, this number was finally reduced to 100. Authors finished the study by close ended questionnaire having questions about the current knowledge and awareness about various treatment modalities practiced in complete denture patients with resorbed ridge. Response was collected and data was processed statistically to assess the real-time knowledge and awareness.

**Results:** Statistical analysis was completed using statistical software 'Statistical Package for the Social Sciences (SPSS)'. The complied data was subjected to appropriate statistical tests to obtain p values, mean, standard deviation, standard error and 95% CI.  $P \leq 0.05$  was considered as statistically significant. 74 percent clinicians found satisfactory denture retention when they followed neutral zone technique. 86 percent clinicians found satisfactory denture stability when they followed neutral zone technique. 55 percent patients were satisfied in their post-operative visits (when neutral zone technique has been performed). 88 percent clinicians would like to recommend the neutral zone technique to others.

**Conclusion:** Authors concluded that among the clinician's perception Neutral zone is a favoured technique to treat patients with compromised ridges. The clinicians reviewed a satisfactory response with good stability and an optimal retention with a preferably sound prognosis. The clinicians seem totally satisfied with their results and prefer this technique if case demands.

**Keywords:** Neutral zone, Knowledge, Survey, Questionnaire.

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Residual ridge resorption is one of the main etiologies of loss of denture stability and retention particularly in mandibular complete dentures. Intense resorption of the maxillary and mandibular ridges also, results in sunken form of cheeks, unstable and non-retentive dentures with associated pain and discomfort.<sup>1</sup> Consequently, it offers a clinical challenge towards the manufacture of a successful removable prosthesis. Residual ridge resorption is a very intricate biophysical procedure and a common happening following extraction of teeth. It is the most theatrical during the first year after tooth loss followed by a slower but more progressive rate of resorption thereafter.<sup>2</sup> Bone resorption also is a chronic, progressive and irreversible process that occurs in all patients.<sup>3,4</sup> The residual alveolar ridge consists of denture-bearing mucosa, submucosa, periosteum, and underlying alveolar bone. Residual bone is that part of alveolar ridge which remains after the teeth have been lost. After the loss of tooth, the alveoli that contained root are filled with new bone. This alveolar process becomes the residual ridge which is the foundation for the denture.<sup>5,6</sup> The loose and unstable lower complete denture is one of the most common problems faced by denture patients. One of the methods used to solve this problem is the neutral zone technique. The neutral zone is the area where the displacing forces of the lips, cheeks, and tongue are in balance. It is in this zone that the natural dentitions lie and this is where the artificial teeth should be positioned. This area of minimal conflict may be located by using the neutral zone technique. Many materials have been suggested for shaping the neutral zone: modeling plastic impression compound, soft wax, a polymer of dimethyl siloxane filled with calcium silicate, silicone, and tissue conditioners and resilient lining materials.<sup>7</sup> This survey-based study was attempted to evaluate dentist's knowledge and awareness about various treatment modalities practiced in complete denture patients with resorbed ridge.

## **MATERIALS & METHODS**

The present study was planned, outlined and conducted to evaluate dentist's knowledge and awareness about various treatment modalities practiced in complete denture patients with resorbed ridge. This study was entirely executed on

a cross sectional survey philosophies. A total of 150 dental clinicians, were firstly targeted and approached for the study. On further examination we found that 50 of them not responded to our questionnaire efficiently because of various reasons. Therefore, this number was finally reduced to 100. We have analyzed questionnaire response data of 100 clinicians efficiently. Authors finished the study by close ended questionnaire having six questions about the current knowledge and awareness about various treatment modalities practiced in complete denture patients with resorbed ridge. While formulating the questions, authors have put special emphasis on neutral zone technique and its clinical outcomes. Delivery of the questionnaire and collection of responses was done by electronic surveying method (online). Data collection was completed within one month. Informed consent was taken from the respondents those were willingly ready for participation. The significance of this study was explained in detail to all participating clinicians. Results thus obtained was tabulated and subjected to basic statistical analysis. P value less than 0.05 was considered significant ( $p < 0.05$ ).

## **RESULTS**

Responses which observed from questionnaire work out were sent for statistical analysis using statistical software Statistical Package for the Social Sciences version 21 (IBM Inc., Armonk, New York, USA). The resulting data was subjected to suitable statistical tests to obtain p values, mean, standard deviation, chi-square test, standard error and 95% CI. Table 1 and Graph 1 showed that out of 100 clinicians, males were 66 and females were 34. Total 4 clinicians were belonging to age group >65 years. 25 clinicians were belonging to the age range of 41-50 years. 26 clinicians were belonging to the age range of 30-40 years. P value was significant in first, second and fifth age groups. Questionnaire responses revealed noteworthy outcomes with positive responses for neutral zone technique (Table 2). 64 percent clinicians agreed that they fabricate conventional denture in case of edentulous mandibular resorbed ridge. 41 percent clinicians found satisfactory results with neutral zone technique. 74 percent clinicians found satisfactory denture retention when they followed neutral zone technique. 86 percent clinicians found

satisfactory denture stability when they followed neutral zone technique. 55 percent patients were satisfied in their post operative visits (when neutral zone technique has been performed). 88 percent clinicians would like to recommend the neutral zone technique to others. All responses have also

Table 1: Age & gender wise distribution of clinicians

| Age Group (Yrs) | Male | Female | Total %   | P value      |
|-----------------|------|--------|-----------|--------------|
| 30-40           | 19   | 7      | 26 [26 %] | 0.01*        |
| 41-50           | 15   | 10     | 25 [25 %] | 0.02*        |
| 51-60           | 15   | 8      | 23 [23 %] | 0.08         |
| 61-65           | 14   | 8      | 22 [22 %] | 0.50         |
| >65             | 3    | 1      | 4 [4 %]   | 0.01*        |
| Total           | 66   | 34     | 100%      | *Significant |

\* $p < 0.05$  significant

Table 2: Questionnaire assessment with responses of clinicians (best values)

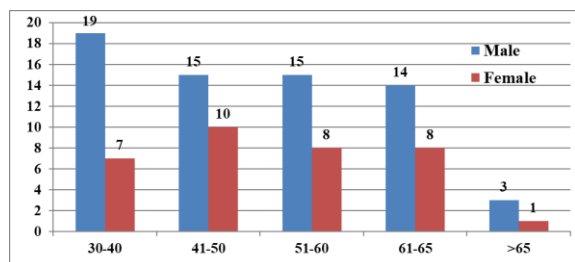
| Questionnaire S. No. | Variables (Questions)                                                                               | Options                                                                                                                                        | Responses of Clinicians (Best Values) |
|----------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| 1                    | Which treatment protocol you follow in case of edentulous mandibular resorbed ridge                 | A. Conventional Denture<br>B. Conventional Denture+Denture Adhesive<br>C. Conventional Denture+Soft Liner<br>D. Denture+Neutral Zone Technique | A. Conventional Denture = 64%         |
| 2                    | What is your prognosis for the neutral zone technique                                               | A. Satisfactory<br>B. Non Satisfactory<br>C. Good<br>D. Fair<br>E. Poor                                                                        | A. Satisfactory=41%                   |
| 3                    | Denture Retention (If you follow the neutral zone technique)                                        | A. Satisfactory<br>B. Non Satisfactory                                                                                                         | A. Satisfactory=74%                   |
| 4                    | Denture Stability (If you follow the neutral zone technique)                                        | A. Satisfactory<br>B. Non Satisfactory                                                                                                         | A. Satisfactory=86%                   |
| 5                    | Patient's experience after post operative visits (if the neutral zone technique has been performed) | A. Satisfactory<br>B. Non Satisfactory<br>C. Good<br>D. Bad                                                                                    | A. Satisfactory=55%                   |
| 6                    | Would you recommend the neutral zone technique to others                                            | A. Yes<br>B. No                                                                                                                                | A. Yes=88%                            |

Table 3: Fundamental statistical description with level of significance evaluation using pearson chi-square test.

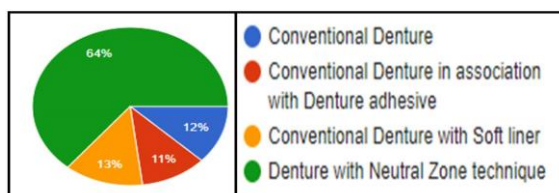
| Question No. | Mean | Std. Deviation | Std. Error | 95% CI | Pearson Chi-Square Value | df  | Level of Significance (p value) |
|--------------|------|----------------|------------|--------|--------------------------|-----|---------------------------------|
| 1            | 3.32 | 0.873          | 0.630      | 2.52   | 1.930                    | 2.0 | 0.002*                          |
| 2            | 2.98 | 0.536          | 0.252      | 1.69   | 1.293                    | 1.0 | 0.060                           |
| 3            | 3.23 | 1.039          | 0.590      | 1.82   | 2.442                    | 1.0 | 0.010*                          |
| 4            | 2.62 | 0.637          | 0.438      | 2.02   | 1.748                    | 2.0 | 0.001*                          |
| 5            | 2.98 | 1.953          | 0.736      | 1.96   | 2.039                    | 1.0 | 0.090                           |
| 6            | 3.27 | 1.937          | 0.546      | 1.91   | 1.937                    | 1.0 | 0.005*                          |

\* $p < 0.05$  significant

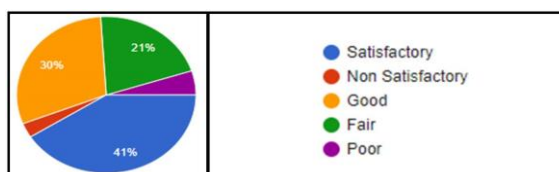
Graph 1: Age & gender wise distribution of clinicians.



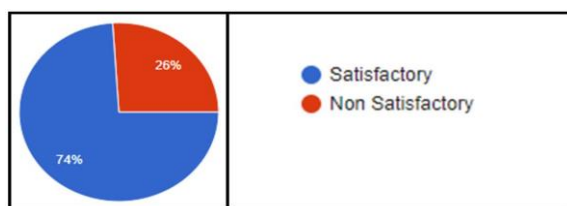
Graph 2: Pie chart showing responses of question no 1.



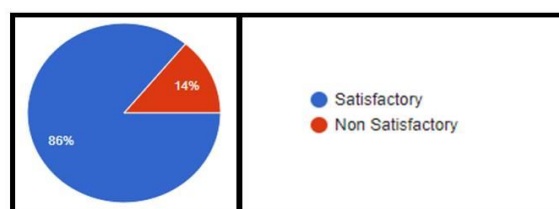
Graph 3: Pie chart showing responses of question no 2.



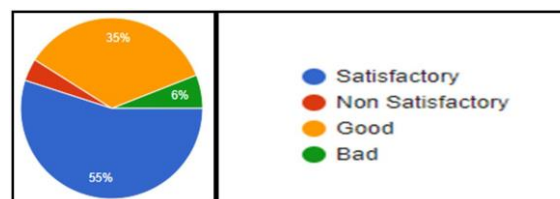
Graph 4: Pie chart showing responses of question no 3.



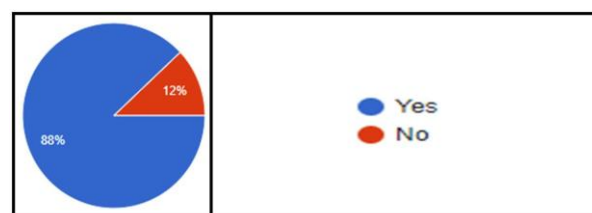
Graph 5: Pie chart showing responses of question no 4.



Graph 6: Pie chart showing responses of question no 5.



Graph 7: Pie chart showing responses of question no 6.



## DISCUSSION

MM Devan has very correctly stated that 'The perpetual preservation of what remains is more important than the meticulous replacement of what is missing.' Complete dentures are mainly mechanical prosthesis but because they function in the oral cavity, they should be modified so that they are in synchronization with the regular neuromuscular function.<sup>8,9</sup> All oral activities like speech, mastication, swallowing, smiling, and laughing, engage the synergistic actions of the tongue, lips, cheeks, and floor of the mouth which are very complex and highly individual. Failure to identify the cardinal significance of tooth situation and flange form and contour often results in dentures which are unbalanced and unacceptable, even though they were expertly made and skillfully manufactured.<sup>10,11</sup> The harmonization of complete dentures with the neuromuscular function is the foundation of successful, stable dentures. Residual ridge resorption is an intricate biophysical procedure and a common occurrence following extraction of teeth. Ridge atrophy is very spectacular throughout the first year after tooth loss. The specialized impression method plays the key role. Compared to the maxilla, the mandibular residual ridge demonstrates more severe bone resorption.<sup>12,13</sup> The cause is the basic dissimilarity in the rate of resorption of both jaws. It is reasonably faster in the mandible than in the maxilla. Harshly resorbed lower edentulous ridges often lead to diminished support, retention and

stability. Correct choice for rehabilitation of edentulous mandible could be implant supported overdenture and ridge augmentation techniques. However, mostly these couldn't possible clinically because many times the patient who reports with such a problem is geriatric patients. The neutral zone technique is constructive for patients with multitudinous, unstable, nonretentive mandibular complete dentures. The objective of this method is to place the teeth such that the forces exerted by the tongue and the cheek muscles are nullified, and the teeth remain in a safe, protected zone. Conventionally, the arrangement of teeth is based on the principles of teeth-setting. Nonetheless, in the neutral zone technique, the placement of teeth is dictated by the oral musculature that varies from one patient to another. Various materials such as impression compounds, tissue conditioners, waxes, and impression plaster have been used for recording the neutral zone, and each material has its inherent advantages and disadvantages.<sup>14,15</sup>

## CONCLUSION

Implications of this study clearly illustrated the current knowledge/awareness of studied dental clinicians about various treatment modalities practiced in complete denture patients with resorbed ridge. Among all the treatment modalities, neutral zone technique has been studied in detail. Authors concluded that among the clinicians perception Neutral zone is a favoured technique to treat patients with compromised ridges. The clinicians reviewed a satisfactory response with good stability and an optimal retention with a preferably sound prognosis. The clinicians seems totally satisfied with their results and prefer this technique if case demands. The outcomes of this study should be considered as evocative for predicting clinical results of such crucial situations. However, we expect some other large scale studies to be conducted that can further establish certain authentic guidelines in these perspectives.

## CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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