

## Denture Care Practices and Perceived Denture Status among Complete Denture Wearers

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### ABSTRACT

**Aims and Objectives:** Considerable importance to oral health care was lacking in India, and oral health neglect continues to exist, which is evident in the low utilization rates and poor oral health status. Conventional dentures are the most common alternative in restoration of lost teeth. Without proper denture care practices, there is an increased risk of developing a multitude of problems. The aim of this study is to assess the denture care practices among complete denture wearers in East Godavari district, Andhra Pradesh.

**Materials and Methods:** A cross-sectional study was conducted in the department of Prosthodontics at the Konaseema Institute of Dental Sciences, Amalapuram, Andhra Pradesh. Patients with self-care ability and adequate overall health who were using either single or full complete dentures for more than 6 months from the time of the study were requested to participate in the study. A total of 375 study participants were given a self-administered questionnaire on denture care practices followed by clinical examination of the denture status. Statistical analysis was done using the Statistical Package for the Social Sciences software for windows, version 20.0 (Armonk, NY: IBM Corp).

**Results:** The majority of participants reported cleansing their dentures once a day, with brush and water, and had the habit of removing the dentures at night. Almost 80% of the participants reported their denture status to be good/fair. Clinical examination revealed that slightly more than half of the participants had poor denture status.

**Conclusion:** This study highlights the need for improvement in patient education and counseling with respect to the maintenance of dentures and upkeep of denture hygiene. It also emphasizes the need for educating patients on how to evaluate the status of their dentures.

**KEYWORDS:** Denture care, denture hygiene, edentulism, self-perceived

### INTRODUCTION

The World Health Organization's (WHO) definition for oral health states that an individual would be considered to have good oral health if he/she retains, throughout life, at least 20 natural teeth which are functional, aesthetic, and not needing a prosthesis (WHO, 1982). Though this definition has its own inherent limitations of confining the broader construct of oral health to retention of teeth, it highlights the importance of retaining teeth to lead a healthy and productive life. This concept of retention of teeth acquires greater significance in today's ageing world. Nearly 1.5 billion of the world's population is predicted to be 65 years and old by 2050.<sup>[1]</sup> This is 15.46% of the projected world's population by 2050.<sup>[2]</sup> This percentage is less in the Indian scenario, with only 12.5% of the country's population predicted to be 65 years and older by 2051.<sup>[3]</sup> However, considerable importance to oral health care is lacking in India, and oral health neglect continues to exist which is evident in the low utilization rates and poor oral health status.<sup>[4-7]</sup> The prevalence of edentulism (loss of

all natural teeth) was found to be 16.3% among Indians aged 50 years and above.<sup>[8]</sup> Loss of teeth has a significant negative impact on the quality of life of individuals.<sup>[9,10]</sup> It is associated with aesthetic, psychological, functional, and social impacts on peoples' lives.<sup>[11]</sup>

Conventional dentures are the most common alternative in restoration of lost teeth enabling individuals in improving oral function, enhancing phonetics, facilitating social engagement, and in leading an aesthetically acceptable life.<sup>[12]</sup> The fact that there is increased use of conventional dentures even today in this scientifically progressing world where dental implants have been proven to have remarkable

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benefits over conventional dentures, highlights the economic trade-off people make.<sup>[13]</sup> In 2007, private spending accounted for 74% of the total spending on health care in India, and 90% of this private expenditure was out-of-pocket expenditure.<sup>[14]</sup> Though there is no concrete data available on the out-of-pocket oral health expenditure, it is for certain that the proportion only increases when it comes to oral health. In light of these circumstances, it is understandable that people choose affordable conventional dentures over more comfortable implants. It is important to realize at this point that rehabilitative treatment for edentulous patients could not be confined to denture fabrication and delivery. It goes way beyond the clinical and technical laboratory precision in denture fabrication to include denture wearing and denture care practices of the edentulous patients. Without proper denture care practices, there is an increased risk of developing a multitude of problems ranging from denture stomatitis, angular cheilitis, and burning mouth syndrome to severe superimposed infections.<sup>[15]</sup> With this background, the aim of this study is to assess the denture care practices among complete denture wearers in Guntur district, Andhra Pradesh.

## MATERIALS AND METHODS

The present cross-sectional study was conducted in the department of prosthodontics at the Konaseema Institute of Dental Sciences, Amalapuram, Andhra Pradesh from April to September 2015. The institution is located in the suburbs of Amalapuram, which is situated 60 kilometers away from Rajamahendravaram,<sup>[16]</sup> and offers oral health care services to people residing within a radius of approximately 45 km. Sample size for this cross-sectional study was determined using the formula  $Z\alpha.p.q/d^2$ . Prevalence of good denture hygiene observed in a study conducted in central India by Saha *et al.*<sup>[17]</sup> (60%) was used in the derivation of the sample size. Alpha level was set at 5, and the precision of the estimate (d) was set at 5. The obtained sample size was 369. In the recruitment of the required sample, patients with self-care ability and adequate overall health who were using either single or full complete dentures for more than 6 months from the time of the study were requested to participate in the study. Out of the 418 patients who met the inclusion criteria, 375 agreed to participate in the study, yielding a response rate of 89.7%. The final sample of 375 participants was given a self-administered questionnaire, which was previously validated on a convenience sample of 40 patients attending the department of prosthodontics for face validity, feasibility of administration, and internal consistency reliability. The questionnaire was prepared in English, later translated into the regional language Telugu followed by back-translation to English for assessing the accuracy of translation. The initial questionnaire was slightly modified to improve comprehension for the patients based on the suggestions received. The questionnaire sought information on demographics including age, gender, education, and time of wearing of dentures, method and frequency of cleaning, and self-perceived denture status. A thorough clinical examination was performed after the completion of the questionnaire, which also included examination of the status of existing dentures. The dentures

were evaluated for hygiene, and were categorized as “good,” “fair,” and “poor” based on the accumulated plaque on denture surfaces. Two investigators participated in the clinical examination, and the inter-rater agreement in the clinical rating of denture status was identified to be good with a kappa statistic of 0.86. The questionnaire was found to have good internal consistency reliability (Cronbach’s alpha = 0.78). Ethical clearance for the study was obtained from the institutional review board of Konaseema Institute of Dental Sciences. The purpose of the study was explained to the participants and a written informed consent was taken prior to the start of the study.

## STATISTICAL ANALYSIS

The obtained data was statistically analyzed using the Statistical Package for the Social Sciences (SPSS) version 20 software (IBM Corp. IBM SPSS Statistics for Windows, Armonk, NY: IBM Corp; 2011). Descriptive statistics, Spearman’s correlation test, and Chi-square test were employed for data analysis. Alpha level was set at 5%, and the statistical data was summarized in table form.

## RESULTS

Of the 375 denture wearers who participated in the study, females outnumbered males by a considerable margin. The majority of the participants belonged to the age group of 65–74 years, who were illiterates residing in rural areas, with less than 2 years of experience wearing dentures. Descriptive

**Table 1: Descriptive statistics**

| Variable           | Frequency N=375 | Percentage |
|--------------------|-----------------|------------|
| Gender             |                 |            |
| Male               | 169             | 45.1       |
| Female             | 206             | 54.9       |
| Age group          |                 |            |
| 35-44 years        | 32              | 8.5        |
| 45-54 years        | 81              | 21.6       |
| 55-64 years        | 106             | 28.3       |
| 65-74 years        | 114             | 30.4       |
| 75 years and above | 42              | 11.2       |
| Education          |                 |            |
| Illiterate         | 155             | 41.3       |
| Lower school       | 78              | 20.8       |
| Middle school      | 80              | 21.3       |
| High school        | 09              | 2.4        |
| Degree             | 33              | 8.8        |
| Professional       | 20              | 5.3        |
| Location           |                 |            |
| Rural              | 217             | 57.9       |
| Periurban          | 39              | 10.4       |
| Urban              | 119             | 31.7       |
| Duration of use    |                 |            |
| 1-2 years          | 197             | 52.5       |
| 3-5 years          | 92              | 25.5       |
| 6-10 years         | 61              | 16.3       |
| 11-15 years        | 14              | 3.7        |
| 16 years and above | 11              | 2.9        |

statistics are presented in Table 1. Approximately 80% of the participants reported cleaning their dentures once a day regardless of the material used for cleaning. The most common mode of cleansing dentures was with water and toothbrush (61%). Table 2 shows the differences in denture hygiene practices, self-perceived denture status, and actual denture status based on the gender and age of the patient.

There was no statistically significant association between the denture hygiene practices of the patients and their educational level ( $P > 0.05$ ). Almost 80% of the study participants reported their denture status to be good/fair. Clinical examination revealed that more than half of the participants had poorly maintained dentures. There was a significant weak positive correlation between the self-perceived denture status and actual denture status. Table 3 shows correlation between self-perceived denture status, actual denture status, duration

of wearing dentures, and the frequency of cleansing dentures. However, no satisfactory conclusions regarding trends or correlations could be deduced from this study in light of the insignificant and rather weak correlations obtained. Table 4 shows the association between denture hygiene practices and self-perceived/actual denture status.

## DISCUSSION

Cleaning and disinfecting dentures are key for the upkeep of oral delicate tissue wellbeing. Similar to natural dentition, dentures also require sufficient cleaning to ensure prevention of biofilm development. The present study reveals the denture hygiene practices among complete denture wearers, as well as the self-perceived, actual status of these dentures. A significant majority of the participants (80.3%) reported cleaning their dentures once a day regardless of the method of cleaning.

**Table 2: Denture care practices and denture status based on gender and age group**

| Question                                   | Gender     |            |        | Age group |           |           |            |           | P       |
|--|------------|------------|--------|-----------|-----------|-----------|------------|-----------|---------|
|  | Male (%)   | Female (%) | P      | 35-44 (%) | 45-54 (%) | 55-64 (%) | 65-74 (%)  | >75 (%)   |         |
| Frequency of cleaning dentures by patients |            |            |        |           |           |           |            |           |         |
| Twice/more a day                           | 10 (5.9)   | 07 (3.4)   | 0.322  | 0 (0)     | 10 (12.3) | 01 (0.9)  | 04 (3.5)   | 02 (4.8)  | 0.017*  |
| Once daily                                 | 138 (81.7) | 163 (79.1) |        | 27 (84.4) | 59 (72.8) | 93 (87.7) | 93 (81.6)  | 29 (69)   |         |
| Once/twice a week                          | 21 (12.4)  | 35 (17)    |        | 05 (15.6) | 12 (14.8) | 12 (11.3) | 16 (14)    | 11 (26.2) |         |
| Occasionally                               | 0 (0)      | 01 (0.5)   |        | 0 (0)     | 0 (0)     | 0 (0)     | 01 (0.9)   | 0 (0)     |         |
| Methods of denture cleansing               |            |            |        |           |           |           |            |           |         |
| Water + cleansing tablet                   | 09 (5.3)   | 07 (3.4)   | 0.015* | 0 (0)     | 2 (2.5)   | 05 (4.7)  | 09 (7.9)   | 0 (0)     | 0.000** |
| Water + brush + soap                       | 20 (11.8)  | 15 (7.3)   |        | 01 (3.1)  | 0 (0)     | 17 (16)   | 11 (9.6)   | 06 (14.3) |         |
| water + brush                              | 110 (65.1) | 119 (57.8) |        | 19 (59.4) | 62 (76.5) | 55 (51.9) | 73 (64)    | 20 (47.6) |         |
| Water + brush + toothpaste                 | 29 (17.2)  | 57 (27.7)  |        | 12 (37.5) | 12 (14.8) | 28 (26.4) | 21 (18.4)  | 13 (3.1)  |         |
| Water only                                 | 01 (0.6)   | 08 (3.9)   |        | 0 (0)     | 05 (6.2)  | 1 (0.9)   | 0 (0)      | 03 (7.1)  |         |
| Removing dentures at night                 |            |            |        |           |           |           |            |           |         |
| Yes  | 153 (90.5) | 191 (92.7) | 0.444  | 31 (96.9) | 71 (67.7) | 86 (81.1) | 114 (100)  | 42 (100)  | 0.000** |
| No   | 16 (9.5)   | 15 (7.3)   |        | 01 (3.1)  | 10 (12.3) | 20 (18.9) | 0 (0)      | 0 (0)     |         |
| Placement of dentures at night             |            |            |        |           |           |           |            |           |         |
| Water                                      | 153 (90.5) | 193 (93.7) | 0.104  | 32 (100)  | 74 (91.4) | 93 (87.7) | 105 (92.1) | 42 (100)  | 0.000** |
| Denture cleansing tablet in water          | 16 (9.5)   | 10 (4.9)   |        | 0 (0)     | 4 (4.9)   | 13 (12.3) | 09 (7.9)   | 0 (0)     |         |
| Outside without water                      | 0 (0)      | 03 (1.5)   |        | 0 (0)     | 3 (3.7)   | 0 (0)     | 0 (0)      | 0 (0)     |         |
| Self-perception on denture status          |            |            |        |           |           |           |            |           |         |
| Poor                                       | 25 (14.8)  | 49 (23.8)  | 0.066  | 1 (3.1)   | 24 (29.6) | 08 (7.5)  | 28 (24.6)  | 13 (31)   | 0.000** |
| Fair                                       | 73 (43.2)  | 72 (35)    |        | 17 (53.1) | 23 (28.4) | 48 (45.3) | 41 (36)    | 16 (38.1) |         |
| Good                                       | 71 (42)    | 85 (41.3)  |        | 14 (43.8) | 34 (42)   | 50 (47.2) | 45 (39.5)  | 13 (31)   |         |
| Denture status on examination              |            |            |        |           |           |           |            |           |         |
| Poor                                       | 84 (49.7)  | 113 (54.9) | 0.568  | 23 (71.9) | 41 (50.6) | 48 (45.3) | 57 (50)    | 28 (66.7) | 0.033*  |
| Fair                                       | 49 (29)    | 51 (24.8)  |        | 05 (15.6) | 18 (22.2) | 36 (34)   | 36 (31.6)  | 05 (11.9) |         |
| Good                                       | 36 (21.3)  | 42 (20.4)  |        | 04 (12.5) | 22 (27.2) | 22 (20.8) | 21 (18.4)  | 09 (21.4) |         |

Chi square test ( $P \leq 0.05$ ); \*Significant; \*\*Highly significant

**Table 3: Correlation between self-perceived denture status, actual denture status, duration of wearing dentures, and the frequency of cleansing dentures**

|                                 | Correlation coefficient ( <i>r</i> ) |                       |                          |                                 |
|---------------------------------|--------------------------------------|-----------------------|--------------------------|---------------------------------|
|                                 | Self-perceived denture status        | Actual denture status | Duration of denture wear | Frequency of cleansing dentures |
| Self-perceived denture status   | 1 (-)                                | 0.176**               | -0.058 (NS)              | 0.220**                         |
| Actual denture status           | 0.176**                              | 1 (-)                 | -0.313**                 | 0.114*                          |
| Duration of denture wear        | -0.058 (NS)                          | -0.313**              | 1 (-)                    | -0.062                          |
| Frequency of cleansing dentures | 0.220**                              | 0.114*                | -0.062                   | 1 (-)                           |

Spearman correlation test; \*\*Highly significant; NS: non significant

**Table 4: Association between denture care practices and self - perceived, actual denture status**

| Question                          | Self-perceived denture status |            |            |          | Actual denture status |           |           |          |
|-----------------------------------|-------------------------------|------------|------------|----------|-----------------------|-----------|-----------|----------|
|                                   | Poor (%)                      | Fair (%)   | Good (%)   | <i>P</i> | Poor (%)              | Fair (%)  | Good (%)  | <i>P</i> |
| Removing dentures at night        |                               |            |            |          |                       |           |           |          |
| Yes                               | 68 (19.8)                     | 136 (39.5) | 140 (40.7) | 0.443    | 175 (50.9)            | 91 (26.5) | 78 (22.7) | 0.01*    |
| No                                | 6 (19.4)                      | 9 (29)     | 16 (51.6)  |          | 22 (71)               | 9 (29)    | 0 (0)     |          |
| Placement of dentures at night    |                               |            |            |          |                       |           |           |          |
| Water                             | 64 (19.4)                     | 133 (29)   | 149 (51.6) | 0.05*    | 185 (53.5)            | 86 (24.9) | 75 (21.7) | 0.014*   |
| Denture cleansing tablet in water | 7 (26.9)                      | 12 (46.2)  | 7 (26.9)   |          | 12 (46.2)             | 11 (42.3) | 3 (11.5)  |          |
| Outside without water             | 3 (100)                       | 0 (0)      | 0 (0)      |          | 0 (0)                 | 3 (100)   | 0 (0)     |          |

Chi square test ( $P \leq 0.05$ ); \*Significant

However, this was not reflected in the clinical examination of dentures, with 52.5% of dentures being rated as having poor hygiene. There are two possible explanations for this mismatch. While one could be the method of cleansing the dentures, the other possibility is the general tendency of the participants to be socially desirable. The percentage of participants who reportedly clean their dentures once daily was higher in the present study (80.3%) than those reported by Saha *et al.* (52.5%)<sup>[17]</sup> and Apratim *et al.* (44.7%).<sup>[18]</sup> The reasons for low frequency of cleansing dentures in these studies was lack of awareness on how to clean their dentures. This highlights the genuine need to make patients more aware regarding the process of cleansing dentures.

The most common method of denture cleaning was using water and brush (61.1%), which is more when compared with studies reported by Patel *et al.* (58.3%),<sup>[19]</sup> Dikbas (3.84%),<sup>[20]</sup> Peracini *et al.* (3.7%),<sup>[21]</sup> Azad *et al.* (22%),<sup>[22]</sup> Polyzois (10.3%),<sup>[23]</sup> Saha *et al.* (47%),<sup>[17]</sup> and Apratim *et al.* (31.3%).<sup>[18]</sup> The reasons for this finding could be the fact that majority of the study participants were from rural areas who have limited privilege for denture care materials both in terms of availability and affordability. However, cleansing dentures with mechanical aids such as toothbrush could cause denture surface abrasion that can lead to poor aesthetics. Denture care practices relating to the removal of dentures at night and placement of dentures at night were found to be associated with actual denture status, as clinically examined by the investigators. This finding adds support to the hypothesis that appropriate knowledge translates to good practices and consequently better health status.

On examination the condition of the dentures, most of the study participants were identified to have poor denture hygiene

status (52.5%), which was found to be similar to the results reported by Saha *et al.* (60%)<sup>[17]</sup> and Apratim *et al.* (44.7%).<sup>[18]</sup> The relatively poor denture hygiene status in the aforementioned studies could be due to the limited awareness among the patients regarding the necessity to upkeep denture hygiene and limited denture hygiene education they might have received at the oral health care facilities. There was only a weak positive correlation between self-perceived denture status and the actual denture status, which could be due to the social desirability bias on the part of the participants. A limitation of this study is that all the observed correlations were weak, and the significance obtained with regard to these correlations must be interpreted with caution in light of the relatively large sample size. The belief among a great majority of participants that the status of their dentures is good/fair could actually be a contributory factor for poor self-care.

The fact that denture fabrication with absolute precision is not an end in itself but must be thoroughly complimented by appropriate hygiene practices should be made comprehensible to the patients. It must also be realized at this juncture that a majority of complete denture wearers are elderly who usually have compromised immunity, which emphasizes the need to maintain high standards of denture hygiene to avoid unwanted consequences.

## CONCLUSION

The study revealed that the denture hygiene practices were poor among the study population. It highlights the need for improvement in patient education and counseling with respect to maintenance of dentures and upkeep of denture hygiene. It also emphasizes the need for educating the patients on how to evaluate the status of their dentures.

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**CONFLICTS OF INTEREST**

There are no conflicts of interest.

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