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Evaluation of Treatment Gaps in Prosthodontic Rehabilitation: A Quality of Life Assessment

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Abstract **Original Research Article**

Prosthodontic treatment is not limited to fulfillment of functional needs related to chewing and masticating. It also offers esthetic enrichment which eventually affects the social and psychological needs. At the same time it has financial implications too. In present study, an attempt was made to study the priorities of prosthodontic treatment needs among 36 patients from elderly age group belonging to a low socioeconomic class from Lucknow (U.P.). The treatment needs were assessed on functional, social, financial and psychological dimensions. It was observed that the functional needs and psychological needs were more pronounced than the social and financial needs. Assessment of priorities of treatment revealed that functional needs had a high priority. Assessment of treatment gaps through graphical modeling revealed that during a short follow up (at 15 days), the functional needs showed a low performance. The order of concern for social, psychological and financial needs was ranged between average to low with a low to average performance. It was felt that the change in quality of life of patients with prosthodontic rehabilitation are not spontaneous, rather they require a substantial period to bring about a measurable change.

Keywords: Prosthodontic rehabilitation, Prosthodontic Quality of Life, APS (QOL), Treatment gaps, QOL Matrix.

INTRODUCTION

Though unmet Prosthodontic needs impair the function of teeth, yet its impact on overall quality of life of the individual is much wider than the functional aspect alone. Tooth loss especially, complete loss or edentulism, is equivalent to the dental death. Tooth loss often substantially reduces the quality of life[1].

Although dental diseases are usually not fatal yet they affect the 'ability to eat, speak and socialize without active disease or embarrassment and contribute to one's general well being. In essence, dental disorders can affect interpersonal relationships and daily activities, and therefore the "goodness" or "quality of life [2]". Oral health problems are more frequently found in an older adult population for whom other health problems are often a priority [3].

There has been a complete lack of a specific dental health related quality of life inventory for prosthodontic health. Keeping in view the specific quality of life related issues associated with prosthodontic treatment, a quality of life inventory targeted to measure the different dimensions of prosthodontic needs was developed by APS-ARG and has been tested for pre-treatment needs among different age and gender groups [4]. APS-QOL matrix has also been used to graphically depict the treatment needs and their post-treatment fulfillment.

In present study, an attempt has been made to assess the pre-treatment prosthodontic need based on a quality of life scale and then to evaluate the post-treatment change in quality of life of patients to measure the extent of success of the treatment offered to the patients.

MATERIAL AND METHOD

A total of 36 patients (31 males and 5 females) aged between 40 to 75 years of age coming for prosthodontic rehabilitation to King George's Medical University, Lucknow (U.P.), India comprised the study subjects. Most of the patients received complete denture rehabilitation (29/36) while 3 patients (8.3%) received

partial rehabilitation, the remaining 4 patients (11.1%) received complete denture either in maxillary or mandibular segment and partial rehabilitation in the opposing segment.

The treatment needs of the patients were assessed using APS-ARG Quality of Life (Dental Subscale) [4]. The scale covers functional, social, emotional and financial domains with the help of 20 items with each item having a score ranging between 1 to 5 based on Likert Scaling, with higher score indicating a lower quality of life. The scale was administered before the start of treatment and 15 days after the completion of treatment. For each domain the sum of scores was divided by 5 to get the weighted score for that domain.

For different items, the treatment need was considered of high concern if the initial score for the item was >3 whereas for scores <2 the treatment need was considered as of low concern. Pretreatment item score of 2 and 3 were considered to be indicative of average concern. Effect of treatment on quality of life was categorized as high concern high performance (if initial score was >3 and post-treatment decline was 2 or more), high concern low performance (if initial score was >3 and post-treatment decline was <2), low/average concern average performance (if the initial score was 2 to 3 and post-treatment decline was <2) and low concern low performance (if the initial score was $\leq$2 and post-treatment decline was $\leq$1).

Data was analyzed using Statistical Package for Social Sciences (SPSS) version 17.0 was used for analysis of data. Reliability of scale was tested by calculating Cronbach's alpha value. The inter-dimension differences were calculated using "t"-test. Post-treatment change in prosthodontic quality of life was assessed using paired “t”-test. The significance level of the study was kept at 95% hence a "p" value less than 0.05 indicated a statistically significant difference.

RESULTS

The reliability of this 20-item scale as assessed by Cronbach alpha coefficient was found to be 0.809.

For functional domain, the mean pre-treatment QOL scores for different items ranged from 1.92±1.34 (Ability to clean teeth/prosthesis properly) to 4.69±0.79 (Ability to use opposing teeth effectively). Weighted dimensional score was 3.28±0.56. Post-treatment, itemized mean scores ranged from 1.69±0.86 (Ability to clean teeth/prosthesis properly) to 3.92±1.42 (ability to speak some particular words/phonetics). Weighted dimensional score was 2.32±0.67. Except for the item ability to clean the teeth effectively, for all the other items as well as for the weighted dimensional score there was a significant difference between pre- and post-treatment mean scores ($p<0.001$).

For social domain, the mean pre-treatment QOL scores for different items ranged from 2.03±1.27 (avoidance by spouse/partner) to 3.75±0.97 (unwanted attention towards missing tooth). Weighted dimensional score was 2.97±0.77. Post-treatment, itemized mean scores ranged from 1.08±0.28 (Reduction in participation in social gatherings) to 2.39±0.90 (unwanted attention towards missing tooth). Weighted dimensional score was 1.42±0.27. For all the items as well as for the weighted dimensional score there was a significant difference between pre- and post-treatment mean scores ($p<0.001$).

For financial domain, the mean pre-treatment QOL scores for different items ranged from 1.53±0.77 (cost of oral care and hygiene) to 3.47±1.36 (cost of loss of occupational opportunities). Weighted dimensional score was 2.35±0.52. Post-treatment, itemized mean scores ranged from 1.19±0.47 (costs of taking special diet) to 2.81±0.40 (expenditure on dental prosthesis). Weighted dimensional score was 1.95±0.32. Except for the item Cost of oral care and dental hygiene for all the other items as well as for the weighted dimensional score there was a significant difference between pre- and post-treatment mean scores ($p<0.001$).

For psychological/emotional domain, the mean pre-treatment QOL scores for different items ranged from 2.67±1.39 (covering mouth with hand/handkerchief) to 4.03±0.81 (Fear of hurting gums). Weighted dimensional score was 3.42±0.69. Post-treatment, itemized mean scores ranged from 1.03±0.17 (covering mouth with hand/handkerchief) to 2.64±0.87 (continuous thinking about dental problem). Weighted dimensional score was 1.48±0.29. For all the items as well as for the weighted dimensional score there was a significant difference between pre- and post-treatment mean scores ($p<0.001$) (Table 1).

On dimensional level, the mean pre-treatment scores were observed to be above 3 for two items *i.e.* Functional and Psychological. Though for social aspect the value was quite close to 3 (2.97±0.77). For financial aspect the value was much below 3 (2.35±0.52). However, post-treatment assessment showed a significant improvement for all the four dimensions ($p<0.001$) with mean scores <3 for all the four. For total scale, the mean pre-treatment score was 3.01±0.51 indicating a poor quality of life which was observed to be 1.79±0.25 after treatment thus indicating a better quality of life which showed a significant difference from pre-treatment values ($p<0.001$) (Fig. 1).

Comparison of dimension wise priority of treatment needs showed that psychological needs had significantly higher priority as compared to social as well as financial needs whereas no significant difference between functional and psychological needs ($p=0.353$), functional and social needs ($p=0.053$) was observed. Thus in present study financial needs were

least pronounced whereas functional needs and psychological needs had the maximum scores (Table 2).

Treatment gap assessment for functional dimension showed, two items *i.e.* ability to speak some particular words/phonetics and ability to take some specific foodstuff to be of high concern with an increase observed for the former and a decrease below 2 for the latter. High concern and high performance was observed for the item ability to use opposing tooth effectively while item ability to take all kind of food was of average concern showing an average performance. The item ability to clean teeth/prosthesis properly was of low concern and showed a low performance after treatment (Fig. 2a).

For social dimension, only 1 item *i.e.* unwanted attention towards missing tooth was of high concern and for this item low performance was observed. The items reduction in participation in social gatherings, recommendations to visit a dentist and social contacts cutting jokes were observed to be of low to average concern with average performance while for item avoidance by spouse/partner were observed to be of low concern and low performance (Fig. 2b).

On financial dimension, an increase in mean scores was observed for two items *i.e.* expenditure on dental prosthesis and cost of oral care and dental hygiene, though the increase was marginal yet owing to its incremental nature, the concern was high from the point of view of bringing about a positive qualitative change in quality of life of the patient. The item cost of loss of occupational commitments was of high concern and the treatment showed low performance on the same. Of the remaining two items, *i.e.* cost of visits to a dentist and costs of taking special diet, for the former, the concern was average and the performance too was average while the latter item was of low concern and the treatment had a low performance (Fig. 2c).

For psychological dimension, there were three items falling into high concern category. Of these three items, for two items *i.e.* feeling of ugliness and fear of hurting the gums the treatment was observed to be of high performance whereas for the remaining one item *i.e.* continuous thinking about dental problem the performance was of low level. The remaining two items were of low/average concern with average performance (Fig. 2d).

Dimension wise assessment of treatment concern and performance depicted only functional dimension to be of high concern. For this dimension the treatment was observed to be having low performance. For all the other three dimensions the concern was from low to average and the treatment showed an average performance (Fig. 3).

Table 1: Change in Quality of Life related with different dimensions of prosthodontic treatment needs following prosthodontic rehabilitation

Item/ Dimension	Pre-treatment QOL Score		Post-treatment QOL Score		Significance Of Change	
	Mean	SD	Mean	SD	"t"	"p"
Functional						
Ability to take all kind of food	3.00	0.53	2.06	0.95	5.308	<0.001
Ability to speak some particular words/phonetics	2.97	1.28	3.92	1.42	-3.088	0.004
Ability to take some specific foodstuff	3.83	1.18	2.00	1.15	5.916	<0.001
Ability to clean teeth/prosthesis properly	1.92	1.34	1.69	0.86	0.870	0.390
Ability to use opposing tooth effectively.	4.69	0.79	1.92	1.52	9.658	<0.001
Dimensional Score	3.28	0.56	2.32	0.67	6.776	<0.001
Social						
Unwanted attention towards missing tooth.	3.75	0.97	2.39	0.90	5.460	<0.001
Reduction in participation in social gatherings	2.94	1.47	1.08	0.28	7.111	<0.001
Avoidance by spouse/partner	2.03	1.23	1.08	0.37	4.844	<0.001
Recommendations to visit a dentist	3.19	1.09	1.42	0.69	8.132	<0.001
Social contacts cutting jokes.	2.94	1.24	1.14	0.35	8.442	<0.001
Dimensional Score	2.97	0.77	1.42	0.27	11.042	<0.001
Financial						
Expenditure on dental prosthesis	2.53	0.51	2.81	0.40	-2.712	0.010
Costs of visits to a dentist	2.22	1.10	1.58	0.55	2.920	0.006
Costs of taking special diet	2.00	1.07	1.19	0.47	3.979	<0.001
Cost of oral care and dental hygiene	1.53	0.77	1.81	1.04	-1.303	0.201
Cost of loss of occupational commitments	3.47	1.36	2.36	0.59	4.799	<0.001
Dimensional Score	2.35	0.52	1.95	0.32	3.969	<0.001
Psychological						
Feeling of ugliness	3.89	0.92	1.06	0.33	17.508	<0.001
Covering mouth with hand/handkerchief	2.67	1.39	1.03	0.17	7.255	<0.001
Loss of confidence	2.89	1.19	1.08	0.50	8.919	<0.001
Continuous thinking about dental problem	3.64	0.83	2.64	0.87	4.743	<0.001
Fear of hurting the gums	4.03	0.81	1.61	0.80	13.438	<0.001
Dimensional Score	3.42	0.69	1.48	0.29	15.213	<0.001

Table 2: Comparison of Dimension wise Priority of Treatment Needs

	"t"	"p"
Functional vs Social	1.968	0.053
Functional vs Financial	7.310	<0.001
Functional vs Psychological	0.934	0.353
Social vs Financial	4.030	<0.001
Social vs Psychological	2.614	0.011
Financial vs Psychological	7.406	<0.001

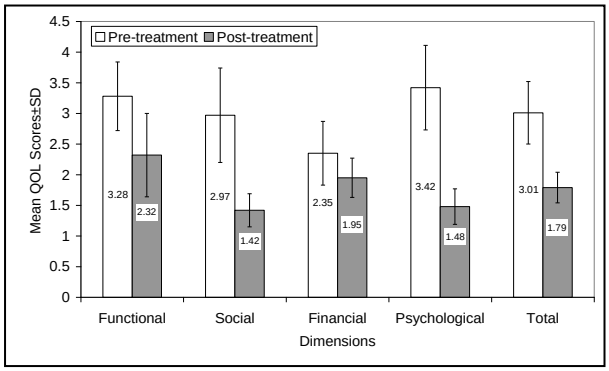

Fig-1: Comparison of Pre- and Post-treatment Mean Dimensional and Total Scores

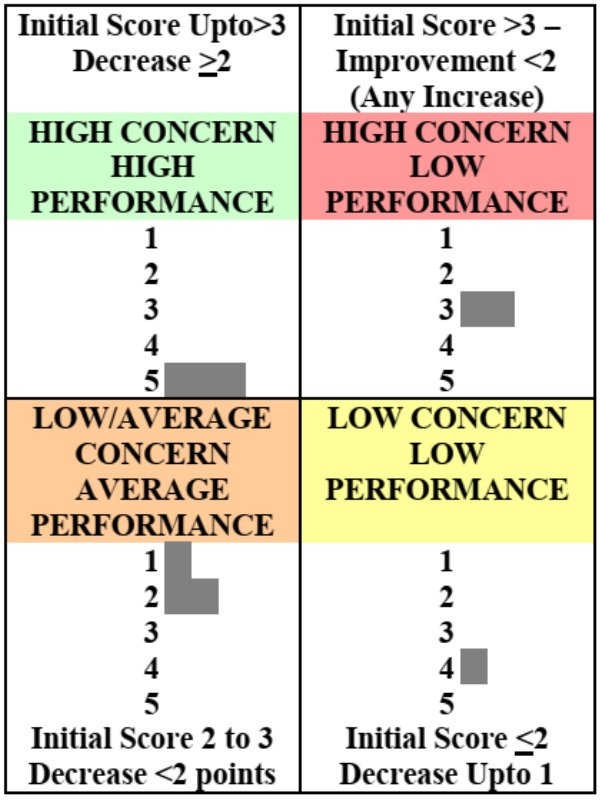

Fig-2a: Treatment Gap Assessment for Functional Dimension

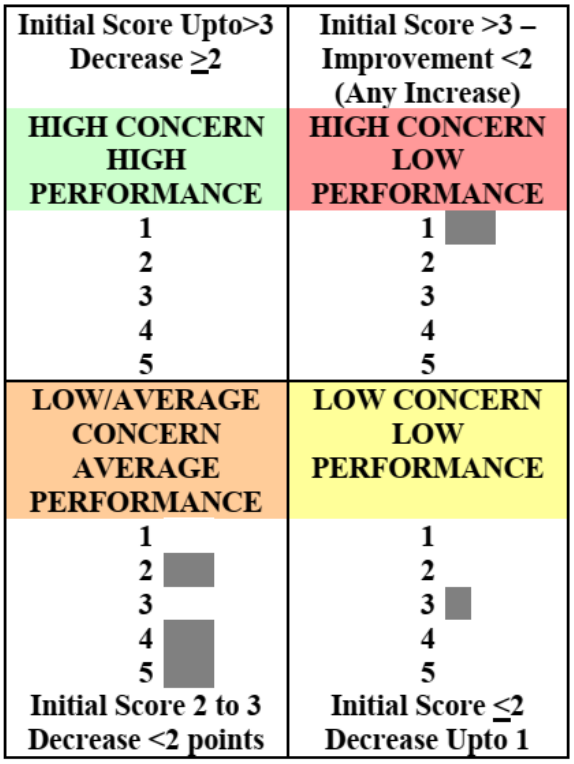

Fig-2b: Treatment Gap Assessment for Social Dimension

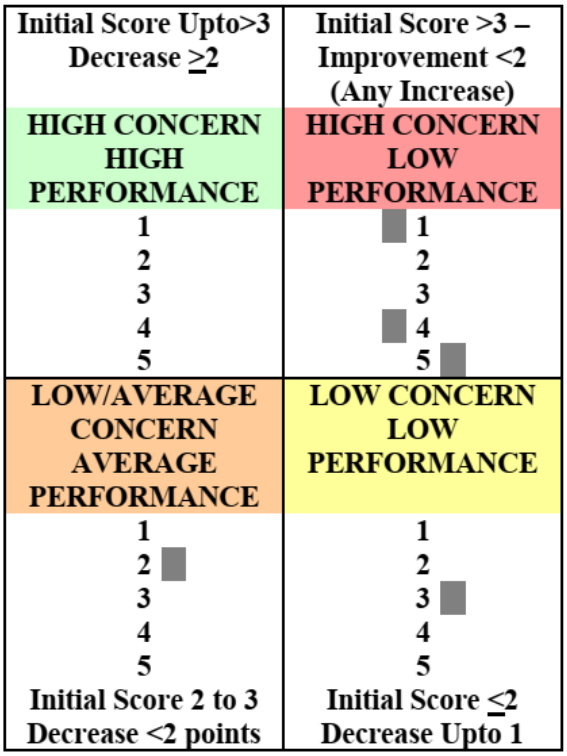

Fig-2c: Treatment Gap Assessment for Financial Dimension

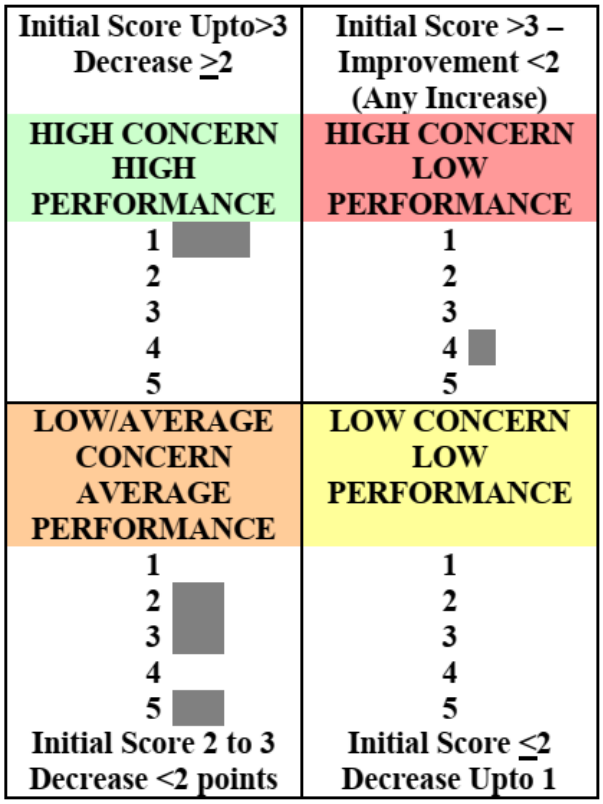

Fig-2d: Treatment Gap Assessment for Psychological Dimension for Psychological Dimension

DISCUSSION

Prosthetic dental treatment is not uniquely limited to technical aspects. Indeed, it includes multidimensional aspects of patient perceived needs, desires and expectations [5, 6]. Tooth loss (structural impairment) can, but not necessarily, lead to food avoidance or reduced nutritional intake (functional limitation), or result in emotional distress, social or professional deprivation (psychological discomfort). If the dentist is not prepared to properly identify these needs, clinical decisions are based on idiosyncratic choices that often lead to overtreatment. Studies have confirmed that clinical decisions that involve restorative treatment are frequently variable, conflicting and poorly defined[7]. Researchers have also laid emphasis on understanding the patient needs related to social, psychologic, and economic factors [8].

The present study was carried out to study the impact of prosthodontic handicaps on the quality of life using APS-Quality of Life (Dental Subscale), which is a comprehensive scale taking into account functional, social, financial and psychological needs of the patient. In APS-QOL, there are four dimensions with five items each thus giving an opportunity to enhance the internal consistency of the scale. The internal consistency of the scale was assessed in terms of Cronbach alpha value which was observed to be 0.809 which is well above the generally agreed upon criteria of 0.7 [9].

The scale was able to differentiate and distinguish among different dimensions of the treatment needs. In present study most of the patients were edentulous and hence the functional needs were more pronounced. For item no. 5 of the functional dimension *i.e.* ability to use opposing tooth effectively, the mean scores were very close to maximum value of 5. However, from the psychological dimensional point of view the scores of the subjects were quite high and does not reflect an imminent situation to intervene. As majority of the subjects were in the elderly age group and being edentulous affected their facial harmony, which has a substantial impact on the psychology of the patient. Owing to physical dysfunction and low personal control add to personal and status losses in growing age, the psychological needs of the elderly patients are more pronounced [10]. These people are faced with numerous physical, psychological and social role changes that challenge their sense of self and capacity to live happily. Many people experience loneliness and depression in old age, either as a result of living alone or due to lack of close family ties and reduced connections with their culture of origin, which results in an inability to actively participate in the community activities [11].

For social circle of the individuals were limited and their social needs did not depend on the prosthetic appearance that's why the scores for this aspect were not that much pronounced as for functional and psychological dimensions. For the item no. 3 on social dimension *i.e.* avoidance by spouse/partner, the majority of respondents had very high scores, this implied that in the elderly age-group there is a strong bond between partners which is not dependent on the physical appearance rather it is dependent on the qualitative assessment of a person in a whole. In the elderly age group the physical needs from the opposite gender were limited or almost diminished and hence in this agegroup the social needs related to attraction towards the opposite gender were less pronounced. Kotwal[12] have in their study on physical needs and adjustments made by the elderly have also reported that the physical needs and psychological functions diminish during the old age.

With advancing age, it is inevitable that people lose connection with their friendship networks and that they find it more difficult to initiate new friendships and to belong to new networks [8] and hence the social needs are less pronounced. On the financial aspect, the low scores were reflective of the low financial burden of prosthodontic rehabilitation as the cost of rehabilitation was borne to a great extent by the institution and not the individual. In fact, the to and fro-cost for movement was also reimbursed to some patients by the institution.

Given these observations, the priority of prosthodontic rehabilitation was found to be

psychological followed by functional and then social and financial needs. However, as rehabilitation was provided free of cost, the financial needs of the patients could be checked within a reasonable limit only.

The post-treatment administration of the scale revealed fulfillment of all the needs for all the four dimensions individually as well as for the overall scale. This reflects that if carefully planned and followed, not only the functional but the social, psychological and financial needs too.

Some of the key issues highlighted by the scale were in finding out treatment gaps. These gaps were found wherever the mean post-treatment scores for an item were higher as compared to the pre-treatment scores. In present study, three such issues were identified, one was related to functional dimension *i.e.* ability to speak some particular words/phonetics and the other two were related to financial dimension *i.e.* Expenditure on dental prosthesis and cost of oral care and dental hygiene. Although the cost of dental prosthesis was borne to a great extent by the institution yet even the token cost being paid by the patients made a significant impact on their financial quality of life. These findings reveal poor state of elderly in India, particularly in the region our hospital is serving, and thus a strategic planning for the benefit / healthcare of poor patients is recommended. It is pertinent to mention here that the Government of India has recently initiated a free-healthcare facility under the name "National Health Insurance Scheme"[13] for those living below poverty line, yet these facilities do not cover the dental healthcare. On the basis of the findings made in the present study, it is recommended that the government should plan for the coverage of dental healthcare, particularly prosthodontic care of elderly population under the plan. Another item related to financial dimension on which post-treatment scores were observed to be higher was cost of oral care and dental hygiene might be because of the costs incurred to purchase the denture-cleanser. As most of the patients were edentulous earlier, they did not use any specific oral care and dental hygiene product. In rural India, the practice of using locally available oral hygiene products or simple gargling is prevalent amongst edentulous subjects.

For all the other items the scale showed a significant improvement in quality of life of patients. On dimensional level too, a significant improvement was observed for all the four dimensions. The findings of the study reflect a quantitative measurement of patient needs and their fulfillment with the help of APS-QOL (Dental Subscale). The scale is useful in assessing the treatment gaps too and thus enabling the prosthodontist to point out the items where the treatment strategies need further improvement. On assessment of treatment gaps, it was observed that the functional needs were of high concern but the treatment showed low performance. The concern level for other dimensions was between low to average and treatment showed average performance. One of the reasons for the low/average performance of the treatment could be the shorter duration of follow up wherein the adjustment to prosthesis to achieve desired functional level might not be of optimum level. Similarly for financial and social dimensions too the changes for the items loss of occupational opportunities and unwanted attention towards missing teeth, indicated that owing to follow up at a shorter interval the patients considered the follow up visit to be a financial burden on them while owing to rehabilitation, instead of unwanted attention towards missing teeth they had now unwanted attention owing to changed dentition status among their social contacts.

The authors feel that in order to assess the treatment gaps in a better way, the follow up should be conducted at least after one year of rehabilitation which is a sufficient time to bring about a change in overall quality of life of the subjects.

CONCLUSION

'Man is a social animal and need time to learn the desired objectives' this saying is well reflected in our study. While Prosthodontic rehabilitation, the quality of life should always be kept in mind and this scale can be a useful tool in measuring the quality of life of an individual.

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REFERENCES

1. Slade GD, Spencer AJ. Social impact of oral conditions among older adults. Australian Dental Journal. 1994 Dec;39(6):358-64.
2. Acharya S. Oral health-related quality of life and its associated factors in an Indian adult population. Oral health & preventive dentistry. 2008 Jun 1;6(3).
3. Vargas CM, Kramarow EA, Yellowitz JA. The oral health of older Americans. Hyattsville, MD: Centers for Disease Control and Prevention, National Center for Health Statistics; 2001 Mar.
4. Nath DK, Bagchi G, Arora V, Nath M, Kahar B, Gaunkar RB. Priority of Prosthodontic Need Assessment: Functional vs Other Quality of Life Needs--A Quality of Life Assessment Using APS-ARG QOL (DS)--A Pilot Project. Journal of Oral Health & Community Dentistry. 2013 May 1;7(2).
5. Berkey DB, Berg RG, Ettinger RL, Mersel A, Mann J. The old-old dental patient: the challenge of clinical decision-making. The Journal of the American Dental Association. 1996 Mar 1;127(3):321-32.

6. Rich B, Goldstein GR. New paradigms in prosthodontic treatment planning: a literature review. The Journal of prosthetic dentistry. 2002 Aug 1;88(2):208-14.
7. Nuttall NM, Elderton RJ. The nature of restorative dental treatment decisions. British dental journal. 1983 Jun;154(11):363.
8. Tedesco LA, Garlapo DA. Social and economic factors in prosthodontic practice and education. The Journal of prosthetic dentistry. 1994 Mar 1;71(3):310-5.
9. Nunally JC. *Psychometric Theory*, McGraw-Hill, New York. 1978.
10. Mirowsky J, Ross CE. Age and depression. J. Health Soc Behav. 1992; 33(3): 187-205.
11. Singh A, Misra N. Loneliness, depression and sociability in old age. Industrial psychiatry journal. 2009 Jan;18(1):51.
12. Kotwal N, Prabhakar B. Physical needs and adjustments made by the elderly. Studies on Home and Community Science. 2009 Dec 1;3(2):115-221.
13. Rashtriya Swasthya BimaYojana Guidelines. Government of India. http://www.rsby.gov.in/ RSBY.Guidelines13.3.08_rev.pdf.