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Is lesser treatment better? A survey on practice of Shortened Dental Arch

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Abstract

Context: Replacement of missing posterior teeth always poses a problem to the restoring dentist. Fixed prosthodontics is difficult when there is no posterior abutment and implant placement might be constrained due to anatomical, economical or health constraints. Removable prosthodontics is not well accepted by all the patients. This study helps to ascertain whether restoring every missing posterior teeth is mandatory or can be managed well by the patient without rehabilitation.

Aims: To evaluate the attitude of prosthodontists (P) and general practitioners (GP) towards shortened dental arch (SDA) concept.

Settings and Design: This study was conducted in 2019. A questionnaire was designed for this study based on the model used in a study by Witter.

Methods and Materials: Total 50 prosthodontists and 500 general practitioners were selected for the survey. The survey questionnaire contained 8 open ended questions (Q. Nos.1to 8) and 7 close-ended questions, with the number of options set at four (Q. Nos. 9,10, 12) and five (Q. Nos. 11,13,14,15).

Statistical analysis used: Pearson’s chi square test

Results: Out of 60% GP who were aware of the concept, 45% used it whereas in spite of 100% Prosthodontists being aware of the concept it is only 22% who use it.

Conclusion: Advocating the SDA concept offers some important advantages like oral functionality, hygiene and

cost. Also, it appears to fit well with the problem solving approach favoured in modern dentistry.

Keywords: Shortened Dental Arch, SDA Concept, Survey, Prosthodontist

Introduction

Dentistry, over the years has evolved around the excerpts of DeVan, viz; 'Perpetual preservation of what remains is more important than the meticulous replacement of what is missing'.[1] This has led various clinicians into experimenting with the treatment planning protocols.

The ultimate goal of any dentist is restoration of the oral function of a patient. The continuing advances in science act as a boon, aiding to rehabilitate the patients to the fullest of compliment of dentition. However, it has to be taken into consideration that sometimes it is not necessary to restore or rehabilitate all teeth, or at times, the economics of the whole procedure might deter the patient from opting for such treatment. It then becomes the decision of the operator to minimize the number of restorations such that the oral functionality is still established. This laid the foundation for the concept of "Shortened Dental Arch".

Furthermore, it is often observed that patients having periodontally weakened teeth prefer to keep those teeth rather than getting them extracted and replaced. In such situations when logic defies science, they usually have no complaints and are happy with the masticatory efficiency from those teeth. This occurs because of individual adaptability. While some patients may be satisfied with even ten teeth in both arches; some are uncomfortable even with a single molar missing. In this age of implant dentistry and fixed prosthodontics, dentists are ready to try out various extreme surgical modalities with extreme capital and risk invested in it, without sometimes evaluating whether it is really needed.

A Dutch Prosthodontist, Arnd Kayser, in 1981, revolutionized the contemporary practice by concluding from his study that, "There is sufficient adaptive capacity to maintain oral function in Shortened Dental Arches (SDA) when at least 4 occlusal units are left." [2] Hence, the concept of SDA gained popularity. SDA is defined as a specific type of dentition with an intact anterior region and a reduction in the occluding pairs of posterior teeth, starting posteriorly.[3] Kayser explained this by developing a system of occlusal units. According to him, one occlusal unit = one premolar and one molar = two premolars.

The SDA concept is based on the rationale and considerations that: (i) Anterior and premolar regions are functionally and esthetically strategic parts of the dentition, and are considered a priority in rehabilitation; (ii) It maintains the current theories of occlusion; (iii) It meets the requirements of the normal oral function; and (iv) The need for complex restorative treatment in the posterior region is decreased.[4]

Consequently, a series of researches were executed and data published to determine the, minimum number of teeth required by ,a healthy individual so as to sustain functionality of the oral cavity.[3,5,6] Finally, the World Health Organization in 1992 declared its goal for oral health as 'Oral health by retention of healthy, natural, functioning dentition comprising not less than 20 teeth and not requiring prosthesis'.[7]

Though SDA could be easily complied in the patients, one must weigh its merits against demerits (Table 1) to formulate and execute a suitable treatment plan. Since SDA is indicative of reduced occlusal units, it is essential for the clinician to evaluate and decide the retention of the existing molars. Also, this decision has to be dictated by the prognosis of the patients' anterior teeth and pre molars, attitude and motivation of the patient towards the

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treatment and any constraints associated with the restoration and rehabilitation of the posterior teeth.

Owing to the simplicity of this concept, it was expected to find a large application in clinical practice. But studies over the years depicting popularity of this concept among the dental practitioners are scarce. Thus, this study was done to assess the attitude of Prosthodontists, Other Specialists (OS) and General Dentists (GP) towards using this concept in their routine clinical practice. Also, the reasons for not opting for this treatment concept were revealed.

Table 1: Advantages and disadvantages of SDA concept

S. N.	Advantages	Disadvantages
1.	Easy access for oral hygiene procedures in remaining teeth	Limited application
2.	Simplified restorative treatment and subsequent maintenance of the restorations	Prevalence of TMJ problems
3.	Enhanced prognosis for the remaining teeth	Increased occlusal loading
4.	Reduction of cost	

Materials and Methodology

This was a questionnaire-based study that was conducted over a year (2019) among the Prosthodontists and registered GP and OS dentists in the state of Gujarat. The questionnaire was formatted with a statistician for 500 GD (includes OS) and 50 Prosthodontists. The questionnaire was designed for this study based on the model used in a study by Witter.[4] It was prefaced by a short explanation of the SDA concept and objectives of this survey.

The questionnaire contained 8 open ended questions (Q. Nos.1 to 8) and 7 close-ended questions, with a number of options set at four (Q. Nos. 9, 10, 12) and five (Q. Nos. 11,13,14,15). Assuming that the attitudes of the prosthodontists to the SDA concept will be 70% positive, to assess the same with a plus or minus 8% variation in the survey, the minimum sample size required was estimated to be 25. Assuming that the attitude of general dentist and other speciality who have not heard of the concept will be 30 %, minimum sample size required was 250. This sample size was decided keeping confidence interval at 99 % and power of the study at 90%. To validate the study and attain more reliability the sample size selected was 50 prosthodontists and 500 general dentists**.**

The sample frame comprised of all the registered prosthodontists of Gujarat, as available from the Members Directory of the Indian Prosthodontic Society and GPF directory. A simple random technique was employed to select 50 prosthodontists from the sample frame and 500 general dentists were also selected randomly from directory of IDA.

The questionnaire was distributed via e-mail and post amongst all the prosthodontist and general dentist of Gujarat State by referring to Gujarat Prosthodontic Forum directory and IDA directory. Constant reminders were also sent to the participants.

All the data obtained was subjected to statistical analysis through Pearson’s chi square test.

Results

The results revealed that out of 60% GD who were aware of the concept, 45% used it whereas in spite of 100% Prosthodontists being aware of the concept it is only 22% who use it.

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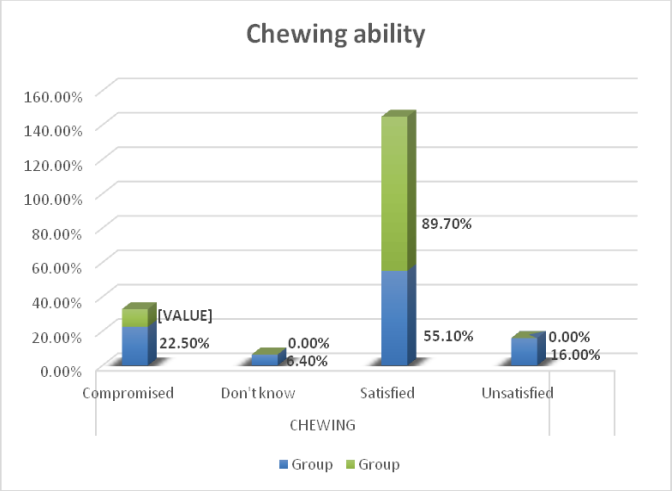
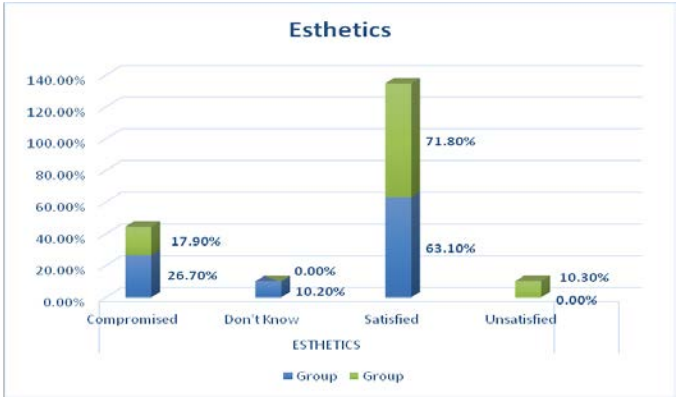
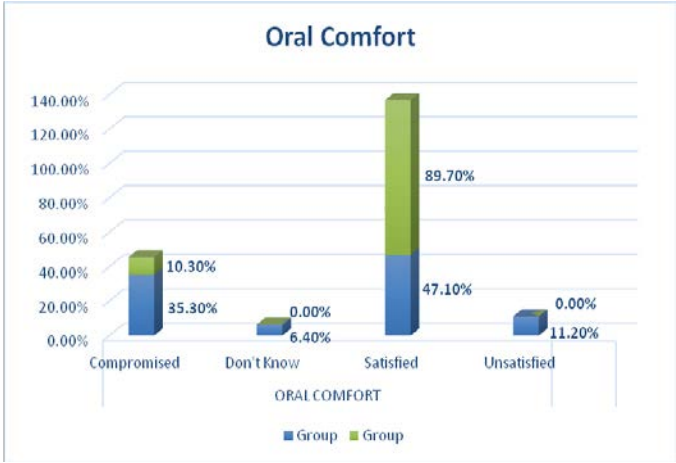


Graph 1: Chewing ability evaluation with SDA concept



Graph 2: Evaluation of esthetics with SDA concept



Graph 3: Evaluation of oral comfort with SDA concept

p value for all these comparisons were highly significant. (<0.01)

Discussion

With the introduction of the SDA concept, the traditional concepts of restorative dentistry were challenged. The traditional approach in restorative dentistry stresses on idealized morphological criteria and mechanically oriented concepts.[8] There is ample published data that accentuates the importance of molar support to prevent TMJ problems and occlusal instability.[9,10] This compulsion to save or replace every absent tooth may lead to overtreatment. Kayser emphasized that it was needless to restore all the teeth which are lost, for a successful and satisfactory functioning of oral system.[11] Ramfjord also pointed that replacement of lost molars is a common source of iatrogenic periodontal disease and should be avoided, if requirements to esthetic and functional stability can be satisfied without such replacements.[12]

The present study was started in the same essence. The basic awareness of the concept was evaluated amongst the general dentists and prosthodontists. It was seen that despite good knowledge of the concept, application of this concept was less (22%) by the prosthodontists. This could possibly be because of either the traditional aspects of restorative dentistry emphasizing that molars are indispensable for chewing staple food, or because some practitioners think that they may lose income if they do not replace molars.[13]

On the contrary, general practitioners showed a better utilization of the concept (45%) owing to their limited knowledge on this concept. This could be attributed to the fact that most of the general practitioners avoided the replacement of posterior units when it comes to a cast partial denture since molar replacement by removable partial denture does not contribute to patient satisfaction.[14] Moreover damage to underlying distal tissues cannot be overemphasized.[14] Fixed prosthesis cannot be substantiated without the presence of distal abutment.[15] Hence implant becomes the choice of treatment. This goes hand in hand with the findings of Witter, Van and Kayser who found through studies that

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distal rehabilitation with removable dentures does not contribute to patient satisfaction and oral comfort.[14,15]

But an implant treatment needs a proper diagnostic plan, favourable anatomy, skill of the clinician, patient compliance etc. It is seen through various studies that in zeal of replacing posterior teeth, many clinicians end up disrupting the harmony of the patient's system.[16,17] Hence, this is the point when the dentist should switch to the shortened arch approach.

In the present study, in both the groups (Prosthodontists and General Practitioners), the patient satisfaction with SDA related to Chewing ability (89% P 55% GP), Esthetics (71% P 63% GP) and Oral comfort (89% P 47% GP) was on the higher scale. There were few complaints of compromised functions in both the groups but they comprised of a lower percentage.

Creugers and Witter in their epidemiological studies demonstrated that SDA comprising 3-4 occlusal units did not differ significantly from complete dental arches in regards to occlusal stability.[4,18] Inspite of the favourable published data, and a pleasing patient compliance it is seen through this study that SDA concept does not find its way in application by the Prosthodontists. The overzealous treatment enthusiasm many a times leads to the periodontal deterioration of the patient. Thus, a scrutinized oral diagnosis clubbed with other factors should pave way for a proper treatment plan that will, in future, help patient maintain a healthy stomatognathic system. Also, rehabilitation should be followed by maintenance, which should be evaluated at regular intervals by the dentist.

Conclusion

The literature reads in favour of the Shortened Arch concept. However, functional demands and the number of teeth to satisfy such demands vary with individual. Hence, the dental treatment should be tailored to each individual's need and adaptive capability.

Advocating the SDA concept offers some important advantages like oral functionality, hygiene and cost. Also, it appears to fit well with the problem-solving approach favoured in modern dentistry.

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