

SHORTENED DENTAL ARCH - A REVIEW

Sarojini Ramya Pillay

*Saveetha Dental College and Hospitals Saveetha Institute of Medical and Technical Sciences
Saveetha University Chennai, India. Email id: 151601058.sdc@saveetha.com*

Dr. Sanjana Devi N

*Assistant Professor Department of Prosthodontics and Implantology Saveetha Dental College
and Hospitals Saveetha Institute of Medical and Technical Sciences Saveetha University
Chennai, India. Email id: sanjanadevin.sdc@saveetha.com*

Dr. Deepak Nallaswamy Veeraiyan

*Professor and Director of Academics Department of Prosthodontics Saveetha Dental College
and Hospitals Saveetha Institute of Medical and Technical Sciences Saveetha University
Chennai, India*

ABSTRACT

Several studies have been conducted to determine the minimum number of teeth needed to meet functional demands. However, because of functional demands the number of teeth required will differ from person to person, this minimum number cannot be precisely established. In practice, occlusion of the entire dental arch is preferred. Yet, for general, dental, or economical reasons, this goal may be neither achievable nor required. Many studies have shown that shorter dental arches consisting of the anterior and premolar regions can meet the functional dentition requirements. As a result, while prioritizing restorative treatment, the anterior and premolar areas of the dental arch should be prioritized. Moreover in cases of a reduced dental arch, replacing missing posterior molars with free-end removable partial dentures leads to unnecessary treatment and discomfort. The idea of a shorter dental arch is established on circumstantial evidence: it does not violate present occlusion theories and works well with a problem-solving strategy. The approach has several advantages and could be viewed as a strategy for reducing the need for extensive restorative therapy in the posterior parts of the mouth.

INTRODUCTION

A shortened dental arch is a dentition in which the most posterior teeth are lacking. This condition is more common because molars are commonly lost due to dental problems such as caries and periodontal problems. Traditionally, dentistry emphasized the importance of whole dentition repair in order to retain full dental arches. Teeth that are missing should be replaced. As this model has limits for many patients and health care systems, a different approach to dental care planning, called the "problem-oriented approach," has been suggested (1). The concept of a shortened dental arch is a method for reducing difficult restorative therapy in the molar area. It can be used both actively as well as passively. Removal of poorly infected molars is 'actively shortening the dental arch. By shortening dental arches and focusing on the anterior teeth and premolars, complicated treatment plans can be simplified (2,3). Passively is not a suitable replacement for newly extracted molars. Following a period

of 'wait and see,' prosthetic extension of the reduced dental arch should be taken into account (4). A shorter dental arch with intact anterior and premolar areas can provide long-term adequate functioning of the oral cavity (5,6) and free-end detachable partial dentures do not significantly improve oral function (7,8). In SDA their chewing platform area is reduced due to the decrease in the number of teeth in the dental arch. In some research it has been proven that the chewing performance, which was measured with chewing tests, declines linearly with decrease of the chewing platform area (1). It is reasonable to expect that the reduction in the number of posterior teeth, in shortened dental arches, will give rise in chewing difficulties. Moreover, a number of studies show that the majority of people with a reduction of posterior teeth report satisfactory chewing capacity as long as twenty 'well-distributed teeth' are present (9). This was observed in the case of SDA when at least 3 to 4 occluding pairs of teeth were visible, ideally in a symmetrical position (10). In a Dutch longitudinal study, about 10% of these subjects reported chewing function complaints, such as having to chew longer or swallow food coarsely (11). Our team has extensive knowledge and research experience that has translated into high quality publications(12–31).

HEALTHY OCCLUSION CRITERIA

The primary goal of dental care is to maintain a natural functional dentition throughout life. Functional outcomes can be measured by masticatory function, chewing ability, occlusal effects, nutrient intake and for social functions like aesthetics, speech, chewing, and oral comfort are some criteria for a healthy occlusion. With respect to the social and functional impact on daily life and satisfaction with a reduced number of teeth of posterior teeth the following research paper provides the information. Cushing et al (32) investigated the social impact of dental disease on individuals. They reported on the scope of socio-dental problems and their connection to clinical oral status. They separated the effects into four categories: (i) functional (ii) social interaction, (iii) comfort and well-being and (iv) self-image. They calculated self-assessment based on questionnaires filled out by 414 people from an industrial population in the north of England. Individual people with eating problems had an average of 17.8 functioning teeth in a dentate group without removable partial dentures, whereas those who had no eating problems had 21.1 functioning teeth. The group with communication issues had an average of 18.5 functional teeth, while the group without issues had an estimate of 20.8. The perspective of pain and discomfort did not link to the number of functional teeth. Moreover, the group reporting dental aesthetic problems had an estimate of 17.7 functioning teeth, while the group without aesthetic problems had an average of 21.0. When the problems were added together to create a "total impact," the group of participants with one or more problems had an average of 19.2 functioning teeth, while the group with no problems had an average of 21.9 functioning teeth. One significant implication is that the number of teeth can vary and be less than 28. If there are fewer than 28 teeth, the teeth should be evenly distributed for proper oral cavity function (32)

PRINCIPLES OF SDA

Apart from the fact that SDAs can satisfy oral functional demands, the SDA concept is established on other factors also. When it comes to dental diseases, high-risk teeth and subjects (33) can be identified. Molars are at a higher risk than any other tooth. They have the most plaque deposits (48, 49) and, as a result, are the teeth most affected by caries (34,35) and periodontal disease (36). Molars respond poorly to periodontal treatment, and is more common to the molar than any other tooth (37,38). Extraction has been the treatment line frequently used to solve the problem. Numerous studies show

that the anterior teeth are retained in comparison to earlier loss of molars (39,40). Tooth loss causes interrupted dental arches. The interrupted dental arches provide more possibilities for adjacent teeth to migrate mesially and distally into the open space than SDAs. The most common migration reported is mesial tilting of distal remaining teeth, followed by distal tilting of mesially located teeth (41). Solely on clinical observations, it appears that overeruption of non-opposed teeth occurs more frequently in tooth-bounded spaces than in SDAs; this is due to the tongue function. It is assumed that in SDAs, the tongue's interposition prevents overeruption. Interposition of the tongue in tooth-bounded spaces is frequently hindered by the teeth, resulting in more horizontal and vertical migration of adjacent and opposing teeth. The discovery that tooth migration in SDAs is small (42) adaptive, and self-limiting means that occlusal interferences occur infrequently. This is in contrast to the effects of migration in tooth-bounded spaces, which increase the risk of occlusal interferences and necessitate treatment(43). The SDA has the advantage of making the remaining anterior and premolar regions easily accessible for oral hygiene and restorative procedures.

NEED FOR SDA

A complete natural set of 28 teeth is preferable to any form of short dental arch because the molars contribute to the anterior and premolar regions' long-term occlusal stability (44). Maintaining a healthy, natural, functioning dentition for life involves preserving a premolar dental arch and molar support until a certain age. Some studies (45) support the SDA concept in the elderly, indicating that even an extreme shortened dental arch (ESDA, 16 occluding teeth) can provide an adequate, minimal, functional level. When considering the SDA concept as a treatment approach for simplifying a complex treatment plans, the health professional should determine whether the subjects meet the following criteria like major issues (caries, periodontal disease, severe tipping and drifting due to disrupted dental arches) primarily affect the molar region, favorable prognosis for the anterior and posterior region, restorative care options are limited. According to questionnaire studies among dentists, the SDA concept has been widely acknowledged but not largely accepted (46). Moreover, from a public health point of view, preserving complete dental arches is impractical and uneconomical when complex restorative treatment in the molar regions is required.

CONCLUSION

According to research, SDAs made up of anterior and premolar teeth can meet oral functional demands such as aesthetics, chewing ability, occlusal stability, and mandibular stability for an extended time. However, the precise relationship between arch length, oral function, and cost-effectiveness can only be determined in prospective cohort studies, which are difficult to conduct in an ethical manner. There is a growing body of circumstantial evidence indicating that the SDA concept offers a viable treatment strategy for reducing complex restorative treatment in the molar regions.

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