

The “Point of Care” section answers everyday clinical questions by providing practical information that aims to be useful at the point of patient care. The responses reflect the opinions of the contributors and do not purport to set forth standards of care or clinical practice guidelines. Readers are encouraged to do more reading on the topics covered. If you would like to contribute to this section, contact editor-in-chief Dr. John O’Keefe at jokeefe@cda-adc.ca.

QUESTION 1

Do missing teeth need to be replaced or is a “shortened dental arch” acceptable?

Background

For many years, it was thought that any missing tooth should be replaced,¹ although numerous clinicians and researchers questioned this opinion. Arnd Käyser was the first to coin the term “shortened dental arch” (SDA) to describe the concept of acceptable oral function with partial dentition.² Through a number of clinical studies, he and his co-workers came to the conclusion that many people could function without a full complement of teeth and that not all missing teeth require replacement.²⁻⁶ For many people, a functional dentition consists of as little as opposing anterior and premolar teeth.¹ In terms of a minimum number of teeth that patients need, Käyser and colleagues suggested that, in addition to anterior teeth, most people require at least 4 occlusal units of posterior teeth (1 pair of opposing, occluding premolars would be 1 occlusal unit, a pair of occluding molars would represent 2 occlusal units).² People with asymmetrical tooth loss

noticed a change in chewing function when they had fewer than 6 units (Figs. 1 and 2).²

The Effect of a Shortened Dental Arch on Oral Function

In general, studies comparing people with a full complement of teeth with those with SDAs have not demonstrated significant differences in ability to chew.¹ Among patients with the minimum recommended number of occlusal units, the insertion of a removable partial denture does not significantly improve oral function.³ According to some studies, the more teeth missing beyond the minimum, the more difficulty a person will have chewing.¹

In addition, those without molar support have not been shown to have a higher incidence of the signs and symptoms of temporomandibular disorders.⁵ Similarly, SDA has not been associated with significant discomfort, distress or occlusal wear.¹

Although it seems that most people can function acceptably with an SDA, this is not true

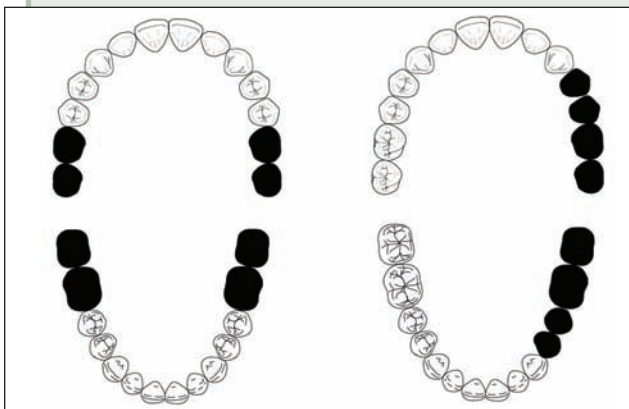


Figure 1: Patients with symmetrical tooth loss (left) normally require 4 occlusal units for acceptable function, while patients with asymmetrical tooth loss normally require 6 occlusal units (right). Darkened teeth are missing.



Figure 2: Here molar 16 and premolars 44 and 45 are unopposed; thus, they cannot be counted as occlusal units. Although overeruption of teeth, as seen here, can be a sequela to missing teeth, long-term studies have tended to show that occlusal changes are usually self-limiting and minor.¹



Figure 3: This patient has 4 premolars left. If they are opposed by maxillary teeth, there are no other complicating factors and the patient has no functional or esthetic complaints, then replacement of the missing teeth may not be necessary.



Figure 4: A prosthesis for replacement of only a few missing teeth may be unnecessary if the patient has no functional or esthetic complaints and there are no other reasons for replacement.



Figure 5: A maxillary complete denture against mandibular anterior teeth does not meet the minimum number (4) of occlusal units required for normal function. A mandibular prosthesis may be helpful for such patients.

for everyone: 7% to 20% of people with an SDA have reported that their chewing ability is hindered or that they had to change food preparation practices.¹

An SDA may also be associated with greater tooth migration and interdental spacing among patients younger than 40 years, although the migration was deemed small and clinically insignificant.¹ An SDA may also be associated with greater overeruption of teeth, although only 2% of such patients reported that it hindered their oral function.¹ People with SDA have been found to have more mobile teeth and lower alveolar bone levels. The combination of increased occlusal loading and existing periodontal disease probably represents a risk factor for further loss of teeth in these people. Patients with SDA probably also represent a high-risk group in terms of periodontal disease. Additional longitudinal studies have been recommended to study this relationship.¹

Shortened Dental Arch Options in Dental Practice

The SDA concept is increasingly accepted, although in some areas, it is not widely put into practice.¹ For dentists who provide services to patients with limited financial resources or patients who do not wish to acquire a prosthesis, the evidence provides a measure of reassurance that “no treatment” can be a sound option. Considering the implications of informed consent and the evidence collected by Käyser and others, it is prudent to ensure that treatment planning for all partially edentulous patients includes a discussion of the option of not replacing missing teeth and the pros and cons of this choice. For many patients, there

may be no need to replace missing teeth, unless they are unhappy with their ability to chew or their appearance (Figs. 3 and 4). For patients with 4 or more occlusal units who do not feel they can chew as well as they wish, replacements can still be fabricated (Fig. 5).

The SDA concept is based on the notion that patients have an adaptive capacity to function with missing teeth. This capacity clearly varies, and not all patients will feel they have optimum function with the same number of teeth. Future research will most likely improve our understanding of this clinically relevant subject. ♦

THE AUTHOR



Dr. Robert Loney is professor and head, division of removable prosthodontics, faculty of dentistry, Dalhousie University, Halifax, Nova Scotia. Email: robert.loney@dal.ca.

References

1. Kanno T, Carlsson GE. A review of the shortened dental arch concept focusing on the work by the Kayser/Nijmegen group. *J Oral Rehabil* 2006; 33(11):850–62.
2. Kayser AF. Shortened dental arches and oral function. *J Oral Rehabil* 1981; 8(5):457–62.
3. Witter DJ, van Elteren P, Kayser AF, van Rossum MJ. The effect of removable partial dentures on the oral function in shortened dental arches. *J Oral Rehabil* 1989; 16(1):27–33.
4. Witter DJ, de Haan AF, Kayser AF, van Rossum GM. A 6-year follow-up study of oral function in shortened dental arches. Part I: Occlusal stability. *J Oral Rehabil* 1994; 21(2):113–25.
5. Witter DJ, De Haan AF, Kayser AF, Van Rossum GM. A 6-year follow-up study of oral function in shortened dental arches. Part II: Craniomandibular dysfunction and oral comfort. *J Oral Rehabil* 1994; 21(4):353–66.
6. Witter DJ, van Palenstein Helderma WH, Creugers NH, Kayser AF. The shortened dental arch concept and its implications for oral health care. *Community Dent Oral Epidemiol* 1999; 27(4):249–58.