Clinical Guideline 22 -Version 2
Valid to: October 2020

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Treatment Planning for Multiple Tooth Replacement

Purpose

Clinical Practice Guidelines (CPG's) are systematic developed statements intended to support clinicians in providing high quality, best practice evidence-based care. They are not intended to be wholly prescriptive or a legal directive for clinical decisions. While their application is an acceptable ground for patient care, clinicians should carefully consider the individual circumstances and the specifics of their work environment in conjunction with these guidelines. Selection of alternative treatment modalities, based on clinical judgement and/or specialist advice, may be justified in certain clinical scenarios. In such cases, justification for the chosen treatment must be clearly documented in the patient records.

This Clinical Guideline aims to:

• Standardise the way in which patients are assessed and establish a standardised sequence to assist in treatment planning for the replacement of multiple missing teeth.

Guideline

Clinical Considerations

The loss of teeth may be a consequence of the outcome of advanced disease process (dental caries or periodontal disease); trauma; complications associated with treatment; a patient's request or other pathology or conditions.

The replacement of multiple missing teeth is based on the following principles;

1. All primary dental care is completed, including – Acute Phase (management of pain), and Disease Control Phase (namely dental caries and periodontal disease)
2. Current stability and maintenance of oral health
3. Fair to good prognosis of the remaining dentition (1)
4. Dental aesthetics to provide dignity and confidence for patients (anterior teeth replaced)
5. Sufficient number of teeth to provide function – speech, mastication and swallowing (consideration of a shortened dental arch - SDA).

These principles are applied following a comprehensive examination and an understanding of the patient's needs and expectations as well as the clinical constraints in formulating a treatment plan in replacing multiple missing teeth.

Key element of the examination should assess;

Needs and Capability Considerations	• Age • Special Needs • Manual Dexterity • Oral Hygiene Status • Needs and Expectations
Oral Health/Disease Considerations	• Carious Lesions • Restorative status of remaining teeth • Periodontal Condition • Status of the Oral Mucosa • Saliva – flow and consistency
Prosthetic and Occlusal Considerations	• Number and location of remaining dentition • Form and contour of denture bearing areas – inc. Tori • Occlusion – static/dynamic – inc. vertical dimension • Existing Prosthesis

These key elements should assist the clinician in the diagnosis and management of primary disease; establish the prognosis (Periodontal, Restorative and Endodontic) of the remaining dentition; and consider the prosthodontics requirements and constraints (clinician- and patient-based) in the treatment planning for the replacement of teeth.

Following the completion of a comprehensive assessment, the clinical options will be proposed and discussed with the patient taking into consideration the most appropriate treatment to fulfill the agreed requirements for function, comfort and aesthetics.

The consideration of options may be on the basis of whether teeth should be replaced, the method of tooth replacement employed, the predictability of the prosthetic outcome and the long-term stability of oral comfort, function and health.

Patients should be aware that all options have some limitations and that no artificial tooth replacement can be equal to the function, comfort and appearance of healthy, undamaged teeth.

The Shortened Dental Arch (SDA)

The shortened dental arch (SDA) concept is a problem-oriented strategy, based on individual patients' needs, in order to reduce unnecessary complex, costly restorative treatment in posterior regions (2). The literature indicates that dental arches comprising the anterior and premolar regions meet the requirements of a functional dentition (3-6, 8, 9).

Masticatory ability is impaired when there are fewer than 20 uniformly distributed teeth in the mouth (3).

The World Health Organization (WHO) Public Health Policy 9,10 recommends 'the retention throughout life, of a functional, aesthetic natural dentition of not less than 20 teeth and that not requiring recourse to prostheses should be the treatment goal for oral health' (13).

In this context, SDA concept can be considered a minimum interventional approach to reduce the burden of oral disease.

A review of the literature regarding the Shortened Dental Arch has evaluated patient outcomes such as functionality, comfort and satisfaction as well as prosthodontics considerations:

<u>Oral Functionality</u>

- Impaired masticatory ability and associated changes in food selection occur only when there are less than 10 pairs of occluding teeth (16). This can result in malnourishment with adverse consequence on the individuals overall health.
- If the premolar regions are intact and at least one pair of occluding molars, the SDA does not impair masticatory efficiency (15).
- In such cases oral functionality was not improved when provided with a distal extension RPD (14).

<u>Patient Comfort/Satisfaction</u>

- Patient's with a SDA reported no significant difference in pain or distress when compared to subjects with a distal extension RPD or those with a complete dentition; only 8% of patients with SDA reported impaired masticatory ability (19).
- 20% of patients with SDA and removable partial denture were dissatisfied with their dentures (19).

Prosthodontic Considerations

These include: occlusal stability (stable spatial relationship in the occluding arches) establishing correct vertical dimension and preserving the health of the soft and hard tissues and the temporomandibular joint (9).

- SDA comprising anterior and premolar teeth satisfy oral functional demands and show similar vertical overlap and occlusal tooth wear patterns to those with complete dentition (17).
- There is no evidence that SDA causes overloading of the TMJ or the teeth, suggesting the neuromuscular regulatory systems are efficient in controlling the maximum clenching force under various occlusal conditions (18).

Summary

Patients' needs and demands may vary and should be individually assessed (3, 20), However, the SDA offers oral functionality, improved oral hygiene, comfort and possibly reduced costs (3). RPD are associated with increased risk of caries and periodontal disease in patients with poor oral health maintenance (21).

Recommendations

When developing a treatment plan for adult patients, clinicians should aim to:

- Preserve all incisors/canines/premolars + 1 set of molars
- Ensure optimum oral health
- Encourage healthy behaviour and practice
- Select patients most suitable for SDA based on their age, oral health and oral disease risk assessment

(See APPENDIX A – for additional evidence)

Treatment Planning Options

1) No replacement of tooth/teeth is clinically indicated or required.
   - Patient content with appearance and function
   - Existing tooth migration/over eruption is minimal over a sustained period
   - Small edentulous areas distal of second pre-molar when asymptomatic

2) Replacement of teeth with Removable Partial Denture (RPD)

   In the consideration of a RPD the clinician should discuss the limitations in design and the impact on speech, eating and comfort. Also the clinician should discuss the impact of the RPD on oral hard and soft tissues and influence on oral hygiene.

   A RPD may be considered in one of the following contexts:

   a. *Provision of an Interim RPD treatment* - indicated where the patient's age, health or lack of time precludes definitive treatment. Interim RPD's are predominantly produced from acrylic resin unless the interim treatment is required for an extended period of time.

      Indications: - Inadvertent loss of an anterior tooth (Trauma)
      - Young patients where teeth are missing due to trauma, disease or genetic condition (hypodontia)
      - Elderly patients where health, age or mobility are of concern

   b. *Provision of a Transitional RPD* - indicated where the patient requires a functional prosthesis as treatment continues in transition – lose of remaining symptomatic teeth. Transitional RPDs are constructed from acrylic resin to allow the addition of teeth during this transition. A transitional RPD is used during transition to the definitive treatment.

      Indications: Poor oral hygiene
      Periodontally involved dentition with poor prognosis
      Advanced carious lesions
      Dental health awareness of patient is limited

   c. *Provision of Definitive RPD* - indicated where the patient requires treatment to restore the occlusion or aesthetics and presents with a stable remaining

dentition, good oral health status and good oral health awareness. The Definitive RDP typically incorporates a cast metal framework. However, it is recognised that in the Public Dental setting a Definitive RDP may be designed with an acrylic base. The Definitive RDP, is generally provides greater longevity and more stable prosthesis that is less detrimental to the overall oral health.

Indications: Good oral hygiene
Good periodontal health
Suitable abutment teeth to support RPD
Presence of tori (acrylic denture not possible)
Insufficient space in the edentulous area for acrylic denture
Occlusal parafunctional habits

d. *Provision of a Treatment RPD* - typically used as a vehicle to provide a temporary course of treatment and most commonly constructed using acrylic resins.

Indications: Carrier of tissue treatment material where traumatized tissues are present
To restore or increase vertical dimensions (5)
To provide splinting following immediate extraction or other surgical corrections in the oral cavity

3) Replacement of teeth with a Fixed Prosthesis

As a result of the clinical assessment it may be evident that the outcomes of treatment may be best achieved through the replacement of the missing teeth with a fixed prosthesis. In many circumstances such treatment is provided through specialist referral to the Prosthodontic Unit RDHM. Prior to such a referral it is important for the clinician to consider the clinical principles, scope of treatment and referral criteria as set out in the referral form for the Prosthodontic Unit.

Follow-up

- In all cases where treatment involves the replacement of teeth with a removable or fixed prosthesis patients should be provided with instructions regarding care of the prosthesis and modification in oral hygiene (as required).
- In the case of RPD patients should be informed that minor adjustments may be required if the patient experiences problems with fit, function or comfort/tolerance. Removable partial dentures generally require a level maintenance that exceeds that of fixed restorations. A definitive RPD supported by edentulous ridges and abutment teeth will require relining or rebasing over time.
- Patients with a definitive RPD should ideally present for an oral health check-up annually. In the absence of an annual oral health check-up a patient who has been provided with a definitive RPD should be advised to seek a review according to the current DHSV public oral health waiting list guideline (7).
- Patients provided with an Interim RPD, a Transitional RPD or a Treatment RPD will be followed up in line with the treatment plan as required

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APPENDIX A
Oral Functionality

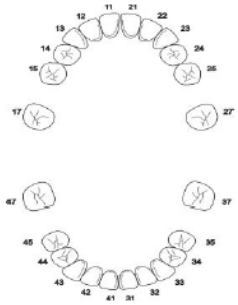
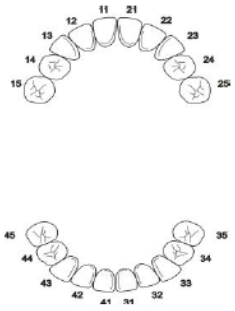
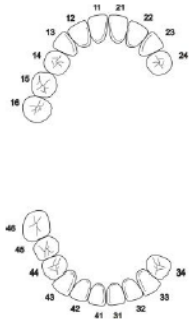
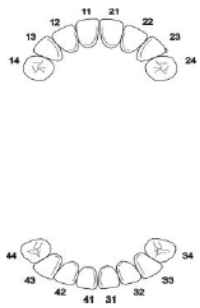
SDA configurations	Mastication ability	Prevalence of complaints
Intact premolar regions & 1 pair of occluding molars	Good	3-5%
Asymmetric arches & unevenly distributed teeth	Fair	33-54%
0-2 pairs of occluding premolars	Difficult/Limited	95-98%

Patient Comfort

Relation between age and needed oral functional level, expressed in minimum number of occluding pairs of teeth (arch length)		
Age	Functional Level	Occluding pairs
20-50	Optimal	12
40-80	Reasonable	10 (SDA)
70-100	Minimal	8 (extreme SDA)

Kayser AF 1989

Clinical presentation of SDA

Optimal Function. Good Masticatory Ability Acceptable for age 20-50 	Reasonable Function Satisfactory Masticatory Ability Acceptable for age 40-80 	Reasonable Function Fair Masticatory Ability Acceptable for age 40-80 
Minimal Funtion Fair Masticatory Ability Acceptable for age 70-100 	Minimal Funtion Limited Masticatory Ability Acceptable for age 70-100 	Poor Funtion Difficult Masticatory Ability 

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Definitions

Nil

Revision date	Policy owner
October 2020	Clinical Leadership in Practice Committee
Approved by	**Date approved**
Chief Oral Health Advisor	October 2017

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Clinical Guidelines

QUESTIONNAIRE

Answer the following questions about what you have just read.
1 Scientific CPD point is available on completion.

YourName:

Email Address:

Title of Clinical Guideline:

Question 1
List 3 key issues this Clinical Guideline reinforced for you?

Question 2
Were there areas of the Clinical Guideline you were previously unaware of? If yes, please list them.

Question 3
How will you share this information with your peers?

Click the button below to submit your answers for verification.