

Dental periscope: A new device to examine the parallelism of abutment teeth

Pravinkumar G. Patil, Rambhau D. Parkhedkar

Department of Prosthodontics, Govt. Dental College and Hospital, Nagpur, Maharashtra, India

For correspondence

Dr. Pravinkumar G Patil, Block No. 59, Hanumannagar, Near Medical Square, Nagpur, Maharashtra, India.
E-mail: pravinandsmita@yahoo.co.in

The evaluation of the relative parallelism of two or more abutment preparations for fixed partial dentures with the help of a mouth or photographic mirror may encounter the errors. A dental periscope is a new device for examining the abutment preparations outside the mouth, which is otherwise difficult to judge intraorally. With the help of this device, the evaluation of relative parallelism of tooth or implant abutment preparations for fixed partial dentures will become more convenient. Axial preparations for individual inlay, onlay or crown also can be evaluated easily with this device.

Key words: Dental periscope, Relative parallelism, Abutment preparation

INTRODUCTION

When teeth are prepared for single crowns or as abutments for fixed partial dentures, the goal is to establish a path of placement that will allow unimpeded insertion of the restoration in conjunction with an optimum convergence angle of 2.5 to 6.5° to minimize stress concentrations.^[1,2] When multiple abutments are evaluated for a common path of placement, the mouth mirror is centered over one abutment and shifted to the next without changing the angulation of the mirror.^[3] The preparation needs to be viewed with one eye closed because the undercuts may remain undetected with binocular vision. This technique requires that the angulation of the mouth mirror remain unchanged since each abutment is evaluated for undercuts relative to opposing the axial walls. The larger the number of abutments between them, the harder it is to determine the existence of a common path of placement.

Mirrors designed for use in acquiring intraoral pictures allow a simultaneous view of multiple abutments.^[4] This gives an easy visualization while evaluating tooth preparation for the path of placement parallelism for multiple teeth or implant abutments. With this technique, all the preparations need to be viewed with single eye centered over one abutment and shifting to the next without moving the mirror. The undercut areas relative to the opposing axial walls are difficult to examine since an operator does not have any guideline to move the eye from over one abutment to the other.

The Oxford dictionary defines a periscope as 'an apparatus with a tube and mirrors or prisms by which

an observer in a trench, submerged submarine or at the rear of a crowd can see objects that are otherwise not visible.

Designing of the device

The concept of design of the dental periscope is based on the principles of any other periscope [Figure 1]. It is constructed by using three plain mirrors (A, B and C) angulated at 45° to a main metal framework (M) [Figure 2]. Mirrors A and B face mirror C. Mirror C (attached to the eye piece [E]) facing towards mirrors A and B. The slidable assembly (S), which houses the mirror B, is slid over the main framework. Handle (H) (attached to mirror B) helps to remove or reseat mirror B in the slidable assembly. The top view of the device is shown in [Figure 3a]. The detachable eye piece allows the device to be used in both arches [Figure 3 b, c].

Guideline for using the device

The device is placed in the patient's mouth in a manner that mirror A is centered over the most posterior abutment and the slidable assembly with mirror B is centered over the anterior abutment preparation [Figures 2 and 4]. For examining the posterior tooth, mirror B is removed from the assembly with the help of a handle (H) attached to it. The occlusal image of the posterior abutment preparation, which is formed

This device was presented as a table demonstration before the 'Indian Prosthodontic Society's 34th National conference', Kanyakumari (INDIA) on 4th Nov., 2006.



Figure 1: Dental periscope is a modification of other periscope

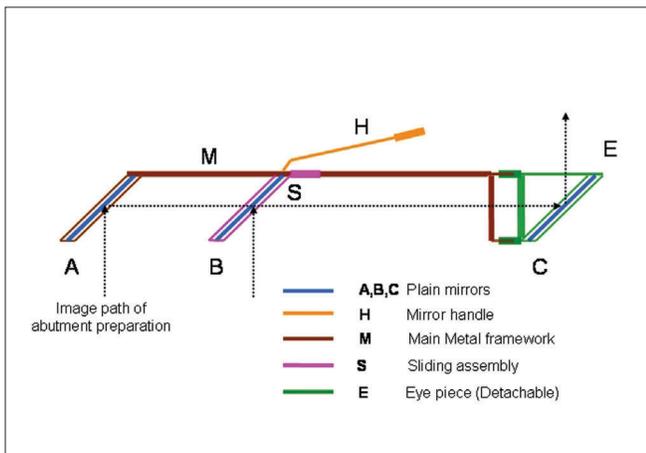


Figure 2: Schematic presentation of dental periscope

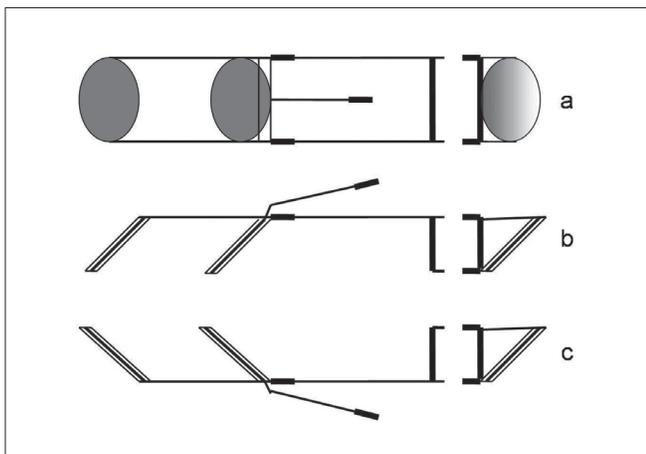


Figure 3: Schematic presentation of the device: (a) Top view, (b) Position of the device for mandibular arch, and (c) Position of the device for maxillary arch

on mirror A acts as an object to mirror C. The image formed on to mirror C can be viewed by an operator into the eye piece outside the patient's mouth. When mirror B is reseat in the slidible assembly, (already centered over the anterior abutment) an occlusal image of the anterior abutment is visible through the eye piece in a similar manner. Alternative removal and reseating of mirror B in the slidible assembly form alternate occlusal images of the posterior and anterior abutments, respectively, in the eye piece. Thus, any two abutment preparations can be examined by keeping

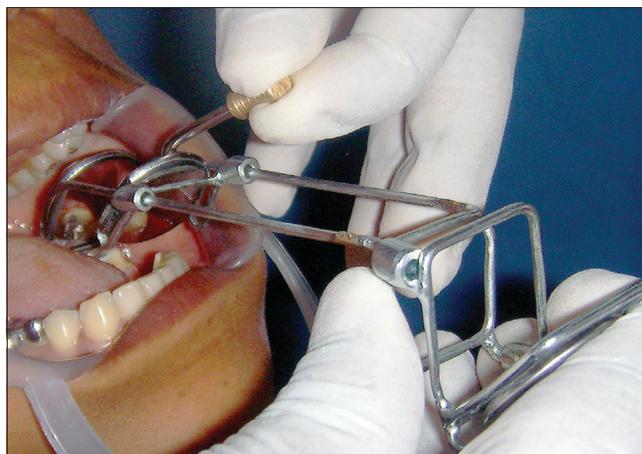


Figure 4: The device in use

mirror A over one abutment and adjusting mirror B (with slidible assembly) over another abutment. Multiple implant abutments can be examined in a similar manner. Single crown, inlay or onlay also can be examined in a similar manner using either of the mirrors (A and B) centered over it.

Advantages of the device

1. Parallelism of multiple implants or tooth preparations can be examined accurately.
2. The walls of the individual crown, inlay or onlay preparations can be examined accurately.
3. The axial wall parallelism can be examined from the side view by keeping the device horizontally on the buccal or lingual side of the preparations.
4. Chairside time is reduced by eliminating the multiple diagnostic impressions and casts, which are required for the purpose of examining the abutments during various stages of preparations.
5. Eliminate the chances of human errors by examining the preparations with a mouth or photographic mirror.
6. The device is autoclavable

Disadvantage of the device

1. Sufficient light illumination is required.

CONCLUSION

The design of the dental periscope allows the clinician to judge the relative parallelism of multiple tooth preparations as well as implant abutments extraorally, which is otherwise difficult to judge intraorally.

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