AN INNOVATION TO EVALUATE PROPER PATH OF PLACEMENT OF FIXED PARTIAL DENTURES

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Abstract

The relationship between taper and axial height of the abutment tooth is most important for providing retention and resistance in a crown & bridge work. In addition, if a bridge is to be fabricated the angulation of the surfaces of the abutments is a vital requirement for single path of placement of the bridge. During tooth preparation,taper and its parallelism are important to better estimate the proper path of placement along with retention and resistance forms. The techniques of measuring the taper and parallelism of axial walls which are available till date are difficult to implement either because of their time consuming procedures or due to expensive equipments. To overcome these difficulties in clinical procedures, a device is fabricated which will measure the degree of taper and the parallelism of axial walls simultaneously. This paper focuses on fabrication of a new device which will help in determining taper and parallelism of axial walls simultaneously in a simplified way.

Key Words Total occlusal convergence angle, taper, mirror, parallelism.

INTRODUCTION

The angle formed between opposing walls of tooth prepared for crown is called total occlusal convergence (Rosenstiel, 1975).The retention of crown has been shown to be inversely proportional to total convergence angle (Jorgenson, 1955). Ideally 6° - 14° total convergence angle is recommended (Shillingburg et al., 1997). Research shows a clinically acceptable total occlusal convergence varies from 10^{O}-24^{o}[1,4,5,7,9]. Ideal path of insertion is achieved when the mesial wall of one prepared tooth is parallel to the mesial wall of the other prepared tooth/teeth in a crown and bridge preparation and the same applies for the distal wall. The techniques of measuring the taper and parallelism of axial walls which are available till date are difficult to implement either because of their time consuming procedures or due to requirement of expensive equipments.[2,3,6,8,10] To overcome these difficulties in clinical measurements, a simple less expensive instrument is fabricated for dental practitioners.

Description of the instrument:

The instrument consists of a metal reflector and an acrylic holder with handle. Both the surfaces of the metal reflector will act as a mirror in this situation. Dimensions of the reflector are height-21mm, length-41mm, width-1mm. The acrylic holder has got 1 slot on each side for holding the metal reflector with above mentioned dimensions. The Metal reflector has parallel graduations at an angle of 10 degree, thus we can measure a total occlusal convergence of 20 degree in a prepared tooth. The parallel graduations have both mesial and distal inclinations. Graduations are so made that a single reflector can be used in both the arches and on both side of the face.(fig1-5).

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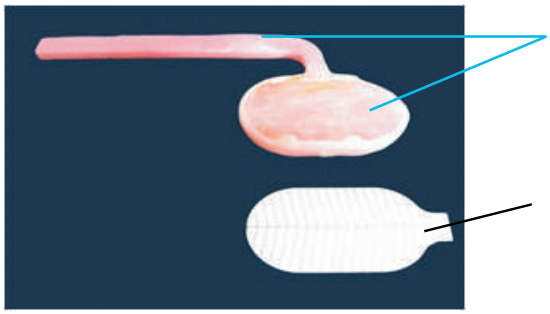
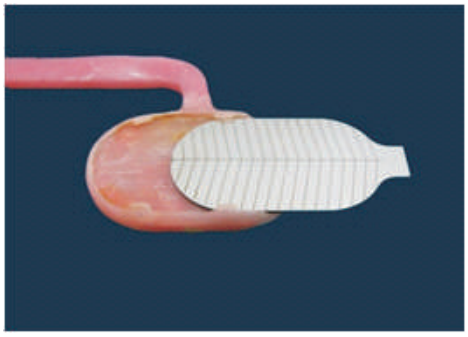


Self cure acrylic holder with handle

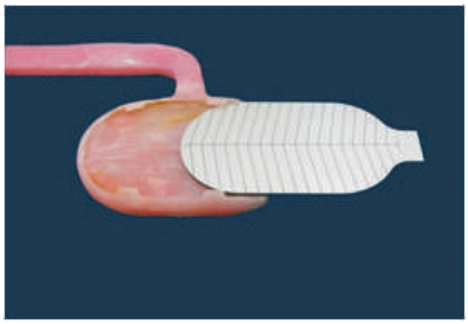
Metal reflector cut & shaped into suitable size so that it can be comfortably placed within the oral cavity

fig 1



Graduations made on metal reflector by laser. A straight line in the middle area depicts the plane of occlusalsurfaces of posterior teeth.Graduations made on upper part of the straight line is for checking parallelism of distal axial walls of maxillary posterior teeth. Graduations made on lower part of the straight line is for checking parallelism of distal axial walls of mandibular posterior teeth.

fig 2



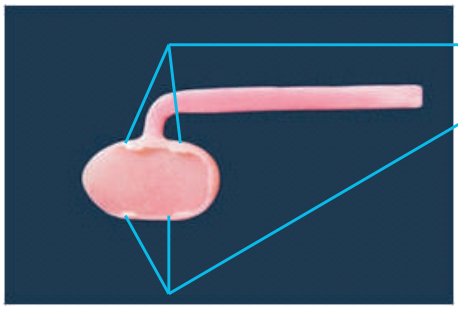
Graduations made on upper part of the straight line is for checking parallelism of mesial axial walls of maxillary posterior teeth. Graduations made on lower part of the straight line is for checking parallelism of mesial axial walls of mandibular posterior teeth.
Reflector is made to slide along the surface of the holder so that it snugly fits into the holder compartment.

fig 3

If holder lies beneath the handle,then it can check parallelism of axial walls of mandbulararch.

To check maxillary teeth parallelism , the instrument to be hold in such a position that holder remains above the handle.

fig 4



Four Small acrylic extensions on both sides are made from the surface of the holder to snugly fit reflector within the compartment and prevent it to fall outwards, allowing for measurements in all quadrants of the dental arches.

fig 5

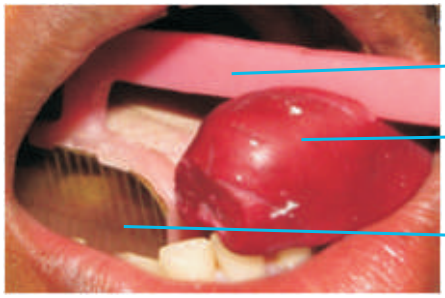


fig 6

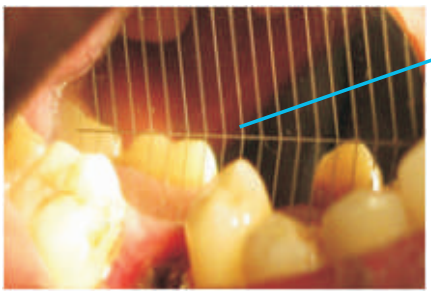


fig 7

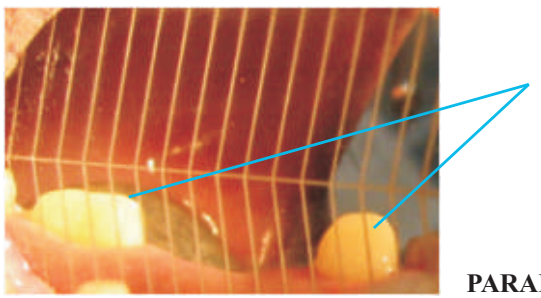
TECHNIQUE

At first type II impression compound is softened in hot water and then placed on the incisal edges of the lower anterior teeth in such a way, that it will act as a jig once it completely sets.(fig 6) Before setting of the compound, the handle of the instrument is placed on the soft compound.(fig 6) The depression thus created by placing the handle on the jig serves as a fixed reference point.(fig 6). This helps to avoid error of faulty placement of the instrument when frequently placed during the tooth preparation procedure.

The reflector is placed lingual to the desired tooth to be prepared, in such a way that the horizontal line present in it, is parallel to the occlusal plane of the teeth to be reduced.(fig 7). After the reduction of teeth, we placed the instrument in same manner as mentioned above, keeping the compound jig as reference. In this way, we are able to see the individual parallelism of mesial and distal walls of the preparation. (fig 8 & fig 9)

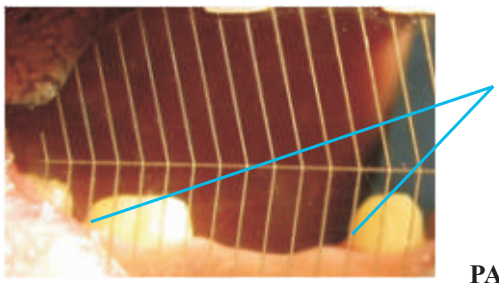
To evaluate the accuracy of taper in bucco lingual/palatal tooth surfaces, this instrument can be placed distally to the posterior prepared tooth, and the reflection thus obtained can be viewed.

Similar procedure can be opted for any desired degrees of taper. This instrument has 10^{o} taper which helps us to check a total occlusal convergence of 20^{o} in final preparation. Similarly, if any other total occlusal convergence is desired, it can be made by changing the graduations accordingly.



PARALLEL MESIAL WALLS

fig 8



PARALLEL DISTAL WALLS

fig 9

DISCUSSION

The present technique can be implemented in daily practice to help the dentist in tooth reduction for crown and bridge work. By knowing the convergence angle during this process, the dentist can better estimate the amount of retention and resistance form of the tooth preparation at this early stage. It provides fast viewing of the angulation of the axial walls during tooth preparation. However, it requires a short training period in order to be effective. It does not show the exact determination of the convergence angle, but the interval in which it falls. However, this limitation is not clinically relevant in most situations.

CONCLUSION

The present technique, based on an instrument developed for this pusrpose, allows the determination of the approximated convergence angle (axial walls) during the tooth preparation for crown and bridge work.

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