Clinical Pearl

To cite:
Uday Kumar Digumarthi, R. Prakesh

A simple method to determine the amount of torque incorporated into an archwire using a smartphone application

J ContempOrthod 2021;5(2): 49-50

Received on:
05-06-2021

Accepted on:
19-06-2021

Source of Support: Nil

Conflict of Interest: None

A simple method to determine the amount of torque incorporated into an archwire using a smartphone application

[1]Uday Kumar Digumarthi, [2]R. Prakesh

[1]Professor, Department of orthodontics anil neerukonda institute of dental sciences visakhapatnam, Andhra Pradesh, India.

[2]Professor & Head, Department of orthodontics anil neerukonda institute of dental sciences visakhapatnam, Andhra Pradesh, India.

ABSTRACT

Control of torque in Edgewise systems most often requires manual incorporation of torque into the wire even in Pre Adjusted Edgewise (PAE) brackets as proposed in the MBT system. This article describes an easy and foolproof chair-side method of calculating the incorporated torqueStatistical analyses were performed using Statistical Package for Social Sciences software (SPSS version 26, USA). Normality was checked using the Shapiro Wilk test. As data were not normal Kruskal Wallis ANOVA test was used to compare the data between groups. Bonferroni post hoc tests were used to find out pairwise comparisons. A p-value of <0.5 was considered statistically significant.

INTRODUCTION

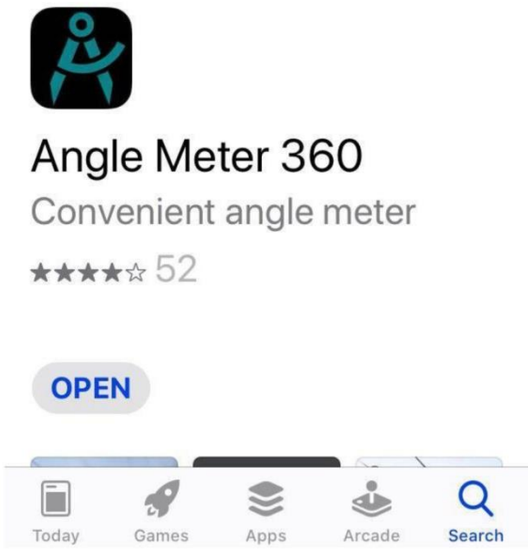
Torque requires the production of a pure rotational displacement about a longitudinal axis and is used in orthodontics to specifically reposition root apices with respect to tooth crowns during the alignment process. For a rectangular wire to exert sufficient torque it must first completely fill the bracket by having a diagonal cross-section that is greater than the occluso-gingival bracket slot width. Torque applied at the point of each bracket is delivered as an overall torsional force system to the dentition.To ensure final stability of the intended esthetic alignment of teeth and to achieve maximum intercuspation of teeth with a stable occlusion optimum facio-lingual and bucco-lingual inclinations of the dentition is desired. [1]

Torque can be incorporated or developed in an rectangular archwires by the following methods :

1. Charles H.Tweed advocated V-bends thus dividing the arch wire into anterior and posterior segments before incorporating torque into the archwire using a No 139 plier or a Tweed plier. They are usually positioned between the lateral incisor and canine.[1]
2. If the v bends recommended by the Tweed method are avoided and instead the distal ends of the wire are bent at right angles torqueing of the posterior segment is facilitated.[1]

Torque is incorporated by grasping the archwire with a plier just mesial to the V bend and then bending the mesial part gingivally with thumb pressure repeating the process in increments while shifting towards the midline for uniform torqueing. The procedure is now replicated on the other side as well thus developing lingual root torque in the arch wire. At this point the distal right angle bends assume a lingual inclination which has to be corrected back to a vertical right angle by grasping the wire distal to the v bend and adjusting it.[1]

Figure 1. The Angle Meter 360 Application used



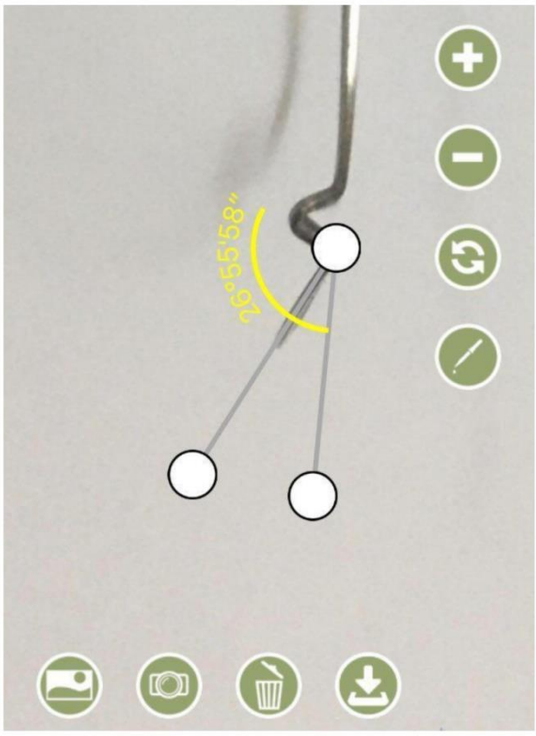
LOSS OF TORQUE

If there is a looseness or play between the rectangular arch wire

and the slot of the bracket there will be a loss in effective torque. A 1 mm freedom of movement can result in a 2 to 4 ° of freedom in tipping in the direction of the applied torque. Similarly a difference of 2 mm may cause a freedom of tipping greater than 5°.

Even in the Pre Adjusted Edgewise brackets of the MBT system it is often required to add an additional 10° to 20° palatal root torque in the upper arch wire and an additional 10° to 15° of labial root torque in the lower arch wire to improve fit in the bracket slot and torqueing performance without loss of intended torque.[2] Reconfirmation of the torque induced by way of angle verification is proposed by way of using a smartphone camera and an application capable of measuring angles on a photograph.

Figure 2. Measuring the angle of the arch wire on screen using the application



MATERIALS AND METHOD

Chair-side Method of Determining Torque.

This clinical tip proposes the use of angle measuring applications or apps that are available for free for use in conjunction with a smartphone. For basic testing an iPhone X was chosen and a free app called Angle Meter 360 (version 1.6) developed by Alexey Kozlov (Fig. 1)was installed for the intended use. The app allows capture of a photograph using the back camera of the smartphone. A photograph of the arch wire stabilized by poking one of the distal legs into a pencil eraser, is shot such that both distal legs and the v bends coincide to prevent parallax error. Once the photograph has been captured, on screen measurements of the angle of torqueing can be performed very easily as shown in (Fig. 2).

Conclusion. This clinical tip is aimed at easy chairside verification of the angle of bend incorporated into an arch wire for an estimation of torque induced. There are numerous protractor and angle measuring applications available on various operating systems for most smartphones which either overlay a translucent picture of a protractor over the image being captured or allow the on screen measurement of angles in a captured image. The latter type was chosen as demonstrated and was found to be easy to use.

REFERENCES

1. Charles H. Tweed .Clinical Orthodontics Vol. 1 CV Mosby St Louis 1966.
2. Richard P McLaughlin, John C Bennett Hugo J Trevesi. Systemized orthodontic treatment mechanics 2nd edition Elsevier Mosby; 2005.