

Incisor Inclination Indicators for Diagnostic Setups

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Customized indirect bonding is required in lingual orthodontics because of the highly variable lingual anatomy.^{1,2} The lingual brackets are placed on a diagnostic setup cast, and the angulation, torque, and in-out needed to achieve the desired tooth movements are built into the resin backings of the bracket bases. For best results, therefore, the diagnostic setup must suit the individual patient precisely.

We recommend the use of incisor inclination indicators to control the axial inclinations of the incisors in the diagnostic setup, as described in this article.

Procedure

1. Mark an anterior reference point at the lowest point of the infraorbital rim (Fig. 1). Orient the facebow on the patient by sliding the bitefork into place while placing the earpieces of the measuring bow in the patient's external auditory meati. Adjust the bow so that its anterior reference pointer aligns precisely with the anterior reference point on the patient's face (Fig. 2). The upper surface of the bow will now coincide visually with Frankfort Horizontal (Fig. 3).
2. Mount the maxillary and mandibular casts on the articulator (Fig. 4).
3. Make inclination indicators for the upper and lower incisors from .021" × .025" stainless steel wire and inlay pattern resin (Fig. 5). Adjust each indicator on the cast so that its angle to the articulator table is the same as the inclination of the incisor to FH (center of mechanical porion-orbi tale) on the cephalogram (Figs. 6, 7).
4. Using the inclination indicators and the protractor, reposition the teeth on the setup casts to achieve the desired axial inclinations of the upper and lower incisors to FH. For example, if the treatment objective for the upper incisor inclination to FH is 116°, reposition the upper incisors so that the inclination indicator measures 116° in relation to the articulator table (Fig. 8).

Discussion

Ross and colleagues have shown that the faciolingual inclinations of the maxillary incisors to the occlusal plane can vary by as much as 13° between high- and low-angle patients.³ The maxillary incisors tend to be more procumbent and the mandibular incisors more upright in Class III skeletal frameworks than in Class I skeletal frameworks. On the other hand, the mandibular incisors are more procumbent and the maxillary incisors more upright in Class II frameworks.⁴ These variations must be considered when making individualized prescriptions for orthodontic appliances.

In most cases, the incisors are tipped back during retraction and space closure, and lingual root torque is then incorporated in the later stages of treatment. Torque is much easier to achieve with a labial archwire than with a mushroom lingual archwire, especially since lingual

mechanics tend to tip the incisors more lingually during space closure.

With the incisor inclination indicators, additional lingual root torque can be built into the resin backings of the anterior lingual bracket bases. The pretorqued lingual brackets will largely prevent lingual tipping of the incisors during retraction and space closure, making it simpler to achieve the desired torque during the finishing stages without placing bends in the lingual archwires.

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FIGURES

Figure 1



Fig. 1 Anterior reference point marked on patient's right side at lowest point on infraorbital rim.

Figure 2

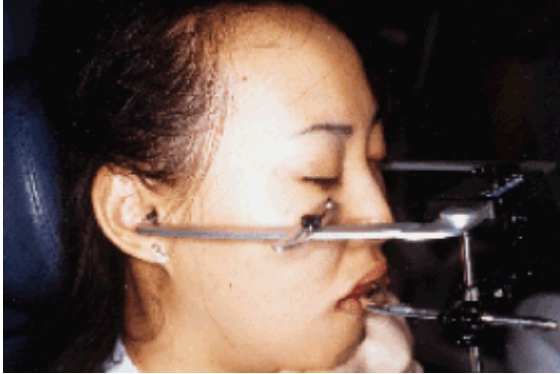


Fig. 2 Earplugs of measuring bow placed in external auditory meati. Anterior reference pointer of facebow aligns precisely with anterior reference point on patient's face.

Figure 3

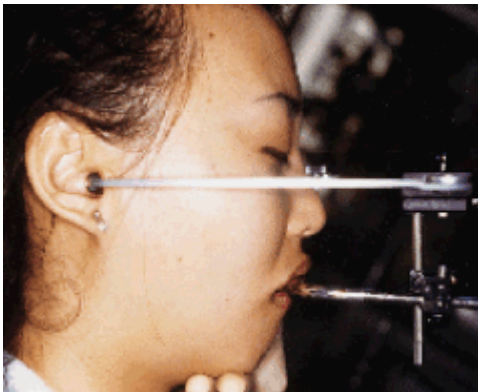


Fig. 3 Upper surface of bow visually represents Frankfort Horizontal (center of mechanical porion-orbitale).

Figure 4

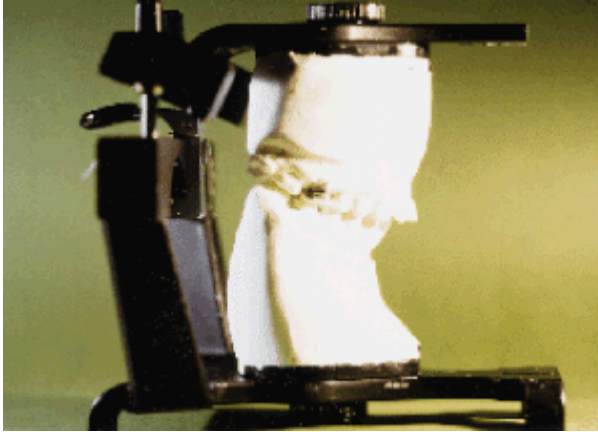


Fig. 4 Maxillary and mandibular casts mounted on articulator.

Figure 5

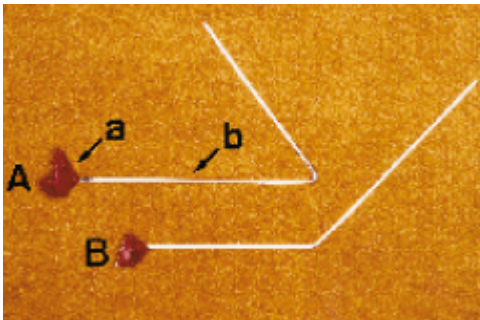


Fig. 5 Inclination indicators made from inlay pattern resin (a) and .021" × .025" stainless steel wire (b). A. Upper incisor indicator. B. Lower incisor indicator.

Figure 6

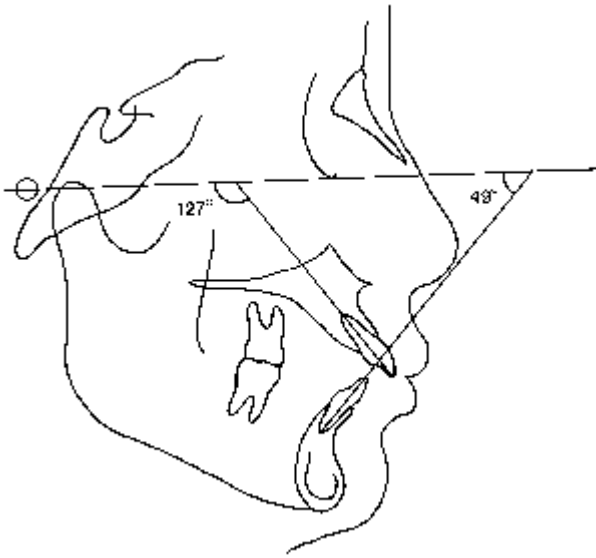


Fig. 6 Cephalometric tracing showing inclinations of upper and lower incisors to FH.

Figure 7

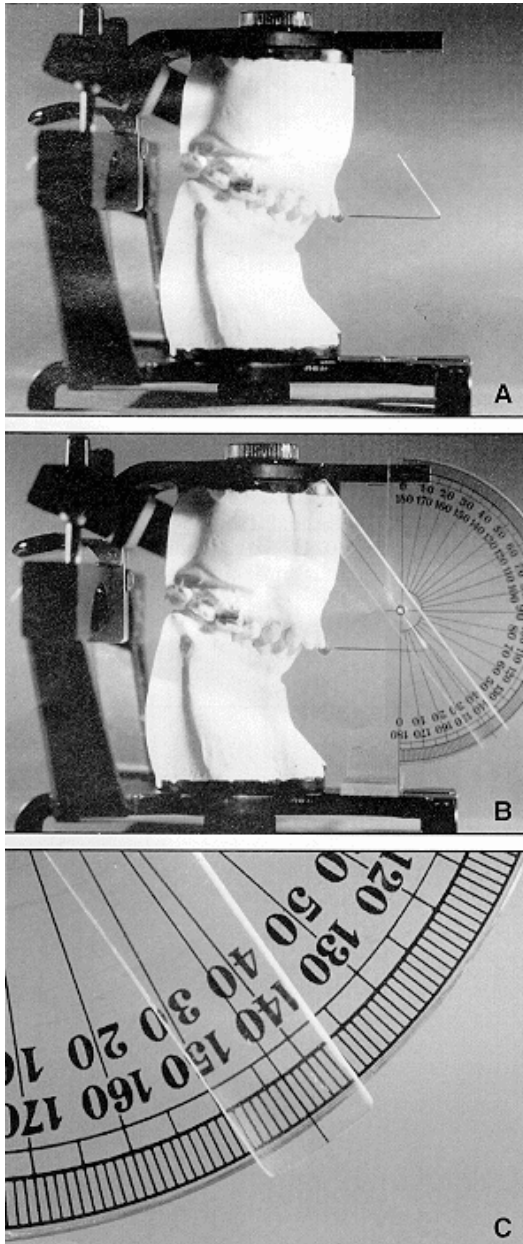


Fig. 7 A. Upper incisor inclination indicator on diagnostic setup cast. B. Angle of upper incisor inclination indicator to articulator table measured with protractor. C. Angle measured at $90^\circ + 37^\circ = 127^\circ$.

Figure 8

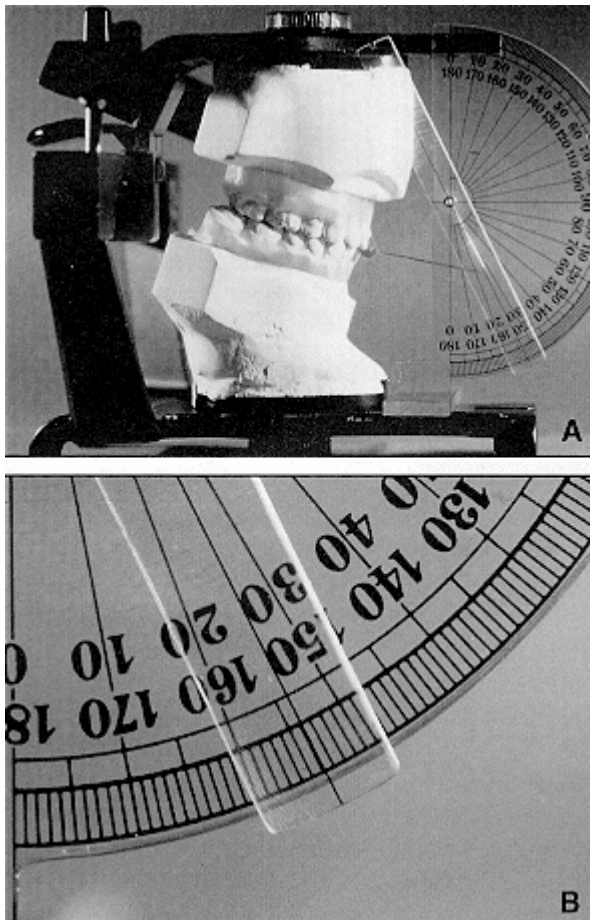


Fig. 8 A. Using upper incisor inclination indicator and protractor, upper incisors are repositioned according to treatment objectives. B. Desired upper incisor axial inclination to articulator table: $90^\circ + 26^\circ = 116^\circ$.

References

1. Hoffman, B.D.: Appliance placement process, in *Syllabus of Lingual Orthodontics*, Ormco, Orange, CA, 1989, pp. 16-39.
2. Hong, R.K. and Soh, B.C.: Customized indirect bonding method for lingual orthodontics, *J. Clin. Orthod.* 30:650-652, 1996.
3. Ross, V.; Isaacson, R.J.; Germane, N.; and Rubenstein, L.K.: Influence of vertical growth pattern on faciolingual inclinations and treatment mechanics, *Am. J. Orthod.* 98:422-429, 1990.
4. Root, T.L.: The level anchorage system, in *Orthodontics: State of the Art, Essence of the Science*, ed. L.W. Graber, C.V. Mosby Co., St. Louis, 1986, pp. 249-278.