Introduction to Congruence Testing

Establishing congruence of the dimensions obtained on lateral, frontal, and base views is our method of checking the accuracy of patient positioning. This is done by relating the dimension of a given structure in one view to the same dimension of that structure in one of the other views. Because each of the views should be perpendicular to the other two, measurement of a given dimension should be the same in both views. If the measurement for a particular dimension is different, one can assume that the patient is incorrectly positioned for one of the two views.

For example, the lateral and base views demonstrate the midsagittal AP dimension of the velopharyngeal portal (1 in Fig. 7.1A, 1’ in Fig. 7.1C). If these two views are perpendicular to each other, measurements of the midsagittal AP dimension of the VP portal will be the same in both views. Likewise, on the frontal and base views, the transverse distance between the lateral pharyngeal walls (2 in Fig. 7.1B, 2’ in Fig. 7.1D) is seen. If these two views are perpendicular to each other, measurement of the distance between the pharyngeal walls should be the same.

In applying the test of congruence to a dimension seen on two views, one should first determine which of the two views is most likely to be properly positioned. The measurement on this view should serve as a reference for the same dimension in the second view.

**FIGURE 7.1.** Demonstrating congruence among lateral, frontal, and base views of velopharyngeal portal: Midsagittal AP dimension (1 in A) equals same dimension on base view (1’ in C). Transverse dimension (2 on B) equals same dimension on base view (2’ on D).
Midsagittal Velopharyngeal Dimension

Now let us be specific. The anterior-posterior dimension of the VP portal, that is, the dimension between the posterior surface of the velum and the anterior surface of the posterior pharyngeal wall, is seen on two views—the lateral and the base (Fig. 7.1). The lateral view is used as the reference standard for this dimension because one can determine whether the lateral view is properly or improperly positioned solely on the basis of the lateral view. The lateral view is correctly positioned when the plane of the hard palate is horizontal (to eliminate flexion or extension distortions), and when the vertical rami and angles of the mandible superimpose (to indicate that the head is not rotated to one side or the other) (Fig. 4.3). This “true lateral” position is the defined position to measure the sagittal or anterior-posterior dimension of the VP portal.

In contrast to the ease of positioning of the lateral view, positioning for the base view, as described in Chapter 4, is much more difficult. Fixed osseous landmarks can neither be used to determine the plane of the VP portal on the base view nor to adjust that plane perpendicular to the vertical x-ray beam. Positioning of the base view is done on a trial-and-error basis by changing the degree of flexion or extension of the head until one perceives what appears to be a smoothly margined en face view of the portal that moves centripetally during phonation from its rest position to its position of maximum narrowing or closure. A check on the accuracy of this position is made by comparing dimensions seen on the base view with the same dimensions seen on the lateral and frontal views. This is vital to insure that the base view was properly positioned. One of the reasons for performing the lateral view before the base view is that one observes the maximum and minimum midsagittal dimensions of the VP portal on the lateral view and looks for the same distances on the base view.

In certain situations the midsagittal distance of the VP portal on base view may not match the same dimension on lateral view. For example, VP closure may occur between the superior surface of the velum and the inferior surface of a prominent adenoid pad. When such a patient is positioned for the base view, the plane of the VP portal will be approximately 45° off the vertical. If this patient is unable to hyperextend his neck enough to bring the plane of closure perpendicular to the vertical beam (Fig. 7.2), the resultant base view image (Fig. 7.3B) will appear to show a grossly inadequate VP portal during speech. If one interprets the images on this base view without referring to the lateral view (Fig. 7.3A), one may conclude that there really is VP inadequacy. However, when the lateral view is used as the reference standard, it is obvious that there is closure in the sagittal dimension on the lateral view and, therefore, that there cannot be inadequacy on the base view. The apparent VP gap seen on the base view represents the distance between the uvula and posterior pharyngeal wall, which is below the region of sagittal closure.

For the sake of simplicity, we have initially defined the proper lateral view as one in which the plane of the hard palate is parallel to the horizontal plane. However, for the base view, the head may have to be hyperextended to properly position the plane of the VP portal perpendicular to the vertical x-ray beam (Fig. 7.4). This hyperextension position, as described in Chapter 4, can increase the sagittal dimension between the velum and the pos-