Protrusion

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Orthodontic studies have related the denture to its base as defined by points A and B.[1,2,3] This study uses the same points to relate the most anterior part of the denture to the facial plane. The distance is measured to the closest half millimeter and is called protrusion.[4]

Subjects selected for study were fifty untreated excellent occlusions collected by Lawrence F. Andrews and his study group in San Diego, California.

The purpose of this paper is to find a simple method for estimating protrusion. It is reasoned that such estimation of protrusion applied to orthodontic patients would provide comparisons. Favorable comparison might indicate stability similar to that of the selected excellent occlusions. Unfavorable comparisons might indicate need for treatment.

Eighteen measurements were taken from fifty tracings. A computer correlated the measurements and derived multiple correlation regression equations. AB plane angle and convexity were selected as relevant variables.

The AB plane angle is the measure of a line through points A and B intersecting a line from nasion through pogonion (facial plane). It is usually a minus measurement because point B is generally posterior to point A from facial plane (Fig. 1).

Convexity was measured by two methods: first, as an angle between a line drawn from nasion through point A intersecting a line from pogonion through point A (Fig. 1); second, as a linear measurement to the closest half millimeter from facial plane to point A. Correlation between convexity and protrusion is higher, .839, as a linear measurement than as an angle, .831.
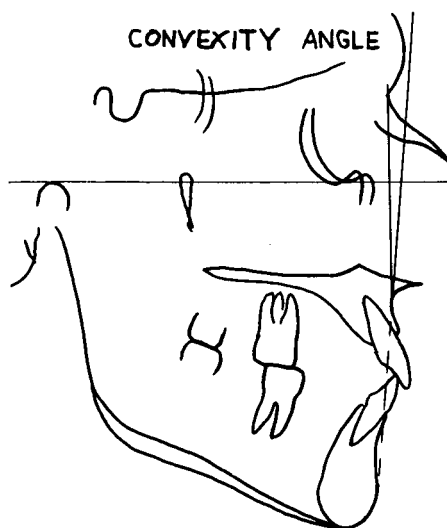

CONVEXITY ANGLE

Fig. 1

To estimate protrusion, multiply the AB plane angle by .514 and multiply convexity by 1.19. To these results add the constant 8.121. This sum approximates protrusion more closely than one standard deviation from mean ninety-five percent of the time. The fifty measurements for protrusion used in this study had a range from 1.5 mm to 12.5 mm with a mean of 6.61 and a standard deviation of 2.81.

Table I lists the fifty measurements and the fifty estimates. O is the observed point and E is the estimate for that point. Tracings No. 29 and No. 34 list only the symbol E because O and E coincided. Tracings No. 17 and No. 36 had estimates beyond the standard deviation (2.81), by less than .2 mm, 2.82 mm and 2.94 mm, respectively.

Graph I is a nomograph. It simplifies estimation of protrusion. A straight line across a convexity measurement on the left to the AB plane angle measurement on the right intersects a point on protrusion. This is the estimate.
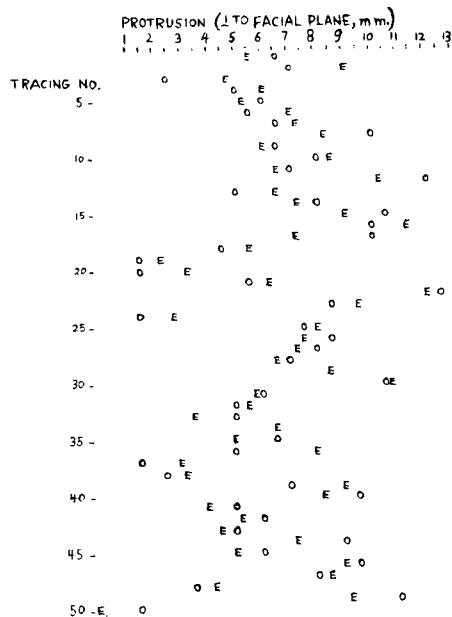
PROTRUSION (⊥ TO FACIAL PLANE, m m.)

TABLE I

If an orthodontist wishes to compare protrusion from his patients with that found in excellent occlusions, this is a convenient method.
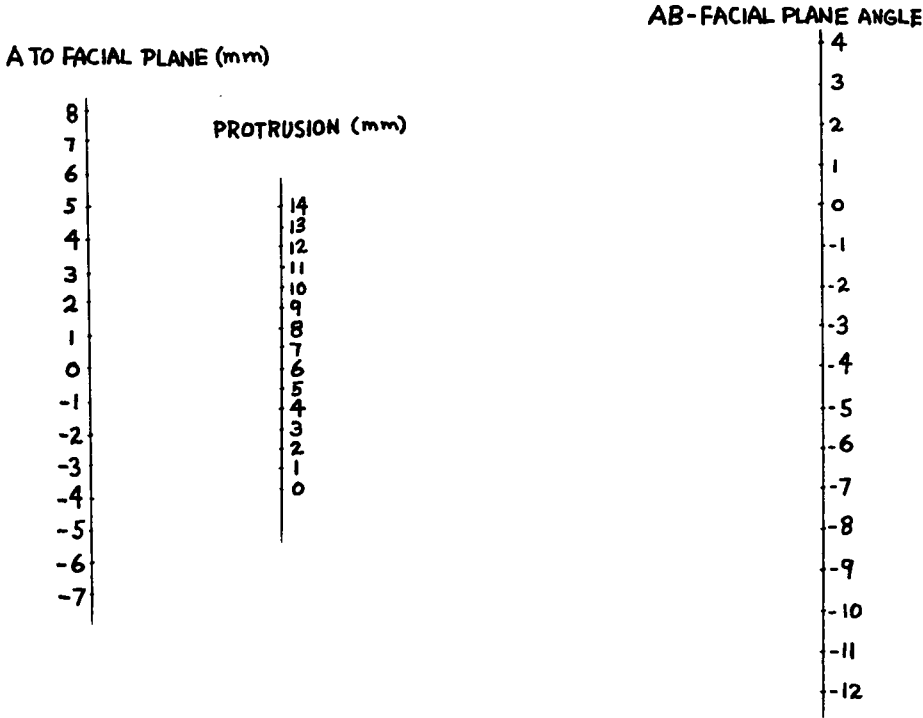
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A TO FACIAL PLANE (mm)

AB-FACIAL PLANE ANGLE

PROTRUSION (mm)

GRAPH I