

The Mandible in Class II, Division 2

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An examination of the unique anatomy of the mandible as found in cases of Class II, division 2 malocclusion

This evaluation of the shape, size, and position of the mandible in Class II, Division 2 malocclusions is based on a sample of 60 subjects (38 male and 22 female) with Class II, Division 2 malocclusion, and a control sample of 28 subjects (13 male and 15 female) with normal occlusion. The age range in each sample was 9 to 14 years.

Cephalometric radiographs were analyzed by means of the measurements employed in our method of cephalometric analysis (Maj, Luzi and Lucchesi). The following dimensions were used to assess the size and shape of the mandible (Fig. 1).

Principal lengths:

- (1) Total length of the mandible (Co - M)
- (2) Length of the mandibular body (Go - M)
- (3) Height of the mandibular ramus (Co - Go)

Related Angles:

- (4) M-Co-Go, which is a measure of corpus length
- (5) Co-M-Go, which is a measure of ramus height
- (6) M-Go-Co, which is the angle between ramus and corpus

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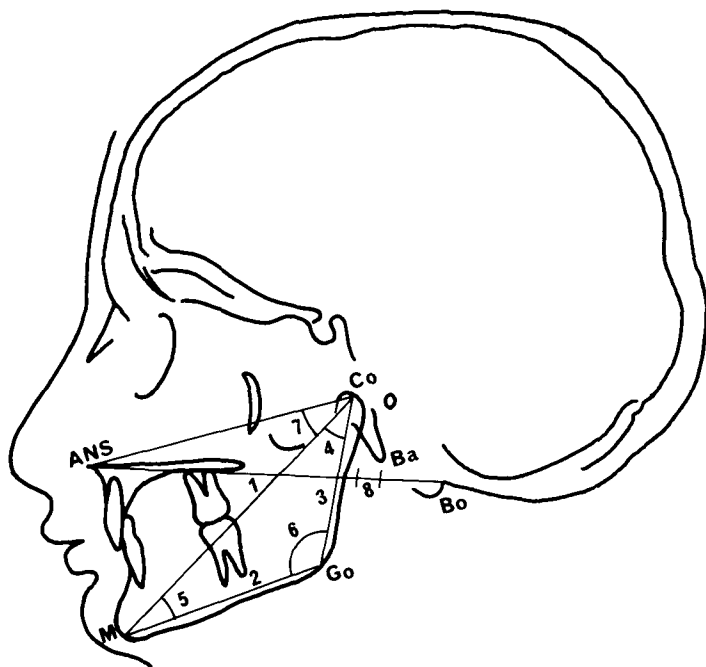


Fig. 1 Landmarks and measurements. Anterior nasal spine (ANS), Bolton point (Bo), Menton (M), Gonion (Go), and Condyle (Co). Numbers correspond to measurements described in the text.

Indicators of Mandibular position:

- (7) ANS-Co-M, which expresses relative lower facial height.
- (8) The distance between projections of basion and the most posterior point of the condyle to the line from Bolton point to ANS, which indicates the anteroposterior position of the condyle in relation to the cranial base.

The medionormal values, between the mean and $\pm 0.43 \sigma$, were calculated for each sex and age level for the sample with normal occlusion (Table 1). These represent about the middle third of the total variations.

The limited dispersion of the values seems to support the method used, in spite of the numerically small sample of children with normal occlusion.

The values registered for each measure in the children with malocclusion have been classified as low, medium and high in relation to the medionormal values found in the normal occlusion subjects of the same sex and age level.

The values related to the shape and development of the mandible are presented in Table 2. The following findings were drawn from the Class II division 2 sample:

1. The length of the mandible from condyle to chin was in the medionor-

TABLE 1
Medio-Normal Values ($M \pm 0.43 \sigma$)

Age Sex (Years)		Mandible length (Co-M)	Corpus length (Go-M)	Ramus height (distance Co-Go)	Corpus length angle (M-Co-Go)	Ramus height angle (Co-M-Go)
9	F	96.1-99.1	59.8-62.4	45.5-47.6	28.5-30.4	21.6-23.0
	M	96.2-100.7	60.1-62.9	48.2-51.0	30.1-31.9	24.0-24.9
10	F	99.1-102.8	62.5-64.8	46.6-48.7	28.6-30.7	21.8-22.9
	M	98.0-102.8	62.8-65.2	49.2-52.3	31.4-33.3	24.1-25.1
12	F	103.5-107.3	65.2-68.2	49.4-52.1	29.3-30.9	22.6-23.8
	M	101.2-107.7	64.8-68.1	51.0-54.8	31.4-33.2	24.3-25.5
13	F	106.1-109.6	66.9-69.6	50.9-53.5	29.3-31.0	23.0-24.1
	M	104.8-109.8	66.3-69.6	52.6-56.5	31.4-33.1	24.5-25.7
14	F	107.9-111.0	68.7-71.3	52.2-54.3	29.9-31.9	22.4-23.9
	M	107.6-113.7	68.5-72.3	54.1-57.8	31.2-33.5	24.5-25.8

Age Sex (Years)		Gonial angle (M-Go-Co)	Lower Face height angle (ANS-Co-M) degrees	Condyle position (Ba-Co) mm	Anterior lower face height (ANS-M)	Co-Go (%) ANS-M
9	F	126.9-129.7	34.4-35.7	6.7-8.3	54.3-57.0	82.0-88.2
	M	123.5-125.5	35.0-37.7	6.6-8.3	55.6-59.7	83.3-89.5
10	F	126.6-129.5	33.8-35.3	6.8-8.4	55.7-58.9	81.0-85.7
	M	122.0-124.0	35.0-37.8	6.8-8.4	57.0-61.4	83.0-89.1
12	F	125.6-128.2	33.5-35.1	6.7-8.7	57.2-61.0	83.5-89.2
	M	121.7-123.9	34.6-37.3	7.0-8.7	58.7-63.9	84.8-90.7
13	F	124.9-127.7	33.1-34.7	7.0-8.8	58.1-62.0	84.6-90.1
	M	121.7-123.7	34.0-36.5	7.6-9.1	59.8-64.3	85.4-91.3
14	F	124.4-127.5	32.9-34.7	6.9-8.8	58.5-62.6	85.8-91.3
	M	121.2-123.4	36.3-37.7	7.0-8.9	60.7-66.2	85.4-92.0

mal range in 28% of the cases, greater in 60% and smaller in 12%.
2. Length of the body was in the median range in only 17%, high in 78% and low in 6% of the cases.
3. Ramus height was in the median range in 28% of the cases, higher in 52% and shorter in 20%.
4. Gonial angle showed median values in 18%, large in 10% and small in 72% of the cases.

The distribution of the angular values related to size of mandibular components is equally significant. An-

gle M-Co-Go, which indicates the relative length of the body, showed median values in 8%, high in 87% and low values in only 5% of the Class II, division 2 cases. Angle Co-M-Go, which indicates the relative height of the ramus, showed median values in 25%, high in 55% and low in 20% of the cases.

The above data lead to the conclusion that the mandible of subjects with Class II, division 2 malocclusion is characterized by a remarkable development of the rami and of the body, with a small gonial angle.

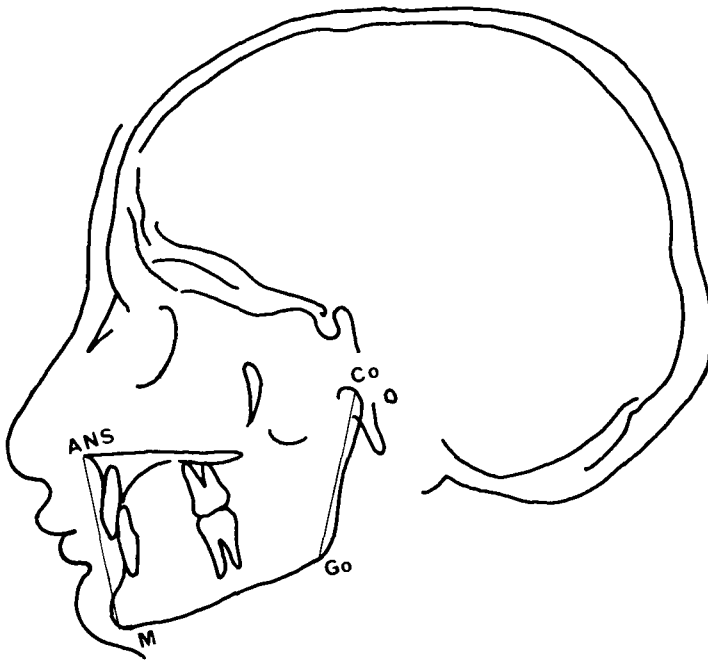


Fig. 2 The dimensions used to compare anterior and posterior lower face height.

Findings from the analysis of the antero-posterior position and inclination of the mandible are also presented in Table 2. The following deductions can be drawn from those measurements:

1. The angle ANS-Co-M exhibits median values in 10%, higher values in 5% and smaller values in 85% of the cases, clearly indicating a remarkably low inclination of the mandible.
2. The anteroposterior position of the condyle was not unusual, falling within the area of median values in 35% of the cases, more forward in 25% and more retruded in 40%.

To further evaluate these relationships, the dimensions Co-Go and ANS-M were compared (Fig. 2). The

distance Co-Go is a measure of the posterior height, and ANS-M is a measure of the anterior height of the lower face. These values and their ratios are reported in table 2, which shows high values for the posterior height of the lower face in relation to the anterior height in 62% of the cases, median values in 20%, and low values in 18%.

This indicates a strong tendency toward an exceeding development of the ramus height, which is consistent with a low angulation of the body of the mandible and relatively low anterior height. The factors are related to the prominent chin and deep overbite described by Schudy and ourselves.

TABLE 2
Incidence of Low, Median and High Values
among the 60 Class II, Division 2 Subjects

	<i>Low</i>	<i>Median</i>	<i>High</i>
Total mandibular length (Co-M)	7	17	36
Corpus length (Go-M)	3	10	47
Ramus height (Co-Go)	12	17	31
Corpus length angle (M-Co-Go)	3	5	52
Ramus height angle (Co-M-Go)	12	15	33
Gonial angle (M-Go-Co)	43	11	6
Lower face height angle (ANS-Co-M)	51	6	3
Condyle position (Ba-Co)	24	21	15
Anterior lower face height (ANS-M)	34	13	13
Posterior lower face height (Co-Go)	12	17	31
Co-Go ANS-M	11	12	37

SUMMARY

Findings in this study lead to the conclusion that subjects with Class II, division 2 malocclusion do tend to have a unique skeletal pattern of the face, characterized by a hyperdevelopment of the component parts of the mandible and a small gonial angle.

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