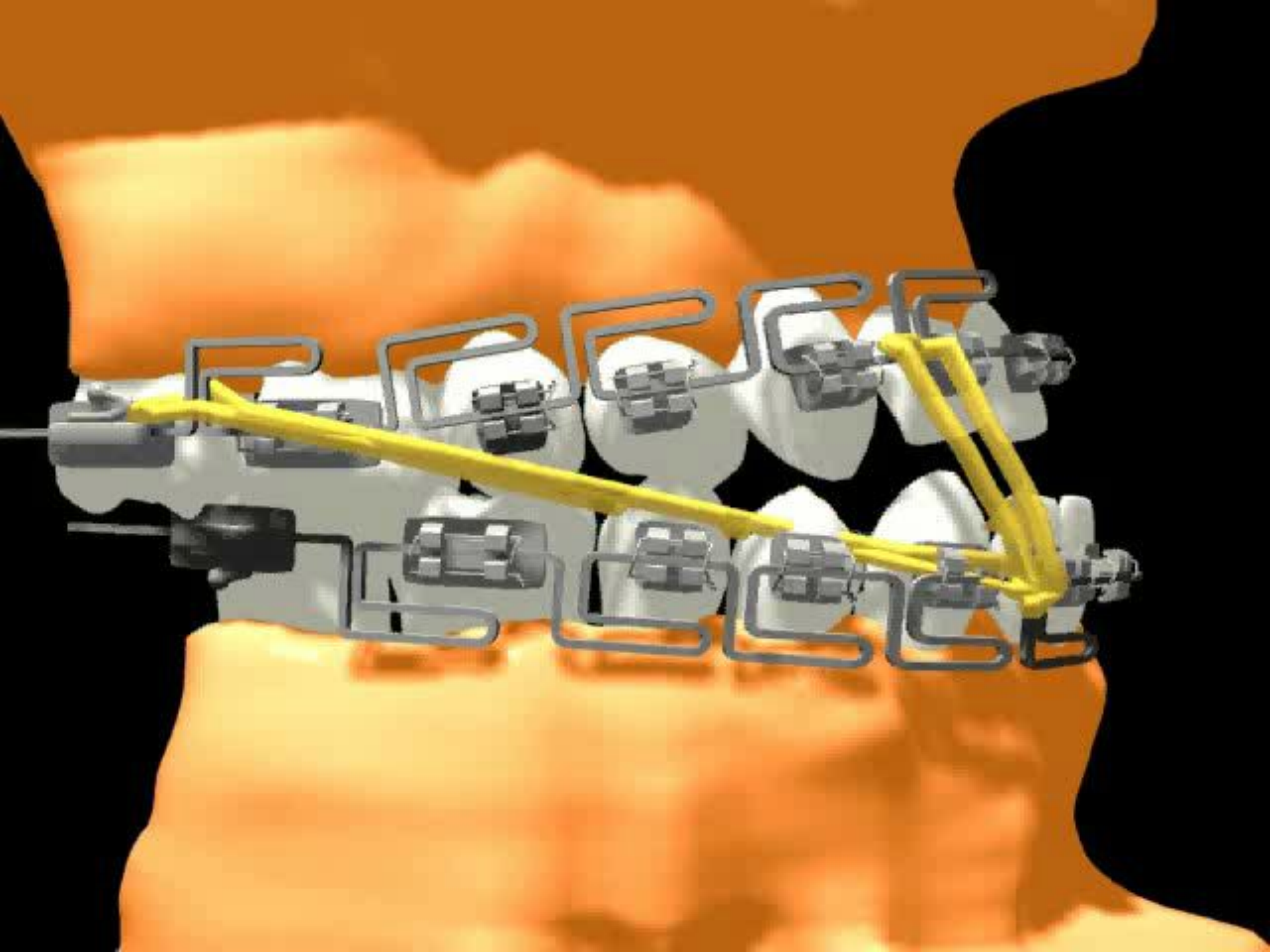
KIM’S ANALYSIS

88 9 15
1988 10 C 現代100년



9 1 11 15

9 1 12 16

ODI

Overbite

Depth

Indicator

Overbite Depth Indicator with particular reference to open-bite

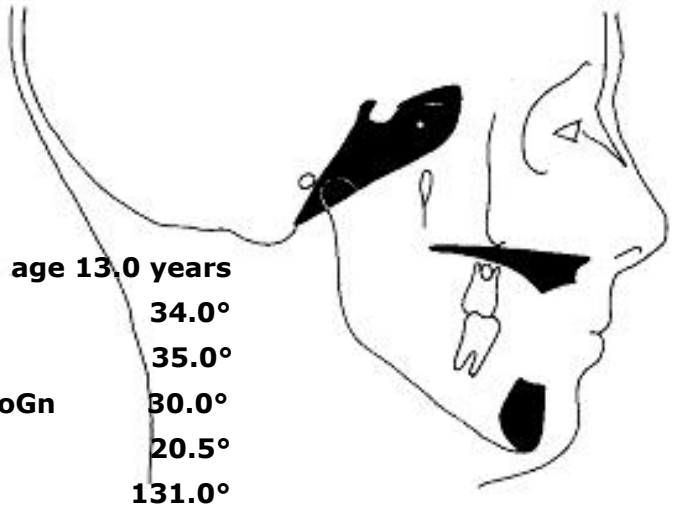
Young H. Kim

Am. J. Orthod. 65:585-611, 1974

VERTICAL PROBLEM

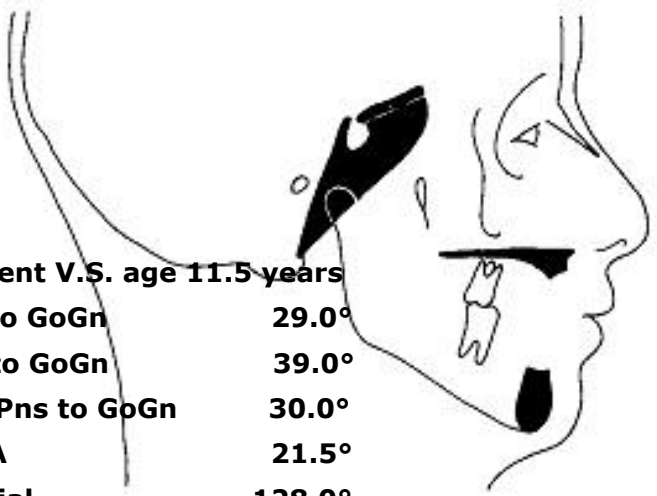
- Gonial angle
- Mandibular plane angle
  (SN - MP, FMA)
- Occlusomandibular plane A.
- PFH / AFH
- Y- axis

Which one is overbite or openbite?



Patient W.C. age 13.0 years	
FH to GoGn	34.0°
NS to GoGn	35.0°
AnsPns to GoGn	30.0°
OMA	20.5°
Gonial	131.0°

A



Patient V.S. age 11.5 years	
FH to GoGn	29.0°
NS to GoGn	39.0°
AnsPns to GoGn	30.0°
OMA	21.5°
Gonial	128.0°

B

Patient C.S. age 12.3 years	
FH to GoGn	35.0°
NS to GoGn	43.0°
AnsPns to GoGn	30.0°
OMA	25.0°
Gonial	131.0°

C

Patient J.H. age 10.2 years	
FH to GoGn	24.0°
NS to GoGn	34.0°
AnsPns to GoGn	240.0°
OMA	18.0°
Gonial	127.5°

D

Normal occlusion sample

- **Group 1**
  - **age range : 7-14 years**
  - **Sample No. : 119 persons**
    Boys : 56
    Girls : 63

Untreated malocclusion sample

Age range : 7-16 years

Sample No. : 500 patients

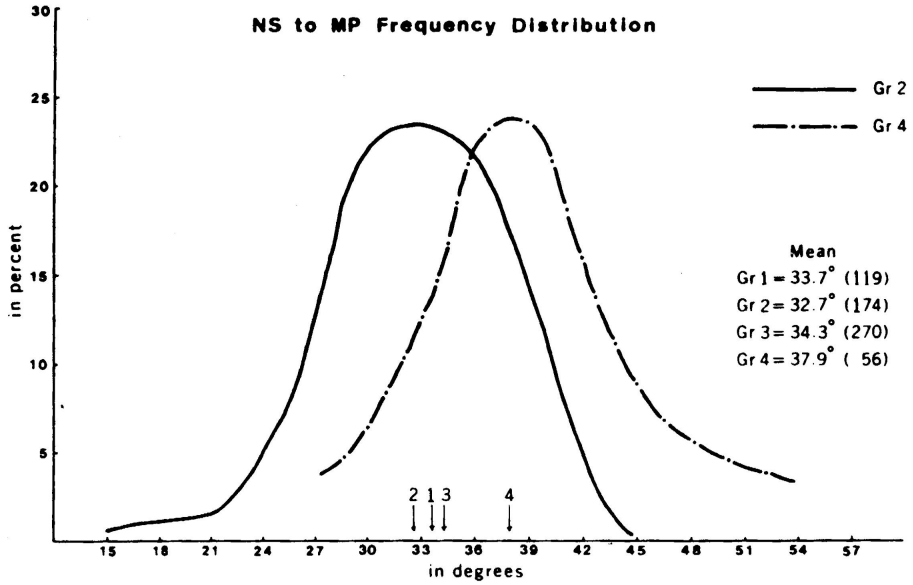
- **Group 2 (Deep – overbite group)**
  4.5 – 11mm overbite range, 174 cases
- **Group 3 (Normal – overbite group)**
  0.5 – 4mm overbite range, 270 cases
- **Group 4 (Open–bite group)**
  0 - 11mm open-bite range, 56 cases

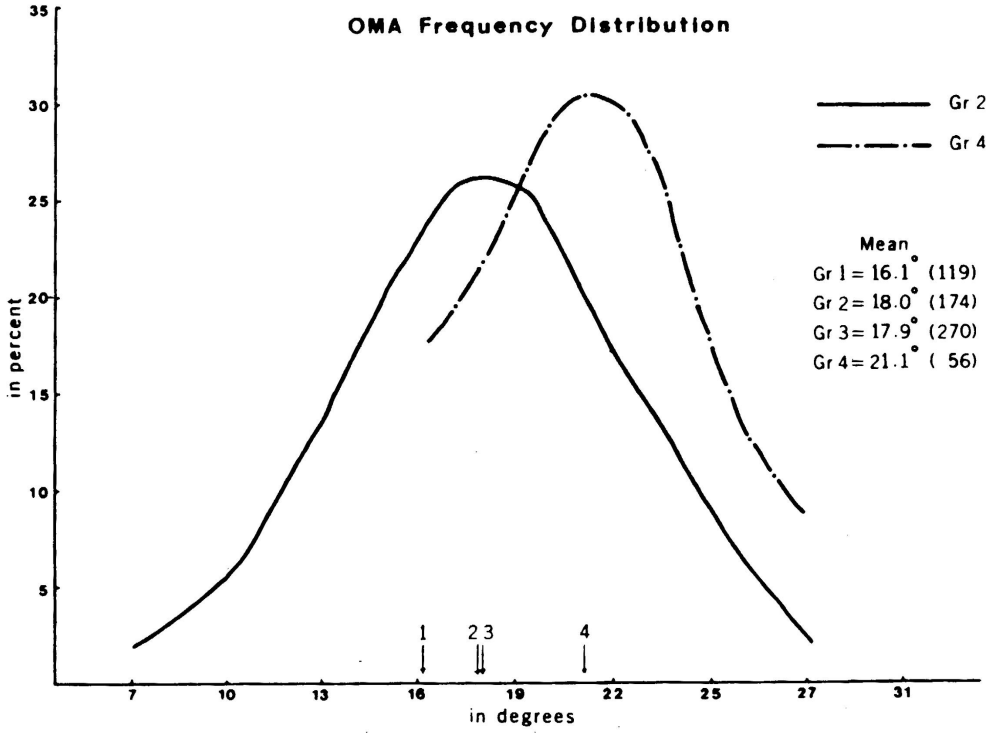
Correlation coefficient between the incisal overbite depth and various measurements obtained from 119 normal persons

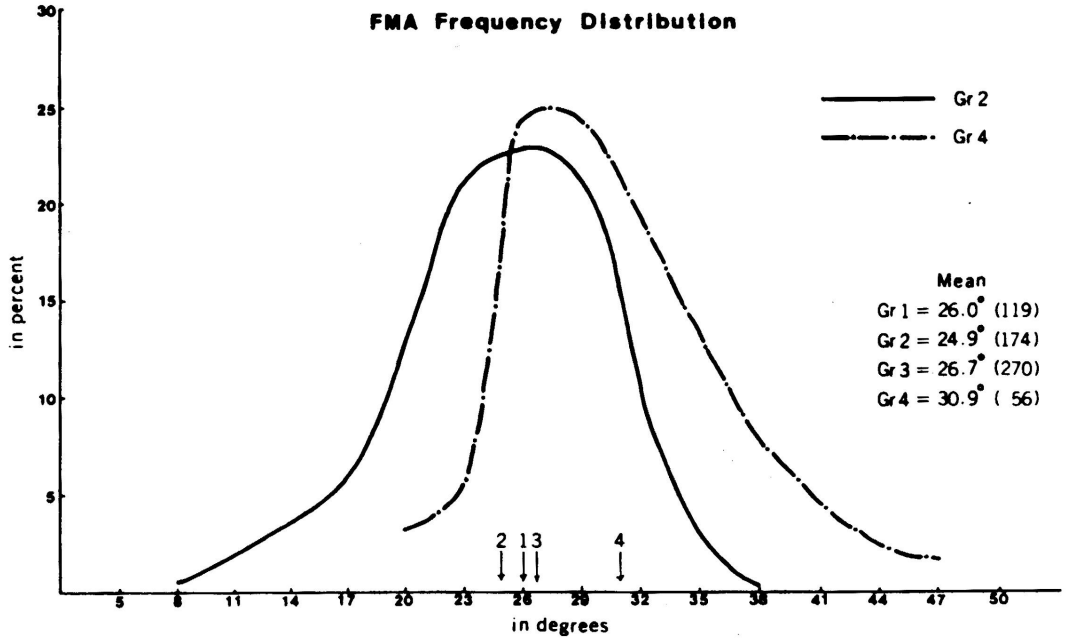
		Maximum	*Mean*	*Minimum*	*S.D.*	*C.C.*
Comparative measurements of two base lines (FH and NS):						
1	FH to facial plane	93.5	85.9	78.5	3.17	0.045
2	NS to facial plane	86.0	78.3	70.0	3.13	-0.025
3	FH to mandibular plane	38.0	26.0	14.0	4.91	-0.232
4	NS to mandibular plane	46.5	33.7	22.5	4.85	-0.195
5	FH to palatal plane	11.0	0.5	-6.5	3.16	0.109
6	NS to palatal plane	18.0	8.0	–1.0	3.45	0.150
Measurements based on mandibular plane:						
7	Palatomandibular plane	35.0	25.6	10.0	5.09	-0.291
8	Occlusomandibular plane	25.0	16.1	5.0	3.80	-0.126
9	Gonial angle	142.0	126.5	110.0	5.97	-0.239
10	Faciomandibular plane	79.0	68.0	59.5	3.71	-0.280
11	AB to mandibular plane	86.0	74.0	60.5	4.74	0.369
12	AB to MP plus FH to PP	91.0	74.5	59.5	6.07	0.394
Incisal relationships:						
13	Incisal angle	147.0	126.5	108.0	7.91	0.193
14	Incisal length from the upper lip (mm.)	8.5	3.9	0.0	1.38	0.187
15	Incisal overbite depth (mm.)	4.5	2.8	0.0	1.15	1.000

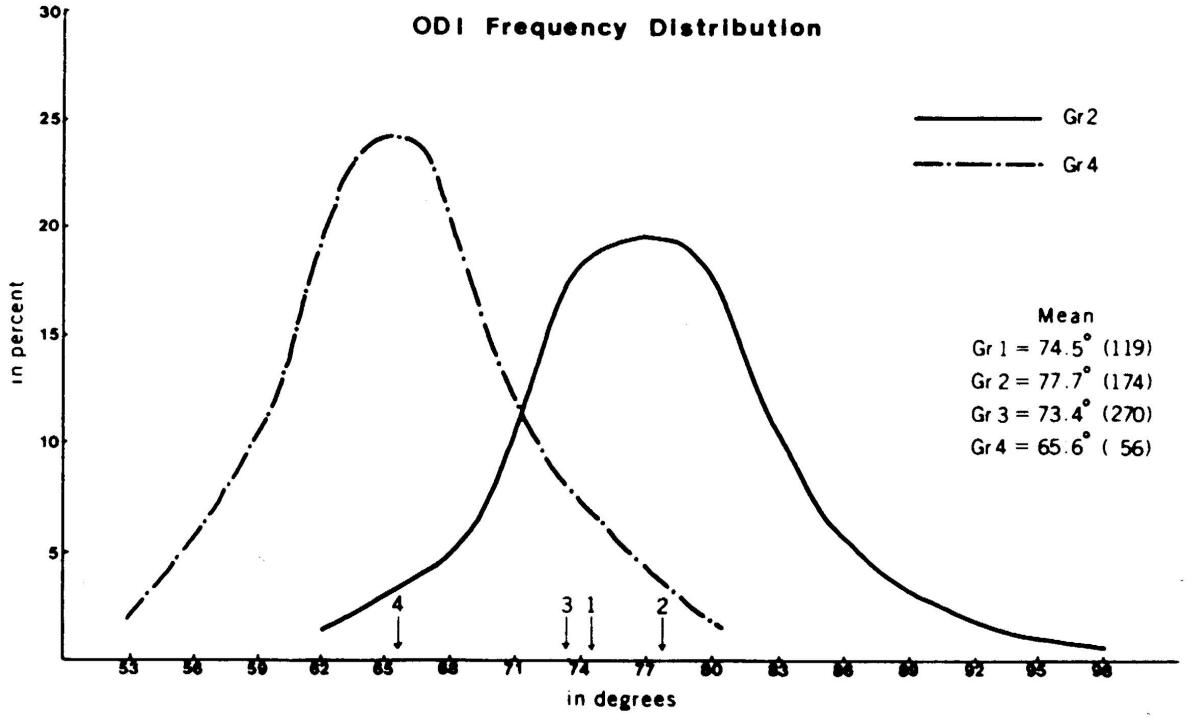
Correlation coefficient between the incisal overbite depth and various measurements obtained from 500 persons with malocclusion

Measurement	*Maximum*	*Mean*	*Minimum*	*S.D.*	*C.C.*
1. FH to facial plane	95.0	85.9	77.0	3.12	–0.113
2. NS to facial plane	90.5	77.9	68.0	3.56	–0.088
3. FH to mandibular plane	46.0	26.5	9.0	5.76	–0.311
4. NS to mandibular plane	53.6	34.1	14.0	6.01	–0.281
5. Palatomandibular plane	45.0	27.8	14.0	5.65	–0.375
6. Occlusomandibular plane	29.0	18.3	6.5	4.10	–0.199
7. Gonial angle	150.0	125.9	105.0	6.29	–0.350
8. Faciomandibular plane	83.0	67.6	52.5	4.35	0.494
9. AB to mandibular plane	96.0	75.2	55.5	6.37	0.557
10. AB to MP plus FH to PP	98.5	74.0	53.7	7.31	0.588
11. Incisal angle	181.0	128.0	100.0	10.40	0.298
12. Incisal overbite depth (mm.)	11.0	3.5	–11.0	2.43	1.000

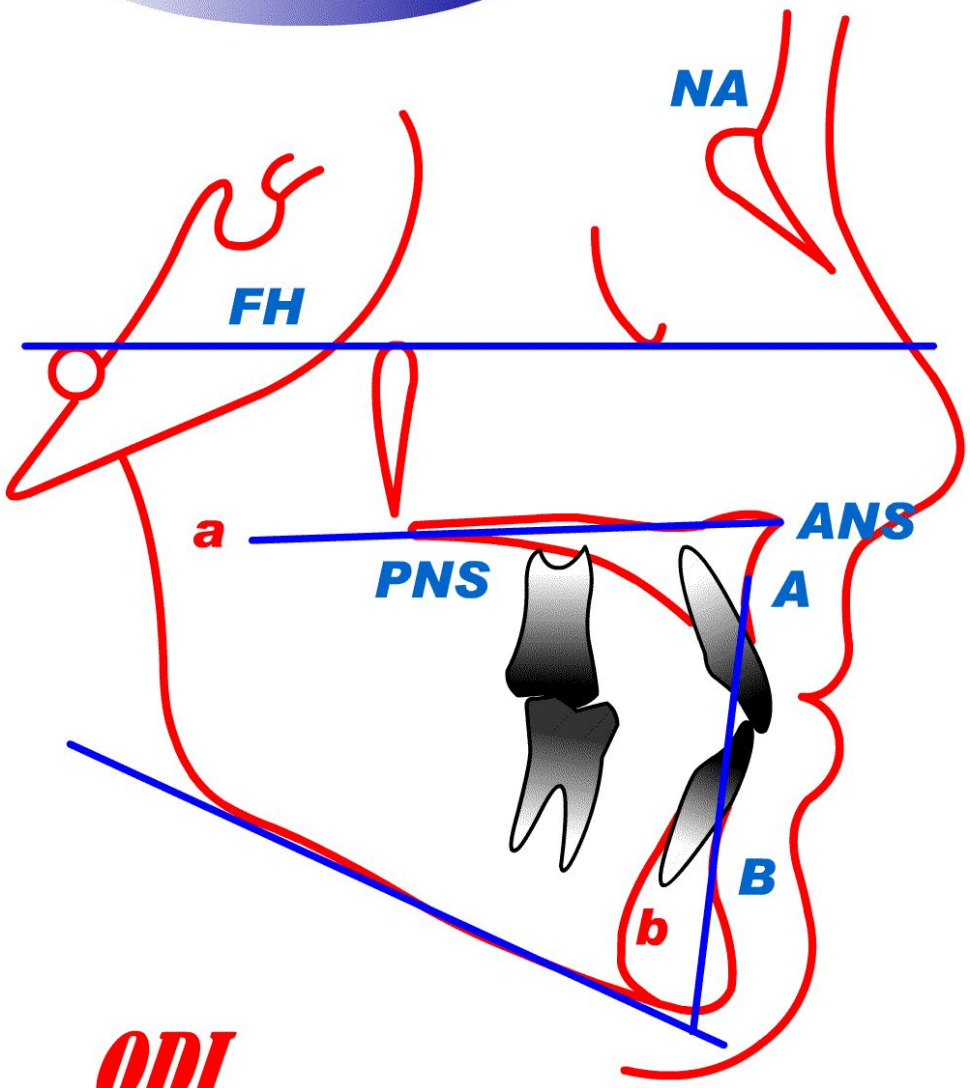

NS to MP Frequency Distribution
Gr 2
Gr 4
Mean
Gr 1 = 33.7° (119)
Gr 2 = 32.7° (174)
Gr 3 = 34.3° (270)
Gr 4 = 37.9° (56)
in percent
in degrees
2 1 3
4


OMA Frequency Distribution
Gr 2
Gr 4
Mean
Gr 1 = 16.1° (119)
Gr 2 = 18.0° (174)
Gr 3 = 17.9° (270)
Gr 4 = 21.1° (56)
in percent
in degrees
1
2 3
4


FMA Frequency Distribution
Gr 2
Gr 4
Mean
Gr 1 = 26.0° (119)
Gr 2 = 24.9° (174)
Gr 3 = 26.7° (270)
Gr 4 = 30.9° (56)
in percent
in degrees
2 1 3
4


ODI Frequency Distribution
Gr 2
Gr 4
Mean
Gr 1 = 74.5° (119)
Gr 2 = 77.7° (174)
Gr 3 = 73.4° (270)
Gr 4 = 65.6° (56)
in percent
in degrees
4
3 1
2

ODI



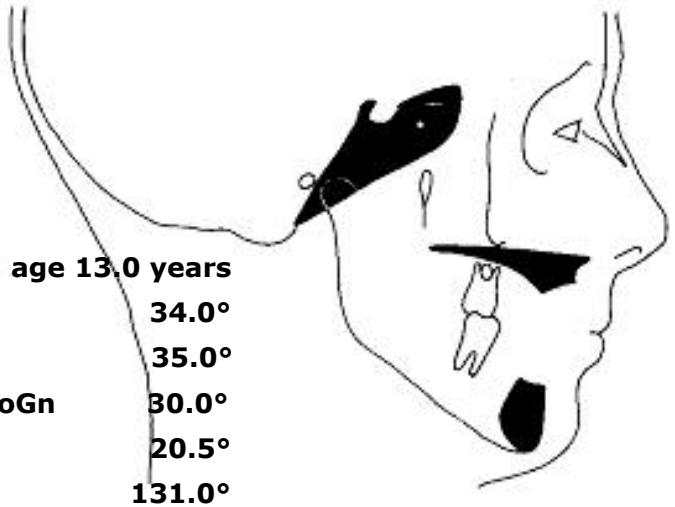
ODI

= FH to Palatal plane A.(a)

± A-B to Mandibular plane A.(b)

- Mean ODI of normal sample
  : 74.5 ± 6.07º
- **Lower ODI value,**
  greater tendency toward open-bite
- **Higher ODI value,**
  greater tendency toward deep overbite
- **ODI is diagnostic indicator & provides information toward a differential diagnosis**

Which one is overbite or openbite?



Patient W.C. age 13.0 years	
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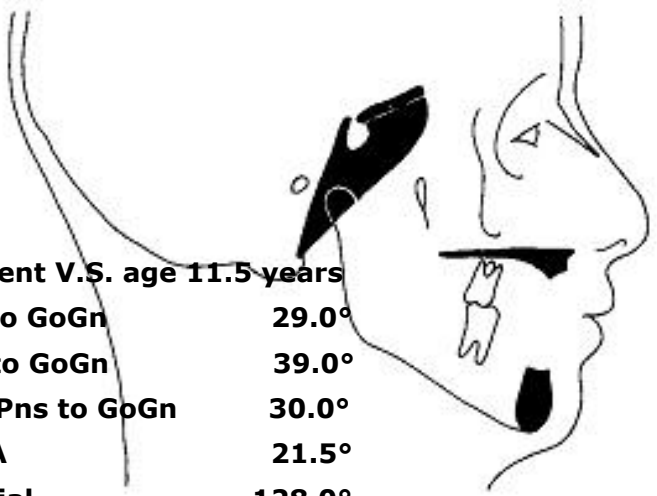
AnsPns to GoGn	30.0°
OMA	20.5°
Gonial	131.0°

A



Patient V.S. age 11.5 years	
FH to GoGn	29.0°
NS to GoGn	39.0°
AnsPns to GoGn	30.0°
OMA	21.5°
Gonial	128.0°

B

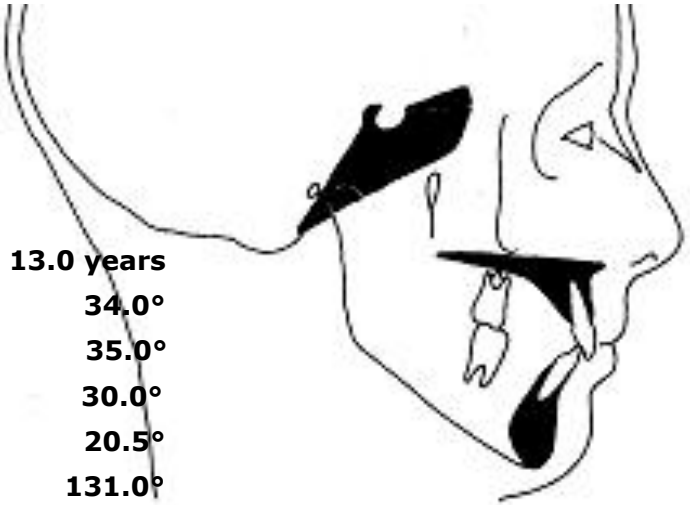
Patient C.S. age 12.3 years	
FH to GoGn	35.0°
NS to GoGn	43.0°
AnsPns to GoGn	30.0°
OMA	25.0°
Gonial	131.0°

C

Patient J.H. age 10.2 years	
FH to GoGn	24.0°
NS to GoGn	34.0°
AnsPns to GoGn	240.0°
OMA	18.0°
Gonial	127.5°

D

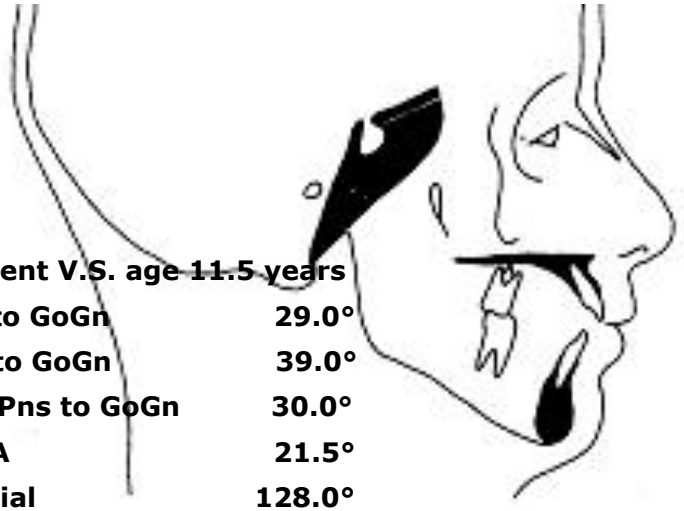
ODI answer ...



Patient W.C. age 13.0 years

FH to GoGn	34.0°
NS to GoGn	35.0°
AnsPns to GoGn	30.0°
OMA	20.5°
Gonial	131.0°
ODI	74.0 °

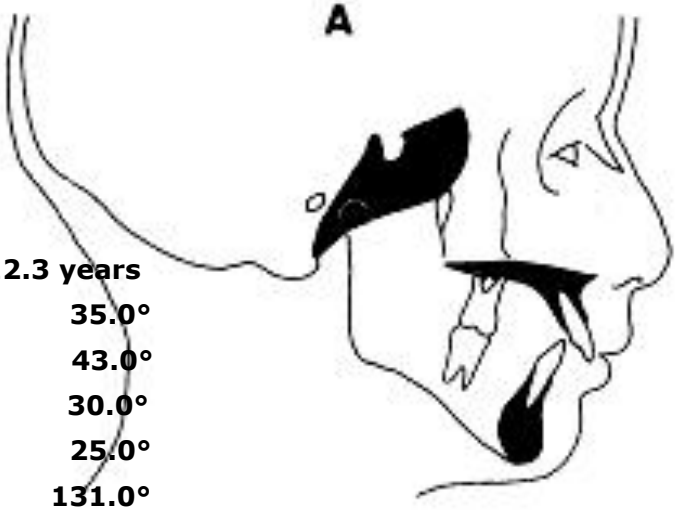
A



Patient V.S. age 11.5 years

FH to GoGn	29.0°
NS to GoGn	39.0°
AnsPns to GoGn	30.0°
OMA	21.5°
Gonial	128.0°
ODI	68.0°

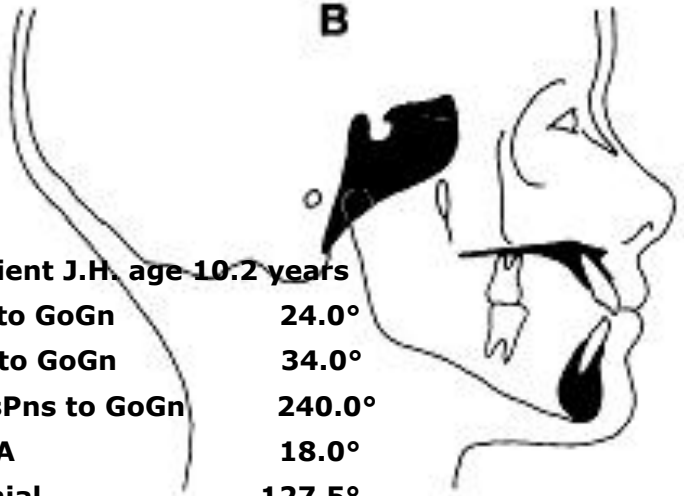
B



Patient C.S. age 12.3 years

FH to GoGn	35.0°
NS to GoGn	43.0°
AnsPns to GoGn	30.0°
OMA	25.0°
Gonial	131.0°
ODI	79.5°

C

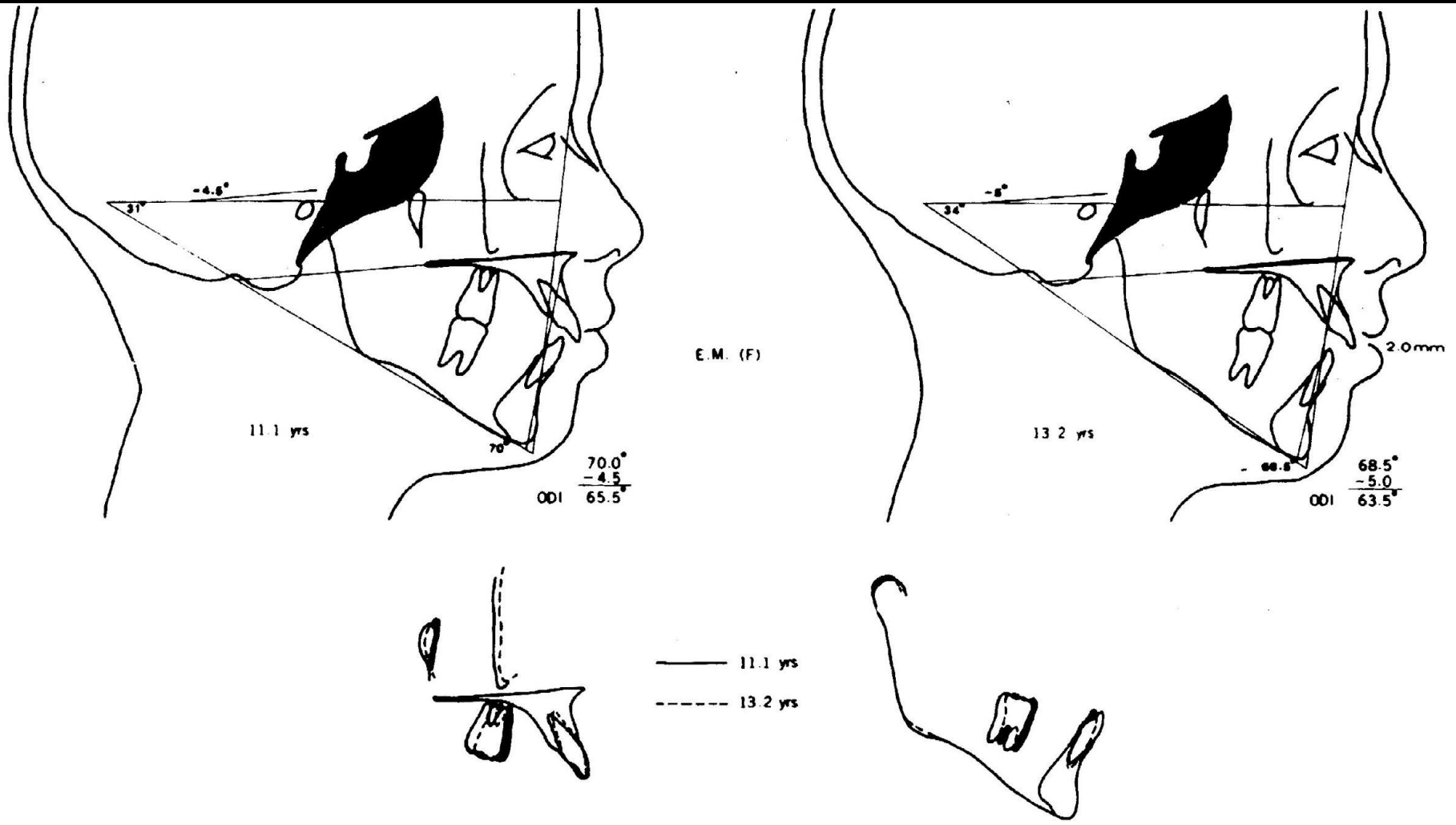


Patient J.H. age 10.2 years

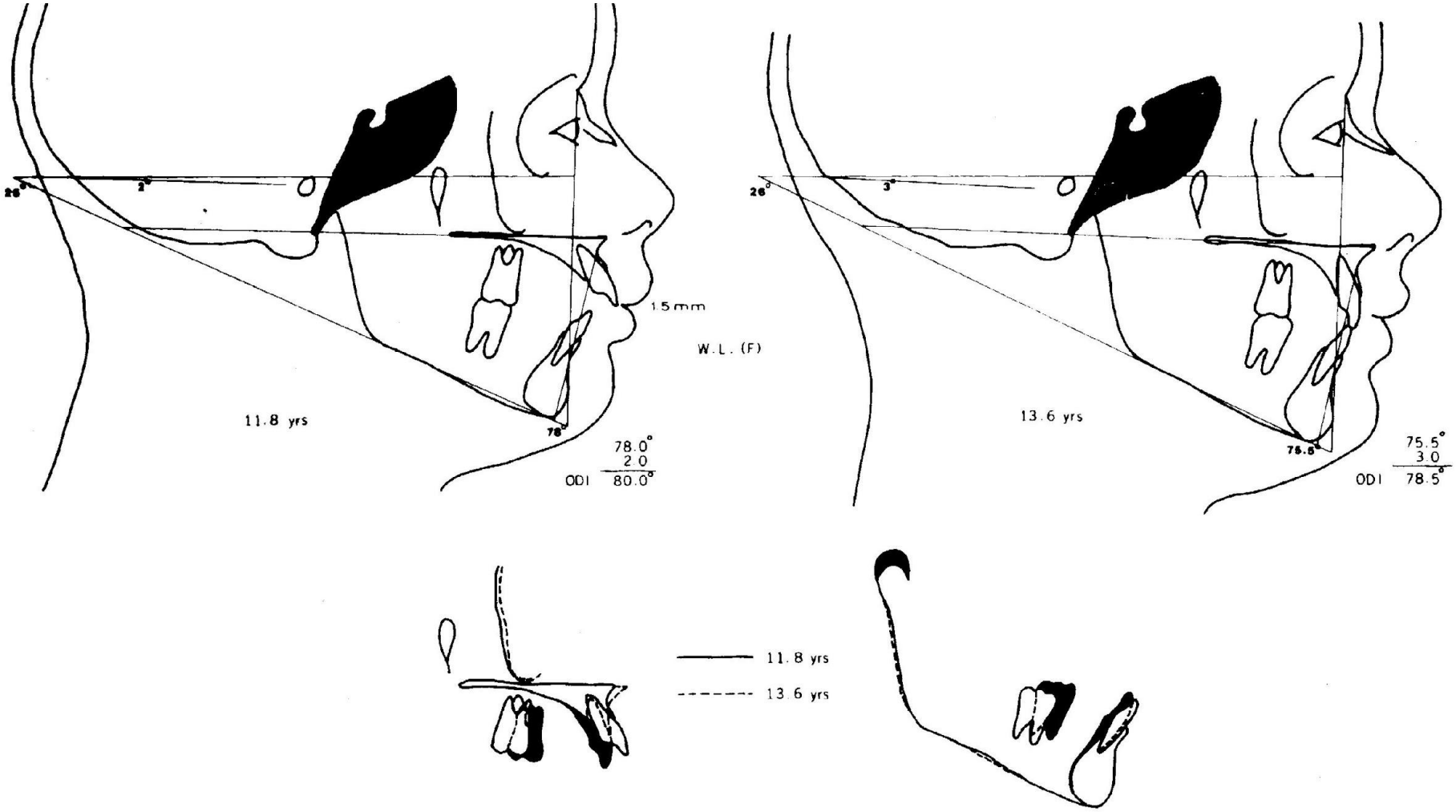
FH to GoGn	24.0°
NS to GoGn	34.0°
AnsPns to GoGn	240.0°
OMA	18.0°
Gonial	127.5°
ODI	67.5°

D

Lower ODI value,



Higher ODI value,
greater tendency toward deep overbite



Skeletal open-bite

- **result of unfavorable skeletal pattern**
- **aggravated by thumb-sucking or tongue thrusting habits**
- ODI : 60’s or 50’s

Acquired open-bite

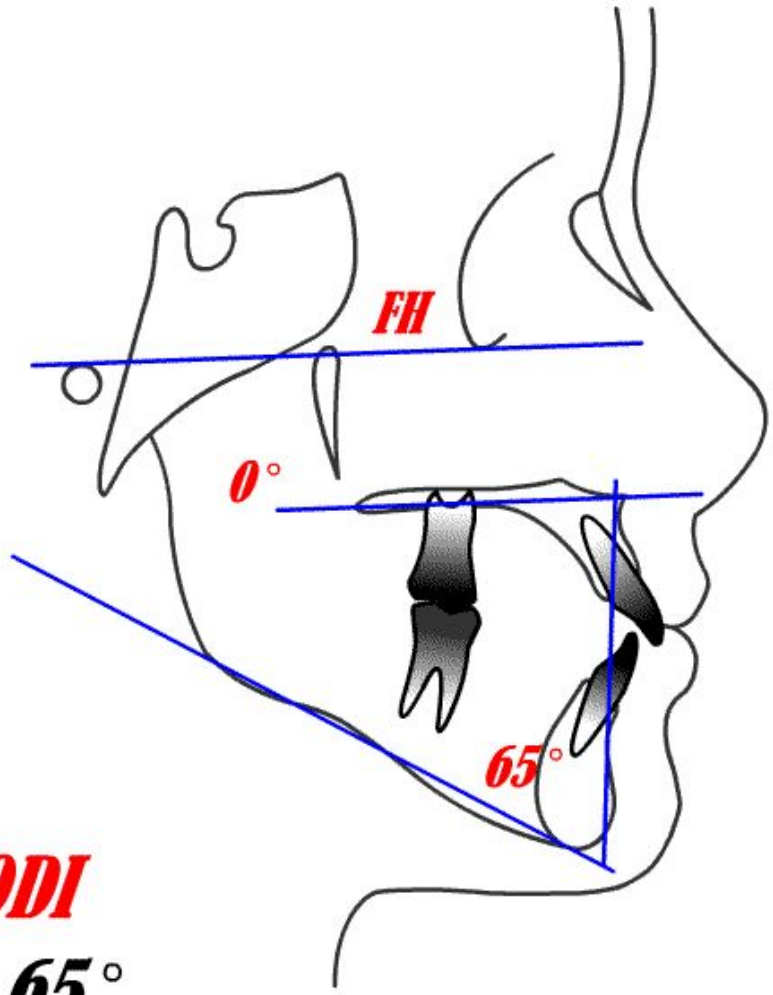
- **good facial pattern**
- **result of thumb-sucking or tongue thrusting habits**
- ODI : 70’2 or 80’s

skeletal deep-overbite

- **unfavorable facial pattern**
- **acute palatomandibular plane angle**
- **lack of vertical dimension**
- ODI : 80’s or 90’s

Acquired deep-overbite

- **overeruption of anterior teeth and/or poor position of posterior teeth**
- ODI : 70’s or 80’s

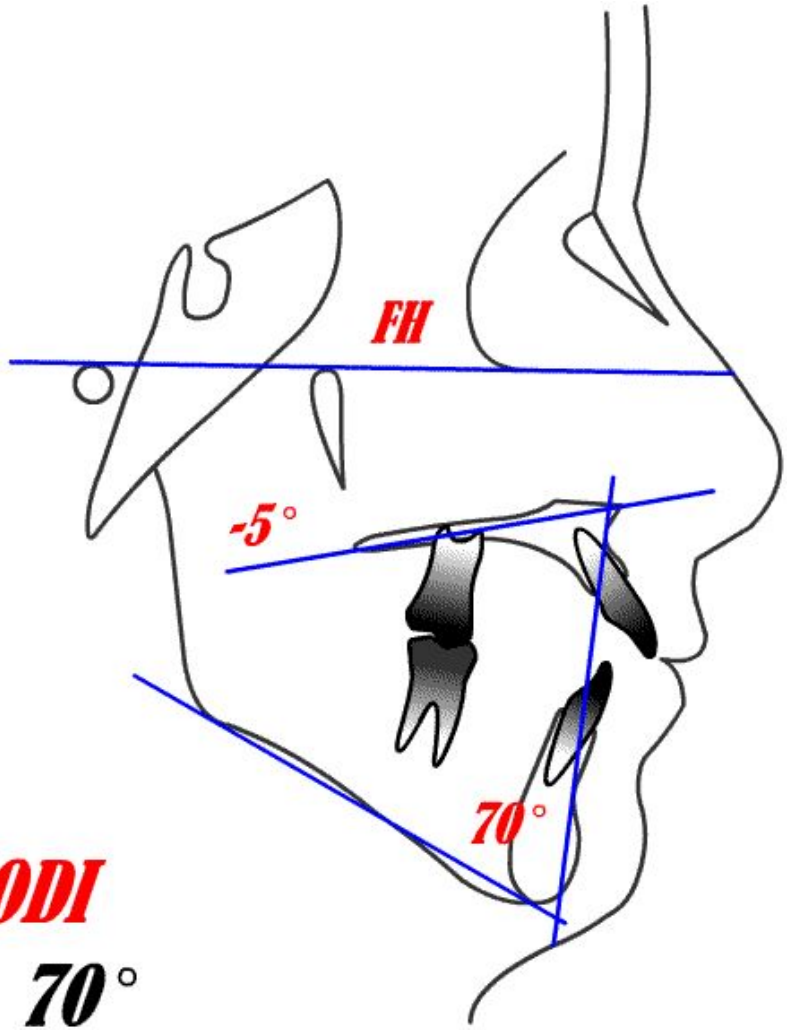


ODI

65°

+ 0°

65°



ODI

70°

- 5°

65°

- Mean ODI of normal sample
  : 74.5 ± 6.07º
- **lower ODI value,**
  greater tendency toward open-bite
- **higher ODI value,**
  greater tendency toward deep overbite
- **ODI is diagnostic indicator & provides information toward a differential diagnosis**

APDI

Antero –

Posterior

Dysplasia

Indicator

Anteroposterior Dysplasia Indicator : An adjunct Cephalometric differential diagnosis

Young H. Kim,

Am. J. Orthod. 73:619-633, 1978

Cephalometric analysis of A-P dysplasia

Steiner(1953) : ANB angle

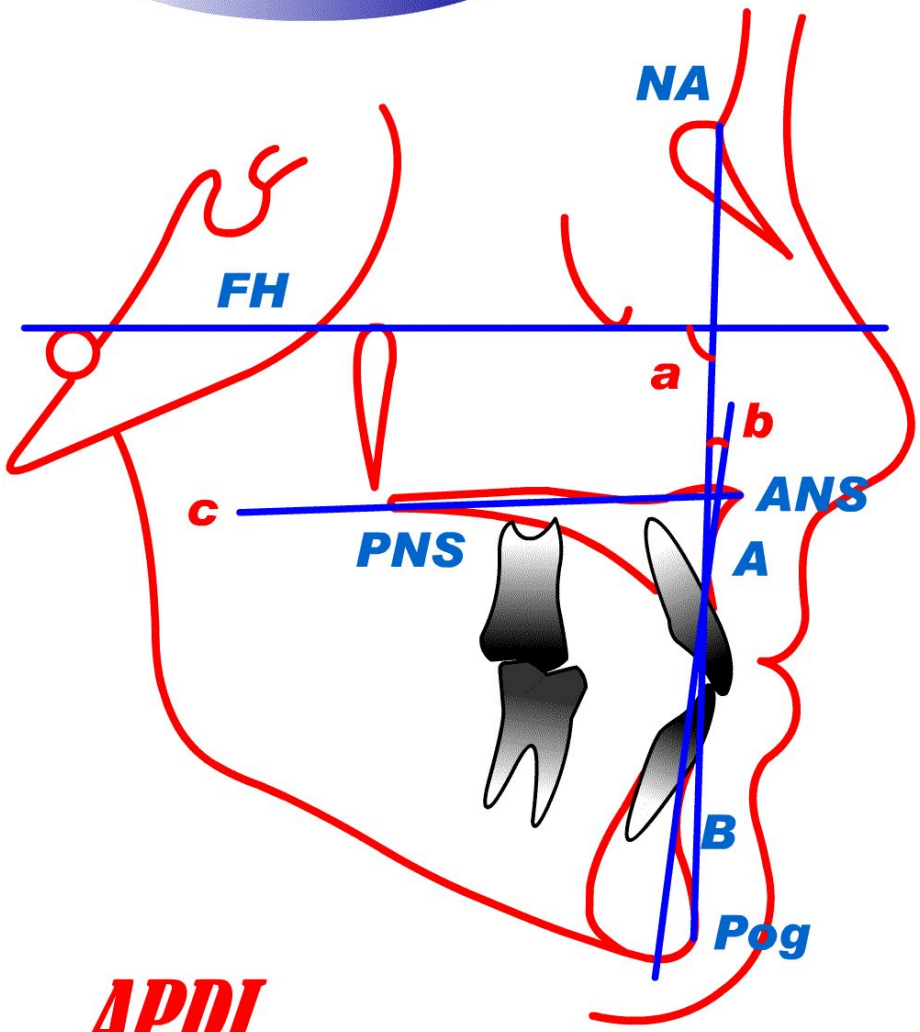
Downs(1948) : A-B plane angle

Hitchcoch(1973) : A-B plane to occlusal plane

Jacobson(1975) : Wits appraisal

Ferrazzini(1976) : perpendicular line from point A and Mx. plane (ANS-PNS)

APDI



APDI

= Facial A.(a)

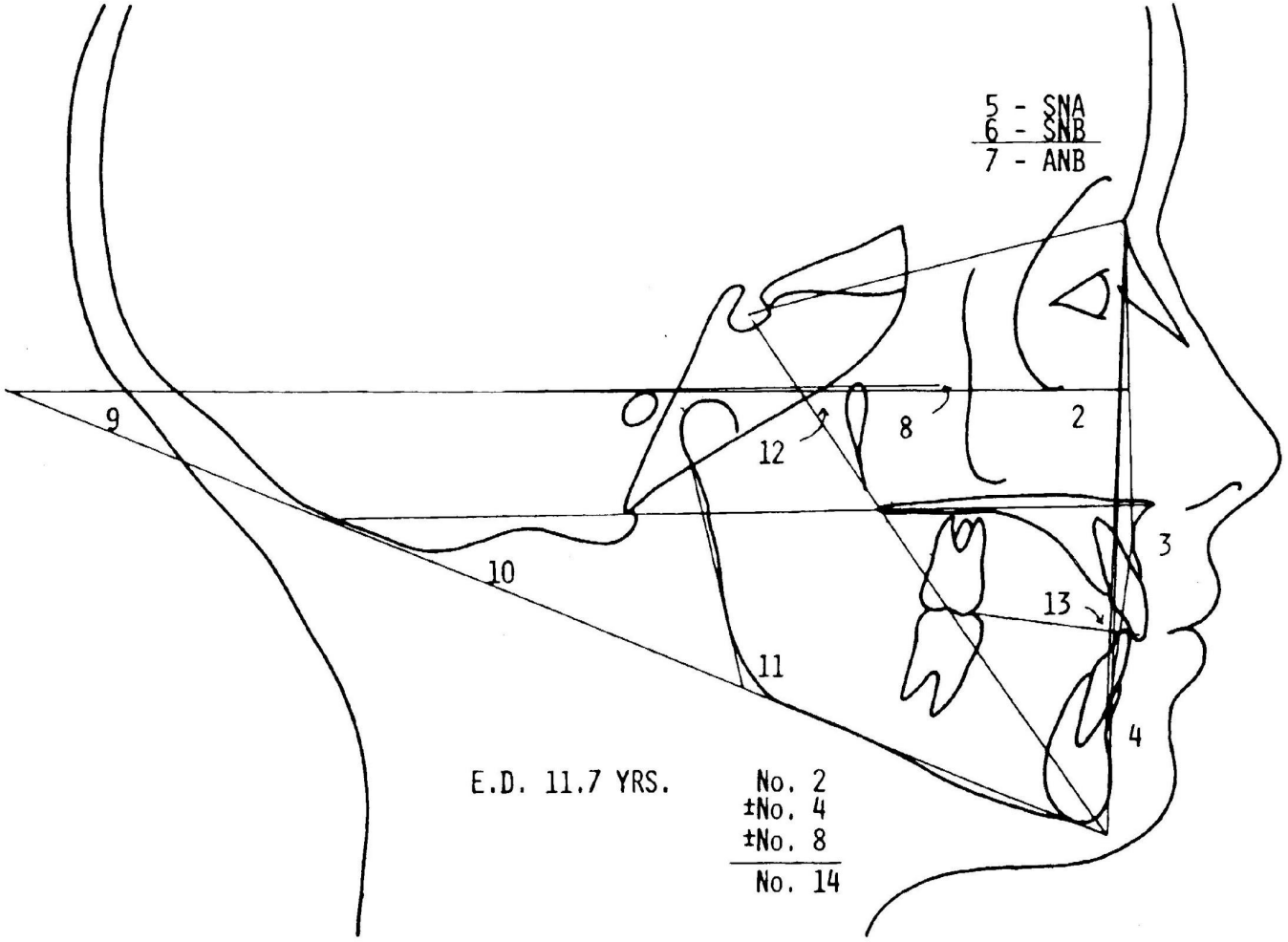
± A-B plane A.(b)

± Palatal plane A. (c)

Sample No.

Group 1 : normal occlusion sample (102)
Group 2 : Class I malocclusion (214)
Group 3 : Class II malocclusion (624)
Group 4 : Class III malocclusion (36)

MEASUREMENTS



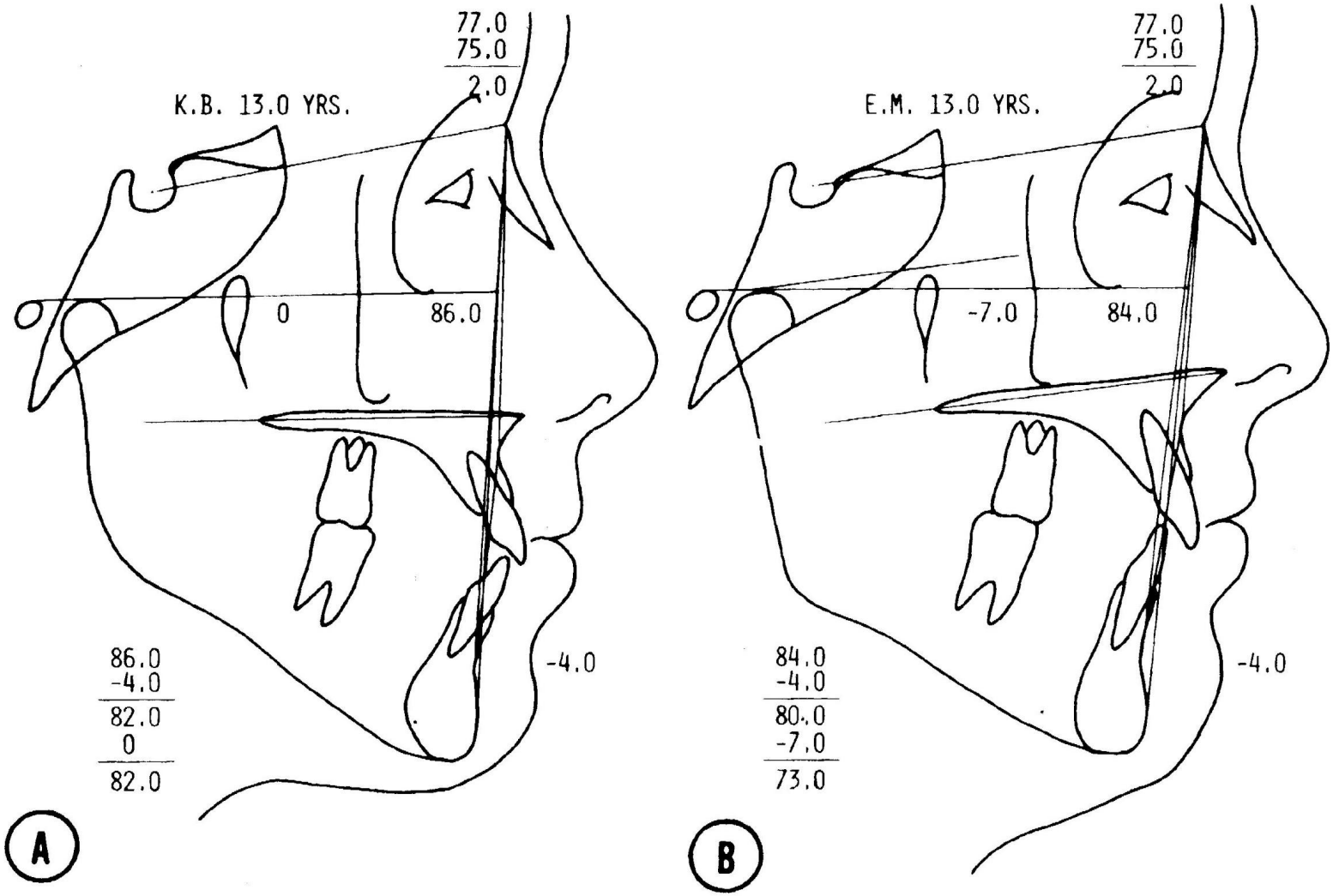
1. Molar displacement	1.000
2. Facial angle (Downs')	0.184
3. Convexity (Downs')	0.434
4. A-B plane(Downs') angle	0.566
5. SNA	0.116
6. SNB	0.321
7. ANB	0.495
8. Palatal plane to FH plane angle	0.159
9. Mandibular plane to FH plane angle	0.168
10. Palatomandibular plane angle	0.069
11. Gonial angle	0.155
12. Y-axis angle	0.009
13. "Wits appraisal"	0.639
14. anteroposterior dysplasia indicator	0.643

Correlation coeffient value : Displacement of molar relationship versus various cephalometric measurements
(N = 874)

High C.C :

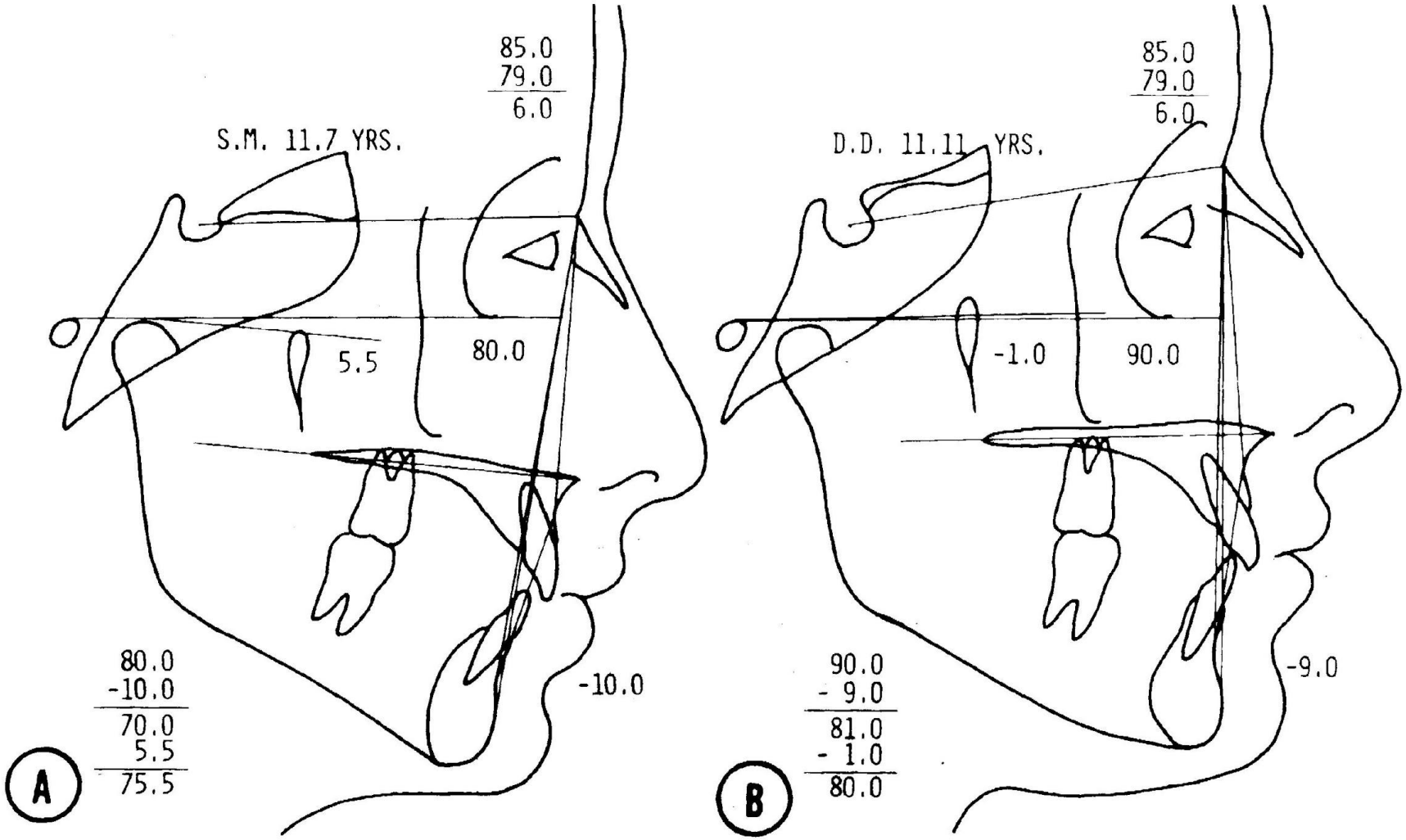
- Wits appraisal (0.639)
- APDI (0.643)

SNA,SNB,A-B plane angle ; same APDI ; different

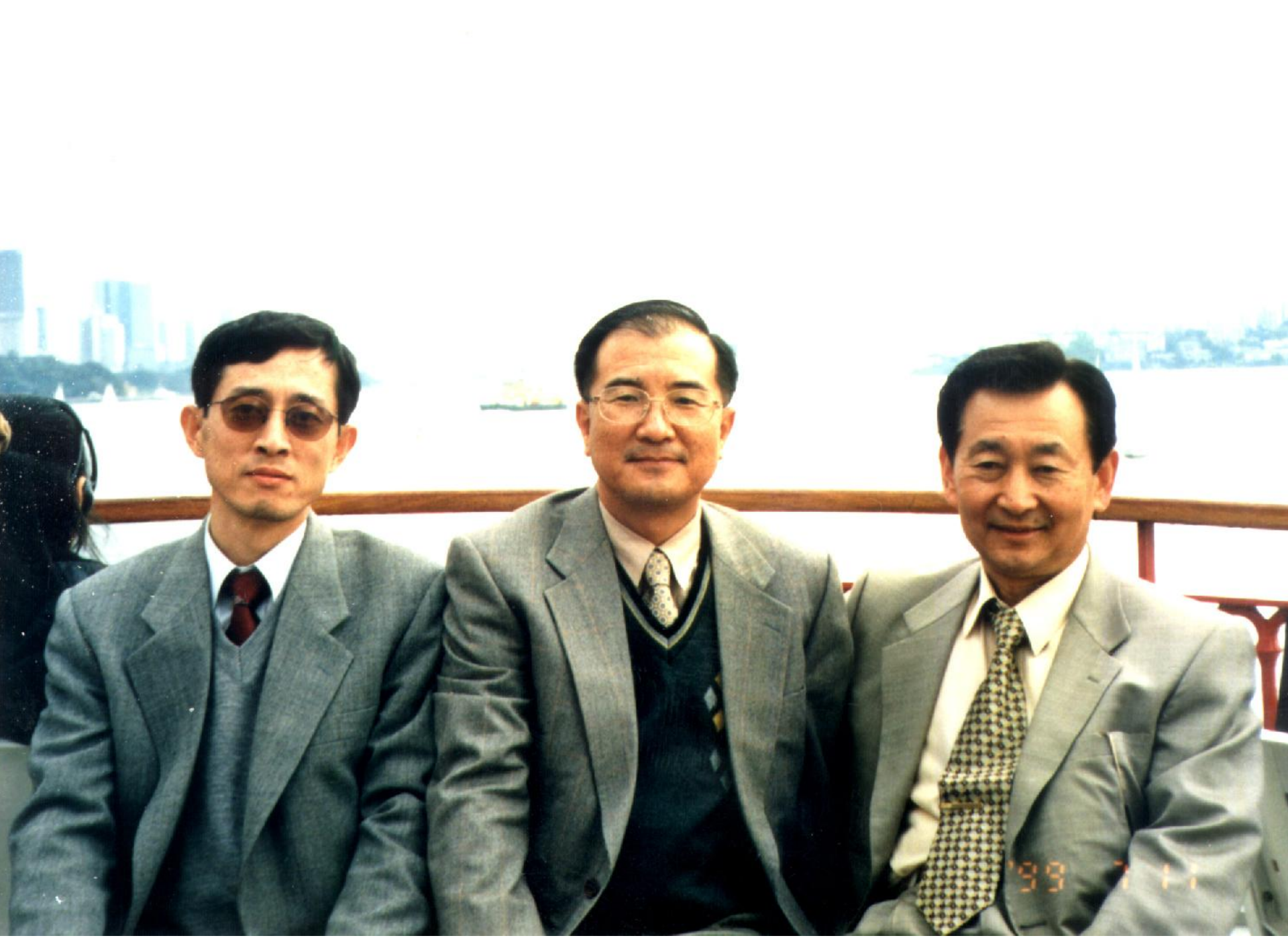


SNA,SNB ; same

APDI ; different



- APDI : facial angle ± A-B plane angle ± palatal plane angle
- Mean value of APDI = 81.4 ± 3.79º

  Smaller APDI value : distoclusion
  Larger APDI value : mesioclusion
- APDI reading provides information

  needed for a differential diagnosis and for planing an appropriate treatment