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Proceeding Book

RELATION OF THE ANTEROPOSTERIOR AND VERTICAL FACIAL GROWTH ON JAVANESE SCHOOL AGE CHILDREN WITH GOOD NUTRITIONAL STATUS

(Cephalometric Lateral Radiographic Study in Elementary School Student at Kasihan District of Bantul Regency)

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Abstract

Human face is a part of cranium that commonly called viscerocranium. Post partum period, facial growth takes in to three directions namely transverse, vertical and sagital (anteroposterior). At the time of cranial base grew into the anterior, facial bones grew into the anterior and inferior. This growth was closely related to the maxillary and mandibulary growth. Sagittal growth, the most intensive occurred before and during the eruption of permanent molars. There was no significant correlation between growth pattern widths at the maxillary sutura mediana with maxillary sutura height supporters. The purpose of this study was to determine the relationship between anteroposterior and vertical facial growth in Javanese school-age children in good nutritional status.

Analytical observational research based on cross sectional research design was done on 112 children from four elementary schools at Tamantirto Kasihan Bantul. The subjects were divided into 14 groups according to their age and sex and each group consisted of 8 children. All of subjects performed an X-ray photographs sefalometri.Measurements included SNA, SNB, SN-Mxpl, FHP-Mnpl,Mxpl-Mnpl. Data were analyzed by Spearman correlation.

The results showed a strong negative relationship between SNA and SN-Mxpl in boys ages 6 years old (r=-0,857), 9 years (r=-0,857), 10 years (r=-0,743), and in girls 12 years (r=-0,81). There is a strong negative relationship between SNA and FHP-Mnpl in boys 7 years old (r=0,831) as well as 11 years old girls (r=-0,738) and 12 years old girls (r=-0,755). There is a verry strong negative relationship between SNB and SN-Mxpl in boys age 6 years (r=-0,934) and a strong negative relationship in boys 9 years (r=-0,857), and in girls age 12 years (r=-0,762). There is a strong negative relationship between SNB and FHP-Mnpl in girls age 6 years (r=-0,849) and 10 years (r=-0,79).

It was concluded that there was a negative relationship between anteroposterior and vertical facial growth in Javanese children of school age in good nutritional status.

Key words: anteroposterior growth, vertikal growth, SNA, SNB, Mxpl, Mnpl, FHP.

Introduction

The directions of post birth period of human facial growth are: transversal, vertical and sagital (anteroposterior). [1] The rate of facial growth will take the peaked at birth then sharply declined and take a minimum rate at pra-puberty period. Afte that, the growth will increase at puberty period and then declined. The growth will stop at the late of adolescent period[2]

Human facial has been constructed by several kind of bones[1]. The jaw (maxilla and mandible) is the main contributor that constructing human face from vertical dimension[3]. Van der Linden said that the growth of procesus alveolaris also affecting the height of face vertically and the depth of the palatum[4]. The growth of the lower side facial has been affected by procesus alveolaris of mandible and maxilla [1,2]. When the cranial base grows on to anterior side, the bone face is also grows to the anterior and inferior. That grows is closed related to the growth of maxilla, mandible and nasopharing[3].

The connection of maxilla with cranium has been channeled through some sutures: *frontomaksilaris, zygomaticomaxillaris, zygomaticotemporalis and palatine*. The growth of sutures make the maxilla moved forward and downward and pushed the cranium to moved rearward and upward. The growth of the maxilla with alveolaris and palatinus processus due to the growth of upper teeth[4].

Figure 1. The growth of Maxilla[7].

The growth of mandible at condilus and edge side of ramus make the mandible become grew longer, whereas the growth of condilus together with the growth of alveolaris creates mandible became higher. The growth of mandible to anterior side is faster than other, so that when the baby's born period where the chin is more posterior tha maxilla and the increasing of the age will make a harmonization between the maxilla and mandible[4]. The rate of mandible growth is 1,5 years faster on girl. This concept is related to the puberty period of the girl that faster than to the boy[5].

Figure 2. The Growth of Mandible[6]

The aim of this study was to determine the relation of anteroposterior and vertical face growth on javenese school age children with good nutritional status.

Materials and Methods

The design of this study was analytical observational research based on cross sectional research design. The subject of this study has been taken based on the proportional distribution at age and sex group of school age children in elementary school, Kasihan district of Bantul Regency that have a good nutrition status.

The inclusion criteria are: Javeneses children who has been living at the village of Tamantirto, Kasihan district of Bantul Regency, with range of age between 6-12 years old, with flush terminal plane occlusion or class I Angle, overjet and overbite are less than 4 mm, without crowding or mild crowding and showing no redices or rampant caries.

Totally of 56 subjects in each sex group, carried cephalometric lateral radigraph. After obtained a rontgen, each of the child is measured the angles of SNA, SNB, SN-(ANS-PNS), FHP-(Go-Me), and (ANS-PNS)-(Go-Me), to determine the anterior and vertical growth of face.

Figure 3. Anteroposterior Measurement of Face[7]

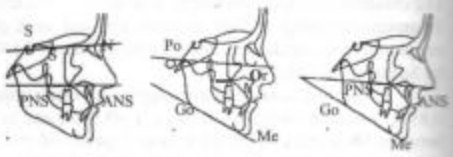

Figure 4. Vertical Measurement of Face[7]

Result

112 subjects of the study was been devided into 14 groups based on the age and sex where each of the group consist of 8 children. Each subject is measured the angles of SNA, SNB, SN-Mxpl, FHP-Mnpl, and Mxpl-Mnpl, continued by Kolmogorov-Smirnov normality test and finished by Spearmen corelation test.

Table 1. Spearman correlation test between SNA and SN-Mxpl, FHP-Mnpl and Mxpl-Mnpl on Javanese School Age Children with Good Nutritional Status

	Sex	Age		SN-Mxpl	FHP-Mnpl	Mxpl-Mnpl
SNA	Boys	6	*Corr.coeff.*	-0,857	0,238	0,214
			Sig.(2-tailed)	0,007	0,57	0,61
		7	*Corr.coeff.*	-0,333	-0,831	-0,429
			Sig.(2-tailed)	0,42	0,011	0,289
		8	*Corr.coeff.*	-0,347	-0,119	-0,19
			Sig.(2-tailed)	0,399	0,779	0,651
		9	*Corr.coeff.*	-0,857	-524	-0,524
			Sig.(2-tailed)	0,007	0,183	0,183
		10	*Corr.coeff.*	-0,743	0,252	0,381
			Sig.(2-tailed)	0,035	0,548	0,352
		11	*Corr.coeff.*	-0,333	0,476	-0,048
			Sig.(2-tailed)	0,42	0,233	0,911
		12	*Corr.coeff.*	-0,595	-0,357	-0,238
			Sig.(2-tailed)	0,12	0,385	0,57
	Girls	6	*Corr.coeff.*	-0,346	0,568	0,368
			Sig.(2-tailed)	0,402	0,142	0,37
		7	*Corr.coeff.*	-0,643	-0,22	0,357
			Sig.(2-tailed)	0,086	0,601	0,385
		8	*Corr.coeff.*	-0,619	-0,048	-0,333
			Sig.(2-tailed)	0,102	0,911	0,42
		9	*Corr.coeff.*	-0,238	0	-0,429
			Sig.(2-tailed)	0,57	1	0,289
		10	*Corr.coeff.*	-0,323	-0,512	-0,12
			Sig.(2-tailed)	0,435	0,195	0,978
		11	*Corr.coeff.*	-0,455	-0,738	0,619
			Sig.(2-tailed)	0,257	0,037	0,102
		12	*Corr.coeff.*	-0,81	-0,755	-0,524
			Sig.(2-tailed)	0,015	0,031	0,183

*: *coeff.corr=coefficient correlation.*
n (number of subject) each of the group=8

Table 1 has shown that there is a significant negative relation between SNA and SN-Mxpl; this data is similar with the hyphothesis and the ralation is happened on boys 6 (r=-0,857), 9 (r=-0,857), and 10 years (r=-0,743) also to the girls on age of 12 years (r=-0,81). The significant negative relation has been shown between SNA-FHP-Mnpl on boys 7 years old group (r=0,831), girls 11 (r=0,738) and 12 years old group (r=-0,755).

Table 2. Spearman correlation test between SNB and SN-Mxpl, FHP-Mnpl and Mxpl-Mnpl on Javanese School Age Children with Good Nutritional Status

	Sex	Age		SN-Mxpl	FHP-Mnpl	Mxpl-Mnpl
SNB	Boys	6	*Corr.coeff.*	-0,934	-0,108	0,371
			Sig.(2-tailed)	0,001	0,799	0,365
		7	*Corr.coeff.*	-0,539	-0,527	-0,599
			Sig.(2-tailed)	0,168	0,179	0,117
		8	*Corr.coeff.*	-0,355	-0,527	-0,204
			Sig.(2-tailed)	0,388	0,18	0,629
		9	*Corr.coeff.*	-0,857	-0,524	-0,524
			Sig.(2-tailed)	0,007	0,183	0,183
		10	*Corr.coeff.*	-0,41	-0,048	-0,108
			Sig.(2-tailed)	0,31	0,91	0,799
		11	*Corr.coeff.*	-0,667	0,476	-0,048
			Sig.(2-tailed)	0,071	0,233	0,911
		12	*Corr.coeff.*	-0,405	-0,143	-0,238
			Sig.(2-tailed)	0,32	0,736	0,57
	Girls	6	*Corr.coeff.*	-0,594	-0,849	0,556
			Sig.(2-tailed)	0,121	0,008	0,143
		7	*Corr.coeff.*	-0,524	0,342	0,548
			Sig.(2-tailed)	0,183	0,408	0,16
		8	*Corr.coeff.*	-0,619	-0,31	-0,524
			Sig.(2-tailed)	0,102	0,456	0,183
		9	*Corr.coeff.*	-0,419	0,144	-0,695
			Sig.(2-tailed)	0,301	0,734	0,056
		10	*Corr.coeff.*	-0,667	-0,79	-0,143
			Sig.(2-tailed)	0,071	0,02	0,736
		11	*Corr.coeff.*	-0,687	0,503	0,371
			Sig.(2-tailed)	0,06	0,204	0,365
		12	*Corr.coeff.*	-0,762	-0,707	-0,452
			Sig.(2-tailed)	0,028	0,05	0,26

*: *coeff.corr=coefficient correlation.*
n (number of subject) each of the group=8

Tabel 2 has shown that there is a negative relation between SNB and SN-Mxpl which is similar with the hyphothesis and the relation is significantly happened on group boys 6 years old (r=-0,934); a significant negative relation on boys of 9 years old group (r=-0,857), also with the girls 12 years old group (r=-0,762). The table also shown that there is a significant negative relation between SNB-FHP-Mnpl of girls 6 years old (r=-0,849) and 10 years old group (r=-0,79).

Discussion

The study with main topic of relation of the anteroposterior and vertical face growth on javanese school age children with good nutrition status has been shown that there is a significant negative relation between SNA and SNMxpl and this result is happened in boys group of 6, 9 and 10 and girls group of 12 years old.

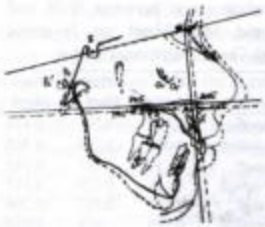

Figure 5. The relation between SNA and SN-*Maxilla plane*

The growth and development of two components is not in line. SN-Mpxl is a maxilla side which has been constructed by SN line and ANS-PNS. On the period of maxilla growth on to frontside and downside, the resorbtion of the bone is occured in anterior surface of maxilla except a small area of ANS. This is the reason of the existance of the negative relation.

Figure 6. The growth of Maxilla

When the maxilla moved to the front and downside, the formation of bone is occured in sutura and posterior of tuberocity, but in the same time the remodelling process is done to eliminating the anterior bone (except the small areal of spinal nasalis anterior)[8].

This study is also showing that there is a significant negative relation between SNA and FHP-Mnpl on boys 7 years old and girls 11 and 12 years old girls. SNA is a calculation of angle that took base of cranium (SN line) and maxilla (A), while FHP-Mnpl took base of cranium (Po) and mandible (Go-Me). The development of maxilla is worked on to aterior and inferior side where resorbtion is occured in A zone and resulted the angle of SNA that constantly relative. While the development of mandible is also moved on to anterior and inferior followed by the development and rotation of posterior side that resulted the position of mandible is higher than the horizontal side. This is the reason why there is a negative relaltionship.

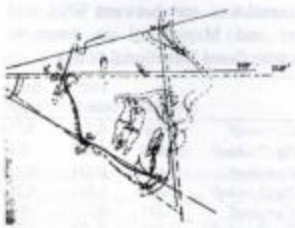

Figure 7. The Relation between SNA and FHP-*Mandibula plane*

The other result of the study shows that there is a significant negative relation between SNB and SN-Mxpl on boys 6 dan 9 years old and girls 12 years old group. The growth and development of each components is not in line. The bigger SNB is, the smaller SN-Mxpl.

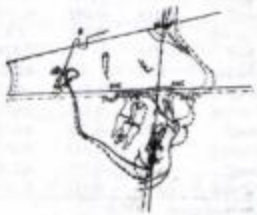

Figure 8. The relation between SNB and SN-*Maxilla plane*

There is a significant negative relation between SNB and FHP-Mnpl on girls 6 and 10 years old group; The bigger SNB is, the smaller FHP-Mnpl. This case can be explain by there is a massive development of mandible on to front and downside and a rotation from mandible so that B zone is going down-backside and creating the angle of SNB which smaller than others, while position of menton is going down which resulted the angle of FHP-Mnpl created is getting bigger. The development of condilus and aposition of anterior edge of ramus resulting the lenghtening of the mandible while the development of condilus together with the development of alveolus resulting elevating the mandible[9]

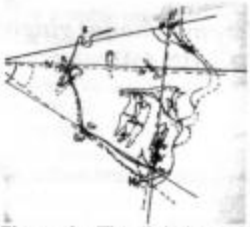

Figure 9. The Relation of SNB and FHP-*Mandibular plane*

Conclusion

There is a significant negative relationship between anteroposterior dan vertikal face growth on Javanese school age children with good nutrition status. The relations that happened are:

1. A significant relation between the component of anteroposterior and vertikal face growth between SNA and SN-*maxilla plane* on boys 6, 9 and 10 years old and girls 12 years old group.
2. A significant relation between the component of anteroposterior and vertikal face growth between SNA and FHP-*mandibula plane* on boys 7 years old and girls 11 and 12 years old group.
3. A significant relation between the component of anteroposterior and vertikal face growth between SNB and SN-*maxilla plane* on boys 6 years old group and a significant negative relation on boys 9 years old and girld 12 years old group.
4. A significant relation between the component of anteroposterior and vertikal face growth between SNB and FHP-*mandibula plane* on girls 6 and 10 years old group.

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