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Relationship between antegonial notch & vertical growth pattern

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ABSTRACT

Aim: To correlate the depth of the antegonial notch to the mandibular growth direction.

Material & methods: Pretreatment cephalograms of 60 patients were taken. Allcephalograms were taken by the same operator. The patients were categorized as normodivergent, hypodivergent & hyperdivergent based on FMA & SN-GoGn angle. Depth of the antegonial notch was assessed.

Results: Comparison of antegonial notch depth of different groups revealed that antegonial notch was found to be deepest in hyper divergent growth pattern (2.743 mm+0.3211) followed by normodivergent growth pattern (1.641 mm+0.6432) & least in hypo divergent growth pattern (0.745+0.7251 mm).

Conclusion: A deep mandibular antegonial notch is indicative of hyper divergent growth pattern.

Key Words: Antegonial notch, hypo divergent, norm odivergent, hyper divergent.

INTRODUCTION

Antegonial notch is the concavity present just anterior to the gonial angle along the lower border of the mandible. Its also known as Bjork implant studies have shown that deposition occurs below the symphysis & resorption occurs below the angle of the mandible in a subject with horizontal growth pattern.In a subject with vertical growth pattern opposite phenomena is occurring i,e deposition occurs below the angle & resorption occurs below the symphysis of the mandible.[1-3]Antegonial notch may be deep shallow or absent.[4,5,6]

It has been shown that Subjects with deep ante gonial notch have disturbed man dibular growth.[6]Also prominent antegonial notching has been shown in congenital& acquired abnormaities of the mandible.[7]

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Prediction of growth pattern plays an important role in decision making such as extraction, anchorage planning, biomechanics etc. The purpose of the present study was to correlate the depth of the ante gonial notch to the man dibular growth direction.

MATERIAL & METHODS

Pretreatment cephalograms of 60 patients were taken. Allcephalograms were taken by the same operator.The patients head were positioned in the cephalostat with the Frankfort horizontal plane set horizontally. The tracing and were measurements were carried out by the same operator. The patients were categorized as norm odivergent, hypo divergent & hyper divergent based on FMA & SN-Go Gn angle (20 each).A tangent was drawn along the lower border of the mandible connecting the two points. The area formed by the tangent & the concave lines connecting the points was defined as the notch.

Inclusion criteria

1. Age group of 21 to 40 years.

2. All land marks readily available on lateral cephalograms.

Exclusion criteria:

1. Cases with extreme growth patterns.

2. Cases with craniofacial syndrome.

3. Previous orthodontic treatment

4. Patients with pathologies in head & neck region.

5. TMJ or cervical spine disorders.

6. Facial asymmetry & trauma.

Statistical analysis

Mean and standard deviation of each variable were calculated.

One-way analysis of variance (ANOVA) was performed to assess any

difference between the three groups. It was followed

by a post hoc test in which a p value < 0.05 was considered

significant.The analysis was performed using IBM SPSS soft-

ware (version 22.0, Armonk, NY)

RESULTS

Table 1: Distribution of subjects in three vertical growth patterns

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Growth pattern	FMA	SN-GoGn
Hyperdivergent,n=20	>28	>34
Normodivergent,n=20	22-28	32 +/-2
Hypodivergent,n=20	< 22	<30

Table 2: Descriptive analysis of antegonial notch depth of different groups.

		Mean +SD (mm)	Standard error	
Antegonial notch depth	Hyperdivergent (20)	2.743+0.3211	0.1324	
	Normodivergent(20)	1.641+0.6432	0.4645	
	Hypodivergent (20)	0.745+0.7251	0.3412	

Table 3: One way analysis of variance

	Sum of Squares	df	Mean Square	F	Sig.
Between groups	21.463	3	11.346	28.734	0.000
Within groups	16.724	44	0.634		
Total	38.187	47			

Table 4: Post hoc tests multiple comparisons Bonferroni

		Mean difference	Standard error	Sig.	Lower bound	Upper bound
Hyperdivergent	Normo	1.04355	0.2443	0.000	0.323	1.946
	Hypo	1.8320	0.2439	0.000	1.467	2.897
Normodivergent	Hyper	1.04355	0.2443	0.000	-1.366	-0.729
	Hypo	0.8349	0.2443	0.033	0.289	1.341
Hypodivergent	Hyper	1.8320	0.2439	0.000	-2.453	-1.562
	Normo	0.8349	0.2443	0.000	-1.226	-0.762

Comparison of antegonial notch depth of different groups revealed that antegonial notch was found to be deepest in hyperdivergent growth pattern (2.743 mm+0.3211) followed by normodivergent growth pattern (1.641 mm+0.6432)& least in hypodivergent growth pattern (0.745+0.7251 mm).The post hoc multiple comparison Bonferoni test was carried out. Hyperdivergent growth pattern group showed significant difference as compared the average & horizontal growth pattern groups.

DISCUSSION

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Accurate prediction of mandibular growth plays an important role in orthodontics. Various morphological features have been studies in the past such as symphysis dimension, angulation, inclination, height& width of the ramus, antegonial notch etc.[8,9,10]

The present retrospectivecross-sectional study was conducted on 60 subjects to assess the correlation of antegonial notch depth & growth pattern. 60 subjects were divided into three equal groups of 20 each namely hypodivergent, normodivergent & hyperdivergent groups. Antegonial notch depth was assessed in each of the groups.

Comparison of antegonial notch depth of different groups showed that antegonial notch was found to be deepest in vertical growth pattern followed by average growth pattern & least in horizontal growth pattern. Vertical growth pattern group showed significant difference as compared the average & horizontal growth pattern groups.

In a similar study Singer et al[11] compared 25 subjects with deep antegonial notch with 25 subjects with shallow notch.it was found in the study that subjects with deep antegonial notch exhibited diminished growth & a vertically directed mandibular growth pattern. Lambrechts et al[12] in their study on shallow & deep antegonial notch subjects found that subjects with shallow antegonial notch demonstrated characteristic features associated with horizontal growth pattern than subjects with deep notches and their mandibles were positioned more protrusive.

Manabeet al[13] in a recent study on Japanese patients showed that both the masticatory muscles and mandibular growth could contribute to the notch formation. Kolodziejet al[10] in their study showed that antegonial notch fails to provide sufficient indication of future growth to warrant its application as a growth indicator in nonextreme population.

CONCLUSION

Antegonial notch was found to be deepest in hyperdivergent group followed by normodivergent & least in hypodivergent group. Hyperdivergent group showed significant difference as compared the average & horizontal growth pattern groups.

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