

A ROENTGENOCEPHALOMETRIC STUDY OF HYOID BONE POSITION ON CENTRIC AND REST POSITION IN MALOCCLUSION

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不正咬合者の 中心咬合位와 下顎安靜位時의 舌骨位置 에 관한 頭部 X線學的 研究

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.....》國文抄錄《.....

齒科矯正學 分野에 있어서 不正咬合者の 多樣한 下顎骨 位置變化에 따른 Hyoid bone 位置變化에 대한 研究는 不足한 感이 있어, 著者들은 Hellman의 齒齡Ⅲ A 以後의 不正咬合을 가진 男·女 97名을 Angle氏 各級 不正咬合의 分類에 依해 中心咬合位와 安靜位時의 頭部 X線 寫眞을 各各 採得하고 Hyoid bone의 位置變化를 測定하여 다음과 같은 結果를 얻었다.

1. 中心咬合位에서의 Cranial base에 대한 Hyoid bone 位置變化에서는 Angle氏 Class Ⅲ에서 男·女 모두 物徵的으로 前方에 位置하며, Mandibular plane에 대한 Hyoid bone 位置變化에서는 各級 不正咬合사이에 特記할 差異가 없다.

2. 安靜位에서의 Hyoid bone 位置는 中心咬合位에서의 位置와 비슷한 分布를 나타내고 있다.

3. 中心咬合位에서 安靜位로의 位置變化에서 各級 不正咬合 똑 같이 後·下方 移動을 나타내고 있다.

In the field of orthodontics, it is necessary from etiological and clinical aspects to understand clearly the effect of function of the hyoid bone.

Especially physiological examinations concerning various jaw movements would bring a better understanding of the behavior of the hyoid bone.

The hyoid bone is a U-shaped bone in the neck between the mandible and upper part of the larynx just above the thyroid cartilage. The hyoid bone is divided

into three parts; an unpaired middle part, the body and the paired greater and lesser horns.

There are eight major muscles attached to the hyoid bone.

- | | | |
|----------------|--------------------------------------|---------------|
| 1. Geniohyoid | 2. Mylohyoid | 3. Omohyoid |
| 4. Sternohyoid | 5. Stylohyoid | 6. Thyrohyoid |
| 7. Hyoglossus | 8. Digastric (not directly attached) | |

Certainly, the hyoid bone is supported by the muscles and does not have an osseous connection with the cranium and the mandible, and its position is dependent on the balance of surrounding soft tissues. Therefore, many investigators pointed out the importance of the position of the hyoid bone as related to various malocclusion patterns. ^(3, 8, 10)

On the hyoid bone many studies have been made and recently a good store of information is available. ^(1, 2, 3, 5, 6, 8, 9, 10) But there was few attempts to describe the changes of the hyoid bone position related to the various jaw positions.

The authors evaluate interrelationship between hyoid bone and the cranium and the mandible in centric occlusion, and interpositional changes of the hyoid bone from centric occlusion to rest position according to the Angle's classification of the malocclusion.

MATERIAL AND METHOD

The authors have selected 97 malocclusion patients of the both sexes as subject from the Dept. of orthodontics, colleeg of dentistry, S.N.U. in Seoul.

The subjects of dental ages were from IIIA. Two lateral cephalometric head films were taken mandible at rest and with the in occlusion by the common roentgenocephalometric procedures.

These materials are shown in Table 1.

Table 1. Classification of the materials (Mean ages)

sex \ class	Cass I	Class II	Class III	Total
male	13(13y11m)	13(12y8m)	11(14y3m)	37(13y7m)
female	20(15y4m)	20(14y9m)	20(14y)	60(14y8m)
Total	33(14y9m)	33(13y11m)	31(14y1m)	97(14y3m)

The tracing papers which of centric occlusion and the rest position in same subjects were superimposed on S-N line and maxilla and measured positional changes from centric occlusion to rest position. (Fig. 1,2.)

Points were as follows.

- | | | | |
|---|---|------------|------------|
| S(sella turcica) | N(nasion) | Go(gonion) | Me(menton) |
| Bo(bolton) | H(center of the hyoid bone body in centric occlusion) | | |
| H(center of the hyoid bone body in rest position) | | | |

The following lines and angles were measured.

- | | | | | |
|----------|----------|----------|---------|---------|
| 1) S-N | 2) H-S | 3) H-N | 4) H-Me | 5) H-Bo |
| 6) Go-Me | 7) GoMeH | 8) HGoMe | 9) HNS | 10) HSN |

Each mean, standard deviation were computed in each of the Angle's classification of the malocclusion.

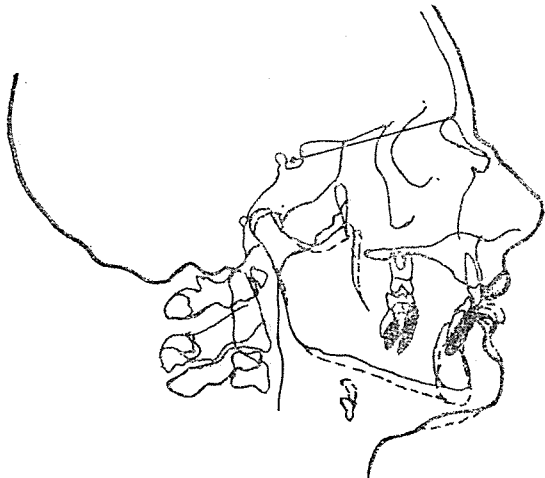


Fig. 1. Superimposition of two roentgenocephalometric films

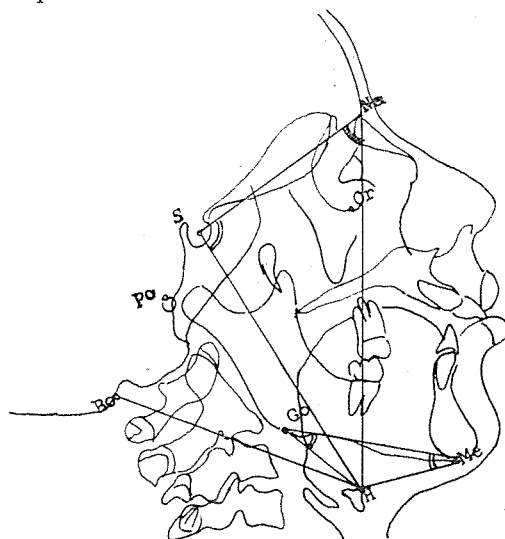


Fig. 2. Points, lines and angles measured.

RESULTS

Table 2,3. showed the results obtained from the measurements in the centric occlusion and the rest position. Table 4 showed positional changes from centric occlusion to rest position.

Table 2. Values measured in centric occlusion.

Class sex	Class I				Class II				Class III			
	Male		Female		Male		Female		Male		Female	
measured items	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
S-N	67.82	3.74	66.33	3.57	70.44	4.50	65.70	3.50	67.44	3.50	66.80	4.80
H-S	109.65	10.62	102.74	5.61	109.86	11.01	101.54	9.47	109.05	11.99	103.59	7.56
H-N	129.29	11.95	123.14	7.03	129.76	11.77	123.54	8.15	124.41	9.56	122.20	8.28
Go-Me	69.47	5.24	71.20	3.79	70.18	8.18	67.68	4.46	75.09	6.16	73.80	6.03
H-Me	36.18	6.38	42.28	5.45	37.25	8.21	39.14	6.51	39.66	6.95	43.81	6.51
H-Bo	80.30	8.01	81.39	7.20	88.61	8.78	80.76	7.43	87.85	12.26	85.09	7.87
<HNS	58.35	3.19	56.68	2.45	58.18	2.85	55.10	3.45	60.90	4.78	58.16	3.76
<HSN	90.17	3.92	90.43	3.13	88.85	3.32	92.10	4.44	86.33	3.52	88.90	4.93
<HGoMe	16.73	8.20	17.71	8.47	19.32	9.32	19.03	8.15	16.50	8.45	17.78	10.26
<HMeGo	17.08	8.29	15.22	4.61	19.69	9.16	17.88	10.71	15.00	4.29	12.97	6.10

Table 3. Values measured in rest position.

Class sex measuring items	Class I				Class II				Class III			
	Male		Female		Male		Female		Male		Female	
	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
S - N	67.82	3.74	66.33	3.57	70.44	4.50	65.70	3.50	67.44	3.50	66.80	4.80
H' - S	112.19	10.26	104.86	5.81	112.03	10.49	102.81	8.89	109.35	11.49	105.27	7.73
H' - N	132.20	15.59	125.16	7.50	132.52	11.23	124.82	7.95	126.11	9.23	124.05	5.73
Go-Me	69.47	5.24	71.20	3.79	70.18	8.18	67.68	4.46	75.09	6.16	73.80	6.03
H' -Me	37.12	6.43	42.39	4.21	38.46	8.81	39.04	7.16	40.49	6.81	44.54	5.94
H' -Bo	88.19	8.49	82.83	6.50	89.45	7.96	81.50	6.82	88.55	11.77	85.33	7.95
<H'NS	57.89	3.66	57.01	2.30	58.20	3.02	55.28	3.70	60.52	4.57	57.91	3.69
<H'SN	90.95	3.80	90.82	3.37	89.72	5.28	92.37	4.87	87.25	2.95	89.73	4.62
<H'GoMe	20.97	7.32	20.96	8.75	23.20	11.87	21.44	9.03	20.09	6.89	21.66	10.97
<H'MeGo	22.30	8.37	17.55	7.61	23.44	9.81	19.60	9.90	18.41	5.30	15.42	5.97

Table 4. Measurements of the positional changes from centric occlusion to rest position.

Class Sex Measured items	Class I		Class II		Class III	
	Male	Female	Male	Female	Male	Female
H - S	2.55	2.12	2.17	1.27	0.26	1.68
H - N	2.91	2.02	2.75	1.28	1.70	2.00
H - Me	0.94	-0.90	1.22	-0.10	0.83	0.73
H - Bo	1.08	0.10	-0.85	0.78	0.70	0.24
<HNS	-0.46	0.33	0.02	0.18	-0.38	-0.26
<HSN	0.78	0.40	0.79	0.27	0.93	0.77
<HGoMe	4.24	3.25	3.88	2.41	3.59	3.89
<HMeGo	5.22	2.34	3.75	1.71	3.41	2.46

1. the position of the hyoid bone in centric occlusion.

The position of the Angle's class III showed more anterior than the class I, II in both sexes as related to cranium. But to compared with mandibular plane, all the groups represented almost similiar position. In other words, there is no significant difference of the position of the hyoid bone among those three groups as related to the mandible.

On the appraisal of the digastric muscle, the length of the anterior belly of digastric muscle showed more longer in female than in male.

The length of the posterior belly of the digastric muscle showed more longer in male than in female.

2. The position of the hyoid bone in rest position.

In the rest position, the position of the hyoid bone located similiar position compared to the centric occlusion. Backward and downward displacement was observed in all the groups with similiar pattern.

DISCUSSION

The purpose of the present study was to determine the positional changes of two mandibular position, centric occlusion and rest position. It is so important that correct positioning of the centric occlusion and the rest position because of reliance of the results. In this study, when projection of the roentgenocephalograms in rest position was used by Lee ⁽⁷⁾ method modified with Thompson⁽¹¹⁾ and Ishikawa's ⁴⁾ method. That method was explained so that trained doctors instructed patiens to relax sutticiently to project roentgenocephalograms in rest position 30 seconds after swallowing. Reference items used Takayuki and Smith modification.

In the present study, the hyoid bone is located slightly backward in the class II female and slightly forward in male comparing with class I in both sexes without characteristics of the class III. The fact seem to represent Grant's ⁽³⁾ conclusion that the position of the hyoid bone determines musculature and skeletal discrepancy not the occlusion of the teeth.

But comparing with Takayuki and his collaborator's work,⁽¹⁰⁾ it is very similiar pattern with these results.

Position of the hyoid bone in rest position, there was few reserch in our fields, so we can't compare with other results. We observed that position of the hyoid bone from centric occlusion to rest position was downard and backward displacement in all the groups in both sexes. The fact showed that mandibular movement was coincidental with to the muscular moving pattern. Those results mean that the position of the hyoid bone was determined by various factors. muscular pattern, jaw position, head posture.

SUMMARY AND CONCLUSION

The position of the hyoid bone as related to the two jaw position, centric occlusion and rest position, was investigated on cephaloroentgenograms in malocclusion. This study demonstrates that the position of the hyoid bone relative to the cranial base and to the mandible was also studied.

The subjects selected for this study were the 97 Korean malocclusion persons in both sexes including each of the Angle's classification. Two lateral roeng-

enocephalometric films were taken in same person on centric occlusion and rest position. Their linear and angular measurements were made directly.

The authors obtained the following results:

1. In the centric occlusion, the position of the hyoid bone as related to cranium showed significant forward positioning of the Angle's class III malocclusion in both sexes. and as related to mandibular plane showed no significant difference in each of the Angle's classification of malocclusion.
2. In the rest position, the position of the hyoid bone showed similar positioning as like centric occlusion.
3. The positional changes of the hyoid bone from centric occlusion to rest position showed similarly backward and downward displacement in each of the Angle's classification of the malocclusion.

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