

THE MEDIAL SIGMOID DEPRESSION: Its Anatomic and Radiographic Considerations

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》 국문초록 《

하악골과 방사선사진상에서의 하악절흔 내측 함요

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하악절흔 내측 함요는 하악골의 하악절흔 전, 내, 하방에 함몰된 양상으로 나타나는 정상해부학적 구조물이다. 이 구조물에 대한 해부학적 중요성이나, 발생이 선천적인가 아니면 출생 후 발생하는 것인가에 대하여는 알려져 있지 않다. Langlais는 하악절흔내측함요는 파노라마 방사선사진상에서 절흔, 또는 소공 모양의 방사선투과상으로 나타난다고 하였지만 이는 하악 사측방향 촬영상 등에서도 나타날 수 있는 해부학적 구조물이다. 파노라마 방사선사진에서는 익상관, 연구개, 기도, 그외 다른 조직등의 중첩으로 인하여, 이 구조물의 발견 빈도가 낮아진다. 저자는 78개의 하악골에서의 발생빈도, 위치, 크기등을 조사하고, 이를 파노라마 방사선사진촬영하여 그 발생 빈도를 조사하였으며, 치과환자 500명의 파노라마 방사선사진에서의 발생빈도도 알아 보았다.

1. 하악골에서의 발생빈도는 62%였다(편측성 28%, 양측성 33%).
2. 하악골의 파노라마 방사선사진상의 발생빈도는 33%였다(편측성 14%, 양측성 19%).
3. 하악절흔내측함요의 중심 위치는 하악절흔 하방 6.0mm, 전방 3.8mm였다.
4. 크기는 수직 7.8mm, 수평 8.3mm이었다.
5. 치과환자들의 파노라마 방사선사진상에서의 발생 빈도는 24%였다(편측성 18%, 양측성 7%).

An anatomic radiolucency called medial sigmoid depression can be observed on a number of panoramic and mandibular oblique lateral views in the ramus just below and anterior to the mandibular sigmoid notch. The radiolucency may be unilateral or bilateral. Seventy-eight mandibles of dry skulls were visually examined and radiographed by panoramic machine. The observable incidence, the location center, and the mean size of the medial sigmoid depression were studied. Additionally, the radiographic incidence of the depression was determined using 500 panoramic radiographs.

Normal anatomic radiolucent areas in the jaws are encountered often in the radiographs taken for the usual dental practice purpose. Some of these radiolucencies can be misdiagnosed as pathologic entities. But in most cases, the size, location, and appearance of the radiolucent area, and the presence or absence of symptoms can lead one to the correct diagnosis before surgery is undertaken. And this can be secured if diagnosticians are aware of the common and varied appearances of the normal anatomic radiolucencies.¹⁻⁸⁾

A depression in the ramus just below and slightly anterior to the most inferior aspect of mandibular sigmoid notch shows occasionally foramen-like or notch-like radiolucency on some panoramic and oblique lateral views. This radiolucency was named medial sigmoid depression by Langlais et al. in 1983.

Since there're no reports about this medial sigmoid depression after that, (The author retrieved the Mediline from 1983 to 1990: Cambridge scientific abstracts, (7200 Wisconsin Ave Bethesda MD 20814 U.S.A.) National Library of Medicine) the author studied the size and the location of the depression of the mandible specimens, and determined the relationship between the observable anatomic incidence and its reproducibility on the radiographs.

Materials and Methods

Seventy-eight dry mandibles were examined in the region of sigmoid notches. (25 skulls from the school of dentistry, Chonnam National University, 53 skulls from the school of medicine, Chosun University in Kwang-Ju, South Korea)

Since the medial sigmoid depression reveals varying depth, it is difficult to suggest any objective standard for its presence. Therefore the three dentist examined the depression on the mandible specimens or radiographs. The presence of the depression was accepted when all the three members coincided in their opinion.

To measure the size and center of the depression, the following arbitrary lines and points were used on the mandibles:

Point A as the deepest point of the sigmoid notch, a perpendicular line P passing the point A was drawn to the posterior border of the mandible. Point D as the lower-most point of the depression, a perpendicular line to the line P passing the point D was drawn. The point where this line met with the line P was considered as point B. A mid point between the point B and D was considered as point C. A perpendicular line to the line BD passing the point C was drawn and Points E and F were determined which met the lateral borders of the depression.

The distance between the points B and D was considered as the vertical length of the depression. The point C as the center of the depression and the distance between the points E and F as the horizontal length of the depression.

The location center of the depression was measured from the point A.

The mandibles were radiographed with the Veraview panoramic machine (J. Morita Co.). The radiographs were examined, and the incidence of the medial sigmoid depression was recorded.

Additionally, the 500 panoramic radiographs taken at the Chonnam National University Hospital were reviewed for the presence of the depression.

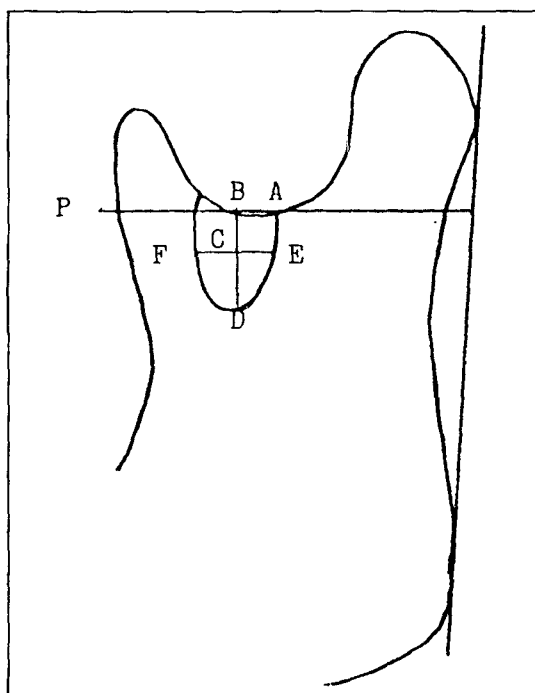


Fig. 1. Reference points on the mandible

Table 5. Findings in 500 panoramic radiographs

| Location of radiolucency | No. | percent of total |
|--------------------------|-----|------------------|
| unilateral | 88 | 17.6 |
| bilateral | 33 | 6.6 |
| total | 121 | 24.2 |

Table 1. Findings on 78 mandibles

| location of depression | No. of mandibles | percent of total |
|------------------------|------------------|------------------|
| unilateral | 22 | 28.2 |
| bilateral | 26 | 33.3 |
| total | 48 | 61.5 |

Table 2. Findings in 78 panoramic radiographs of mandible specimens

| location of radiolucencies | No. | percent of total |
|----------------------------|-----|------------------|
| unilateral | 11 | 14.1 |
| bilateral | 15 | 19.2 |
| total | 26 | 33.3 |

Table 3. Location center of the depression to the sigmoid depression

| | |
|----------|--------|
| below | 6.0 mm |
| anterior | 3.3 mm |

Table 4. Mean size of the depressions

| | |
|-------------------|--------|
| vertical length | 7.8 mm |
| horizontal length | 8.3 mm |

Results

The incidence of medial sigmoid depression on the mandible specimens was 62% (28% unilateral, 33% bilateral) (table 1) (Fig. 2).

The radiographic incidence of the depression was 33% (14% unilateral, 13% bilateral) (table 2) (Fig. 3).

The center of the depression (point C) was located 6.0mm below and 3.8mm anterior to the sigmoid notch (point A) in average. (table 3)

The mean size of the depression was 7.8mm in vertical and 8.3mm in horizontal (table 4).

The incidence of the radiolucency in 500 panoramic radiographs was found to be 24%, with 8% occurring unilaterally and 7% bilaterally (table 5) (Fig. 4).

Discussion

Anatomically mandibular sigmoid notch is crossed by the masseteric vessels and nerve. But there was no mention about the medial sigmoid depression below and medial to the region of the mandibular sigmoid notch in the anatomic literatures.¹⁰⁻¹⁸⁾

The medial sigmoid depression shows foramen like or notch-like radiolucency on some panoramic radiographs. Langlais et al⁹⁾ explain the correlation between the radiographic appearance and the anatomic depression as follows: Panoramic view is a layerlike image in which only a thin slice of the anatomic structure is sharply depicted, a depression could appear as radiolucency. The difference in incidence between the gross specimens and radiographs may be due to two major considerations. The depressions may not always fall within the focal trough of the machine used, and a great number of radiographs could not be evaluated because of technique errors which precluded any interpretation of the area.

But some of the explanations above doesn't seem to be reasonable, because the image layer or focal trough of the panoramic radiograph has some thickness. Fig. 5, A shows a mandible aligned in the middle of the focal trough. Fig. 5, B shows the point of right mandibular angle positioned 1 cm lateral to the middle of the focal trough (left mandibular angle positioned 1 cm medial to the middle of the focal trough). Fig. 5, C and Fig. 5, D show the point of the mandibular angle positioned additional 1 cm lateral to the focal trough. The image of left medial sigmoid depression is magnified, blurred.¹⁹⁾ When the mandible is slightly outside of the middle of the focal trough, we can recognize the medial sigmoid depression. The medial sigmoid depression is an anatomic depression below the sigmoid notch, this depression can be revealed on the oblique lateral view (Fig. 6).

There is the difference in incidence between the mandibular specimen's radiographs and the patient's radiographs. Langlais reported the panoramic radiographic incidence as 10 percent. This study obtained the result of 32 percent incidence from the mandibular specimen's radiographs and 24 percent from the panoramic radiographs. The different results of incidence may be explained by following considerations: The radiolucent nasopharyngeal airway shadow, the pterygoid plate, and the soft palate are superimposed the sigmoid notch region, on the panoramic view^{20,21)} (Fig. 7). And there are soft tissue and other anatomies which are superimposed the sigmoid notch region. If the patient's jaw was not exactly on the center of the panoramic image layer the resultant radiograph reveals some image unsharpness.^{6-8,19)} Consequently, the interpreter may overlook the medial sigmoid depression. The anatomic significance of this depression is not determined.⁹⁾ Whether the origin of the depression is congenital or developmental is a problem to be solved, as the case of Stafne mandibular cavity (it may be developed after birth).^{1,3,4)} In author's examining 500 panoramic radiographs, the 6 medial sigmoid depressions were occurred under the age of ten. (Fig. 8). One of them was seen at a 3 year old child. These examples may suggest that the medial sigmoid depression be congenital.

Summary and Conclusion

A foramen-like radiolucency was occasionally observed on a panoramic radiographs in the upper ramus just below and anterior to the mandibular sigmoid notch. The medial sigmoid depression is an anatomic radiolucency which can be observed on a number of panoramic radiographs in the upper ramus just below and anterior to the mandibular sigmoid notch. The radiolucent shadow was first reported by Langlais et al. (1983) The anatomic significance of this depression on the mandible is not determined. Though it can be observed at the age of three, whether the origin of the depression is congenital or developmental is a problem to be solved.

There was a difference in incidence between mandibular specimen's radiographs and the patient's radiographs. The difference may be due to the following considerations: The radiolucent airway shadow, pterygoid plate, soft palate are superimposed the sigmoid notch region. And there are soft tissues and other anatomies which are superimposed the sigmoid notch region.

Seventy-eight mandibles (of dry skulls) were examined. The observable incidence, location, and size of the depression were recorded. Some of the representative specimens were photographed. The specimens were radiographed with Veraview panoramic machine (J. Morita Co.). The observable incidence of the medial sigmoid depression was compared with the radiographic incidence. The results are as follows:

1. The observable incidence of the medial sigmoid depression was 62% (28% unilateral, 33% bilateral).
2. The radiographic incidence of the medial sigmoid depression was 33% (14% unilateral, 19% bilateral).
3. The center of the medial sigmoid depression was located 6.0mm below and 3.8mm anterior to the sigmoid notch (on the skulls).
4. The mean size of the medial sigmoid depression was 7.8mm in vertical and 8.3mm in horizontal length.
5. The radiographic incidence of the depression in dental patients was 24% (18% unilateral, 7% bilateral).

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LEGEND FOR PHOTOGRAPHS

- Fig. 2.** Medial sigmoid depression in upper ramus area on the anatomic specimens.
- Fig. 3.** Medial sigmoid depression on mandible specimen's radiograph.
- Fig. 4.** Panoramic radiographs of the dental patients showing Unilateral (A) and Bilateral occurring medial sigmoid depression (B)
- Fig. 5.** Panoramic radiographs according mandible specimen's alignment on the image layer. Align in the middle of the focal trough (A), right mandibular angle positioned 1 cm lateral to the middle of the focal trough (B), additional 1cm lateral to Fig. B (C), additional 1cm lateral to Fig. C (D).
- Fig. 6.** Medial sigmoid depression on the lateral oblique view (same patients of the Fig. 4B).
- Fig. 7.** The pterygoid plate and soft palate are superimposed the sigmoid notch area.
- Fig. 8.** Panoramic radiograph showing foramen-like radiolucency in right upper ramus area at the age of 5.

논문 사진부도 ①



Fig. 2.

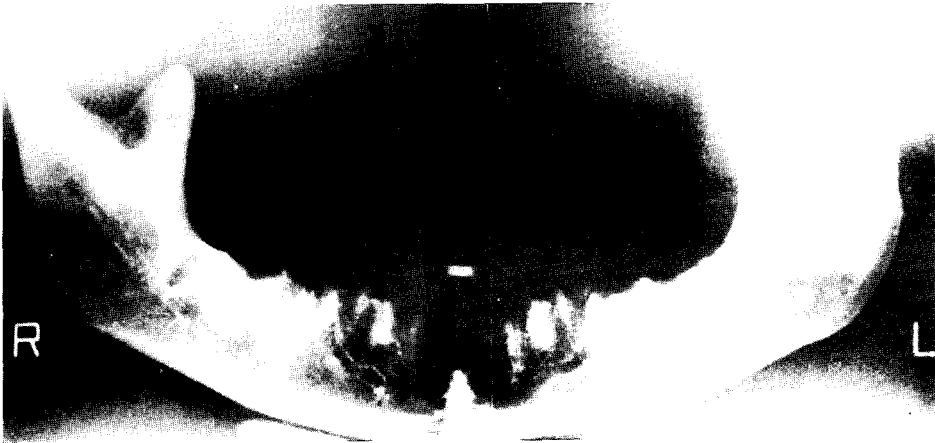


Fig. 3.



Fig. 4-a.

논문 사진부도 ②



Fig. 4-b.

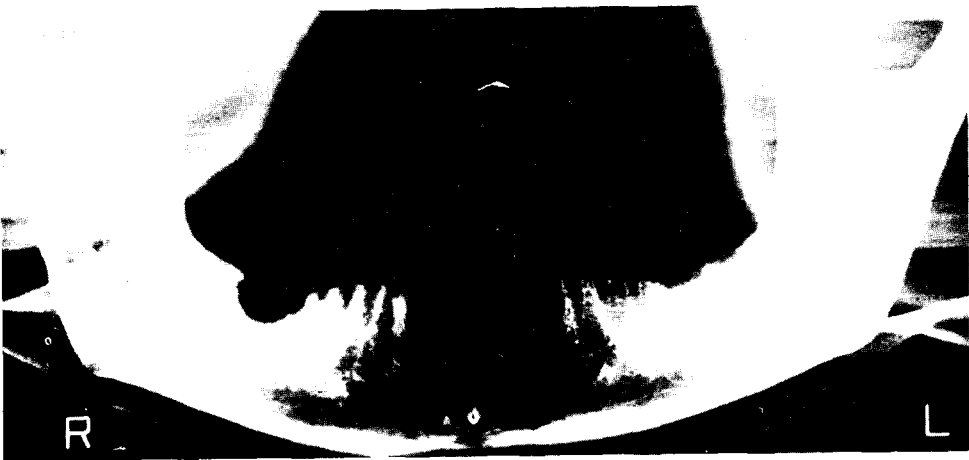


Fig. 5-a.

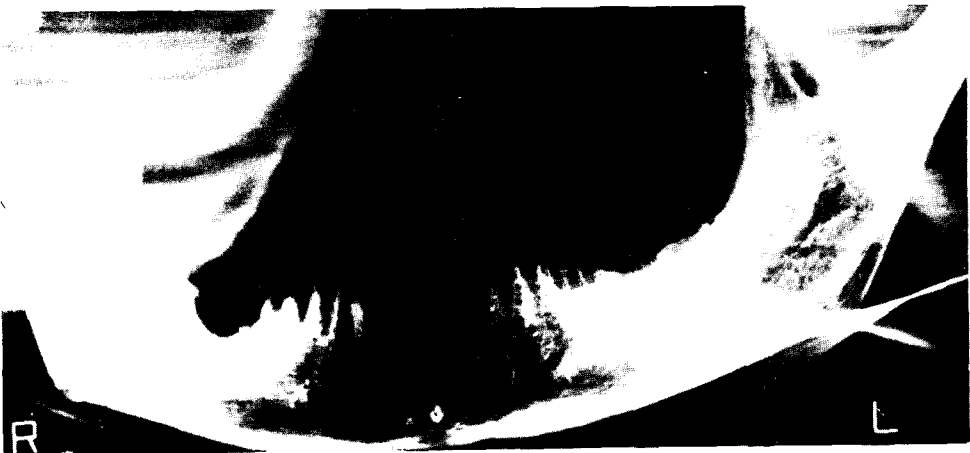


Fig. 5-b.

논문 사진부도 ③



Fig. 5-c.



Fig. 5-d.

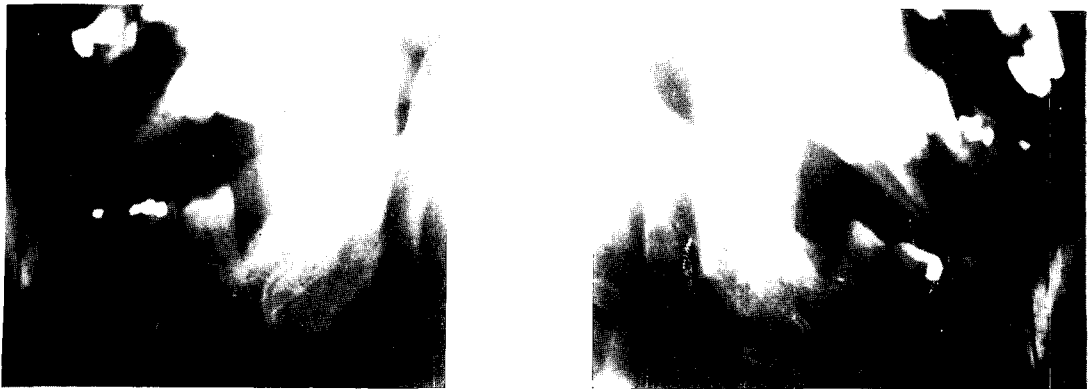


Fig. 6.

논문 사진부도 ④



Fig. 7.

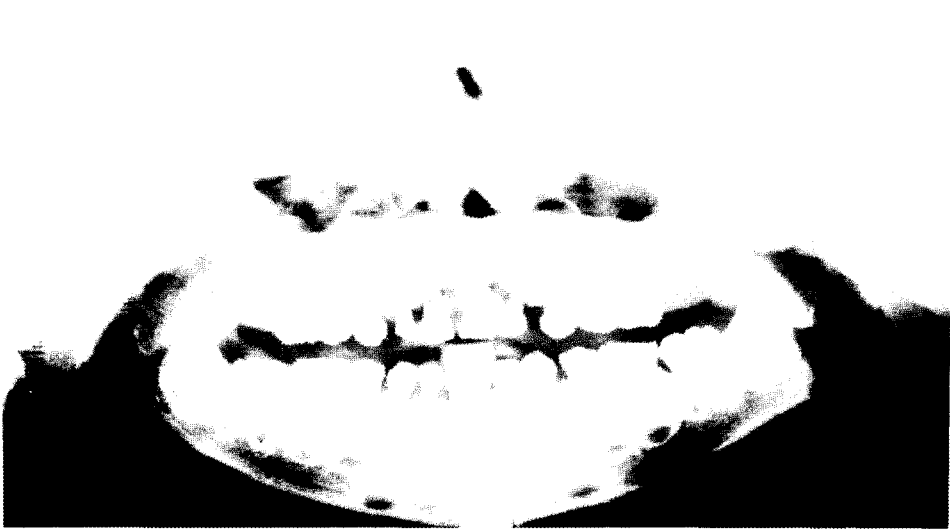


Fig. 8.