

## BASIC PRINCIPLES OF THE TEMPORAL BONE PYRAMID RADIOGRAPHY

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The paper shows the possibilities and advantages of certain methods of temporal bone radiography in diagnosing pathologic conditions and diseases of temporal bones, with description of basic techniques of radiological examinations: *Mayer's axial view of the pyramids*, *the Stenvers view of the pyramids*, *the Arcelini view of the pyramids*, *comparative pyramid radiography by Hass*, *comparative pyramid radiography by Gras-hey*, *comparative pyramid radiography in submentovertical projection and comparative pyramid radiography in verticosubmental projection*. *Acta Medica Medianae* 2007;46(3): 38-39.

**Key word:** radiological, temporal bone pyramid

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### Our paper

Certain parts of the temporal bones can be radiologically viewed in several ways (1-10).

This paper is based on many years of material gathering and literary works of the authors and its aim was to present the basics of the temporal bone radiography.

The results presented in this paper show possibilities and advantages of certain methods of temporal bone radiography in diagnosing pathologic conditions and diseases of temporal bones, with description of basic techniques of radiological examinations:

*Mayer's axial view of the pyramids.* This pyramid radiography technique is commonly used. A patient lies on his back. Arms of the patient are next to his body. The patient's head is rotated to the side being radiographed and positioned so its sagittal plane is angulated at a 45° angle to the plane of the film. The chin should be moved towards the chest. Any items, that could impair the interpretation of the radiograph with their shadows, should be removed from the patient's head and the patient's body should be protected from the ionizing radiation by a lead apron. It is mandatory to mark which side is being radiographed. Standard dimensions of the film are 18x24cm. The central beam is

angulated 45° caudally, enters the tuber frontale of the opposite side and exits through the external porus acusticus which is closer to the film i.e. that is the side being radiographed. The radiograph shows external porus acusticus, antrum, mastoid cells and temporomandibular joint.

*The Stenvers view of the pyramids.* A patient is in a prone position with his hands next to his head, elbows flexed and palms towards the table. The sagittal plane of the head is angulated at a 45° angle to the plane of the film. The upper border of the orbit, the nose and the zygomatic bone are touching the table and the chin is moved towards the chest. The x-ray beam is angulated 12° caudally, with the entry point in the middle between the external occipital protuberance and the external porus acusticus of the side not being filmed. The exit point is slightly above the line of the base. It is mandatory to mark which side is being radiographed. Standard dimensions of the film are 18x24cm. The long axis of the petrous pyramid is parallel to the plane of the film, and the entire pyramid, including its apex is well visualized. This view shows the entire pyramid, arcuate eminence, internal auditory canal, porus acusticus, horizontal and vertical semicircular canals, vestibule, cochlea, mastoid antrum, and mastoid tip.

*The Arcelini view of the pyramids.* This radiography technique is rarely used. This technique shows the pyramids in a profile projection, when a patient is lying on his back! The hands are next to the body. The patient's head is rotated at a 45° angle away from the side being radiographed, while the chin is drawn towards the chest. The x-ray beam is angulated 10° caudally and it is aimed at the middle of the base line which is closer to the x-ray tube, while everything else remains the same as with Stenvers technique.

**Comparative pyramid radiography by Hass.** A patient is in a prone position with his hands next to his head, elbows flexed and palms towards the table. The patient's forehead and tip of his nose are touching the table, while the chin is drawn towards the chest. Any items, that could impair the interpretation of the radiograph with their shadows, should be removed from the patient's head and the patient's body should be protected from the ionizing radiation by a lead apron. The x-ray beam is angulated 25° cranially. The entry point is about 3 cm above the external occipital protuberance and the exit point is about 3 cm above the root of the nose. It is mandatory to mark which side is being radiographed. Standard dimensions of the film are 18x24cm. This view shows both petrous pyramids, the great occipital foramen and the occipital bone.

**Comparative pyramid radiography by Grashey.** A patient lies on his back. Arms of the patient are next to his body. The back of the patient's head is touching the table. Any items, that could impair the interpretation of the radiograph with their shadows, should be removed from the patient's head and the patient's body should be protected from the ionizing radiation by a lead apron. The central beam is angulated 30° caudally, enters at the edge of the hairy portion of the head along the medial line and exits through the great occipital foramen. It is mandatory to mark which side is being radiographed. Standard dimensions of the film are 18x24cm. This view shows both petrous

pyramids, the great occipital foramen and the occipital bone.

**Comparative pyramid radiography in submentovertical projection.** The position of the patient's head and body is the same as for the radiography of the skull base via back of the head. The central beam makes a 90° angle with the line of the skull base. The entry point is at the middle of the axis connecting both mandibular angles. It is mandatory to mark which side is being radiographed. Standard dimensions of the film are 18x24cm. This view shows both petrous pyramids, the great occipital foramen, the occipital bone and zygomatic arches.

**Comparative pyramid radiography in verticosubmental projection.** The position of the patient's head and body is the same as for the radiography of the skull base by submandibular access. The central beam is angulated caudally and it exits through the middle of the axis connecting both mandibular angles. It is mandatory to mark which side is being radiographed. Standard dimensions of the film are 18x24 cm. This view shows both petrous pyramids, the great occipital foramen, the occipital bone any zygomatic arches.

### Conclusion

The knowledge of basic the pyramids temporal bone radiography is exceptionally important, for the purpose of getting precise view of the temporal bone pyramid.

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## OSNOVI RENDGENGRAFIJANJA PIRAMIDE TEMPORALNE KOSTI

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U radu se prikazuju mogućnosti i prednosti pojedinih tehnika rendgenografisanja piramide temporalne kosti pri dijagnostici patoloških stanja i oboljenja temporalne kosti, uz prikaz osnove rendgenografisanja pojedinih tehnika pregleda: aksijalni snimak piramida po Mayer-u, profilni snimak piramida po Stenvers-u, rendgenografisanje piramida po Arcelini-ju, komparativna rendgenografija piramida po Hassu, komparativna rendgenografija piramida po Grashey-u, komparativna rendgenografija piramida u submentoverikalnoj projekciji i komparativna rendgenografija piramida u ventikosubnebtalnoj projekciji. *Acta Medica Medianae 2007;46(3):38-39.*

**Ključne reči:** radiologija, piramida temporalne kosti