Radiographic Anatomy
part 1

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A number of anatomic landmarks are visible in dental radiographs. Knowledge of the location and normal appearances of these landmarks is important in identification and orientation of radiographs.
This knowledge is valuable to the dental officer in determining whether the area is normal or abnormal.

Radiolucent vs. Radiopaque

Structures that are cavities, depressions or openings in bone such as a sinus, fossa, canal or foramen will allow x-rays to penetrate through them and expose the receptor (dental film).

These areas will appear **radiolucent or **black** on radiographic images. Structures that are bony in origin absorb or stop the penetration of the x-rays and, therefore, do not reach the receptor.

These areas appear **radiopaque or **white** on radiographic images. Some structures partially absorb radiation and are represented in varying degrees of radiopacity

NORMAL TOOTH ANATOMY

Tooth structures that can be viewed on dental images include the following: **enamel, dentin, the dentino-enamel junction, and the pulp cavity.**

****Cementum** is not usually apparent radiographlly because cementum layer is so thin.

Enamel is the densest structure found in the human body.

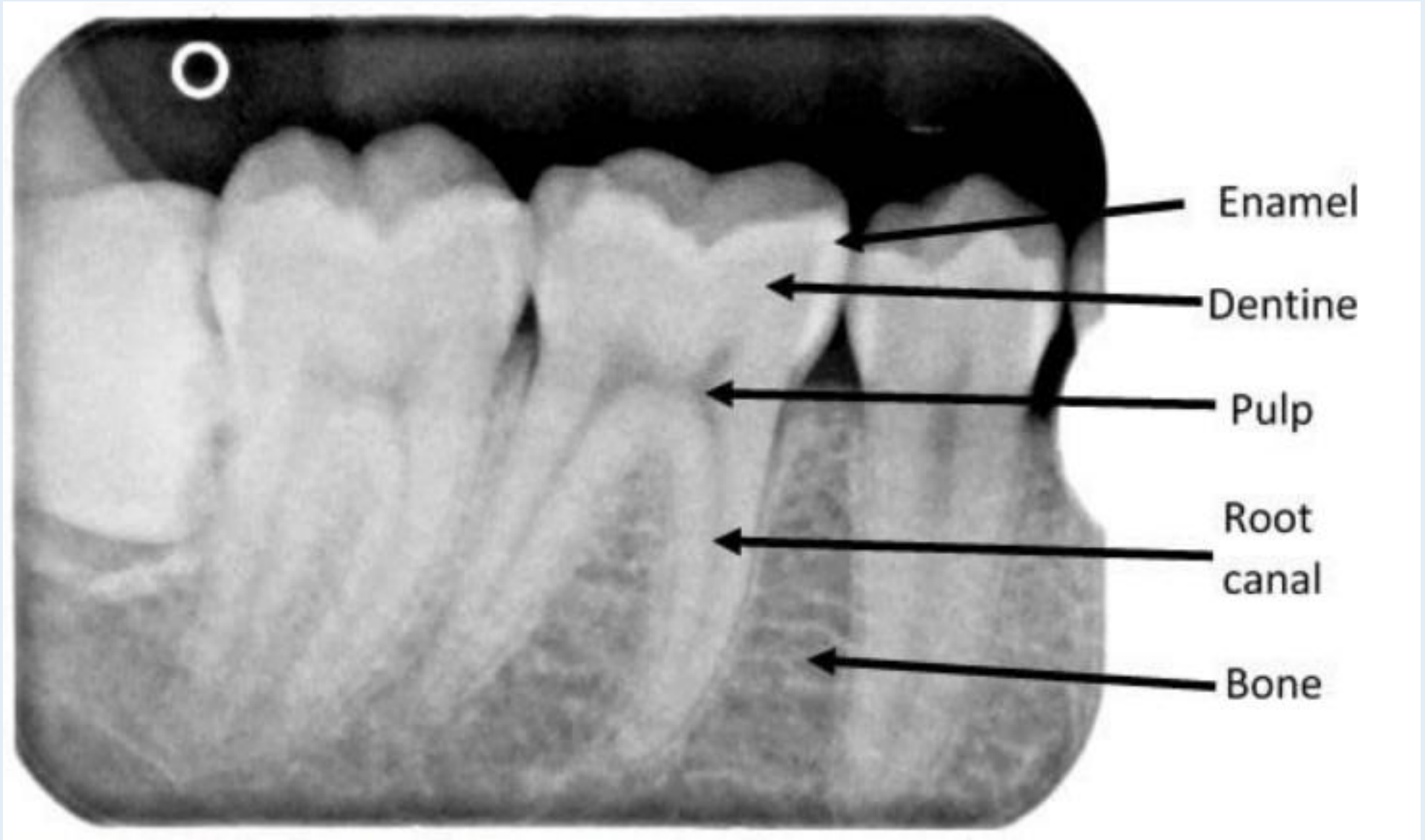
Enamel is the outermost radiopaque layer of the crown of a tooth

Dentin is found beneath the enamel layer of a tooth and surrounds the pulp cavity .

Dentin appears **radiopaque** and makes up the majority of the tooth structure.

Dentin is not as radiopaque as enamel.

Dentino-Enamel Junction (DEJ) is the junction between the dentin and the enamel of a tooth.


Enamel
Dentine
Pulp
Root canal
Bone

The DEJ appears as a line where the enamel (very radiopaque) meets the dentin (less radiopaque) .

Pulp Cavity The pulp cavity consists of a pulp chamber and pulp canals. It contains blood vessels, nerves, and lymphatics and appears relatively radiolucent on a dental image

Supporting Structures

The alveolar process, or alveolar bone, serves as the supporting structure for teeth. Anatomy of Alveolar bone The anatomic landmarks of the alveolar process include the **lamina dura**, the **alveolar crest**, and the **periodontal ligament space .**

Lamina Dura Description. The lamina dura is the wall of the tooth socket that surrounds the root of a tooth.

The lamina dura is made up of dense cortical bone.

Appearance. On a dental image, the lamina dura appears as a dense radiopaque line that surrounds the root of a tooth .

Alveolar Crest Description. The alveolar crest is the most coronal portion of alveolar bone found between teeth.

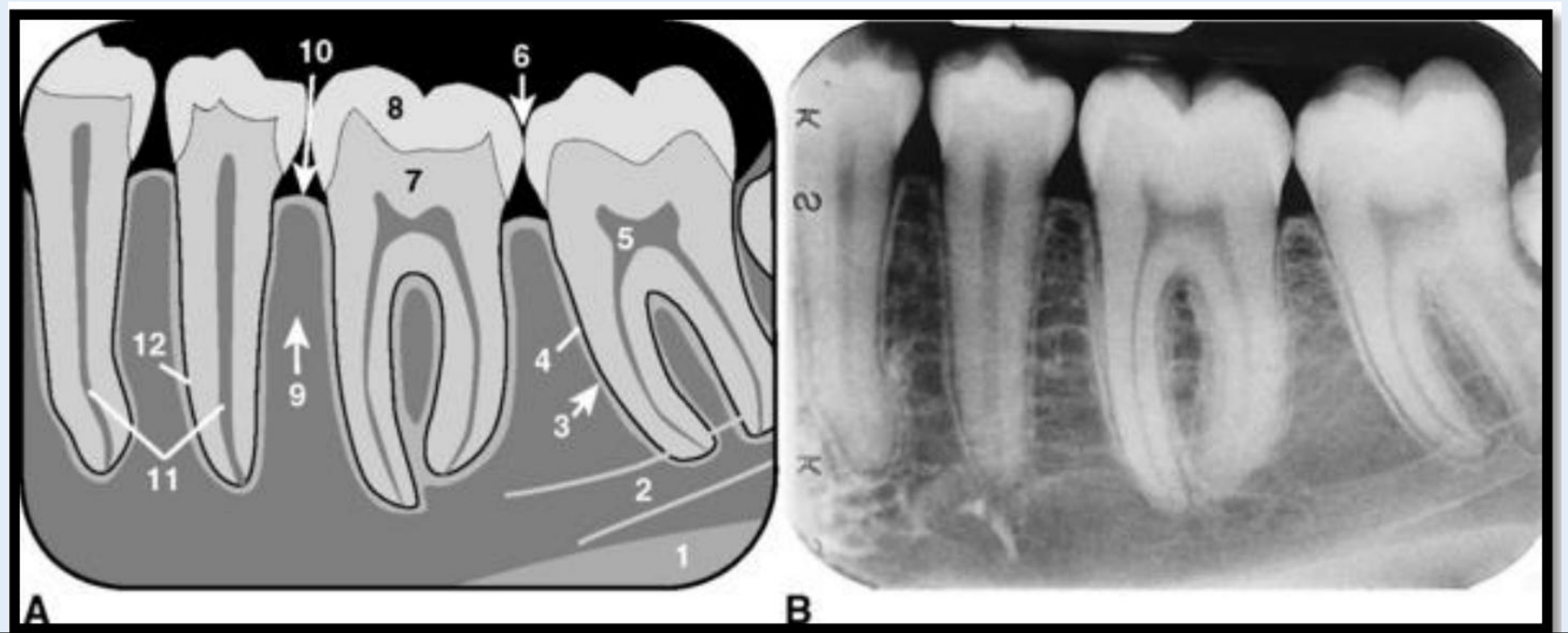
The alveolar crest is made up of dense cortical bone and is continuous with the lamina dura.

Appearance. On a dental image, the alveolar crest appears radiopaque and is typically located 1.5 to 2.0 mm below the junction of the crown and the root surfaces (the cementoenamel junction).

Periodontal Ligament Space Description. The periodontal ligament space (PDL space) is the space between the root of the tooth and the lamina dura. The PDL space contains connective tissue bers, blood vessels, and lymphatics.

Appearance. On a dental image, the PDL space **appears as a thin radiolucent line around the root of a tooth.**

In the healthy periodontium, the PDL space appears as a **continuous radiolucent line of uniform thickness.**



Types of Bone

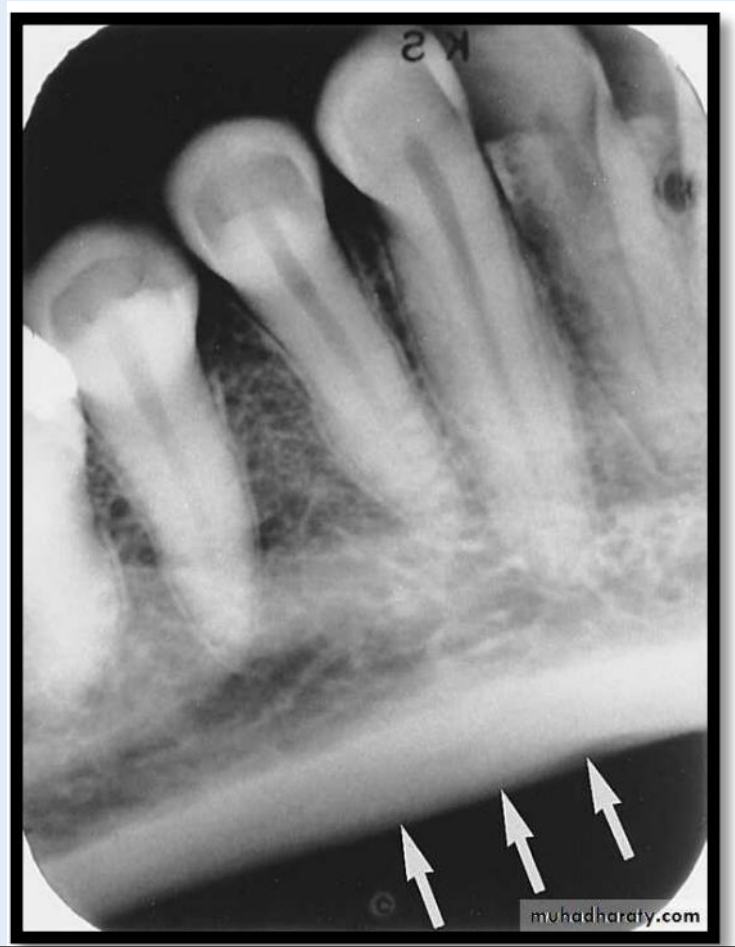
The composition of bone in the human body can be described as either cortical or cancellous

Cortical bone, also referred to as compact bone, is the dense outer layer of bone

Cancellous bone (also called trabecular bone) is the soft, spongy bone located between two layers of dense cortical bone the trabeculae in the anterior maxilla are typically thin and numerous in the posterior maxilla the trabecular pattern is usually quite similar to that in the anterior maxilla, although the marrow spaces may be slightly larger.

In the **anterior mandible** the trabeculae are somewhat **thicker** than in the maxilla, resulting in a coarser pattern, with trabecular plates that are oriented more horizontally

In the **posterior mandible** the periradicular trabeculae and marrow spaces may be comparable to those in the anterior mandible but are usually somewhat larger.



Some terms of dental radiographs

Prominences of Bone

Prominences of bone are composed of dense cortical bone and appear radiopaque on dental images.

*__Process__: A marked prominence or projection of bone; an example is the coronoid process of the mandible

*__Ridge__: A linear prominence or projection of bone; an example is the external oblique ridge of the mandible.

*__Spine__: A sharp, thorn-like projection of bone; an example is the anterior nasal spine.

*__Tuberosity__: A rounded prominence of bone; an example is the maxillary tuberosity

Spaces and Depressions in Bone

Spaces and depressions in bone do not resist the passage of the x-ray beam and appear radiolucent on dental images.
Four terms can be used to describe the spaces and depressions in bone viewed in maxillary and mandibular periapical images, as follows:

Canal: A tube like passageway through bone that contains nerves and blood vessels; an example is the mandibular canal
Foramen: An opening or hole in bone that permits the passage of nerves and blood vessels; an example is the mental foramen of the mandible.
Fossa: A broad, shallow, scooped-out or depressed area of bone; an example is the submandibular fossa of the mandible.
Sinus: A hollow space, cavity, or recess in bone; an example is the maxillary sinus

Miscellaneous Terms

Two other general terms can be used to describe normal landmarks viewed on a dental image, as follows:

Septum: A bony wall or partition that divides two spaces or cavities. An example is the nasal septum.

Suture: An immovable joint that represents a line of union between adjoining **bones** of the skull. An example is the median palatine suture of the maxilla

Normal anatomical landmarks

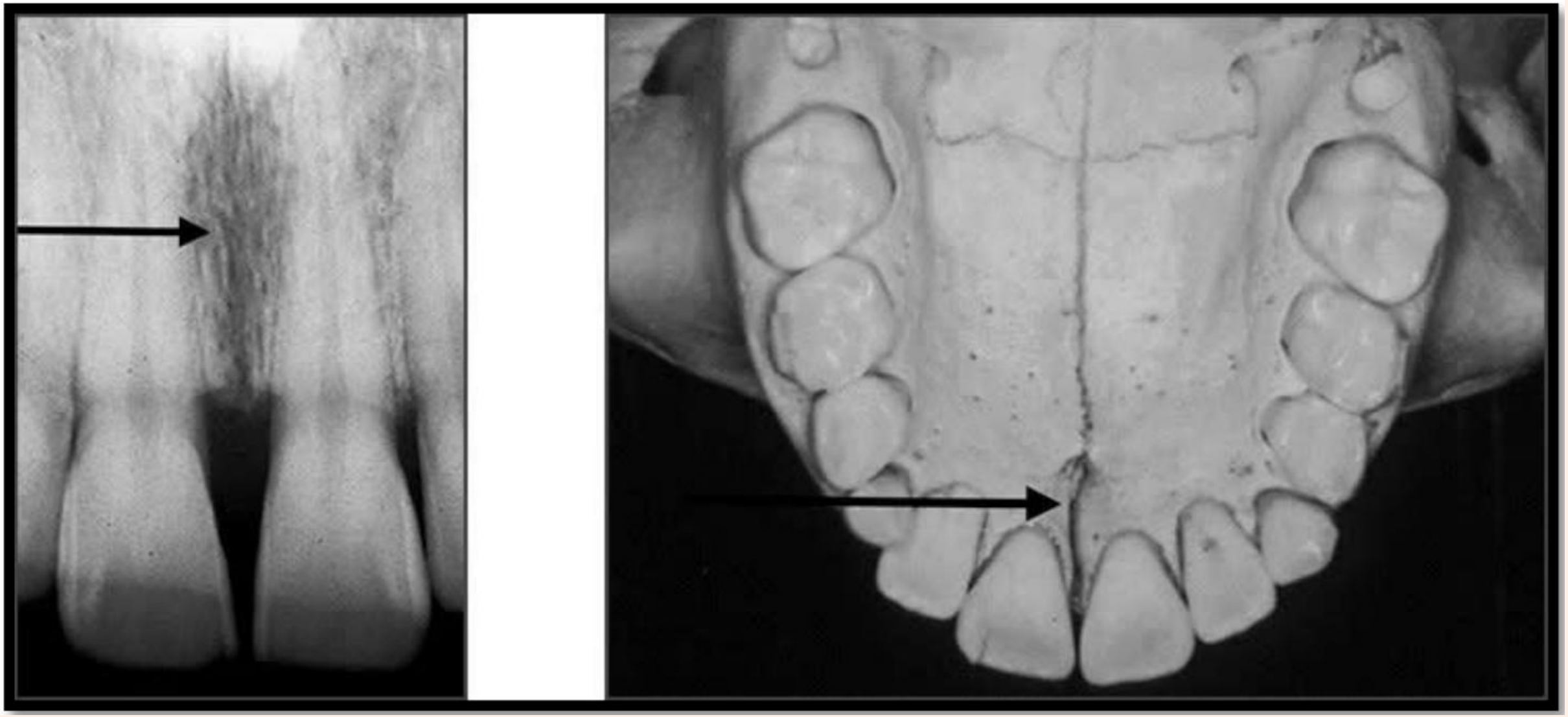
Bony Landmarks of the Maxilla

Incisive Foramen

Description. The incisive foramen (also known as the nasopalatine foramen) is an opening or hole in bone located at the midline of the anterior portion of the hard palate.

The nasopalatine nerve exits the maxilla through the incisive foramen.

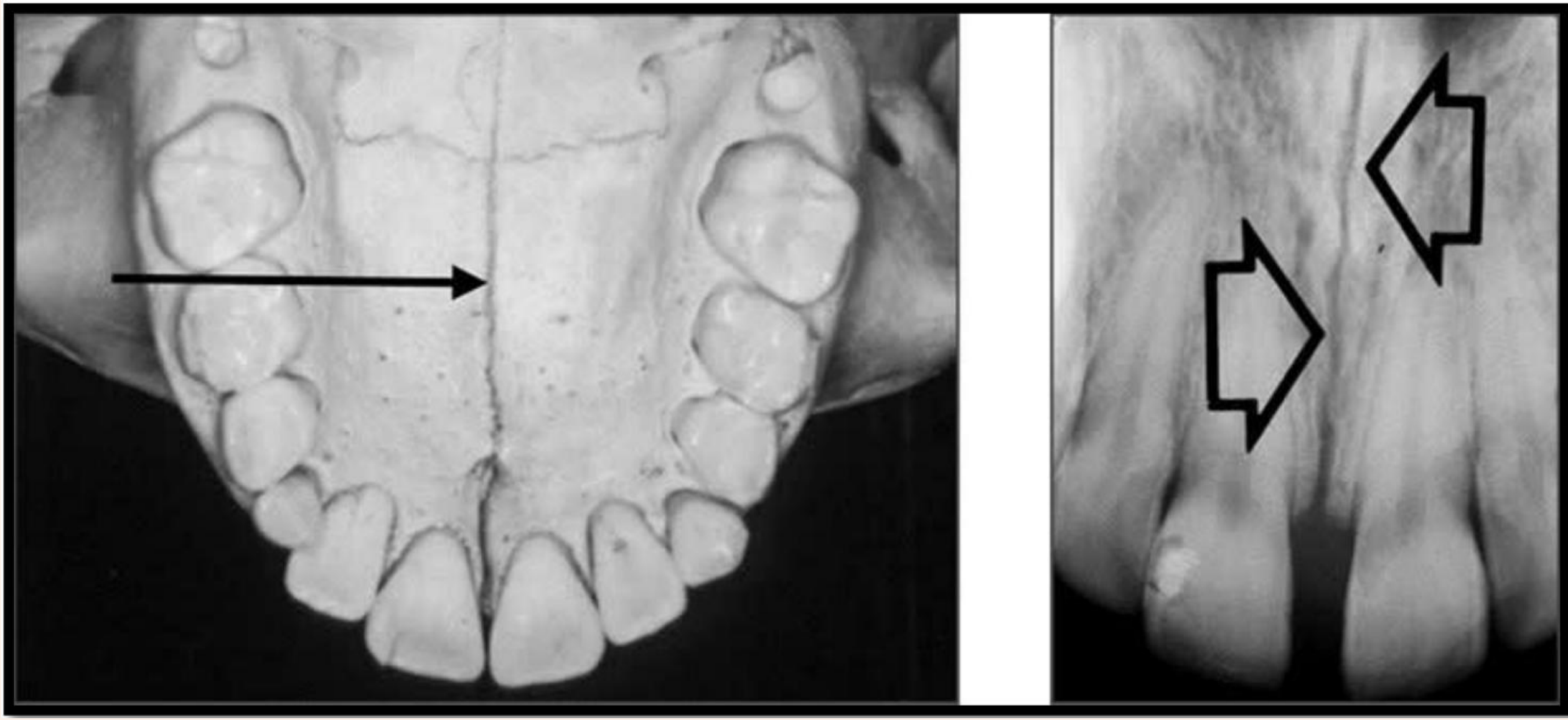
Appearance. On an anterior maxillary periapical image, the incisive foramen appears as a small, ovoid or round **radiolucent** area located between the roots of the maxillary central incisors.



Median Palatal Suture

Description. The median palatal suture is the immovable joint between the two palatine processes of the maxilla.

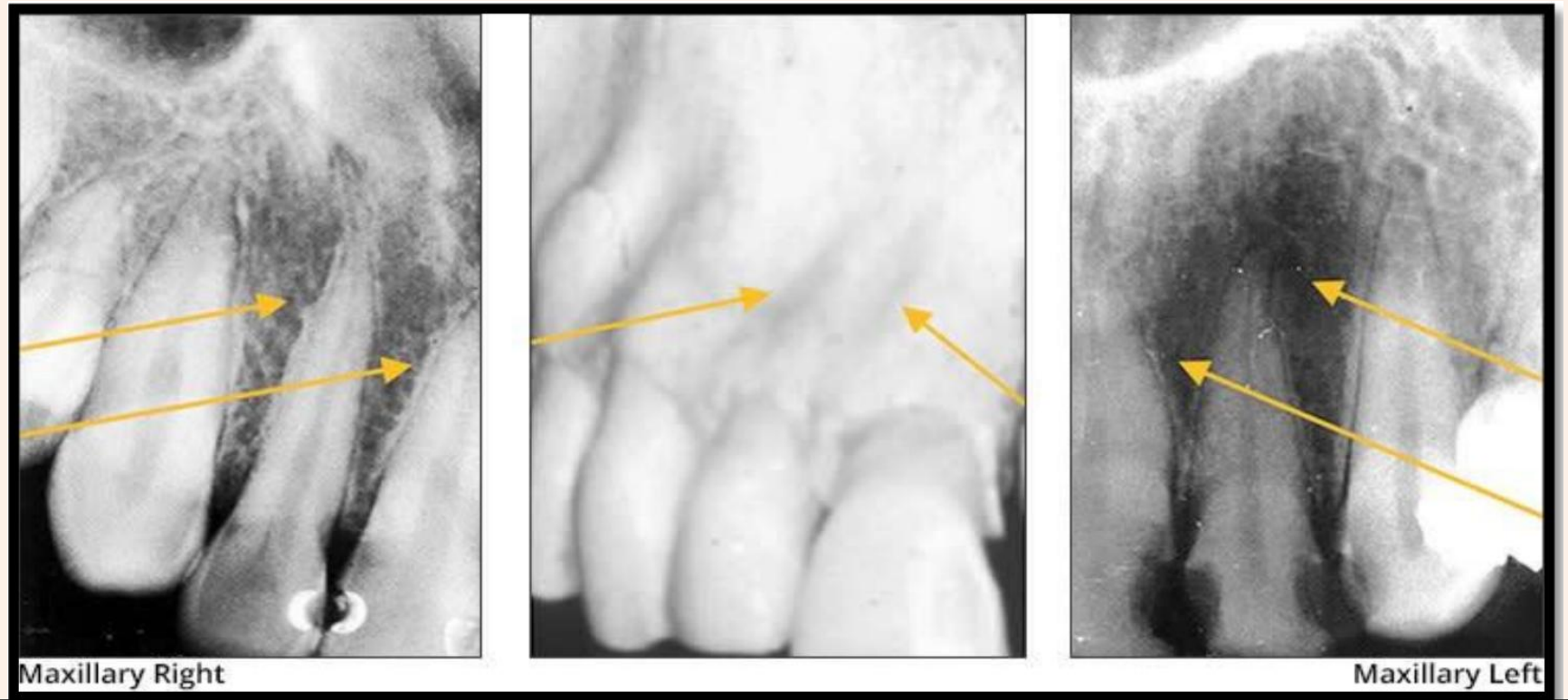
Appearance. On an anterior maxillary periapical image, the median palatal suture appears as a thin **radiolucent** line between the maxillary central incisors



Lateral Fossa

Description. The lateral ossa (also known as the canine fossa) is a smooth, depressed area of the maxilla located between maxillary canine and lateral incisors.

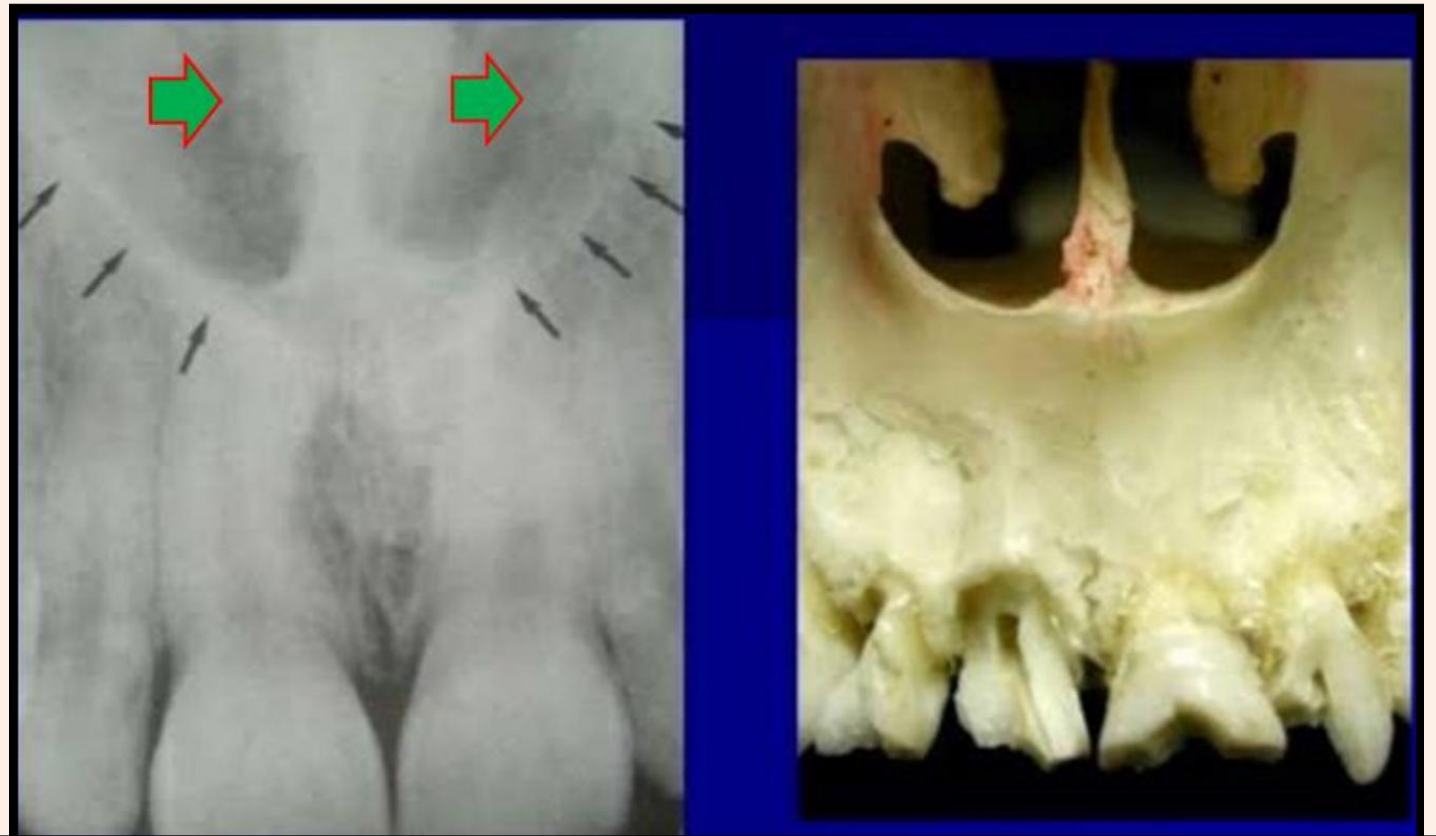
Appearance. On an anterior maxillary periapical image, the lateral fossa appears as a **radiolucent** area between the maxillary canine and lateral incisor



Nasal Cavity

Description. The nasal cavity (also known as the nasal fossa) is a pear-shaped compartment of bone located superior to the Maxilla

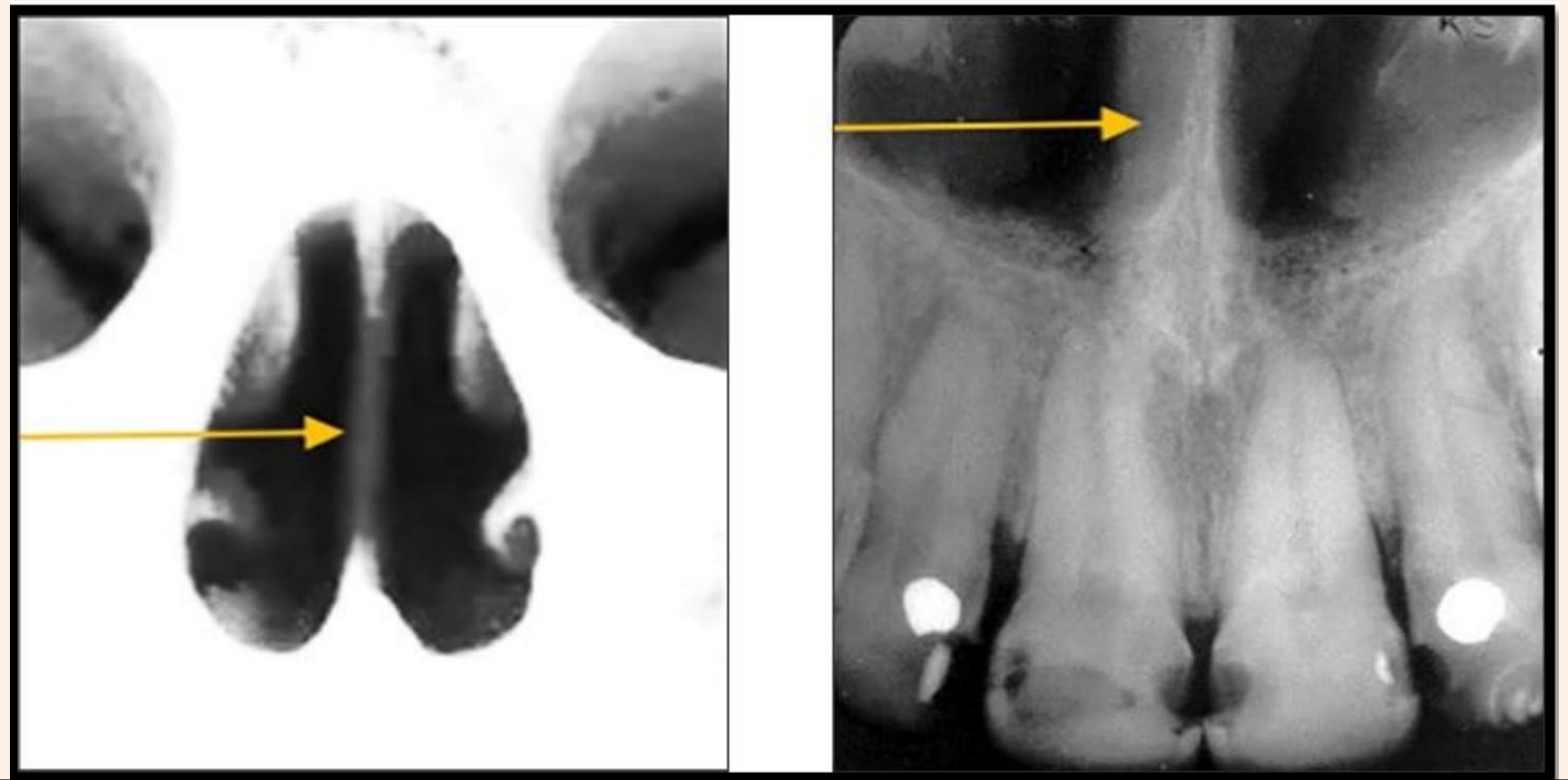
Appearance. On an anterior maxillary periapical image, the nasal cavity appears as a large, **radiolucent** area superior to the maxillary incisors



Nasal Septum

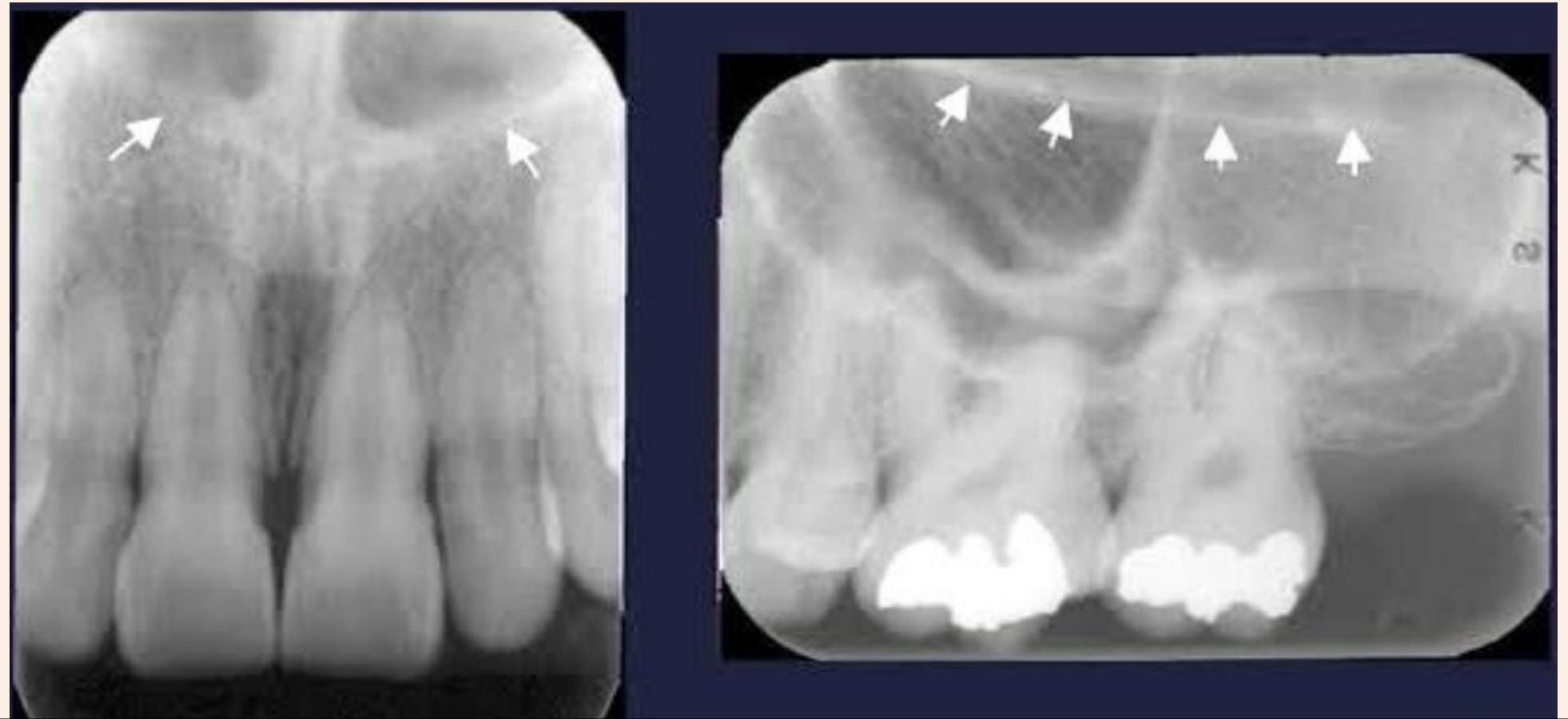
Description. The nasal septum is a vertical bony wall or partition that divides the nasal cavity into the right and left nasal fossae (fossae is the plural of fossa)

Appearance. On an anterior maxillary periapical image, the nasal septum appears as a vertical **radiopaque** partition that divides the nasal cavity.



Floor of Nasal Cavity

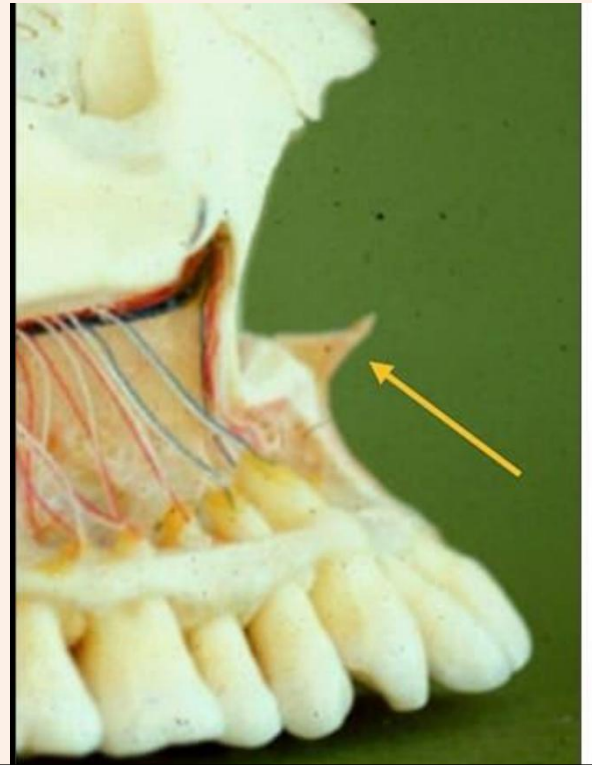
Description. The floor o the nasal cavity is a bony wall Appearance. On an anterior maxillary periapical image, the floor of the nasal cavity appears as a dense **radiopaque** band of bone superior to the maxillary incisors .

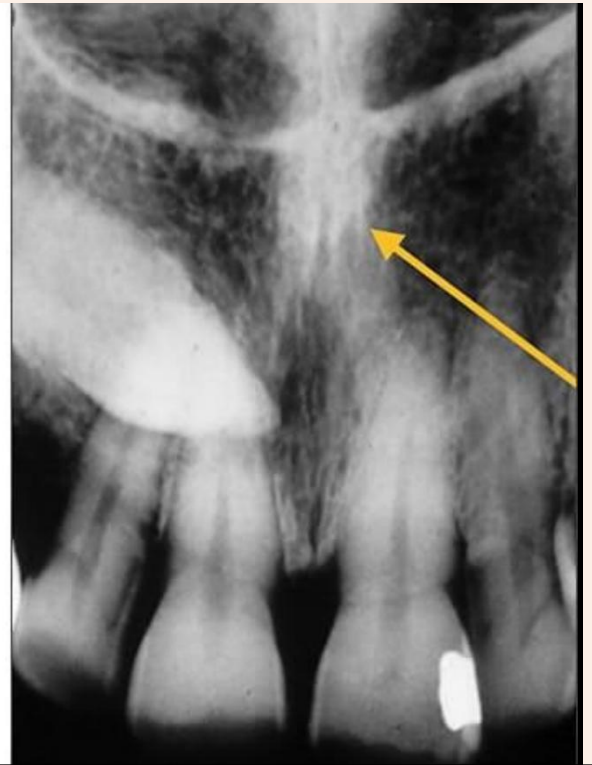


Anterior Nasal Spine

Description. The anterior nasal spine is a sharp projection of the maxilla located at the anterior and inferior portion of the nasal cavity.

Appearance. On an anterior maxillary periapical image, the anterior nasal spine appears as a V-shaped radiopaque area located at the intersection of the floor of the nasal cavity and the nasal septum.

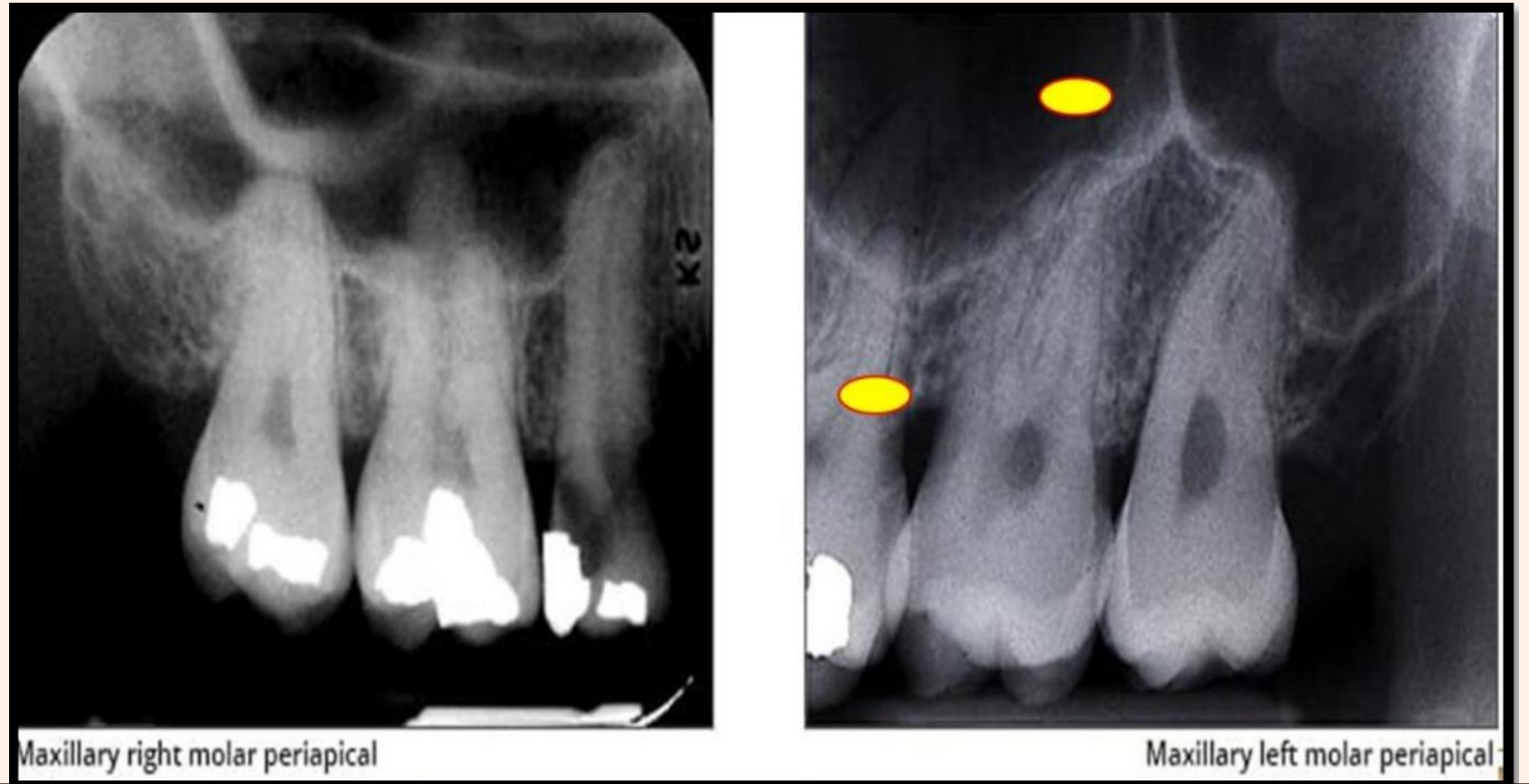




Maxillary Sinus

Description. The maxillary sinuses are paired cavities or compartments of bone located within the maxilla

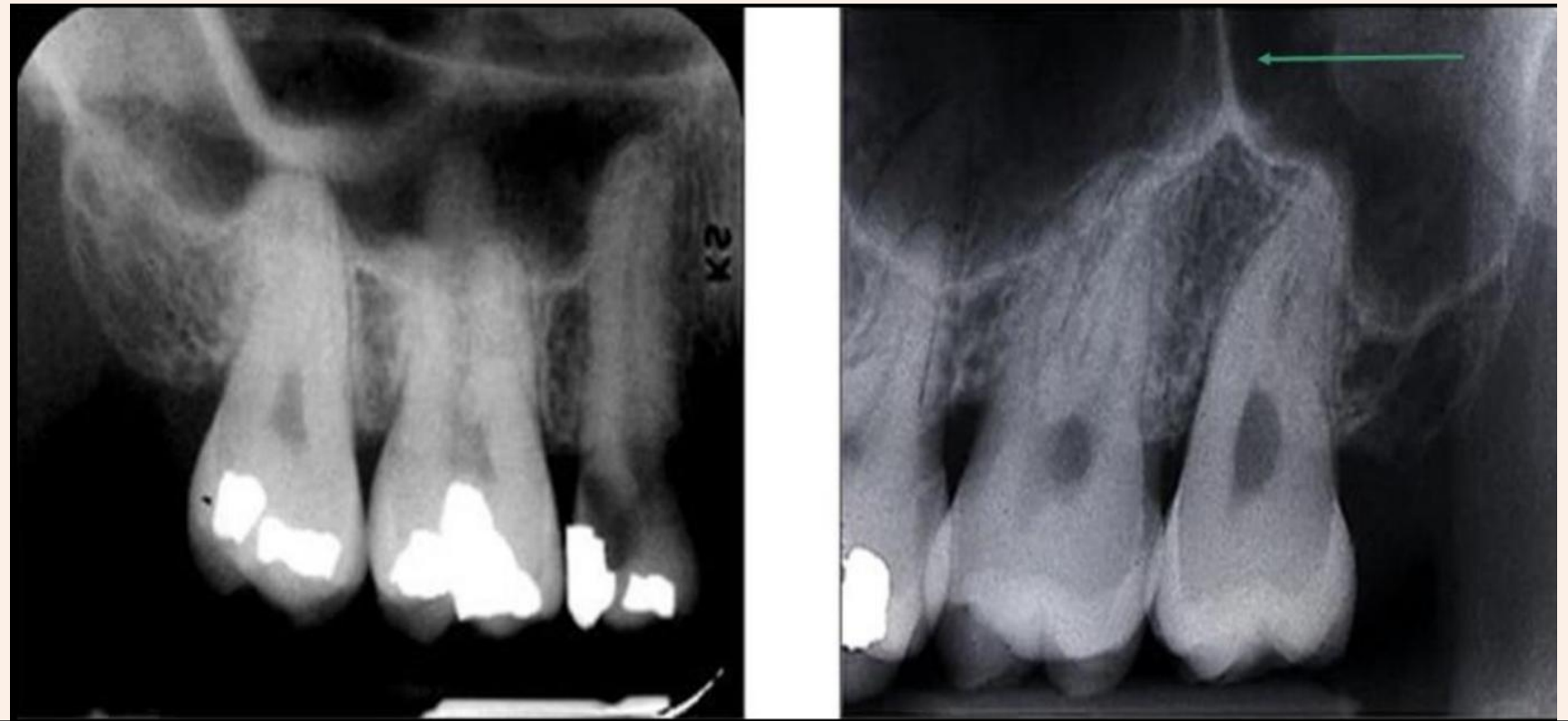
Appearance. On a posterior maxillary periapical image, the maxillary sinus appears as a radiolucent area located superior to the apices of maxillary premolars and molars.



Septa Within Maxillary Sinus

Description. Bony septa (septa is the plural of septum) may be seen within the maxillary sinus. Septa are bony walls or partitions that appear to divide the maxillary sinus into compartments.

Appearance. On a posterior maxillary periapical image, the septa appear as radiopaque lines within the maxillary sinus.



Inverted Y

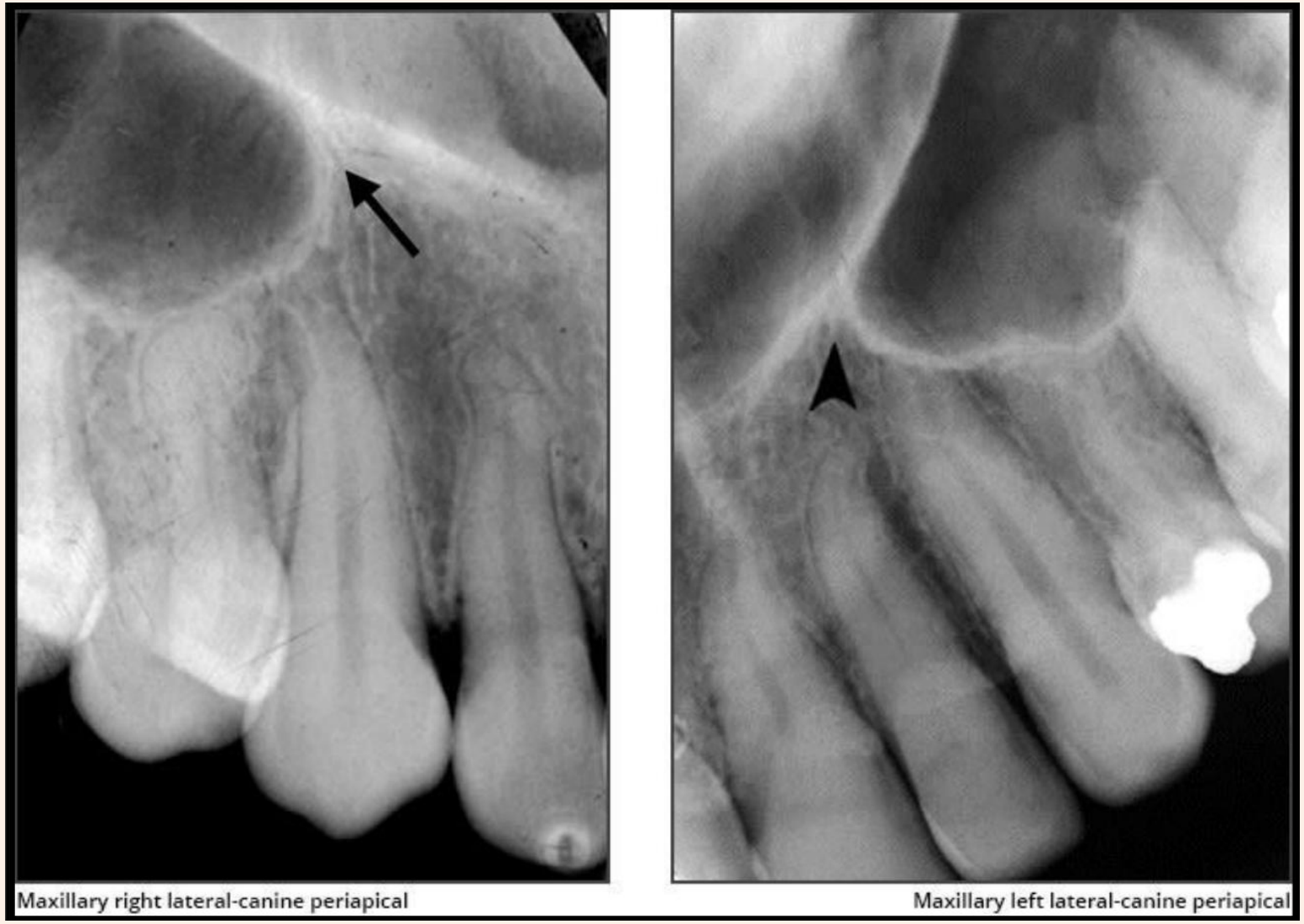
Description. The term inverted Y refers to the intersection of the maxillary

sinus and the nasal cavity as viewed on a dental image.

Appearance. On a maxillary canine periapical image, the inverted Y appears as

a radiopaque upside-down Y formed by the intersection of the lateral wall of

the nasal fossa and the anterior border of the maxillary sinus.



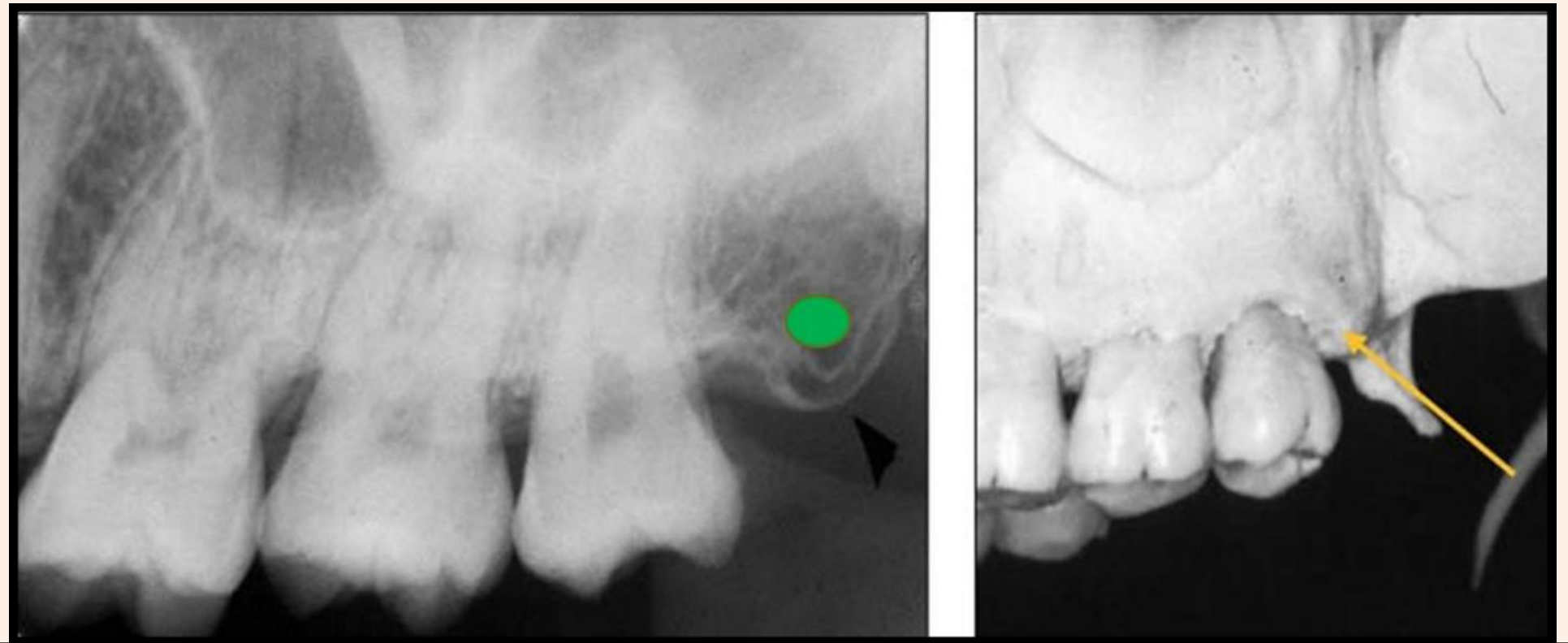
Maxillary right lateral-canine periapical

Maxillary left lateral-canine periapical

Maxillary Tuberosity

Description. The maxillary tuberosity is a rounded prominence of bone that extends posterior to the third molar region .

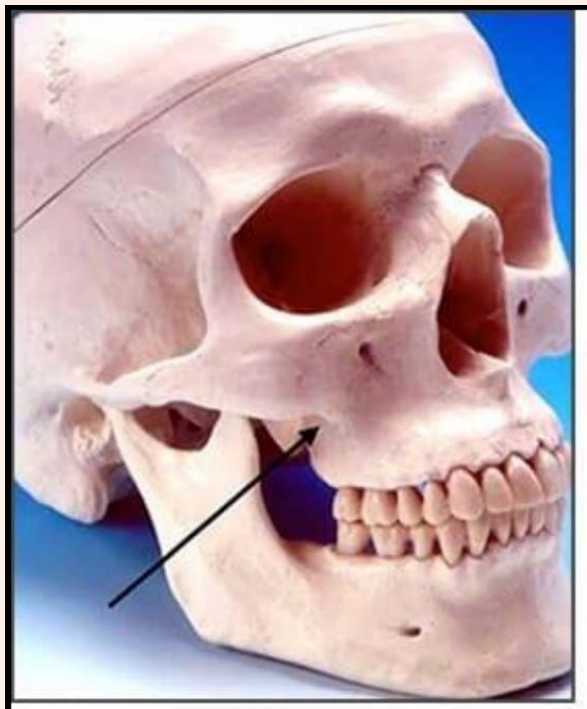
Appearance. On a posterior maxillary periapical image, the maxillary tuberosity appears as a radiopaque bulge distal to the third molar region.

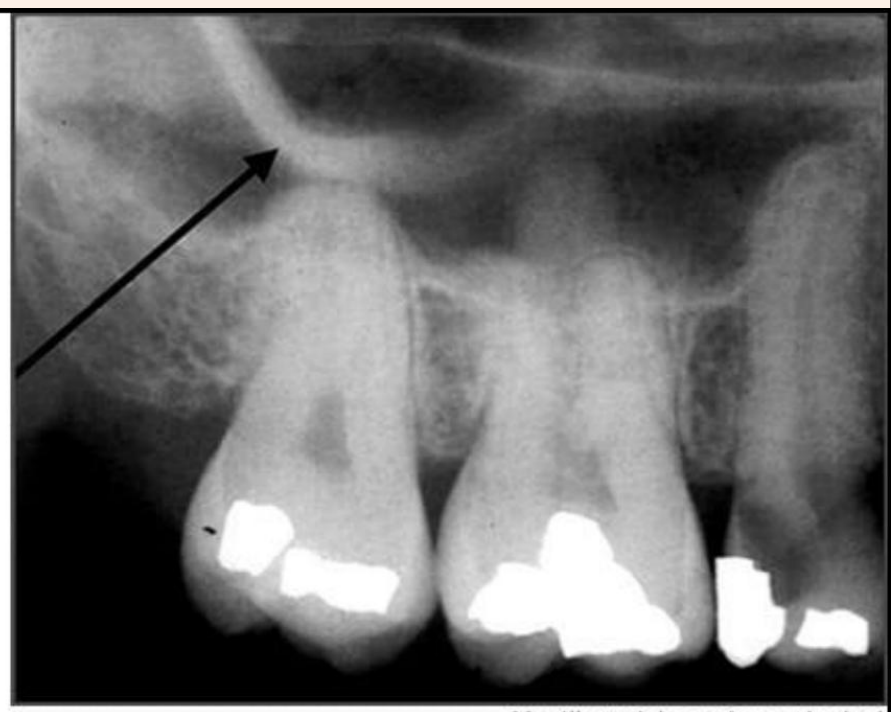


Zygomatic Process of Maxilla

Description. The zygomatic process o the maxilla is a bony projection of the maxilla that articulates with the zygoma, or malar bone. The zygomatic process of the maxilla is composed of dense cortical bone.

Appearance. On a posterior maxillary periapical image, the zygomatic process of the maxilla appears as a J-shaped or U-shaped radiopacity located superior to the maxillary rst molar region.





Maxillary right molar periapical

THANK YOU