

NORMAL ANATOMIC LANDMARKS IN MAXILLA AND MANDIBLE

INTRODUCTION

- ✓ The radiographic recognition of disease requires a sound knowledge of the radiographic appearance of normal structures.
- ✓ Intelligent diagnosis mandates an appreciation of the wide range of variation in the appearance of normal anatomic structures.

TEETH

- The teeth are composed primarily of dentin, with an enamel cap over the coronal portion and a thin layer of cementum over the root surface.



SUPPORTING STRUCTURES

1. **Lamina Dura** - The tooth sockets are bounded by a thin radiopaque layer of dense bone. Its name, lamina dura ("hard layer"), is derived from its radiographic appearance.



2. **Alveolar crest** - The level of this bony crest is considered normal when it is not more than 1.5mm from the cemento-enamel junction of the adjacent teeth. The alveolar crest may recede apically with age and show marked resorption with periodontal disease.



3. PERIODONTAL LIGAMENT SPACE

Because the periodontal ligament (PDL) is composed primarily of collagen, it appears as a radiolucent space between the tooth root and the lamina dura. This space begins at the alveolar crest, extends around the portions of the tooth roots within the alveolus, and returns to the alveolar crest on the opposite side of the tooth.



FIG. 10-10 The periodontal ligament space (arrows) is seen as a narrow radiolucency between the tooth root and lamina dura.

MAXILLA

Intermaxillary Suture:

- The intermaxillary suture (also called the median suture) appears on intraoral periapical radiographs as a thin radiolucent line in the midline between the two portions of the premaxilla



Anterior Nasal Spine

- The anterior nasal spine is most frequently demonstrated on periapical radiographs of the maxillary central incisors. It is radiopaque because of its bony composition and it is usually V shaped.



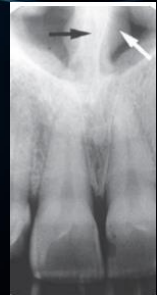
Nasal Aperture

- Because the air-filled nasal aperture (and cavity) lies just above the oral cavity, its radiolucent image may be apparent on intraoral radiographs of the maxillary teeth.
- On periapical radiographs of the incisors the inferior border of the fossa aperture as a radiopaque line extending bilaterally away from the base of the anterior nasal spine, especially in central incisor projections.



Nasal Septum -

The nasal septum (black arrow) arises directly above the anterior nasal spine and is covered on each side by nasal mucosa (white arrow).



Incisive Foramen –

The incisive foramen appears as an ovoid radiolucency (arrows) between the roots of the central incisors.



Nasopalatine canal- The lateral walls of the nasopalatine canal (arrows) extend from the incisive foramen to the floor of the nasal fossa.





FIG. 10-25 The superior foramina of the nasopalatine canal (arrows) appear just lateral to the nasal septum and posterior to the anterior nasal spine.

Lateral fossa -

- The lateral fossa is a diffuse radiolucency (arrows) in the region of the apex of the lateral incisor. It is formed by a depression in the maxilla at this location.



Nose -

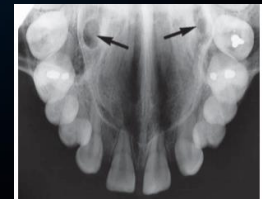
- The soft tissue outline of the nose (arrows) is superimposed on the anterior maxilla.



Nasolacrimal

The nasal and maxillary bones form the nasolacrimal canal. Occasionally it can be visualized on periapical radiographs in the region above the apex of the canine, especially when steep vertical angulation is used. The nasolacrimal canals are routinely seen on maxillary occlusal projections in the region of the molars.

Canal



Maxillary Sinus -

Largest paranasal sinus. Pyramidal in shape

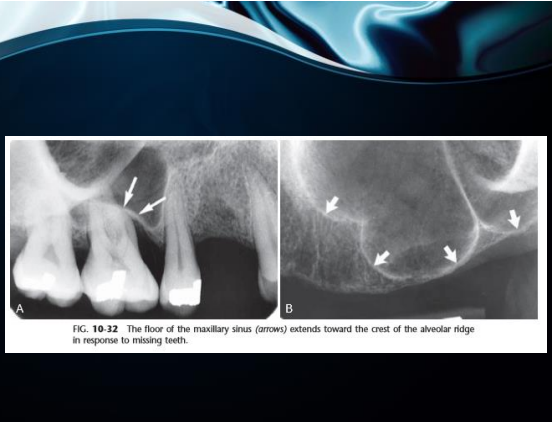
The borders of the maxillary sinus appear on periapical radiographs as a thin, delicate, tenuous radiopaque line (actually a thin layer of cortical bone)



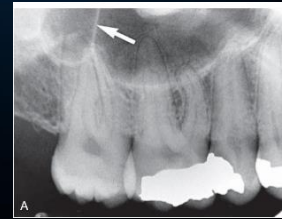
Inverted Y line

- The anterior border of the maxillary sinus (white arrows) crosses the floor of the nasal fossa (black arrow).



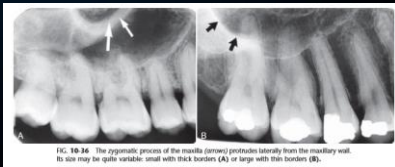


Septae in maxillary sinus



Zygomatic Process and Zygomatic Bone

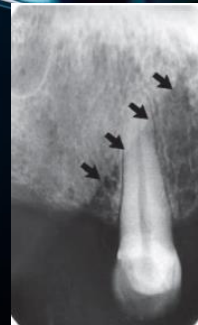
- The zygomatic process of the maxilla is an extension of the lateral maxillary surface that arises in the region of the apices of the first and second molars and serves as the articulation for the zygomatic bone.
- On periapical radiographs the zygomatic process appears as a U-shaped radiopaque line with its open end directed superiorly. The enclosed rounded end is projected in the apical region of the first and second molars.



Nasolabial Fold:

An oblique line demarcating a region that appears to be covered by a veil of slight radiopacity frequently traverses periapical radiographs of the premolar region.

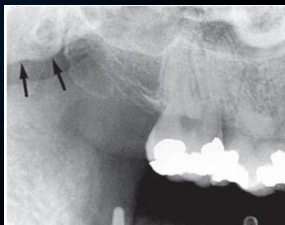
The line of contrast is sharp, and the area of increased radiopacity is posterior to the line. The line is the nasolabial fold, and the opaque veil is the thick cheek tissue superimposed on the teeth and the alveolar process.



Pterygoid Plates

The medial and lateral pterygoid plates lie immediately posterior to the tuberosity of the maxilla.

The image of these two plates is extremely variable, and on many intraoral radiographs of the third molar area they do not appear at all. When they are apparent, they almost always cast a single radiopaque homogeneous shadow without any evidence of trabeculation



Hamular process

Extending inferiorly from the medial pterygoid plate is the hamular process.

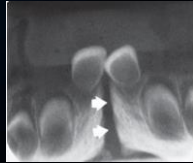


FIG. 10-40 The hamular process (arrow) extends downward from the medial pterygoid plate.

MANDIBLE

Symphysis

- Radiographs of the region of the mandibular symphysis in infants demonstrate a radiolucent line through the midline of the jaw between the images of the forming deciduous central incisors.
- This suture usually fuses by the end of the first year of life, after which it is no longer radiographically apparent. If this radiolucency is found in older individuals, it is abnormal and may suggest a fracture or a cleft.



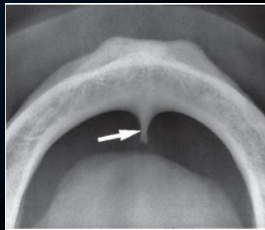
Genial Tubercles

The genial tubercles (also called the mental spine) are located on the lingual surface of the mandible slightly above the inferior border and in the midline.

They are bony protuberances, more or less spine shaped, that often are divided into a right and left prominence and a superior and inferior prominence



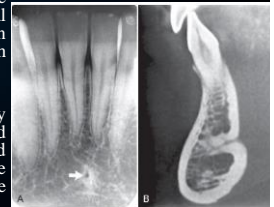
- They are well visualized on mandibular occlusal radiographs as one or more small projections.
- Their appearance on periapical radiographs of the mandibular incisor region is variable: often they appear as a radiopaque mass (up to 3 to 4 mm in diameter) in the midline below the incisor roots



Lingual Foramen

There is usually a foramen on the lingual surface of the midline of the mandible in the region of the genial tubercles, the lingual foramen. Often there are two or even more such foramina.

The lingual foramen is typically visualized as a single round radiolucent canal with a well-defined opaque border lying in the midline below the level of the apices of the incisors.



Mental Ridge

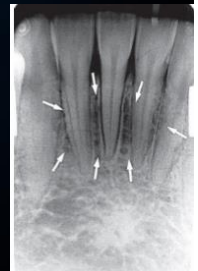
On periapical radiographs of the mandibular central incisors, the mental ridge (protuberance) may occasionally be seen as two radiopaque lines sweeping bilaterally forward and upward toward the midline.

They are of variable width and density and may be found to extend from low in the premolar area on each side up to the midline, where they lie just inferior to or are superimposed on the mandibular incisor tooth roots



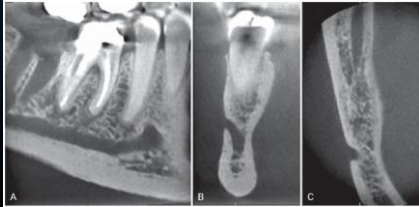
Mental Fossa

The mental fossa is a depression on the labial aspect of the mandible extending laterally from the midline and above the mental ridge. Because of the resulting thinness of jawbone in this area, the image of this depression may be similar to that of the submandibular fossa.



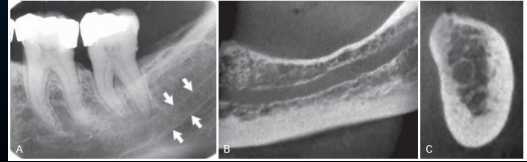
Mental Foramen

The mental foramen is usually the anterior limit of the inferior dental canal that is apparent on periapical radiographs.



Mandibular Canal:

The radiographic image of the mandibular canal is a dark linear shadow with thin radiopaque superior and inferior borders cast by the lamella of bone that bounds the canal.



Nutrient Canals

Nutrient canals carry a neurovascular bundle and appear as radiolucent lines of fairly uniform width.

They are most often seen on mandibular periapical radiographs running vertically from the inferior dental canal directly to the apex of a tooth or into the interdental space between the mandibular incisors.



Mylohyoid Ridge

The mylohyoid ridge is a slightly irregular crest of bone on the lingual surface of the mandibular body. Extending from the area of the third molars to the lower border of the mandible in the region of the chin, it serves as an attachment for the mylohyoid muscle.

Its radiographic image runs diagonally downward and forward from the area of the third molars to the premolar region, at approximately the level of the apices of the posterior teeth

- The margins of the image are not usually well defined but appear quite diffuse and of variable width.



- The contrary is also observed, however, where the ridge is relatively dense with sharply demarcated borders



Submandibular Gland Fossa

On the lingual surface of the mandibular body, immediately below the mylohyoid ridge in the molar area, there is frequently a depression in the bone.

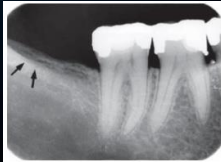
This concavity accommodates the submandibular gland and often appears as a radiolucent area with the sparse trabecular pattern characteristic of the region



External Oblique Ridge

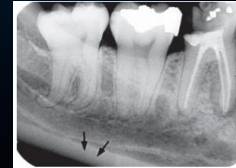
The external oblique ridge is a continuation of the anterior border of the mandibular ramus. It follows an anteroinferior course lateral to the alveolar process; it is relatively prominent in its upper part and juts considerably on the outer surface of the mandible in the region of the third molar.

It appears as a radiopaque line of varying width, density, and length, blending at its anterior end with the shadow of the alveolar bone.



Inferior Border of the Mandible

- Occasionally the inferior mandibular border will be seen on periapical projections as a characteristically dense, broad radiopaque band of bone.



Coronoid Process

The image of the coronoid process of the mandible is frequently apparent on periapical radiographs of the maxillary molar region as a triangular radiopacity, with its apex directed superiorly and somewhat anteriorly, superimposed on the region of the third molar.



Restorative Materials

- Restorative materials vary in their radiographic appearance, depending primarily on their thickness, density, and atomic number.
- Of these, the atomic number is most influential.



