2012-2013

ORAL BIOLOGY

DEVELOPMENT AND GROWTH OF THE MAXILLA

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Development of The Maxilla (Upper Jaw)

Development of the maxilla

It includes development of:

1. **Maxilla proper**
2. **Premaxilla**
3. **Accessory cartilages.**

MAXILLA PROPER

It develops in the mesenchyme of the maxillary process of the mandibular arch as intramembranous ossification.

It has one center of ossification which appears in a band of fibrocellular tissue immediately lateral to and slightly below the infra orbital where it gives off its anterior superior dental branch. The ossification center lies above that part of the dental lamina from which develop the enamel organ of the canine.

The ossified tissue appears as a thin strip of bone. It spread in different directions as:

- **Backward:**

Below the orbit toward the developing zygomatic bone.

- **Forward:**

Toward the future incisor region

- **Upward:**

To form the frontal process of the maxilla.

As a result of this pattren of bone deposition, a bony trough is formed (infraorbital groove) where the infraorbital nerves lies. The inner and outer edges of this groove grow up, meet and fuse forming a canal that encloses the nerve & open anteriorly at the infraorbital foramen

- **downward:**

To form the outer alveolar plate for the maxillary tooth germs

- **Toward the medline:**

Ossification spreads with the development of the palatal process in the substance of the united palatal folds to form the hard palate. At the union between the palatal process and the main part of the developing maxilla, a large mass of bone produced. From this region & on the inner side of the dental lamina & tooth germs, the inner alveolar plate of deciduous canines and molars develops.

- **Development of the maxillary sinus:**

At 4 MIU as a small depression of the mucosa of the lateral wall of the nasal cavity. In its gradual extension the sinus comes into relation with the maxilla above the level of the palatal process & a hallows out the interior of the bone, so separating its upper or orbital surface from its lower or dental region.

PREMAXILLA

Two centers of ossification for the premaxilla:

A) The palato-ficial center:

Appear at the end of 6 WIU. It starts close to the external surface of the nasal capsule, in front of the anterior superior dental nerve and above the germ of the lateral deciduous incisor.

From this center bone formation spreads:

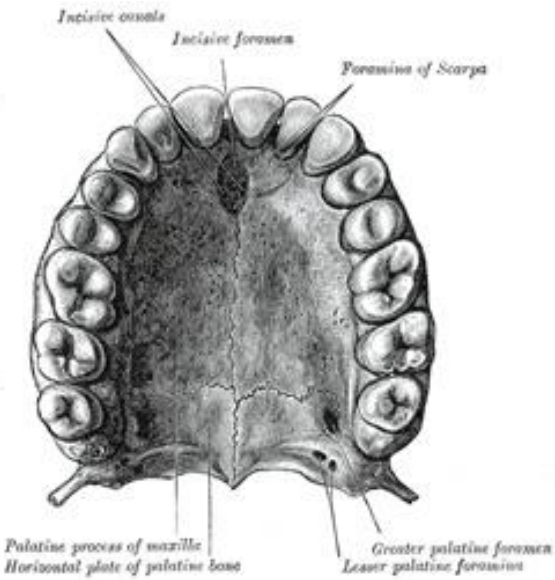
1. Above the teeth germ of the incisors.
2. Then downward behind them.

To form the inner wall of their alveoli & palatal part of the premaxilla.

B) The prevomerine center (paraseptal center):

It begins at about 8-9 WIU along the outer alveolar wall. It is situated beneath the anterior part of the vomer bone and it forms that part of the bone lies mesial to the nasal paraseptal cartilage.

At 8 WIU union occurs between the maxilla and premaxilla



ACCESSORY CARTILAGES

Unlike the mandible the development and growth are little affected by the appearance of secondary cartilages:

1. Accessory cartilagenous center appears in the region of the future zygomatic or molar process and this undergoes rapid ossification & adds considerable thickness to the bulk of this part.
2. Also small areas of secondry cartilagenous center appears along the growing margin of the alveolar plate.
3. In the middle line of the developing hard palate between the two palatine processes.

GROWTH OF THE MAXILLA

1. Sutural growth
2. Alveolar process development
3. Subperiosteal bone formation
4. Enlargement of maxillary sinus
5. Bone resorbtion and bone deposition

1. Sutural Growth

It continues till 10 years of age then becomes less significant. The maxilla articulates with the other bones of the skull by 4 main sutures:

a) Frontomaxillary suture.
b) Zygomaticomaxillary suture.
c) Zygomaticotemporal suture.
d) Pterygopalatine suture

All these sutures are parallel to each other and directed from upward anteriorly to downward posteriorly. So growth at these sutures will shift the maxilla forward and downward.

2. Alveolar process development

It will add to the height of the maxilla. Eruption of teeth specially the permenant set that serves much in this direction, while eruption of the upper permenant molars adds to the lengt of the arch.

3. Subperiosteal bone formation

Occures throughout life serves as a main factor for the growth of the maxilla

4. Enlargement of the maxillary sinus

It plays an important role in the growth of the body of the maxilla. The sinus, which occupies most of the body of the maxilla, expands by bone resorption on the sinus side and bone deposition on the facial surface of the maxillary process. A process known as pneumotization.

5. Bone resorption & bone deposition

Occurs also in other sites than the sinus. Bone resorbtion at the floor of the nasal cavity compensated by bone deposition on the oral surface of the palate will aid in the enlargement of the nasal cavity and consequently increase the height of the maxilla

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Changes Produced in the Maxilla by Age

At birth:

1. The transverse and antero-posterior diameters of the bone are each greater than the vertical.
2. The frontal process is well-marked and the body of the bone consists of little more than the alveolar process.
3. the teeth sockets reaching almost to the floor of the orbit.
4. The maxillary sinus presents the appearance of a furrow on the lateral wall of the nose

In the adult:

In the adult the vertical diameter is the greatest?

In old age:

In old age the bone reverts in some measure to the infantile condition as:

1. its height is diminished.
2. after the loss of the teeth the alveolar process is absorbed, and the lower part of the bone contracted and reduced in thickness.