

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

IN THE NAME OF ALLAH THE MOST
GRACIOUS THE MOST MERCIFUL

ARRANGEMENT AND OCCLUSION OF TEETH

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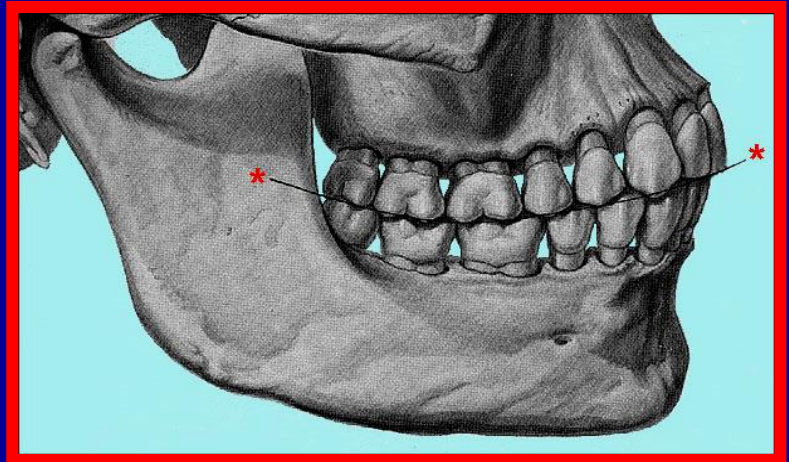
***This chapter discusses the fundamentals of alignment and occlusion of permanent and deciduous teeth.**

***This will include :**

- 1. Dental arch form.**
- 2. Compensating curvature of the dental arches.**
- 3. Compensating curvature of individual teeth.**
- 4. Angulations of individual teeth in relation to various planes.**
- 5. Functional form of the teeth at their incisal and occlusal thirds.**
- 6. Facial relations of each tooth to its antagonists in centric occlusion.**
- 7. Occlusal contact and intercusp relation of all teeth of one arch with those in the opposite arch in centric occlusion.**
- 8. Occlusal contact and intercusp relations of all teeth during mandibular movements.**

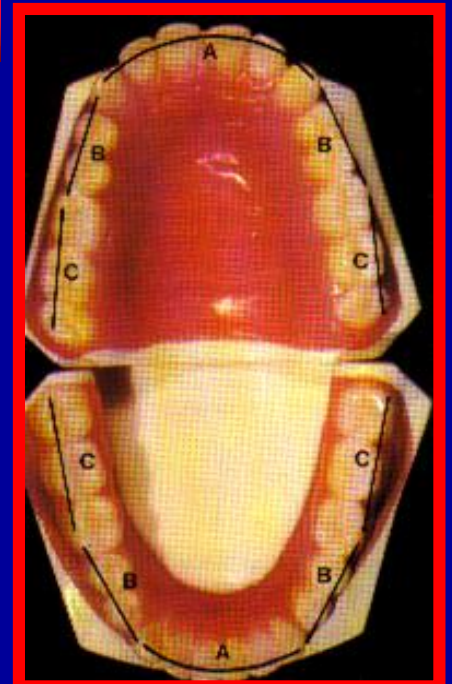
1. Dental Arch Form (Alignment of the Teeth)

The Arrangement of Teeth



Dental Arch Form

Dental arches conform to curved planes



***Teeth are positioned in the maxilla and the mandible in such a way to produce a curved arch which may be :**

1. U – shaped.

2. Square.

3. Tapered.

A. Parabolic Curve

*Describes the shape of the arch from the facial surfaces.

*The curve is divided into three segments:

1.Ant. seg.: **curved line** passing along the facial surfaces of the ant. teeth.

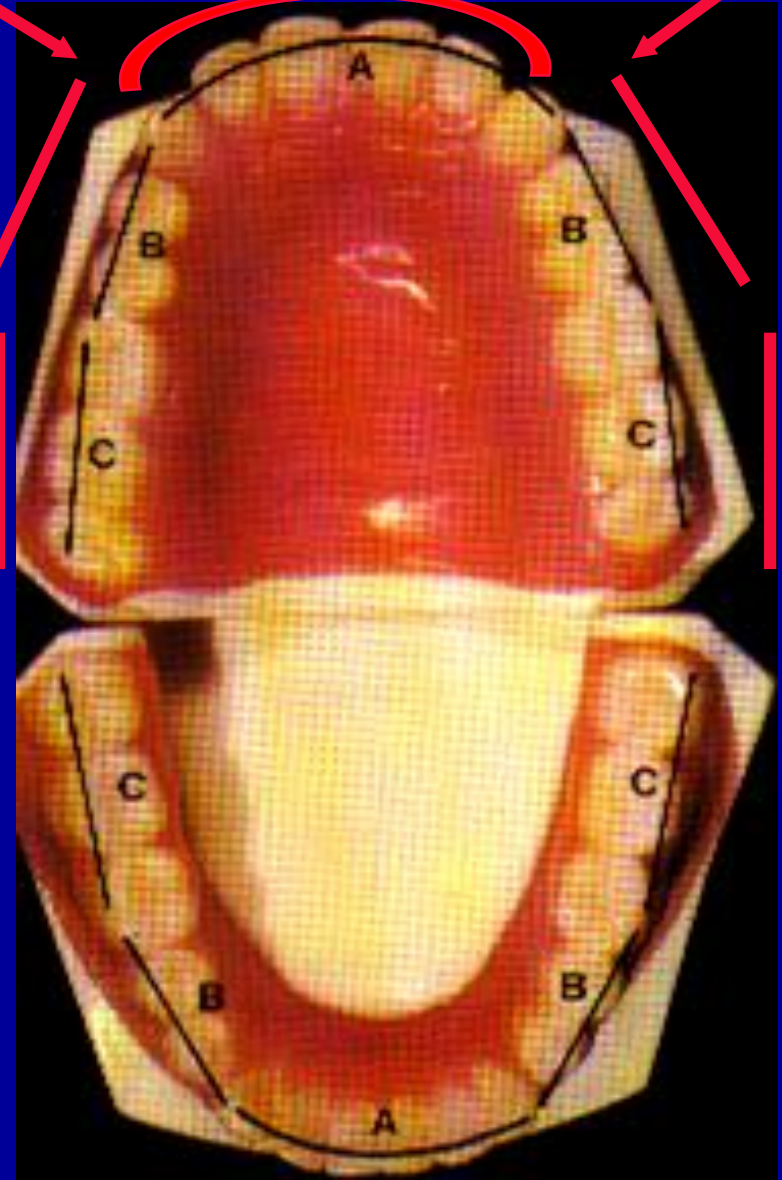
2.Mid. seg.: **straight line** includes the premolars and the mesial half of the 1st molar.

3.Post. Seg.: **straight line** includes the distal half of the 1st molar and the buccal surfaces of the 2nd and 3rd molars (nearly parallel to the median plane).

Anatomical Arrangement of Teeth

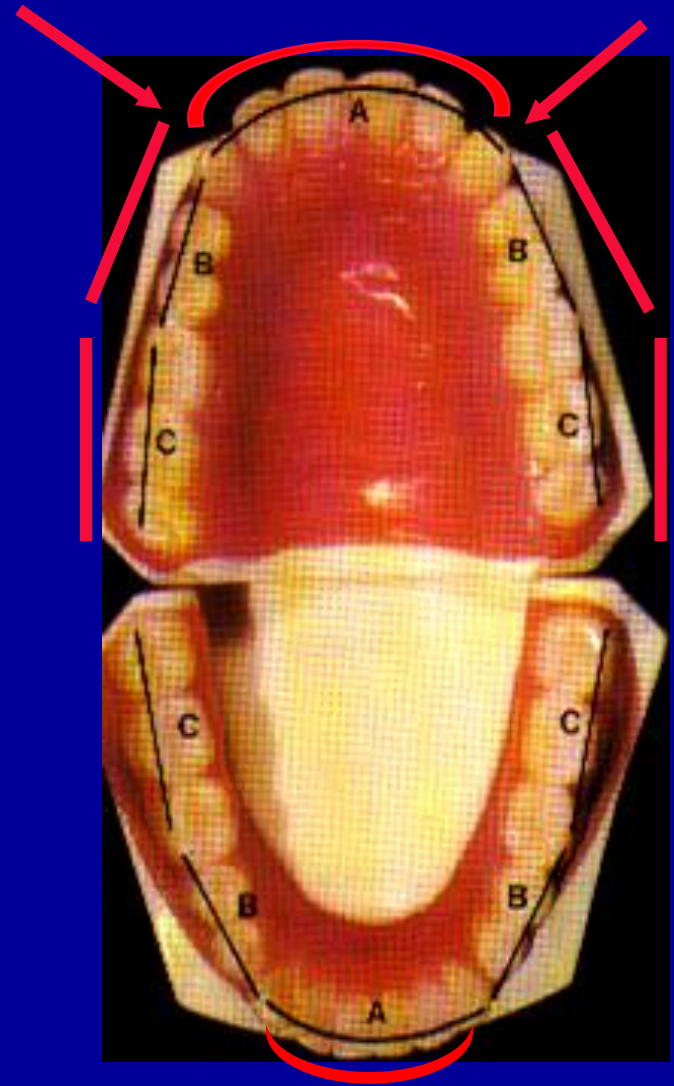
"Parabolic Curve"

- Anterior segment: semicircular
- Middle segment: straight
- Posterior segment: straight
// to mid line



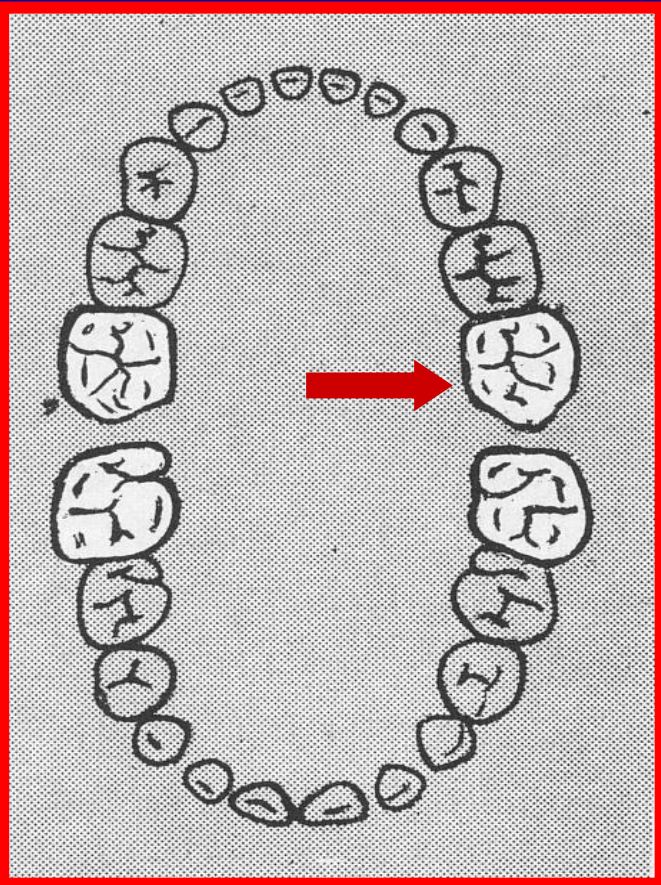
Maxillary arch is larger than mandibular:

- Allows extension of mandibular movements.
- Prevent lip and cheek biting.
- Prevent clashing of the teeth during function.



Phases of Development of the Permanent Teeth Into Dental Arches

First Phase

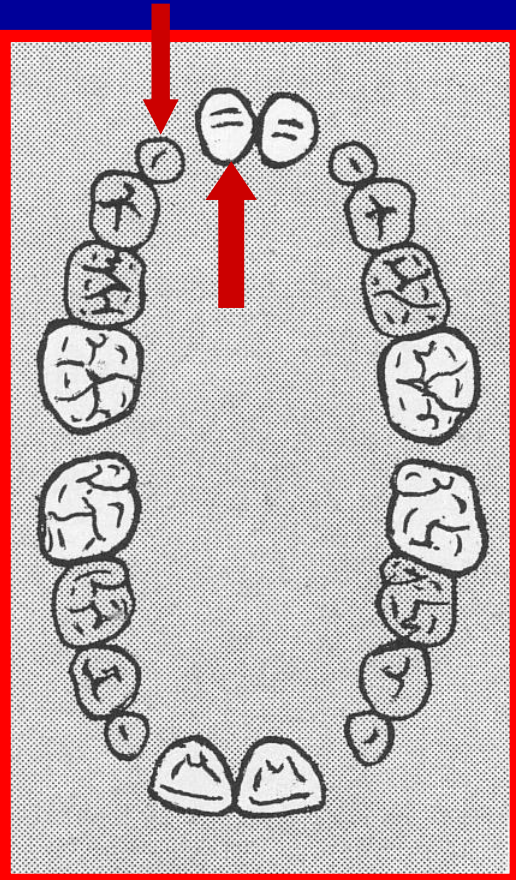


***The first permanent molars erupts at 6 years of age (cornerstones).**

***They serve to back up the deciduous teeth.**

***They add considerably to chewing efficiency and jaw development.**

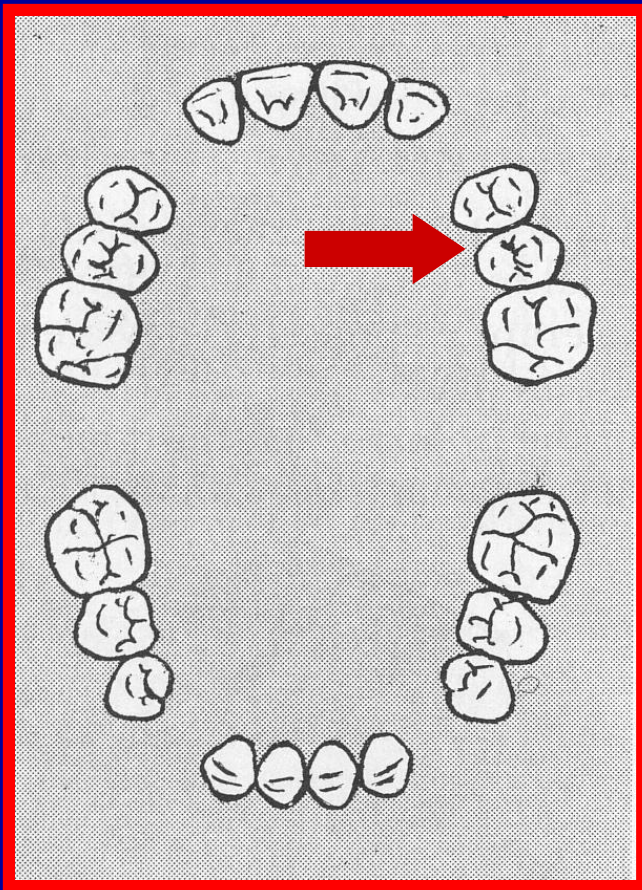
Second Phase



*The permanent central and then lateral incisors emerge at first lingual to the deciduous predecessors.

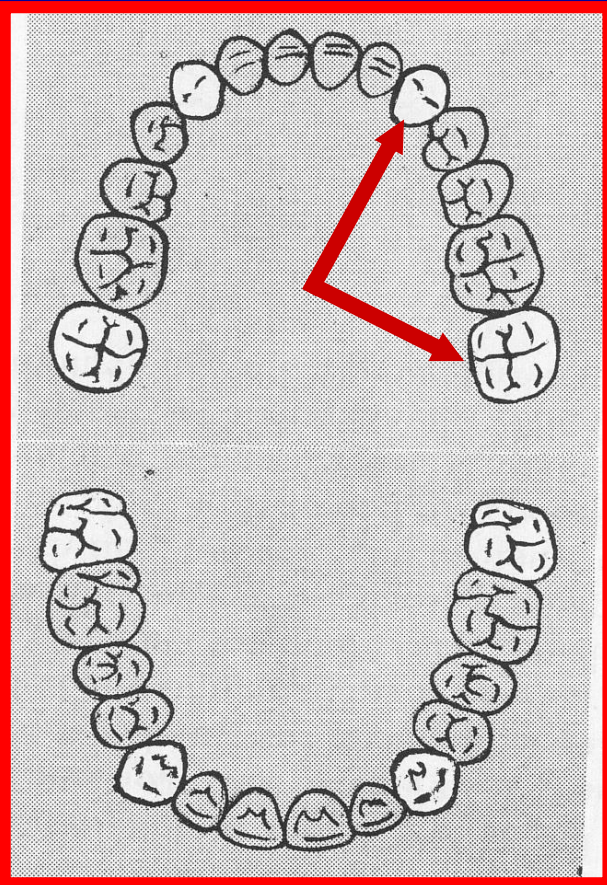
*The permanent location of the incisors cannot be established until development of the dental arch form is complete

Third Phase



The 1st and 2nd premolars take the places of the deciduous molars.

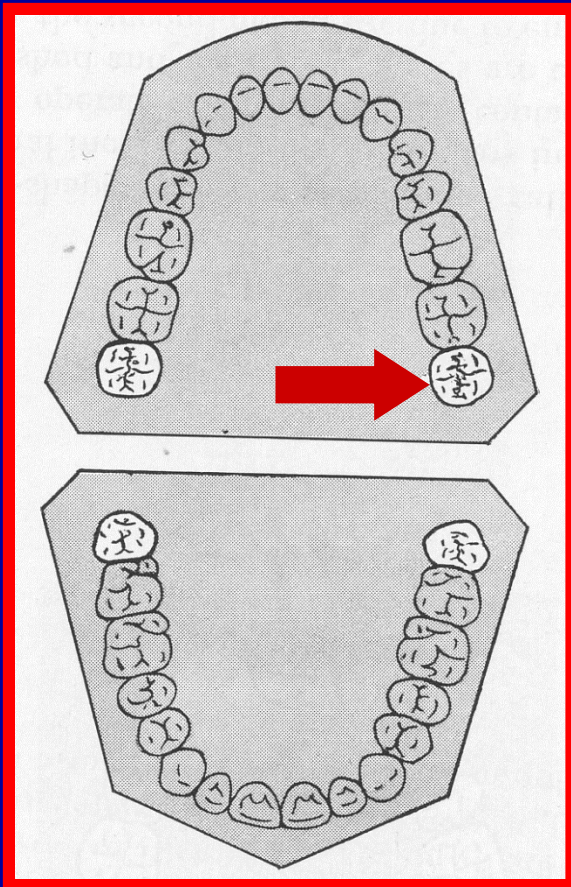
Fourth Phase



The canines (Keystones) force themselves between the lateral incisors and first premolars in both jaws.

Also the second molars emerge distally to the first molars backing them up during the wedging.

Fifth Phase



Eruption of the wisdom tooth

B. Bonwill Triangle

*The mandibular dental arch adapts itself to an **equilateral triangle of 4 inches** length.

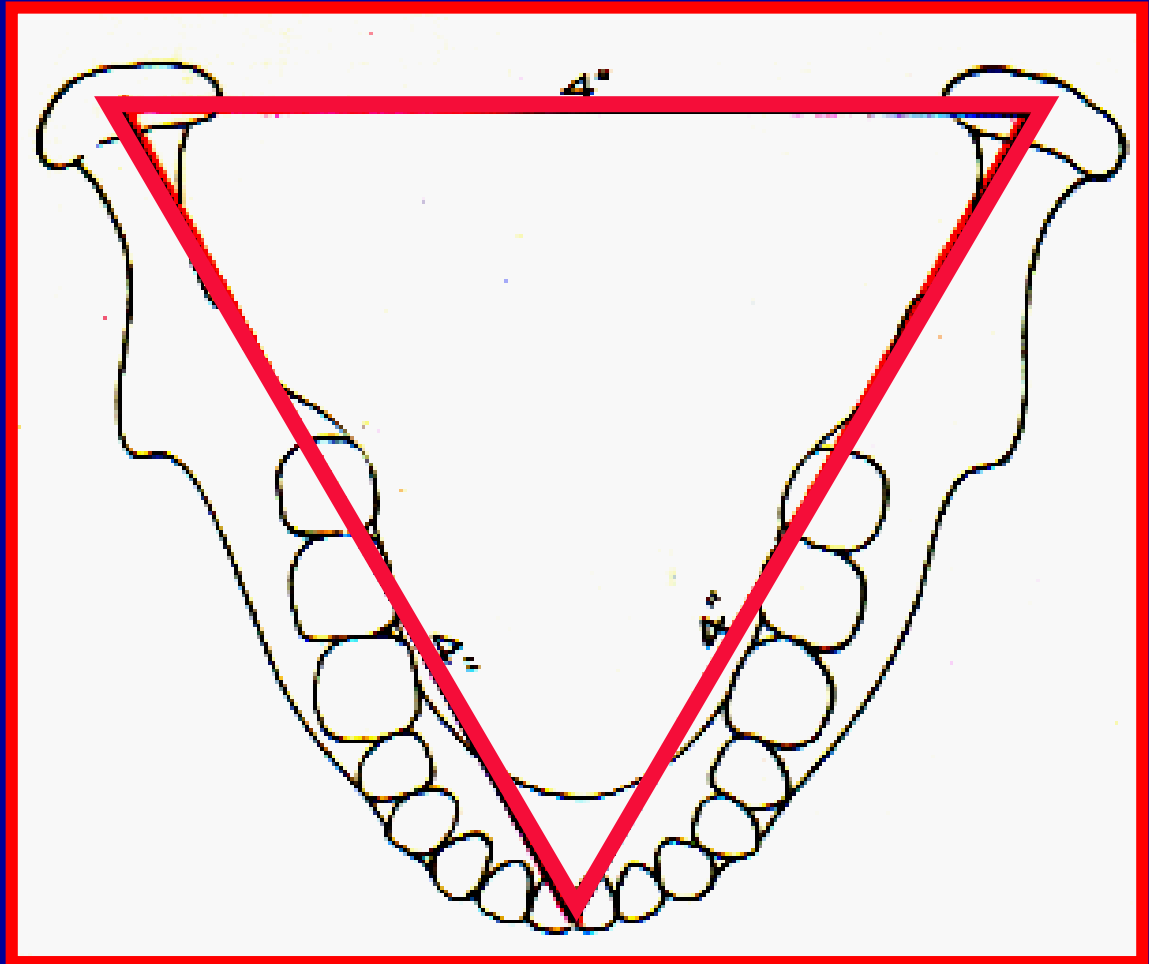
*The **apex** of the triangle is located at the mesial contact area of the lower central incisors

*The angles of the **base** are found at the centers of each condyle.

Bonwill Triangle

The mandible
adapts
to
a 4" equilateral
triangle

Emphasize bilateral
symmetry of
mandibular arch



2. Compensating Curvatures of the Dental Arch (Curved Occlusal Plane)

*The occlusal surface of the mandibular arch conforms a concave plane.

*The maxillary arch appears as a convex plane.

*When the 2 arches are in centric occlusion these curved planes become identical.

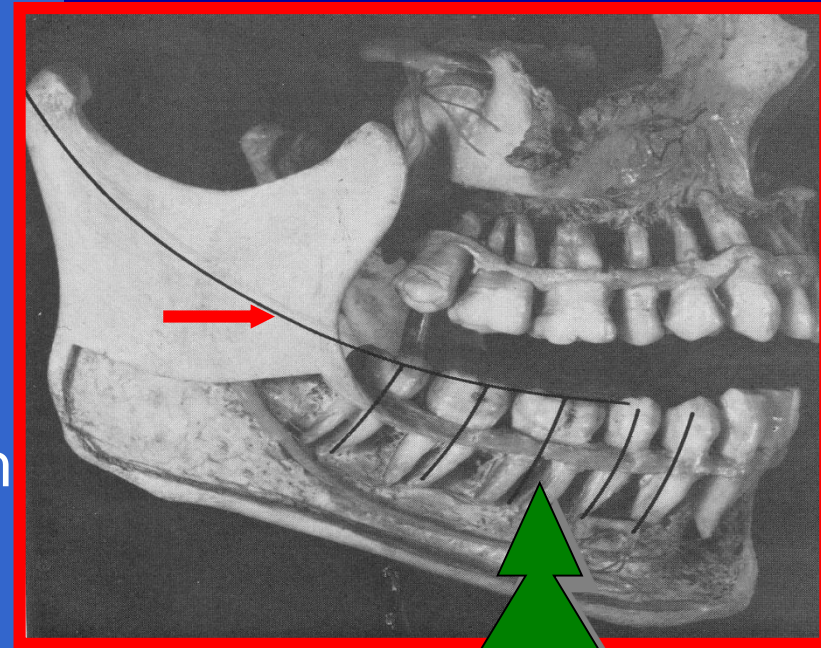
A. Curve of Spee

within the **sagittal** plane.

When the upper and lower dental arches are observed from a point **opposite the first molars** :

The incisal ridges of the anterior teeth and the buccal cusps of the posterior teeth follow a curve.

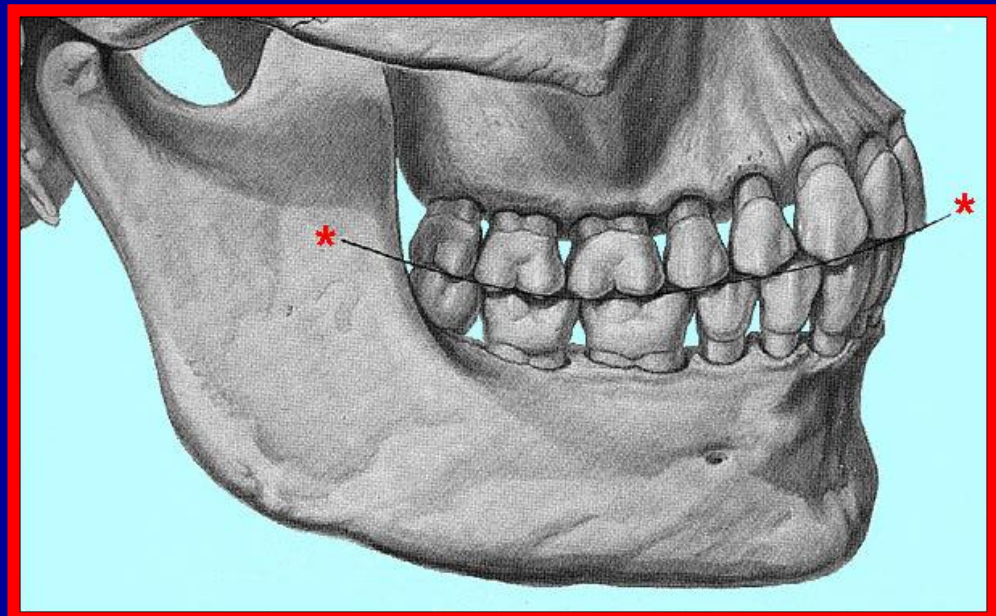
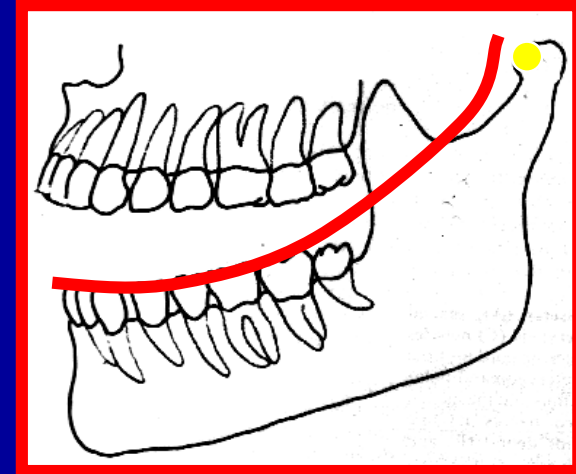
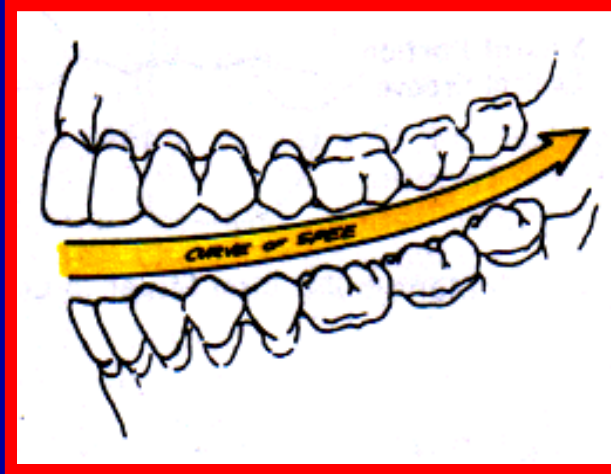
This curve ends at the anterior border of the condyle.



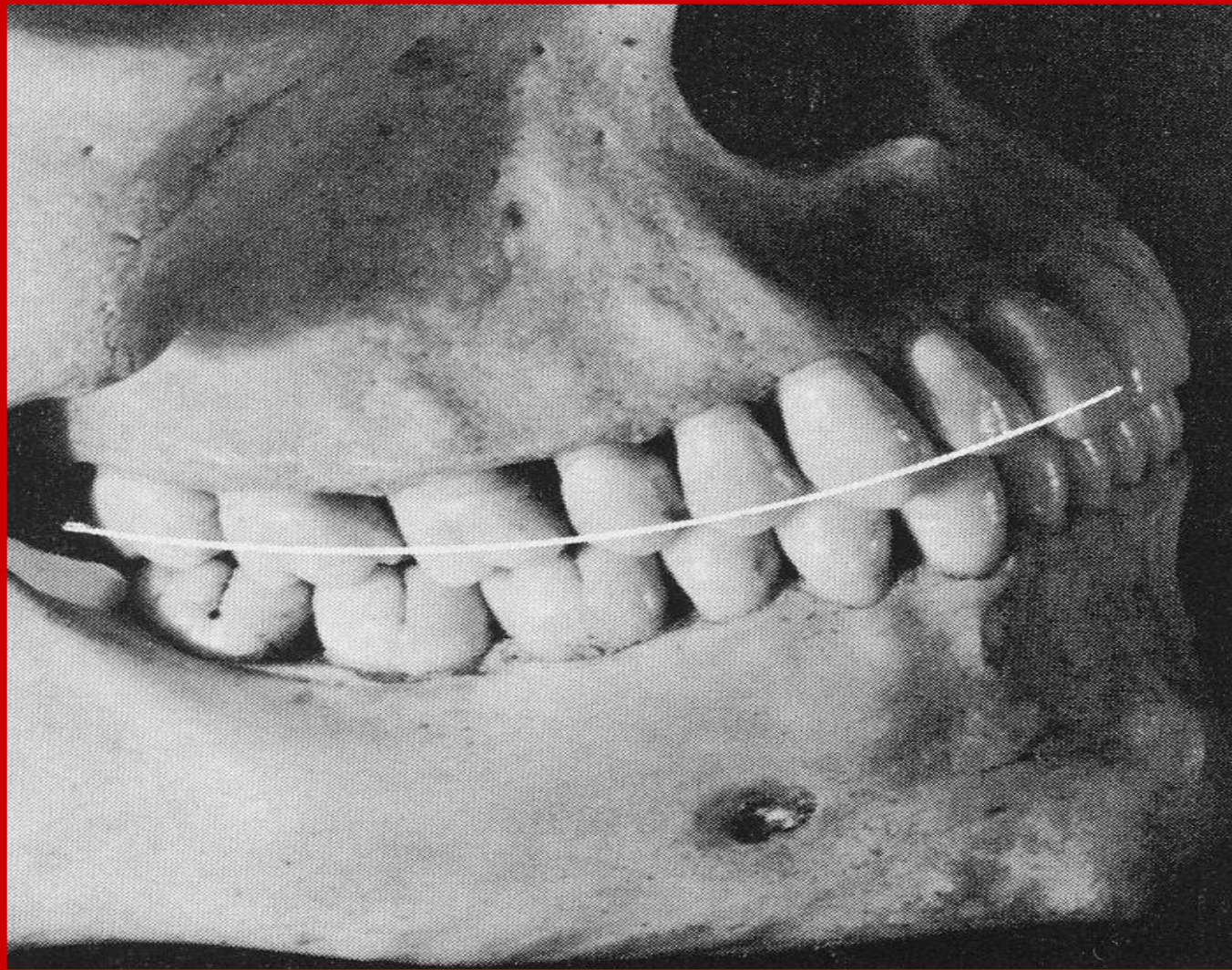
Occlusal Curves of Teeth

Curve of Spee

In
sagittal
plane
(lateral
view)



Curve of Spee



B. Curve of Wilson

In the *coronal plane*

The *occlusal surfaces* of the posterior teeth conform to a curved plane.

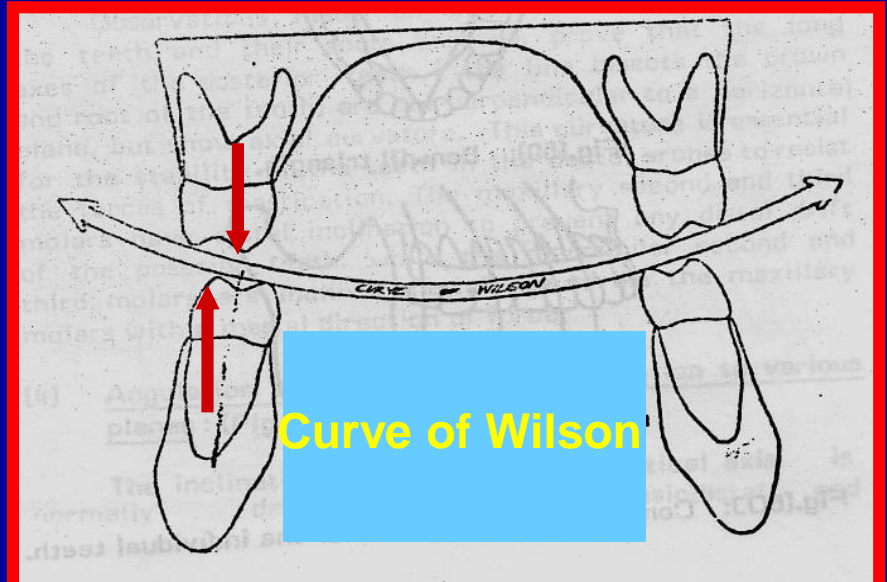
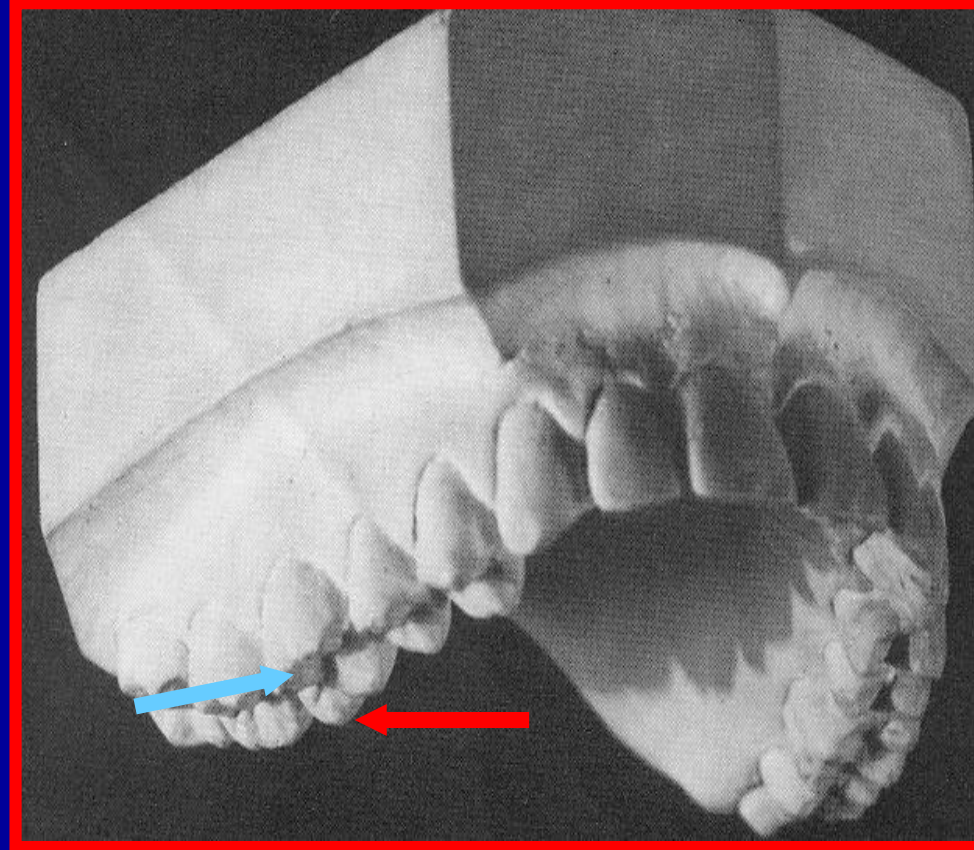
The crowns of mandibular posterior teeth must incline to *the lingual*.

The crowns of maxillary posterior teeth must incline toward *the buccal*.

This curve becomes *deeper posteriorly* so that the molars inclination is greater than that of the premolars.

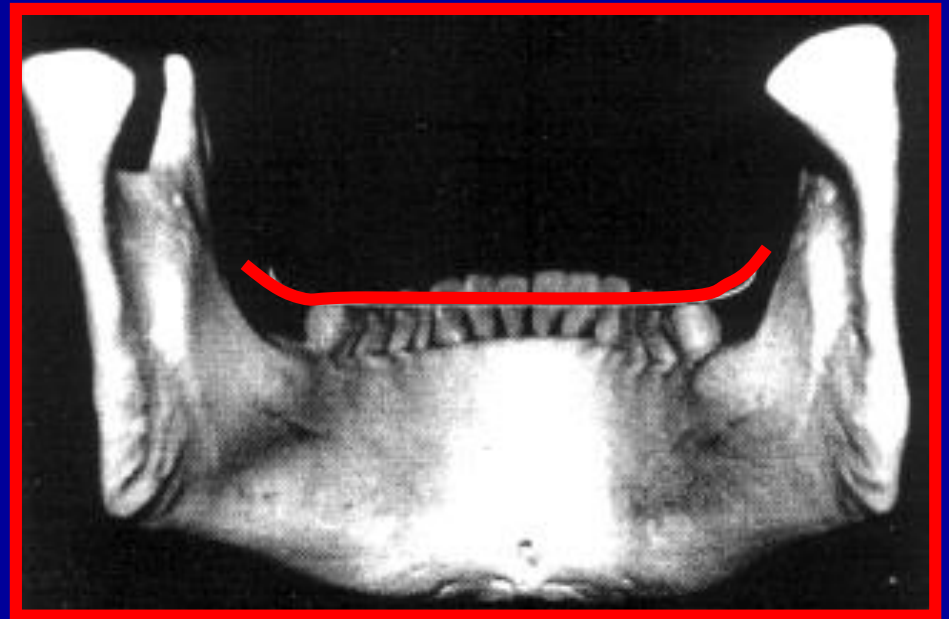
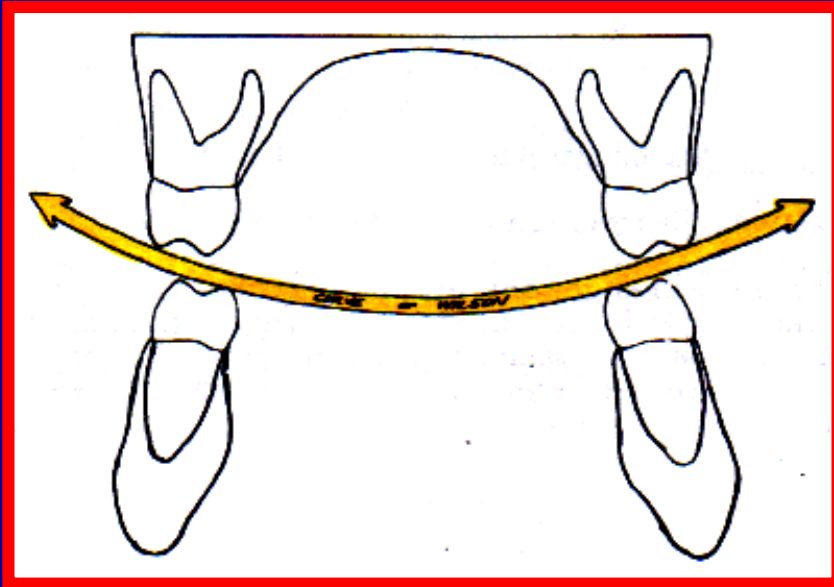
*The buccal cusps of mandibular molars and the lingual cusps of maxillary molars appear to be longer.

*The purpose of this curve is to complement the paths of the condyles of the mandible in its movements



Curve of Wilson

In coronal
Plane
(posterior view)
(transverse)



C. Curve of Monson

It is the combination of the curve of **Spee** and the curve of **Wilson**.

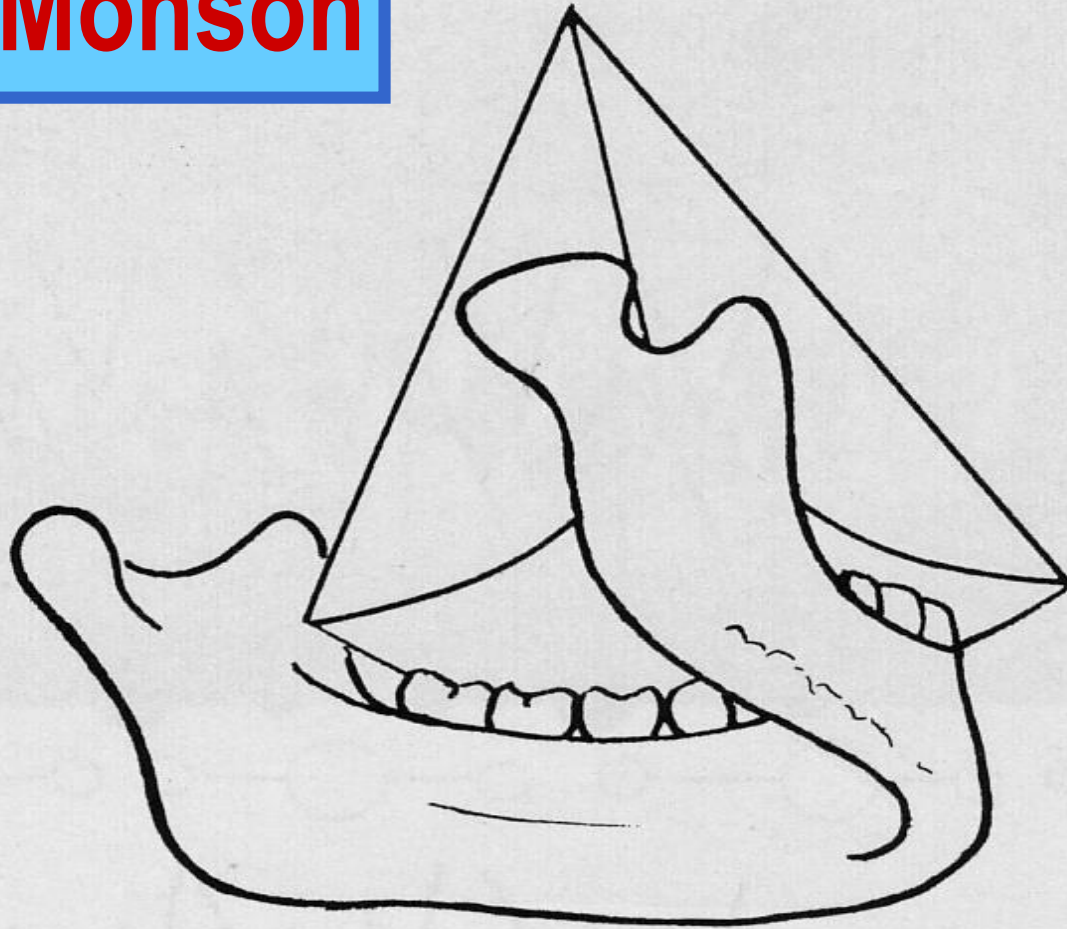
This curve is within **coronal** and **sagittal** planes.

This curvature is **concave** for the mandibular arch and **convex** for the maxillary arch.

These two curved planes become identical in centric occlusion.

They form a segment of a **sphere of 4 inches** radius with the center of the sphere at the **glabella**.

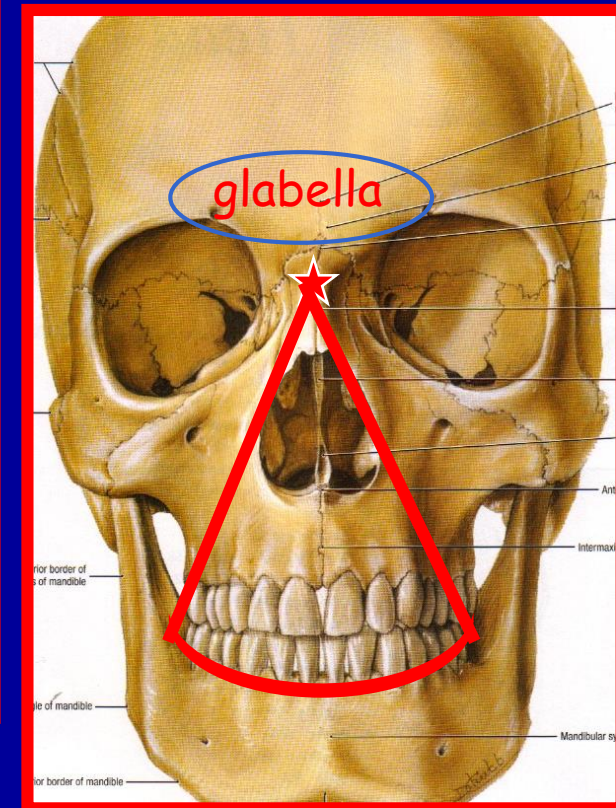
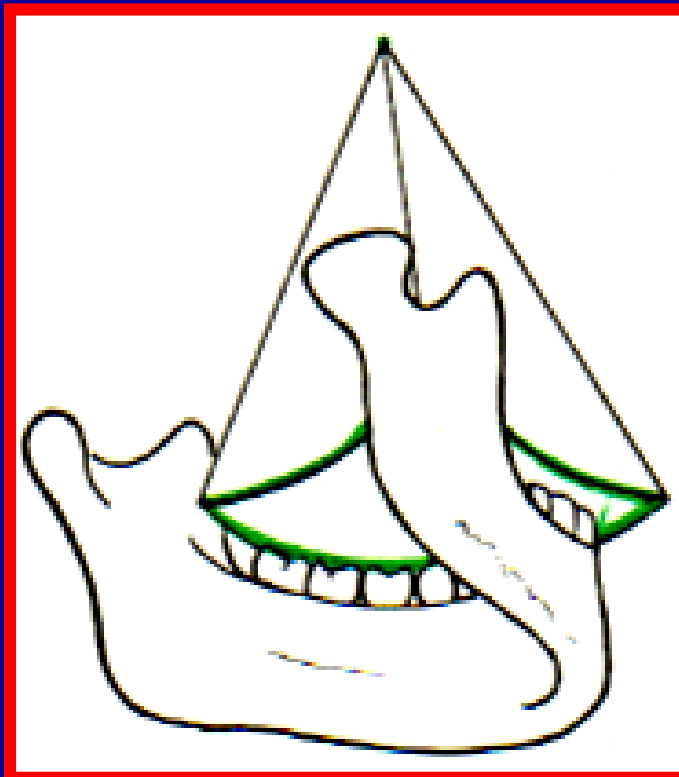
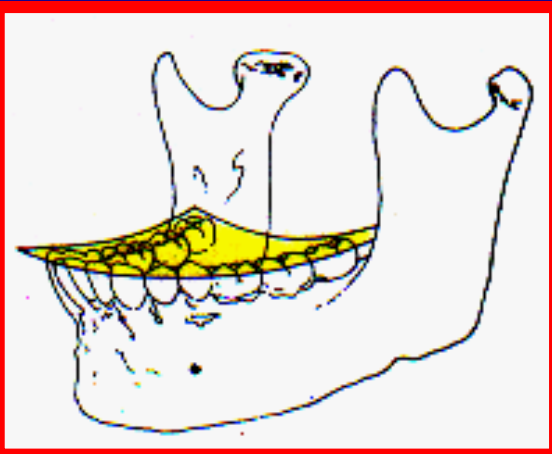
Monson



Sphere of Monson

Monson formulated the Spherical Theory -
a three dimensional
occlusal model

Combining Curve of Spee & curve of Wilson



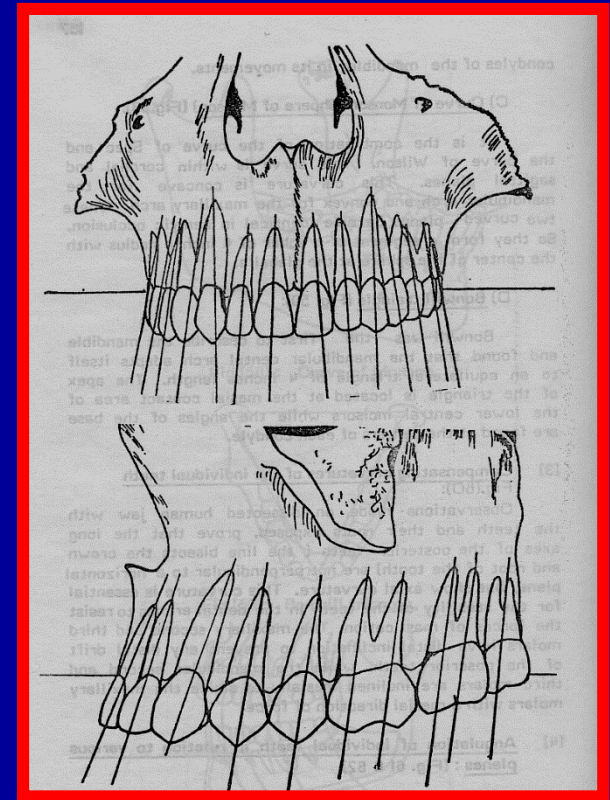
3. Compensating Curvatures of the Individual Teeth (Curved axes)

Compensating Curvatures of the Individual Teeth

The long axes of the anterior teeth (the line **bisects** the crown and root of the tooth) show axial curvature.

This curvature is essential for the stability of the teeth in the dental arches to resist the forces of mastication.

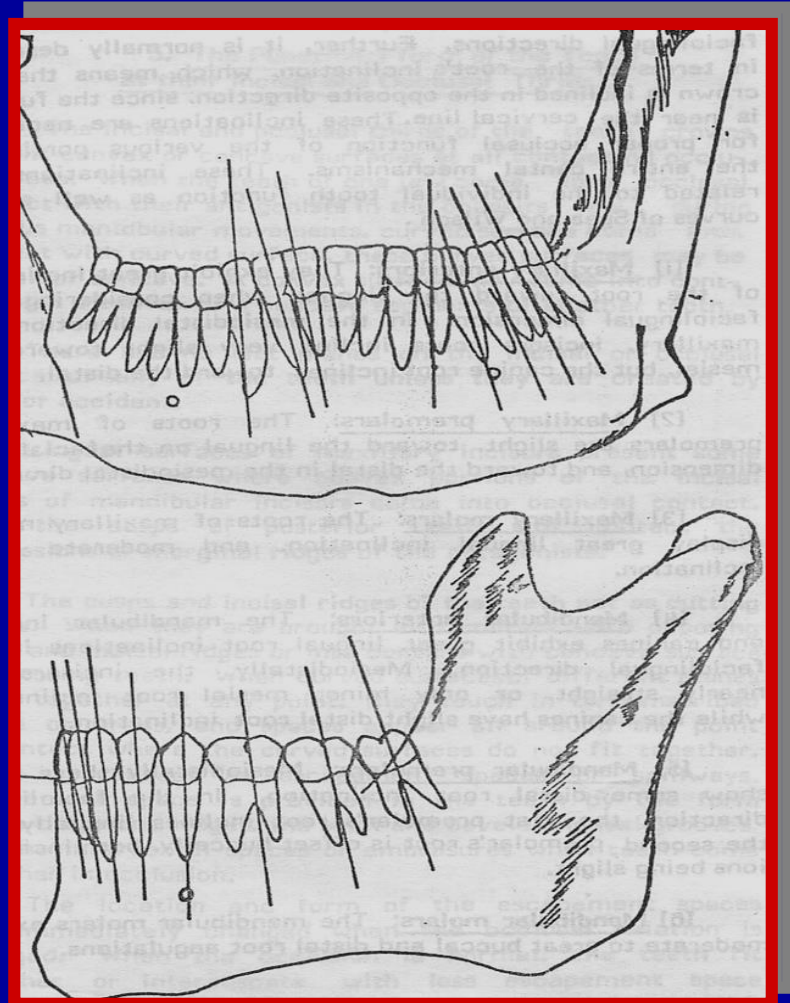
The maxillary second and third molars have distal inclination to prevent any distal drift of the posterior teeth.



Angulation of mand. teeth in relation to various planes

Compensating Curvatures of the Individual Teeth

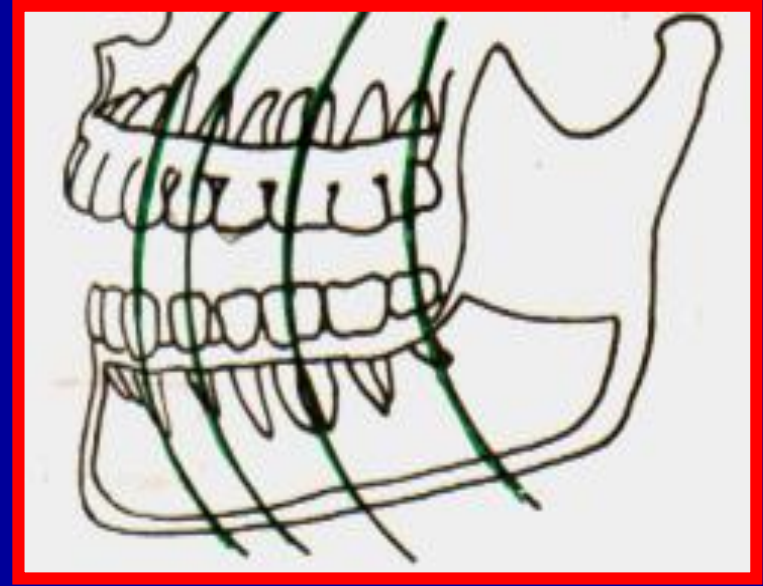
The mandibular second and third molars are inclined mesially to strike the maxillary molars with a mesial direction of force.



Angulation of mand. teeth in relation to various planes

Compensating Curvatures of Individual Teeth

- The long axes of teeth are not perpendicular to the horizontal plane
- Any line bisecting the crown and root of a tooth, when extended, shows axial curvature
- These axial arcs have a tendency toward parallelism



Function:

- stabilize each tooth in the arch.
- Best resistance to masticatory forces
 - ⇒ Occlusal balance to teeth.
- Promotion of mesial drift.
- Prevention of distal drift.

4. Angulation of Individual Teeth In Relation To Various Planes

Angulation of Individual Teeth in Relation to Various Planes

Maxillary anteriors

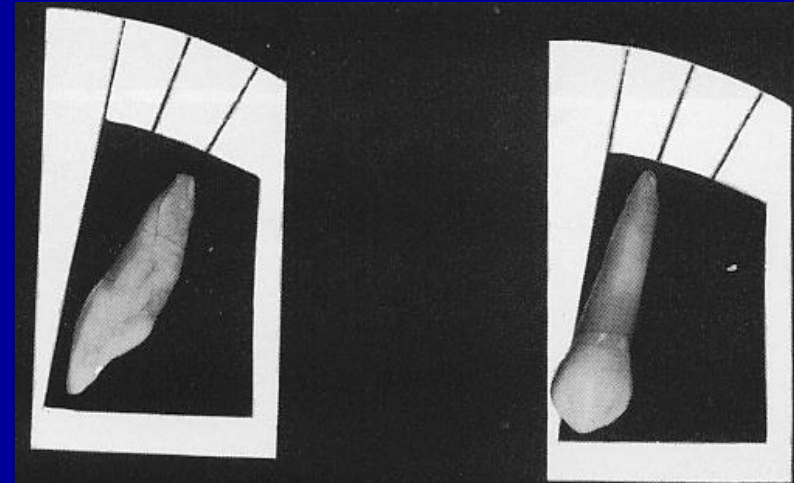
Labiolingual direction:

They exhibit great inclination of the root toward the **lingual**.

Mesiodistal direction

The **maxillary incisors** roots incline very slight toward the mesial

The **canine root** inclines toward the distal.



Angulation of Individual Teeth in Relation to Various Planes

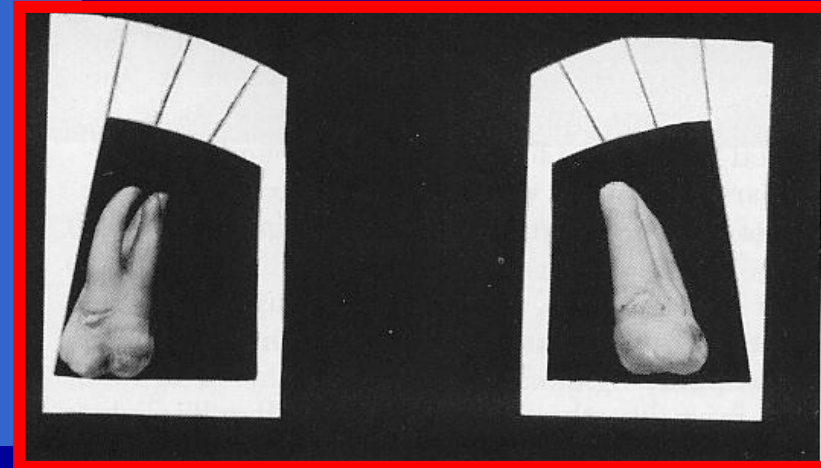
Maxillary premolars

The roots of maxillary premolars are slight toward the lingual on the labiolingual direction, and toward the distal in the mesiodistal direction



Maxillary molars

The roots of maxillary molars display great lingual inclination and moderate distal inclination



Angulation of Individual Teeth in Relation to Various Planes

Mandibular anteriors

Labiolingual direction:

They exhibit great inclination of the root toward the **lingual**.

Mesiodistal direction

The mandibular incisors roots nearly straight or incline very slight toward the mesial

The canine root inclines slightly toward the distal.

Angulation of Individual Teeth in Relation to Various Planes

Mandibular premolars

The roots of mandibular premolars are slight toward the buccal on the labiolingual direction, and toward the distal in the mesiodistal direction

Mandibular molars

The roots of mandibular molars display moderate to great buccal and distal inclination

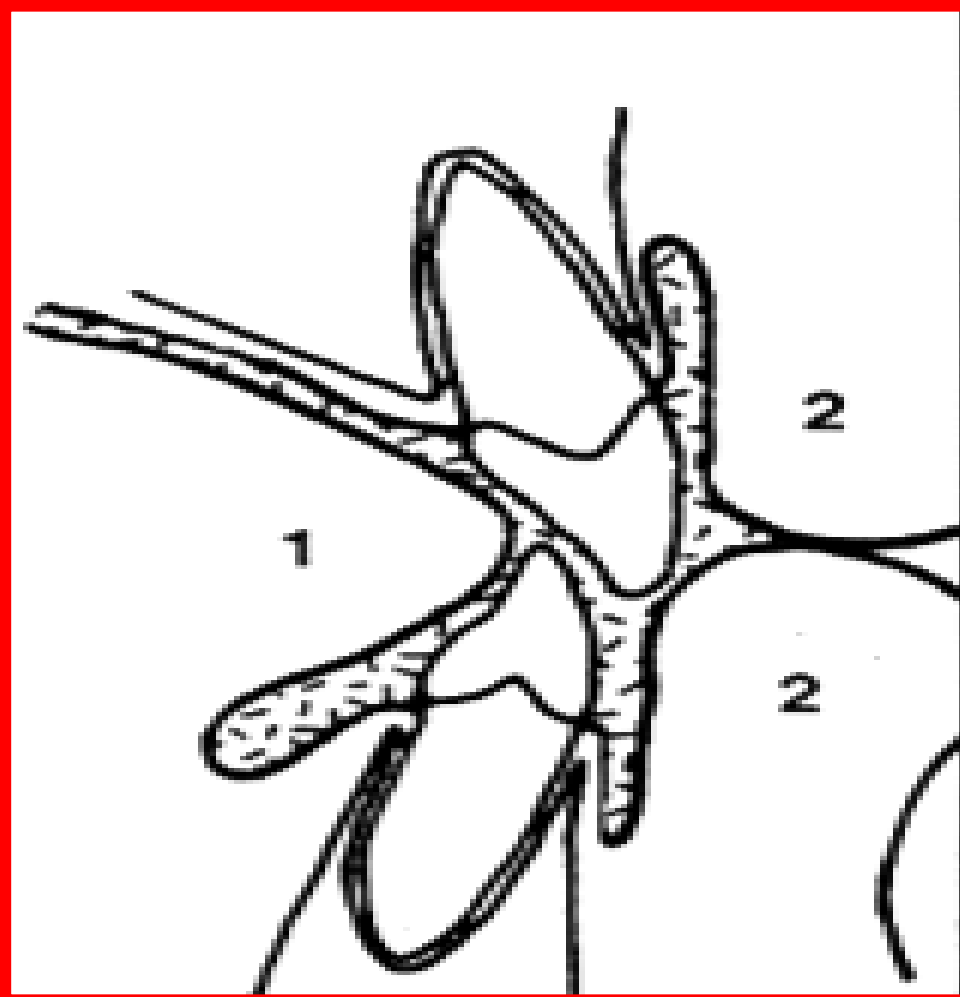
5. Functional Form of the Teeth At Their Incisal and Occlusal Thirds

*The incisal and occlusal thirds of the crowns present convex or concave surfaces at all contacting areas.

*When the opposing teeth come into occlusal contact, curved surfaces also come into contact.

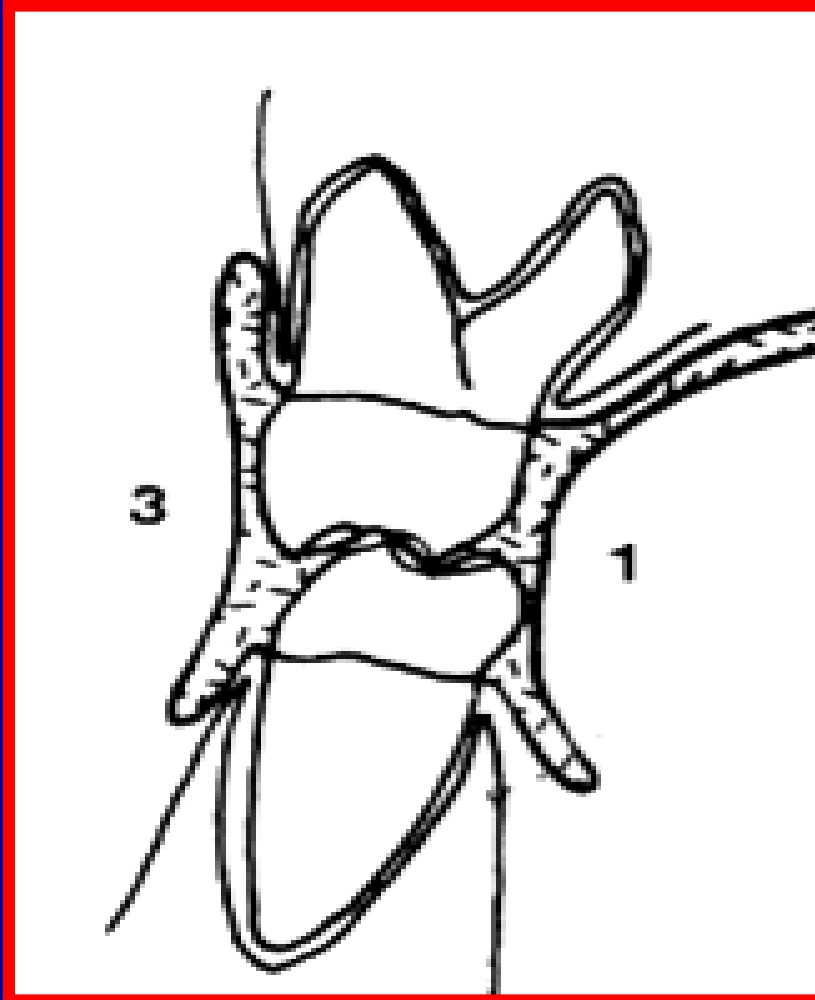
*A convex surface may come into contact with a convex or concave surface.

*Lingual concave surfaces of maxillary incisors contact convex portion of the incisal ridges of mand. incisors.



*The same occurs in the post. teeth.

*The deeper portion of sulci and grooves acts as escapement spaces for food which is needed for efficient mastication.



*The escapments are reduced with the increase in occlusal contact (if the cusps are worn flat).

6. Facial Relation of Each Tooth In
One Arch To Its Antagonist or
Antagonists In the Opposing Arch
In Centric Occlusion

Development of Occlusion :

*Oral functions are related to the development of occlusion of both deciduous and permanent teeth.

Therefore :

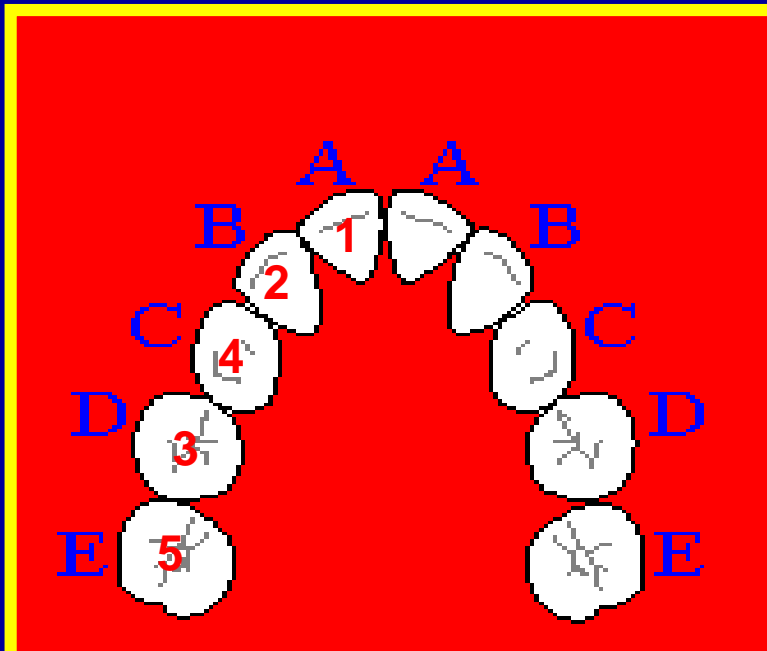
1. Appearance of decid. teeth at proper time,
 2. Development of muscles, teeth, and chewing,
 3. Jew relations, and
 4. Development of lip - cheeks – tongue system
- Are important factors for development of occlusion.

The Deciduous Dentition :

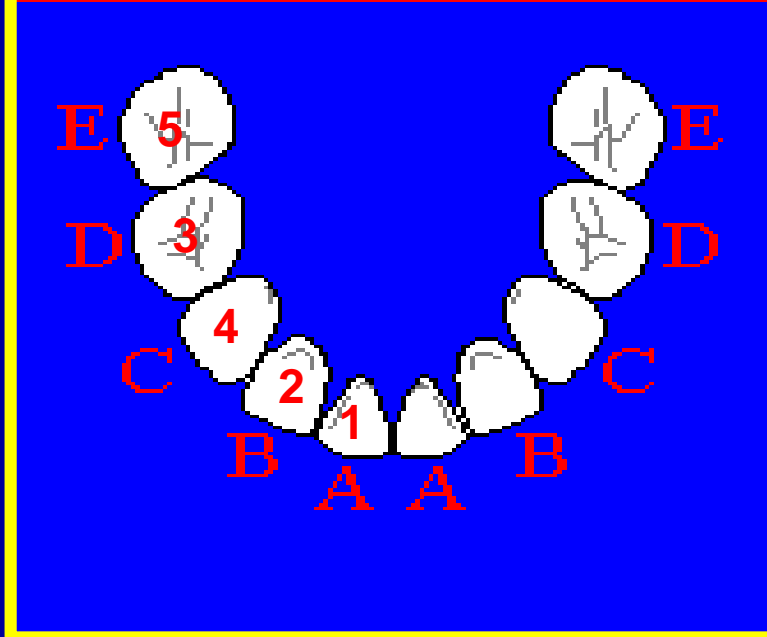
*The timing of eruption of the decid.teeth is due to hereditary and environmental factors.

ERUPTION

A= 7 m
B= 8 m
C= 18 m
D= 14 m
E= 24 m



A= 6 m
B= 7 m
C= 16 m
D= 12 m
E= 20 m



Sequence and age of eruption
of deciduous teeth

*At 2.5-3 yrs. decid. occlusion is established.

*The MD diameter of lower E is greater than that of upper E, resulting in the distal surfaces of these 2 molars being in the same plane.

The Permanent Dentition :

*The sequence and age of eruption of the permanent teeth is :

In the mandible

(6-1)-2-3-4-5-7-8 OR
(6-1)-2-4-3-5-7-8

In the maxilla

6-1-2-4-3-5-7-8 OR
6-1-2-4-5-3-7-8

These are the most favorable sequences for the prevention of malocclusion.



Favorable eruption sequence of permanent teeth

THANK YOU 