Occlusion

Definition

- Angle defined occlusion as the normal relation of the occlusal inclined planes of the teeth when the jaws are closed.
- Occlusion is a complex phenomenon involving the teeth, periodontal ligament, the jaws, the temperomandibular joint, the muscles and the nervous system

Terminology

- Ideal occlusion is **preconceived theoretical concept** of occlusal, structural and functional, relationship that includes idealized principles and characteristics that an occlusion should have.

- Balanced occlusion is occlusion in which balanced and equal contacts are maintained throughout the entire arch during all excursions of the mandible

Periods of occlusal development

- Pre – dental period
- The deciduous dentition period
- The mixed dentition period
- The permanent dentition period

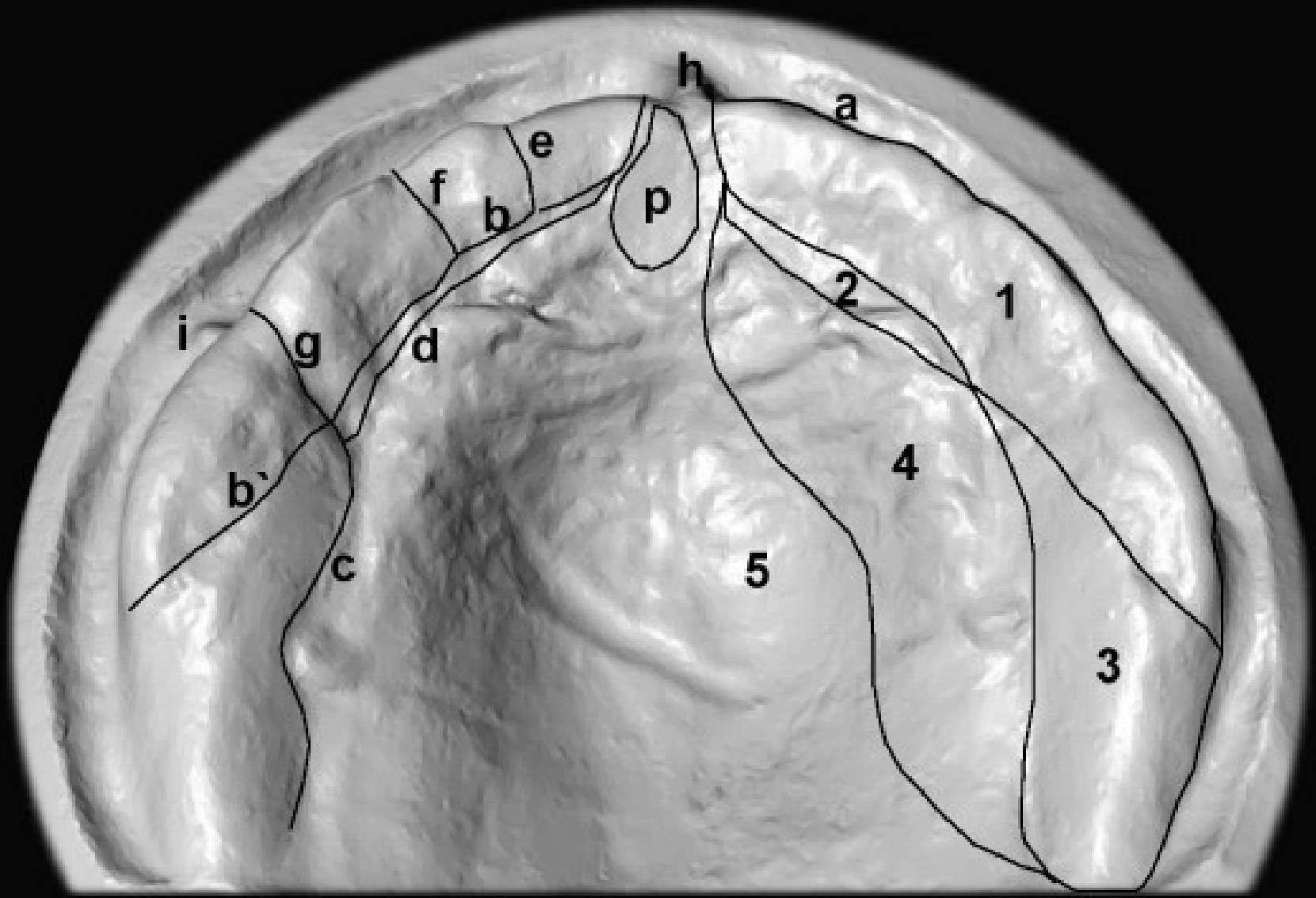
Pre – dental period

- Period after birth during which the neonate does not have teeth – for 6 months after birth.

- Gum pads are pink, firm and are covered by dense layer of fibrous periosteum.

- Horse shoe shaped and develop in two parts – Labiobuccal portion and lingual portion

Gumpads are divided into ten segments by transverse grooves –
each consists of
one developing deciduous tooth sac


h
a
e
f
b
p
i
g
d
2
1
b`
4
c
5
3

- Transverse groove between the canine and first deciduous molar segment is called lateral sulcus – useful in assessing the interarch relationship at early stage.

- Lateral sulcus of the mandibular arch is more distal to that of maxillary arch.

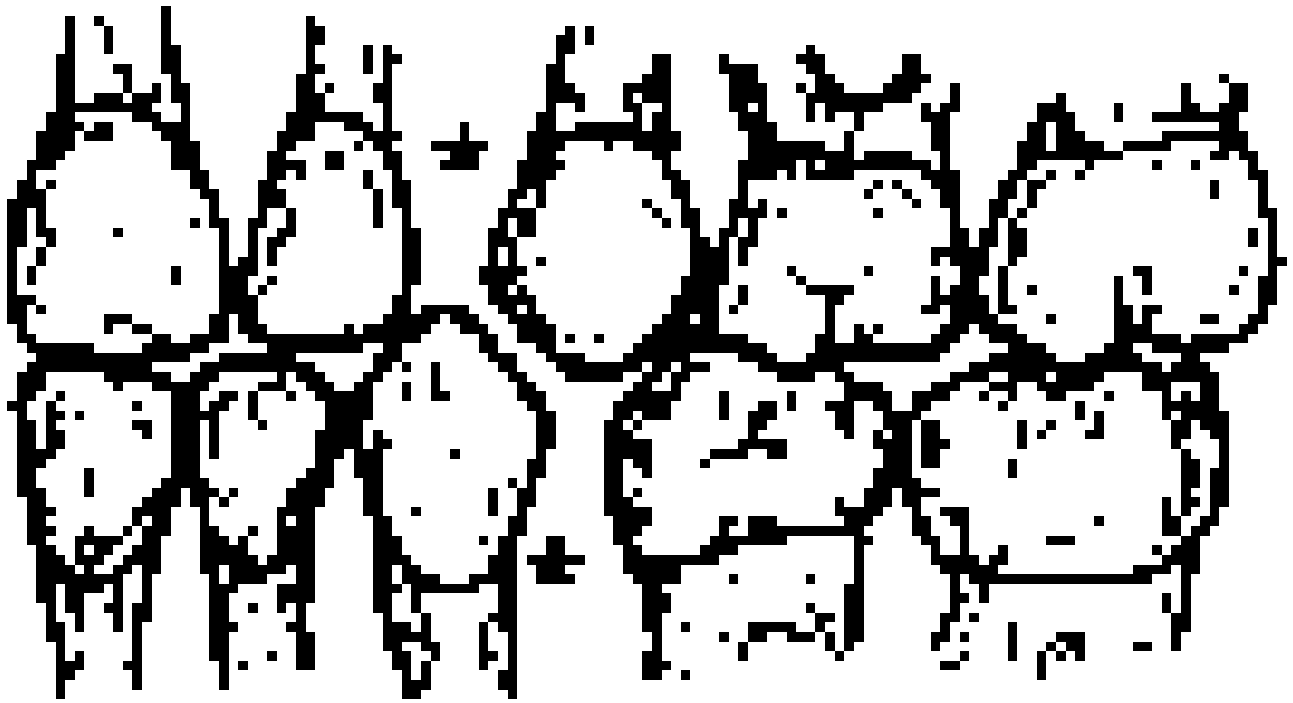
- Teeth that are present at birth are called natal teeth – rare.
- Teeth which erupt during first month are called neonatal teeth

Deciduous dentition period

- Initiation of primary tooth buds – six weeks of IUL
- Beginning of eruption – 6 months after birth
- Completion of primary teeth eruption – 21/2 to 31/2 yrs
- Mandibular central – first tooth to erupt at 6 to 7 months

- Variation of 3 months from mean age has accepted as normal.
- Sequence of eruption A – B – C – D – E.
- Primary dentition is established till 3 yr and is stable till 6 yrs with very little changes

- Spacing occurs between deciduous teeth which is physiological
- Absence of spaces - crowding of teeth can occur when larger permanent teeth erupts
- Spacing mesial to maxillary canine and distal to mandibular canine are called primate spaces or simian spaces as they are seen in primates – helps in placement of canines in opposing arch



Primate Spaces* in Deciduous Teeth

- Distal surface of upper and lower second molars is called terminal plane

- Normal is flush terminal plane where distal surfaces of upper and lower second molars are in same vertical plane

Mixed dentition period

- Begins at 6 yrs of age
- During this period deciduous teeth along with some permanent teeth are present
- Mixed dentition period is classified as
- First transition period
- Inter – transition period
- Second transitional period

First transition period

- Characterized by eruption of first permanent molars and exchange of deciduous incisors with permanent incisors

- Mandibular first permanent molar erupts at 6 yrs which is guided by distal surfaces of second deciduous molar which are of 3 types
- Flush terminal plane
- Mesial step terminal plane
- Distal step terminal plane

Flush terminal plane

- Distal surfaces of upper and lower second deciduous molars are in one vertical plane – normal feature of deciduous dentition.
- For transition from end on to class I lower molar has to move forward by about 3 – 5 mm relative to upper molar.
- This occurs by utilization of physiologic spaces, leeway space and differential growth of mandible

Mesial step terminal plane

- Relation ship of distal surface of lower deciduous second molar is more mesial than that of upper
- Permanent molar erupts directly into Angles class I occlusion
- This occurs due to early forward growth of mandible
- If this mandibular growth persists in forward direction it can lead to Angles class III molar relation
- If forward growth is minimal then it establishes in class I molar

Distal step terminal plane

- Distal surface of lower second deciduous molar is more distal in relation to upper
- Permanent molars erupt in Angles class II malocclusion

Incisal liability

- During first transition period deciduous incisors are replaced by permanent incisors
- Mandibular central incisors are first to erupt
- Permanent incisors are larger than deciduous teeth
- The difference between the amount of space need for the accommodation of the incisors and the amount of space available is called incisal liability
- It is about 7 mm in maxillary arch and 5 mm in mandibular arch

- Incisal liability is overcome by -

- Utilization of interdental spaces in primary dentition
- Increase in intercanine width
- Change in incisor inclination

Inter - transition period

- Arches consists of sets of deciduous and permanent teeth
- This phase is relatively stable and no change occurs

Second transition period

- Replacement of deciduous molars and canines by premolars and permanent cuspids respectively
- Combined mesiodistal width of permanent canines and premolars is less than that of deciduous canines and molars
- Excess space is called as leeway space of Nance
- It is 1.8 mm in maxillary arch and 3.4 mm in mandibular arch
- Excess space available after the exchange of deciduous molars and canines is utilized for mesial drift of mandibular molars to establish class I molar relation

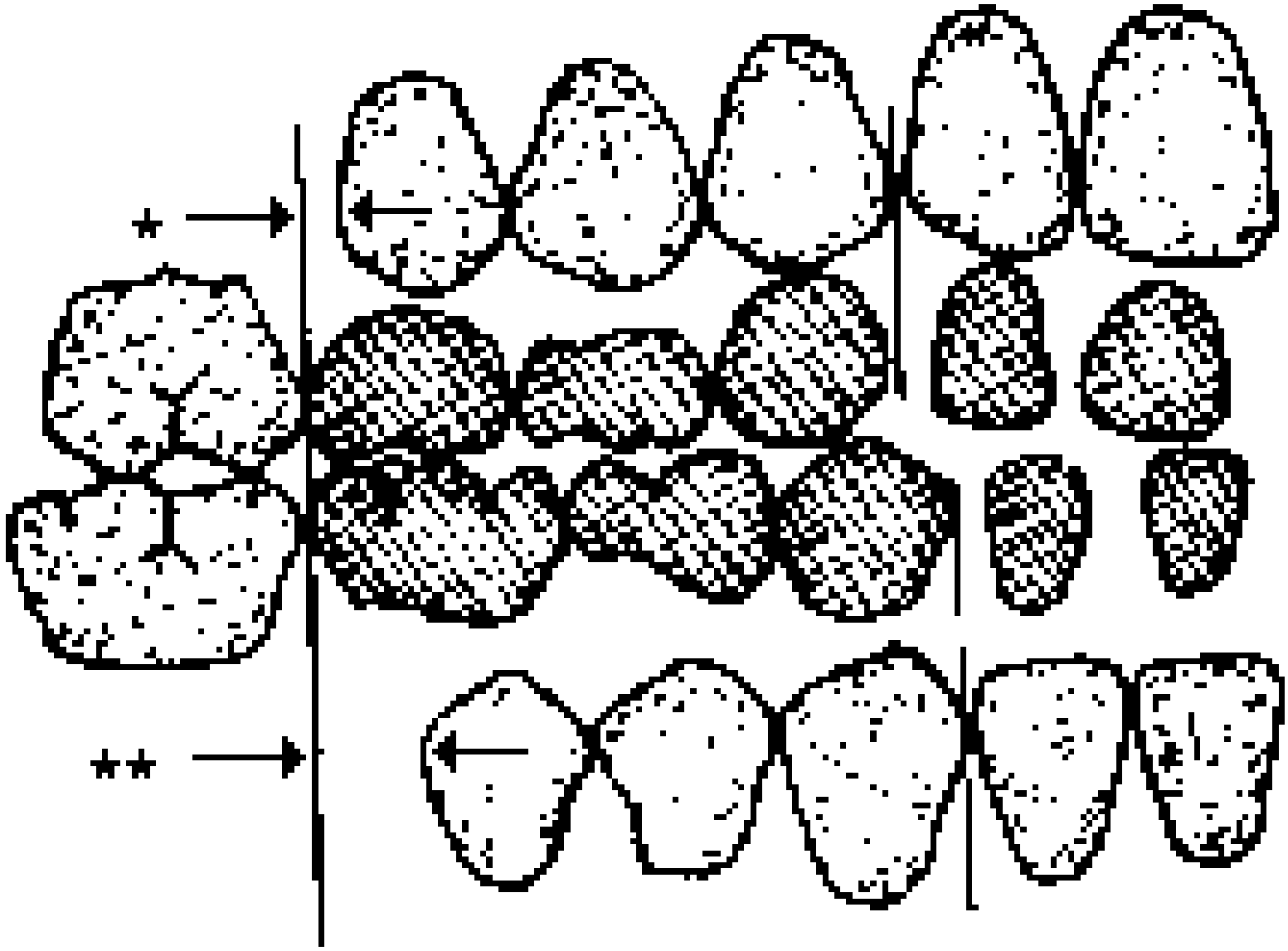
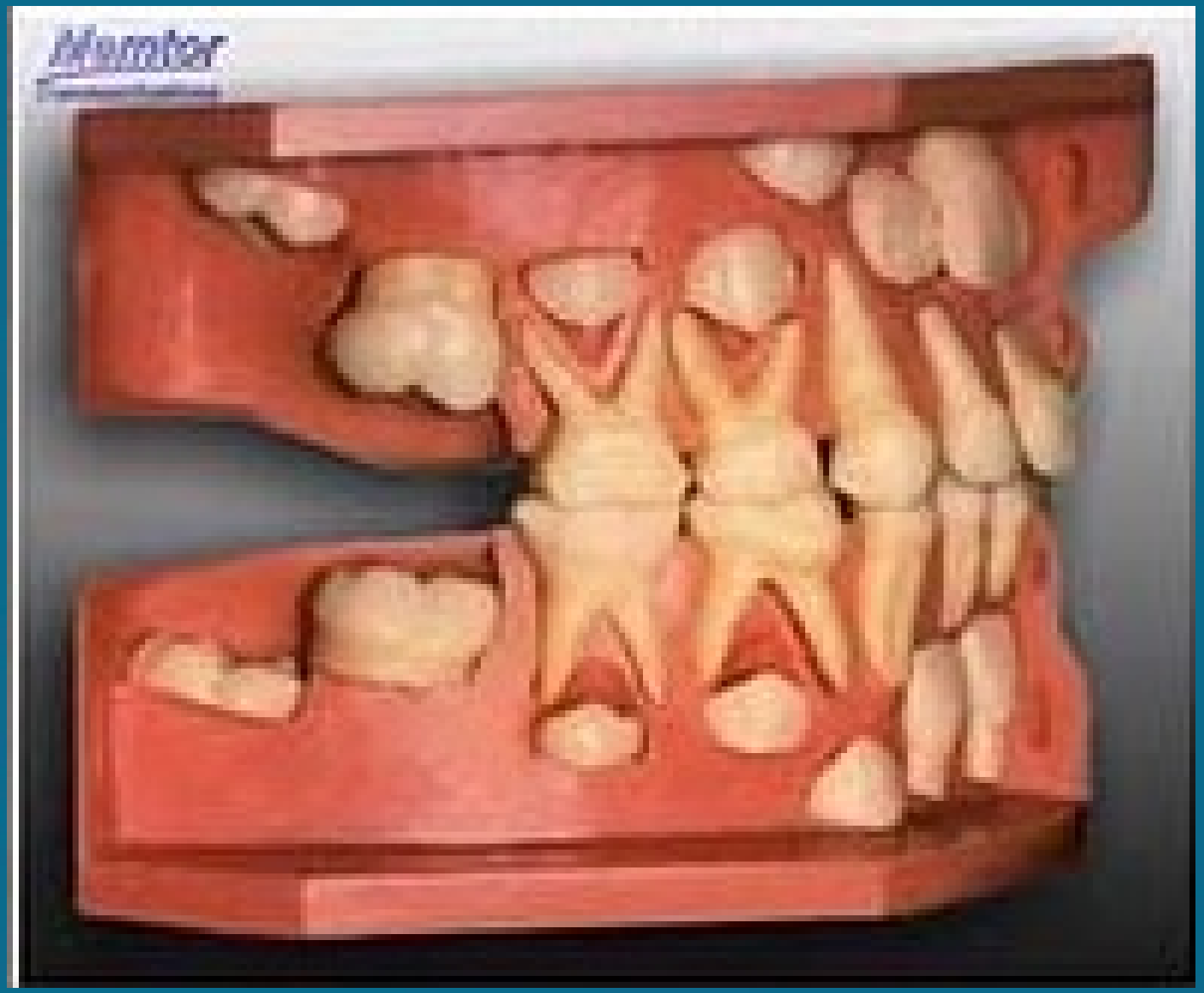
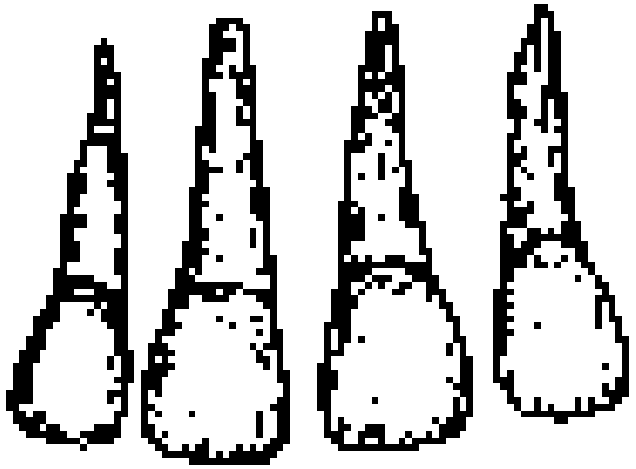


Illustration of the Leeway Space


Monster

Freshly erupted molars



Spaced Incisors in the so-called 'Ugly Duckling' Stage

Arrangement of teeth in humans

Two types

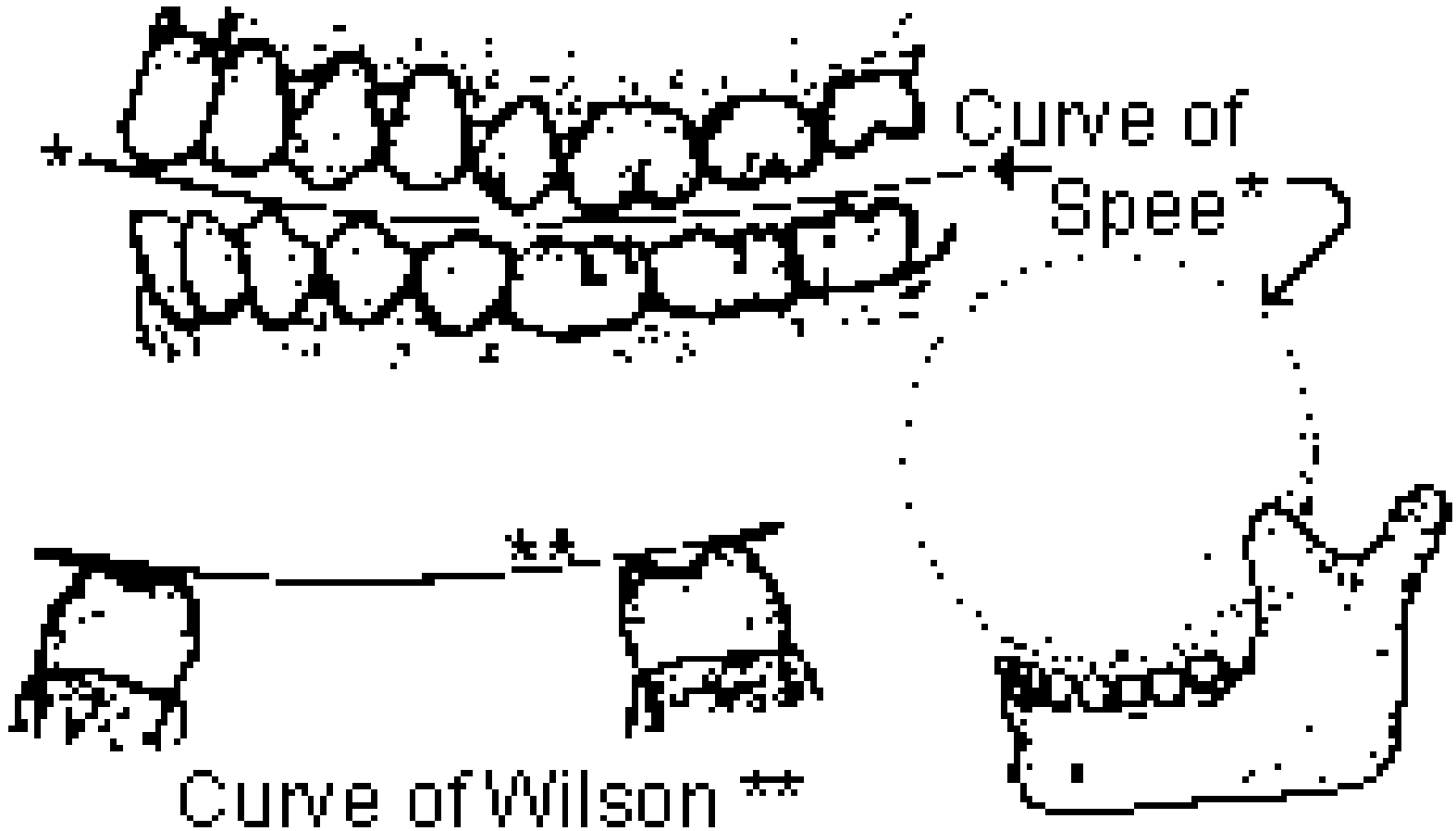
- Cusp to fossa occlusion
- Cusp – embrasure occlusion

Imaginary occlusal planes and curves

- Curve of spee
- Curve of wilson
- Curve of monson

Curve of spee

- Antero – posterior curvature of the occlusal surfaces beginning at the tip of the lower cuspid and following the cusp tips of the bicuspids and molars continuing as an arc through the condyle
- If the curve is extended, it would form a circle of about 4” diameter
- Results in variation in axial inclination of lower teeth

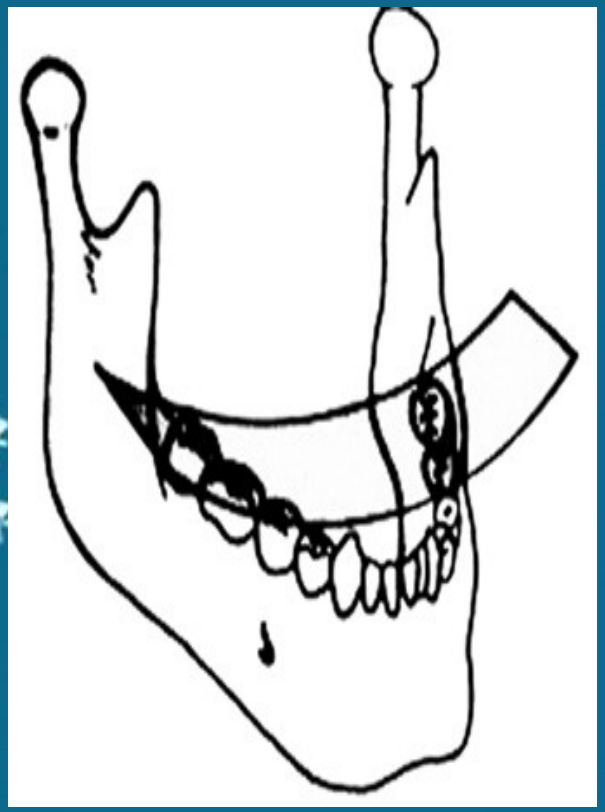

Curve of
Spee*
Curve of Wilson **

Curve of wilson

- Curve that contacts buccal and lingual cusp tips of the mandibular buccal teeth
- Results from inward inclination of the lower posterior teeth
- It helps in
- Teeth are aligned parallel to the direction of medial pterygoid for optimum resistance to masticatory forces
- Elevated buccal cusps prevent food from going past the occlusal table

Curve of Monson

- This is formed by extending the curve of spee and curve of Wilson to all cusps and incisal edges



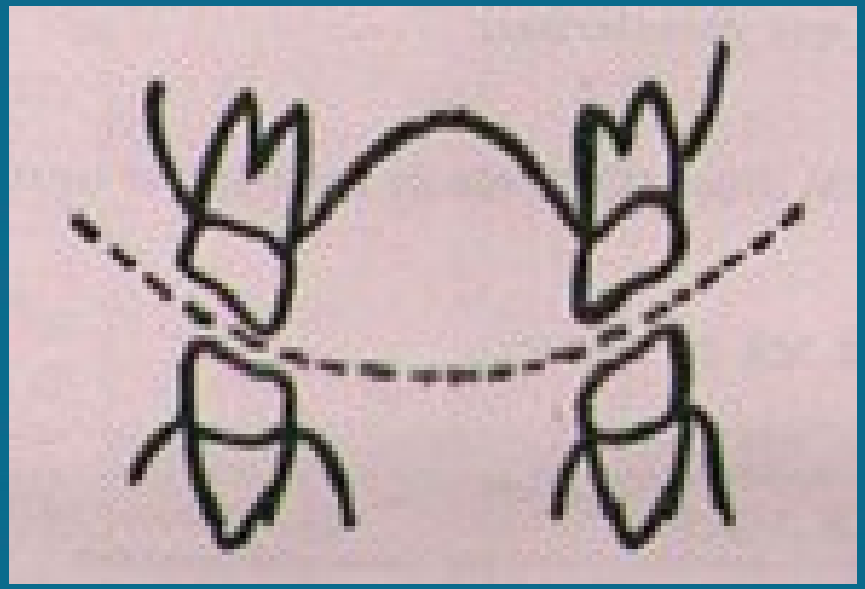


Fig. 1b Andrew's six keys to occlusion[4]

I. Molar relationship: The distal surface of the disto-buccal cusp of the upper first permanent molar occludes with the mesial surface of the mesio-buccal cusp of the lower second permanent molar.
II. Crown angulation (mesio-distal tip): The gingival portion of each crown is distal to the incisal portion and varied with each tooth type.
III. Crown inclination (labio-lingual, bucco-lingual): Anterior teeth (incisors) are at a sufficient angulation to prevent overeruption
Upper posterior teeth – lingual tip is constant and similar from 3–5 and increased in the molars
Lower posterior teeth – lingual tip increases progressively from the canines to the molar
IV. No rotations
V. No spaces
VI. Flat occlusal planes