

# Summary oral science



Lecture #1



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هَيْمَةُ الأَسْنَانِ

# Occlusion

## 1. Definition of Occlusion

- The act of closure or being closed.
- A static morphological tooth contact relationship.
- Includes all factors concerned with development and stability of the masticatory system.
- Includes oral motor behavior and functional units involving teeth, joints, and muscles.

 **HIGH-YIELD:** Occlusion includes teeth + muscles + TMJ, not only tooth contact.

## 2. Concepts of Occlusion

- Intercuspal position
- Centric occlusion
- Picket fence appearance

### CR vs MIP

#### a) Centric Relation (CR)

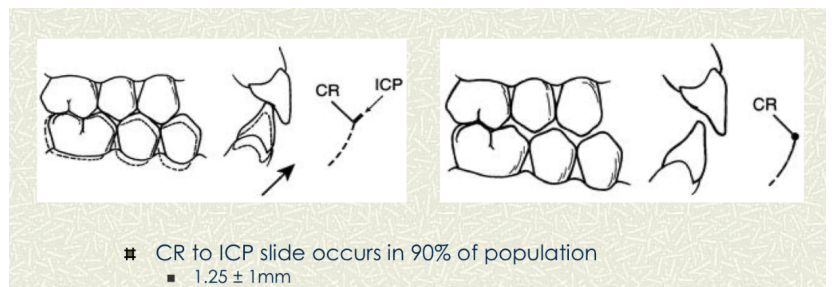
- Maxillomandibular relation where condyles articulate with the thinnest avascular portion of the disc.
- Complex positioned **anterior-superiorly** against articular eminence.
- Independent of tooth contact.
- Clinically **repeatable** and verifiable.
- Restricted to rotary movement around transverse horizontal axis.

#### b) Maximum Intercusation (MIP / MI)

- Complete **intercusation** of opposing teeth.
- Independent of condylar position.
- Tooth-to-tooth relationship.

**Note:** CR and MIP are coincidental in only 10% of the population. The discrepancies between CR and MI can be observed on articulated study casts.

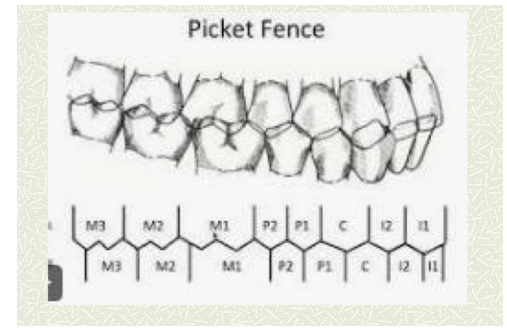
Feature	Maximum Intercusation (MIP / MI)	Centric Relation (CR)
Definition	Complete intercusation between opposing teeth	Jaw relation determined by condyle position
Depends on tooth contact?	✔ Yes	✘ No
Depends on condyle position?	✘ No	✔ Yes
Relationship Type	Tooth-to-tooth	Bone-to-bone
Condyle Position	May vary	Fixed/reproducible
Clinical Repeatability	✘ Not always repeatable	✔ Clinically repeatable



## c) Picket Fence Appearance (Occlusion Concept)

The diagram simplifies the concept of static occlusion (relationship of teeth when the jaw is closed) by mapping out where specific cusps and fossae meet

💡 For more understanding check the practical module (helpful video)

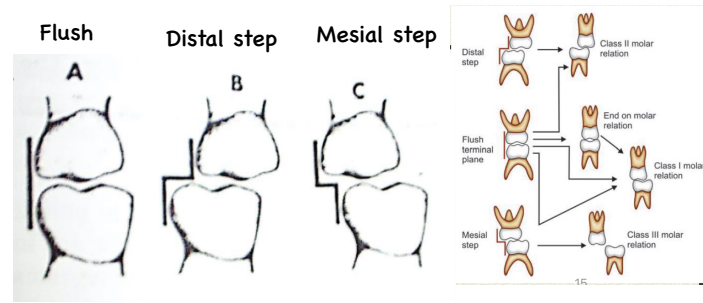


## 3. Primary Occlusion

- Each tooth usually occludes with **2 teeth**.
- **Exceptions:** mandibular central incisor + maxillary second molar.
- Interdental spacing **decreases** future crowding.
- Occlusion is supported and made more efficient after eruption of first permanent molars.

## 4. Primary molar relationship

Terminal Plane	Percentage	Future Occlusion (Possible Outcomes)
Flush	Class I 56% + Class II 44%	Class I (normal) – most predictable
Distal Step	(Not specified)	Class II malocclusion
Mesial Step	(Not specified)	Class I (mild cases) OR Class III (severe cases)



### ➡ Factors influencing the effect of terminal plane relationship on Angle's molar relationship:

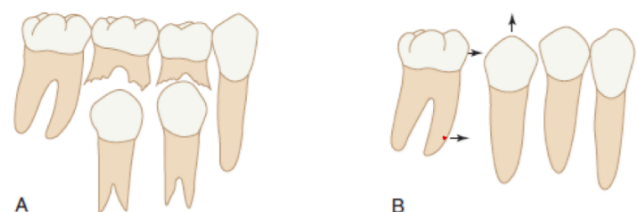
- Differential growth of the jaw
- Forward growth of the mandible
- Sufficient **Leeway space** to accommodate a mesial shift of the permanent molars



The amount of space gained by the difference in the mesiodistal diameter between deciduous molars and premolars

Arch	Leeway Space per Quadrant	Total Leeway Space
Maxilla	0.9 mm	1.8 mm
Mandible	1.7 mm	3.4 mm

**General rule:** Combined mesiodistal crown dimension of primary canine + primary 1st and 2nd molars is larger than that of permanent canine + 1st and 2nd premolars.



Leeway space. Difference in mesiodistal dimensions between primary teeth (A) and permanent teeth (B). Arrows indicate leeway space gained by permanent molars after loss of primary molars and eruption of the second permanent premolar.

# 5. Permanent Occlusion

- Incisor relationship → Class I, II, III.
- Canine relationship → Class I, II, III.
- Molar relationship → Angle's classification.

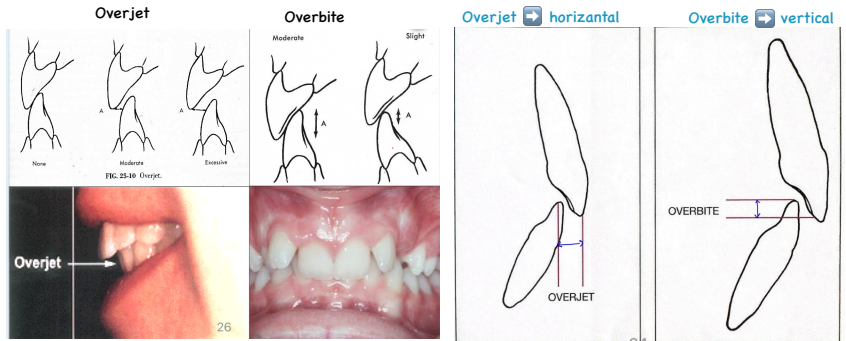
## Incisor relationship

Class Description

Class I Normal overjet

Class II Increased overjet تقدم الأسنان الأمامية

Class III Reverse overjet تقدم الأسنان السفلية



مقياس لدى تغطية الأسنان الأمامية للأسنان السفلية

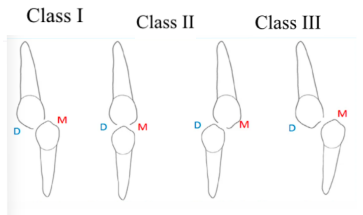
## Canine relationship

Class Position of Upper Canine

Class I Normal — mesial slope of upper canine contacts distal slope of lower canine

Class II Upper canine too far forward

Class III Upper canine too far backward



## Molar occlusal relationship

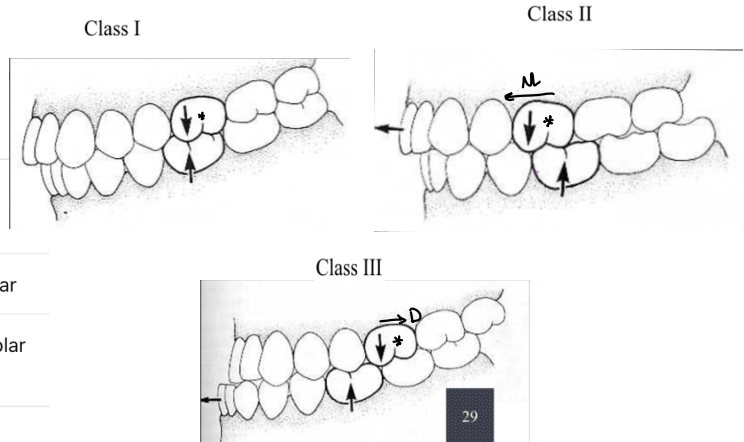
Angle's Classification of Molar Relationship

Classification Description

Class I MB cusp of maxillary 1st molar aligns with buccal groove of mandibular 1st molar

Class II Maxillary molar positioned mesially (forward) relative to mandibular molar

Class III Maxillary molar positioned distally (backward) relative to mandibular molar



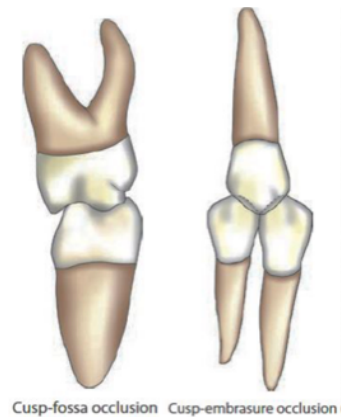
# 6. Arch Occlusal Relationship

a) Cusp-fossa relationship: supporting cusp contacts opposing fossa.

### Functional cusps

- Maxillary → Palatal cusps
- Mandibular → Buccal cusps

Example: Mandibular buccal cusp → central fossa of maxillary molar



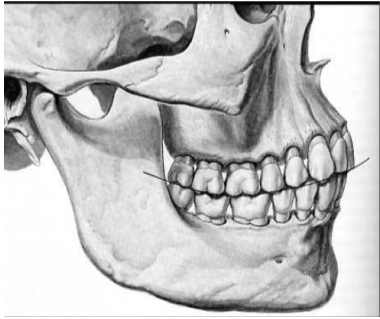
b) Cusp-embasement relationship: cusp contacts embasement between two teeth.

- Fits into the space between adjacent teeth.

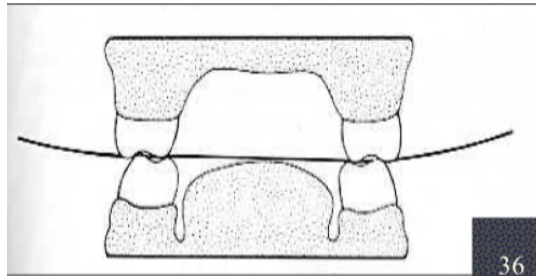
Example: Mandibular buccal cusp fits between: Maxillary first molar + second premolar

## 7. Curves of Occlusion

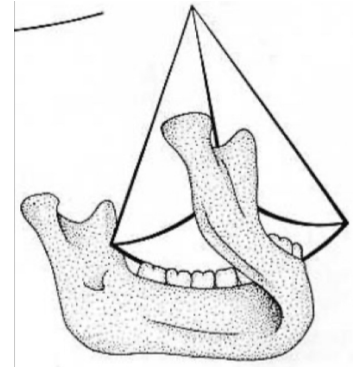
- Curve of Spee



- Curve of Wilson



- Sphere of Monson



## 8. Inclination & Angulation

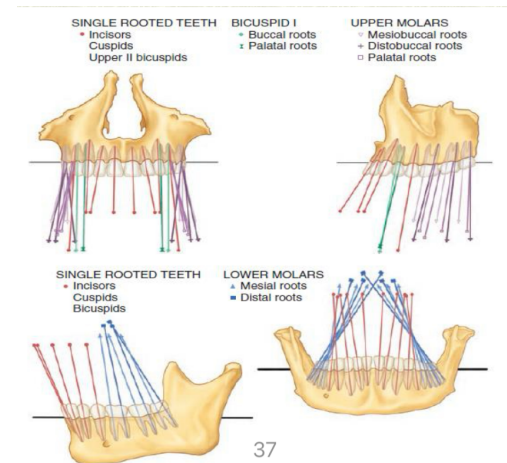
- Mandibular arch is **wider** than maxillary arch.
- Teeth must withstand functional forces.
- Wrong angulation may risk tooth longevity.

كل سن له:

\* ميلان (Inclination)

\* وزاوية بالجزر والتاج (Angulation)

حتى يتحمل القوى أثناء المضغ بطريقة مستقرة.



## 9. Antagonists

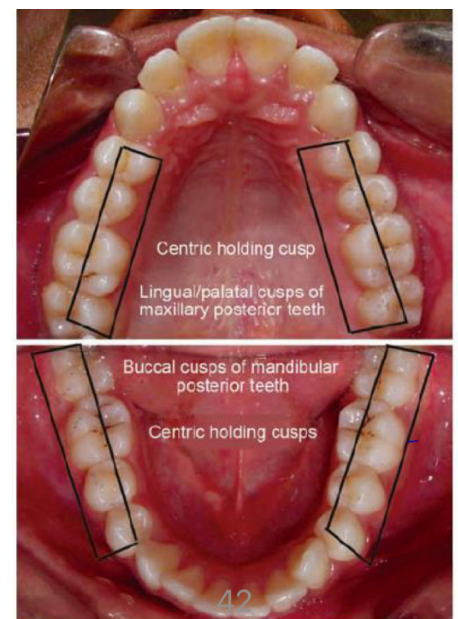
- Most teeth contact two antagonist teeth.
- **Exceptions:** mandibular incisors and maxillary third molars.
- Tooth drifting disturbs occlusion.
- Loss of one tooth keeps the adjacent tooth in contact with opposing antagonist.

## 10. Centric stops

➔ supporting/holding cusps:

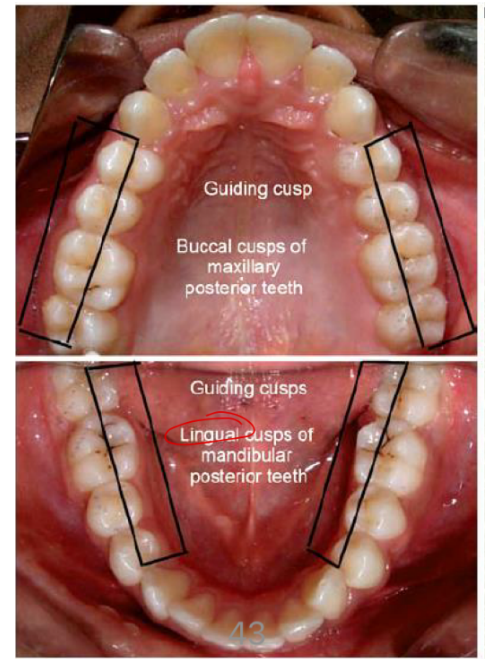
- Maxillary lingual
- Mandibular buccal

\*\*Supporting cusps create **centric stops**.



➔ Non supporting/guiding cusps:

- Maxillary buccal cusps
- Mandibular lingual cusps



## 11. Occlusal contacts

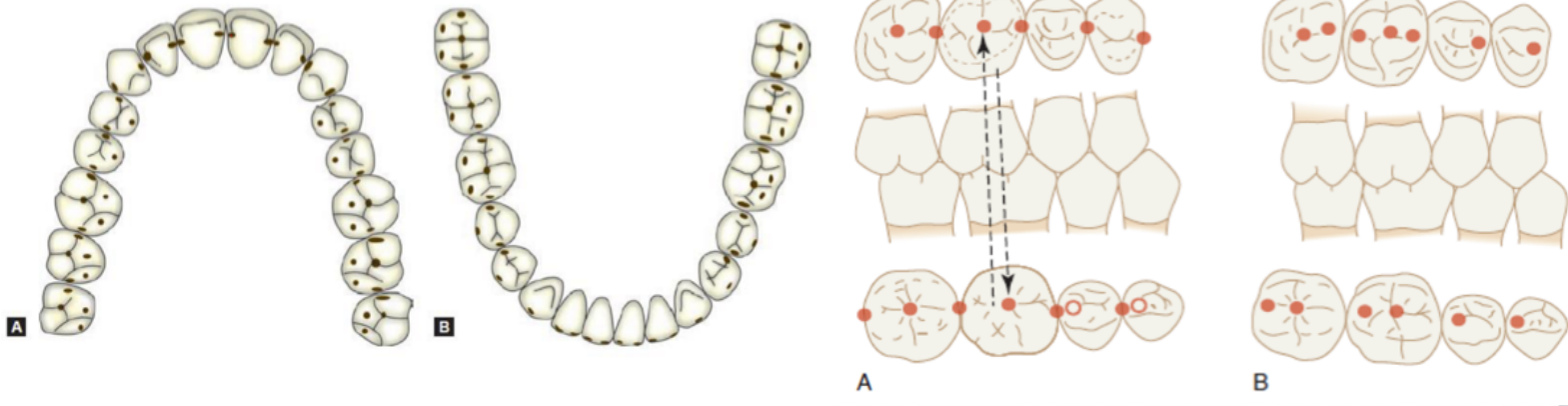
هي نقاط التلامس بين الأسنان العلوية والسفلية أثناء الإطباق.

- تحدث غالباً بين:

supporting cusps

fossae

marginal ridges



## 12. Movements Away from Centric Occlusion

### 1. Lateral movement

a) Working side and Non-working side

Side	Key Point	Definition
Working Side (Laterotrusive)	May contain guiding contacts	Side toward which mandible moves
Non-working Side (Mediotrusive)	Ideally no contact	Opposite side of movement

🔗 Example: If mandible moves RIGHT → RIGHT = working side.

🦷 Clinical Correlation: Non-working side contacts may create destructive forces.

## b) In complete dentures:

-Balancing side

-Non-balancing side

Feature	Non-balancing Side	Balancing Side
Definition	Equivalent to working side	Equivalent to non-working side
Occlusal Contact	Contacts lighter or controlled	Contacts intentionally maintained
Function	Less important for stabilization	Helps stabilize denture during movement

## c) Tooth guidance:

-Group function

-Canine guidance

Feature	(Cuspid guidance) Canine Guidance	Group Function
Contact Pattern	Only canines contact during lateral movement	Multiple posterior teeth contact during lateral movement
Effect on Posterior Teeth	Posterior teeth become discluded	Posterior teeth share occlusal load
Clinical Importance	Considered more protective	Common in worn dentition

## d) Movement in TMJ

Feature	Non-working Side Condyle	Working Side Condyle
Type of Movement	Translates forward, downward, and medially	Mainly rotates
Movement Pattern	Greater range of movement	Slight lateral shift may occur
Clinical Note	Moves across articular eminence	Associated with Bennett movement

## 2. Protrusive Movement

- It is the forward movement of mandible.

➔ Incisal Guidance

- Determined by contact of lower incisors against upper incisors
- Controls separation of posterior teeth during forward movement

## 3. Retrusive Movement

- It is the backward movement of mandible from centric occlusion
- Limited by ligaments and TMJ anatomy

## Summary

### Group Functions

Multiple contacts in lateral or eccentric mandibular movements are referred to as group functions.

### Canine Guidance

Canine guidance is also called as cuspid guidance. Only maxillary and mandibular canines are in contact during lateral/eccentric mandibular movements.

### Incisal Guidance

Incisal guidance refers to contact of the anterior teeth during protrusive movements of the mandible.

### Condylar Guidance

Condylar guidance refers to the downward movement of both the condyles along the slopes of the articular eminence during protrusive movements leading to separation of the posteriors.

# The End

