Occlusal morphology

โดย
สิทธิชัย วณัณทรภักดี
Occlusal morphology

Functional Cusp:

- working cusp, supporting cusp, centric cusp
- B cusp of the mand post teeth & Li cusps of the max post teeth
  --> occlude with the opposing central fossa
  --> board and rounded
  --> located approx 1/3 of buccolingual width of the tooth.
Occlusal morphology

Non Functional Cusp:

- non working cusp, guilding cusp, noncentric cusp
- B cusp of max post teeth & Li cusp of mand post teeth

--> Relatively sharp with definite tips

--> located approx 1/6 of buccolingual width of the tooth
Occlusal morphology

Functional outer aspect (FOA):

Small area of the noncentric cusps

--> have functional significance

--> located on the inner incline of the non centric cusps near the central fossa

--> contact with or close to a small portion of the outer aspect of the opposing centric cusp.
Factors and Forces that Determine Tooth Position

“neutral space”

The teeth are in the midst of powerful opposing muscular forces of lips, cheeks and tongue (the lip-cheek-tongue system)

lips and cheeks externally
tongue internally
Factors and Forces that Determine Tooth Position

“equilibrium of forces”

In balance, equal forces against the teeth were normally maintained in the neutral space.

Proximal surfaces of the teeth are also subjects to variety of forces.

Proximal contact between adjacent teeth helps maintain the teeth in normal alignment.
Factors and Forces that Determine Tooth Position

A functional response of alveolar bone and gingival fibers surrounding teeth appears to result in a mesial drifting of the teeth toward the midline.

Occlusal contact is another important factor that helps to stabilize tooth alignment, which prevents extrusion or supraeruption.
Intraarch Tooth Arrangement

The relationship of the teeth to each other within the dental arch.

Plane of occlusion

A plane drawn through all the B cusp tips and incisal edges of the mand teeth to Li cusp tips and continued across arch to include the opposite side.
Intraarch Tooth Arrangement

Axial Positioning of Teeth or Angulation of the teeth:

All teeth are aligned in their arches with varying degrees of inclination in both mesiodistal and faciolingual direction.
Inclination of Maxillary Teeth
Inclination of Mandibular Teeth
Intraarch Tooth Arrangement

Curve of Spee:

From lateral view, an imaginary line is drawn through the B cusp tips of the posterior teeth (molars and premolar) conformed to a fairly even curve in an anterior to posterior direction.

- convex in maxillary
- concave in mandibular
Intraarch Tooth Arrangement

Curve of Wilson:

From frontal view, buccolingual axial relationship

A line is drawn through the buccal and lingual cusp tips of both the right and left posterior teeth, a curve plane of occlusion
Intraarch Tooth Arrangement

Curve of Wilson:
convex in maxillary arch & concave in mandibular arch
change from first molar to third molar and with wear of
the dentition.
Intraarch Tooth Arrangement

Sphere of Monson:

Two curves of Spee and Wilson are studies in 3D the cusps tips of posterior teeth resting on a sphere.

Bonwill:

describe the dental arches, note that an equilateral triangle existed between the centers of the condyles and the mesial contact of mandibular central incisors. This triangle is 4 inch sides
Intraarch Tooth Arrangement

Sphere of Monson:

Monson:

sphere existed with a radius of 4 inches whose center was an equal distance from the occlusal surfaces of the posterior teeth and from the centers of the condyles.
Interarch Tooth Arrangement

Arch length:

The distance of a line that begins at the distal surface of the third molar, extends mesially through all the proximal contact areas around the entire arch, and ends at the distal surface of the opposite third molar.

Both arches have approximately the same length, mandibular arch slightly smaller 128:126
Interarch Tooth Arrangement

Arch width:

The distance across the arch. The width of the mandibular arch is slightly smaller than that of the maxillary arch.

Maxillary tooth is more facially positioned than mandibular tooth --> for protecting surrounding tissue falling between the occlusal surface of teeth during function.
Interarch Tooth Arrangement

Cross bite:

maxillary buccal cusps contact in the central fossa area of the mandibular teeth

because of discrepancies in skeletal arch size or eruption patterns.
Buccolingual Occlusal Contact Relationship

Buccoocclusal (B-O) line:

Line extend through all the buccal cusp tips of the mandibular posterior teeth
Buccolinguual Occlusal Contact Relationship

Linguoocclusal (L-O) line:

A line extended through the lingual cusps tips of the maxillary posterior teeth.
Buccolingual Occlusal Contact Relationship

Central fossa (C-F) line:

An imaginary line extended through the central developmental grooves of maxillary and mandibular posterior teeth.
Buccolingual Occlusal Contact Relationship

Central fossa (C-F) line:

Proximal contact points are located slightly buccal to C-F line which allow for a greater lingual embrassure area and a small buccal area.
Centric occlusion

Maximum intercuspation:

Determined by the way the teeth fit together

It is the jaw position that affords the greatest interdigtation of the teeth
Centric relation

Position of mandible which condylar against the disc in their upper most position

Determined by the ligament and structure of the TMJ

Be referred as position for analysis and reconstruction of masticatory system
Centric relation

Locate dentist guiding both the patients condyle and disc against the posterior slope of the articular tubercle from \( \frac{1}{2} \) to 1 inch of terminal closer, until the condyle are seat in an acceptable position as allowed by the disk

Position is determined by the disk not by patient’s ligament or muscle

\(< 10 \% \text{ CO} = \text{CR or point centric}\)
Significant of CR

It never been prove that optimal occlusal function will be perform in CR

From Telemetry, Electromyographic and Clinical measure have concluded that Patient naturally function, be able to exert the heaviest force about 0.5 mm anterior to CR
Freedom in centric or Long centric

Patient is given the opportunity to move on a horizontal plane from CR to CO without any restriction or change in VD

Lateral component of a slide should be eliminated in the restoration
Other Centric

Centric position “muscle memory”

Light initial contact of teeth from rest position this position is closed to CO

Power centric

When patient closed against force and the mandible position is determined when the patient bite hardest
Occlusal Relationship of Posterior Teeth

Class I:

- MB cusp of max $1^{st}$ molar --> B gr of mand $1^{st}$ molar
- MB cusp of mand $1^{st}$ molar --> embrasure of max $2^{nd}$ premolar and max $1^{st}$ molar
- MLi cusp of max $1^{st}$ molar --> CF of mand $1^{st}$ molar
Occlusal Relationship of Posterior Teeth

Class II:

- MB cusp of max 1\textsuperscript{st} molar $\rightarrow$ embasser of mand 2\textsuperscript{nd} premolar and mand 1\textsuperscript{st} molar
- MB cusp of mand 1\textsuperscript{st} molar $\rightarrow$ CF of max 1\textsuperscript{st} molar
- DLi cusp of max 1\textsuperscript{st} molar $\rightarrow$ CF of mand 1\textsuperscript{st} molar
Occlusal Relationship of Posterior Teeth

Class II subdivision:

Cl II div 1

maxillary incisors are labial inclination

Cl II div 2

Maxillary incisors are lingual inclination
Occlusal Relationship of Posterior Teeth

Class III:

- MB cusp of max 1\textsuperscript{st} molar --> embrasure of mand 1\textsuperscript{st} molar and mand 2\textsuperscript{nd} molar

- DB cusp of mand 1\textsuperscript{st} molar --> embrasure of max 2\textsuperscript{nd} premolar and max 1\textsuperscript{st} molar
Occlusal Relationship of Posterior Teeth

Class III:

- MLi cusp of max 1\textsuperscript{st} molar --> M pit of mand 2\textsuperscript{nd} molar
Occlusal Relationship of Anterior Teeth

3-5 mm overlap in anterior teeth

Anterior guidance:

Anterior tooth contacts that provide guidance of the mandible

Horizontal is overjet
Vertical is overbite
Masticatory System is Extremely Dynamic

Eccentric – movement of mandibular from the intercuspal position

- Protrusive
- Laterotrusive
- Retrusive
Occlusal Contact
During Mandibular Movement

Protrusive mandibular movement:

Anterior -> mandibular incisors more against lingual fossa of maxillary incisor and incisor edge
Occlusal Contact
During Mandibular Movement

Protrusive mandibular movement:

  Posterior  -> Distal inclination of maxillary lingual
cusp to mesial inclination of
opposing fossa and marginal ridge

  -> Mesial inclination of mandibular
buccal cusp against distal
inclination of opposing fossa and
marginal ridge
Occlusal Contact
During Mandibular Movement

Laterotrusive mandibular movement:

Move left: Left molar -> laterotrusive

- inner inclination of maxillary buccal cusp and anterior inclination of mandibular buccal cusp
- outer inclination of maxillary lingual cusp and inner inclination of mandibular lingual cusp

“Working contact”
Occlusal Contact
During Mandibular Movement

Laterotrusive mandibular movement:

Move left: Right molar -> mesiotrusive

- inner inclination of maxillary lingual cusp and
inner inclination of mandibular buccal cusp

“balancing contact or non working contact”
Canine and Lateral Movement

Labial surface and incisor edge of mandibular canine and lingual fossa and incisal edge of maxillary canine “guiding plane”
Retrusive Mandibular Movement

Mandibular can move posterior from CO approximately 1-2 mm

Mandibular buccal cusp moves distal along occlusal surface of opposing max teeth