Concepts of Occlusion

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“People seldom improve when they have no other model but themselves to copy after.”
Goldsmith

Weepy Wilma
Definitions

- Occlusion
  - Is the act or process of closure or of being closed or shut off

Glossary of Prosthodontic Terms - GPT-7
Definitions

- **Gnathology**
  - the science that treats the biology of the masticatory mechanism as a whole: that is, the morphology, anatomy, histology, physiology, pathology, and the therapeutics of the jaws or masticatory system and the teeth as they relate to the health of the whole body, including applicable diagnostic, therapeutic, and rehabilitation procedures.

Definitions

- **Centric Relation (Earlier)**
  - C.R. is a maxilla to mandible relation in which the heads of the condyles are in the rear-most, upper-most, and mid-most positions in the glenoid fossa with no regard to tooth contact
  - R.U.M.

Definitions

- **Centric Relation (Latest)**
  - The maxillomandibular relationship in which the condyles articulate with the thinnest avascular portion of their respective disks with the complex in the anterior-superior position against the slopes of the articular eminences.
Definitions

Centric Relation (Latest)
- This occurs with a purely rotary movement about a transverse (terminal hinge) horizontal axis, independent of tooth contact.

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Definitions

Maximum intercuspation (MI)
- Is the complete intercuspation of the opposing teeth independent of condylar position.
- Aka – Intercuspal Position (ICP)

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Definitions

Centric Occlusion (CO)
- Old – C.O. is the maximum intercuspation of the teeth at the most closed position.

Glossary of Prosthodontic Terms - GPT-7
Definitions

Centric Occlusion
• New – C.O. is the occlusion of opposing teeth when the mandible is in centric relation. This may or may not coincide with the maximum intercuspation position.

CR to MI Slide
One or both condyles move either anteriorly, inferiorly, or both.

Centric Relation Occlusion
• Obsolete term
• (No replacement term)
• Is maximum intercuspation of the teeth, in their most closed position, with the condyle in the Centric Relation position
Definitions

Centric Relation Occlusion
- If CRO exists, then CO (new) exists.
- If CO (new) exists, then CRO may or may not exist.
- Why?

Optimum Functional Joint Position

Variation in the definition of C.R.
- Early – R.U.M.
- Latest – Superior/anterior
- Challengers – downward and forward

Optimum Functional Joint Position

- Variation in the definition of C.R.
- Evolution of the definition of C.R.
  - RUM
    - Reproducibility-ligamentous position
  - Superior Anterior
    - Muscle function
    - Skeletal anatomy
Optimum Functional Joint Position

Muscle force direction
- Superoanterior
  - Temporalis in contraction
  - Masseter in contraction
  - Medial Pterygoid in contraction
  - Infer. Lateral Pterygoid in tonus

Optimum Functional Joint Position

Muscle force direction
- Superoanterior
- Downward and Forward
  - Temporalis in contraction
  - Masseter in contraction
  - Medial Pterygoid in contraction
  - Infer. Lateral Pterygoid in contraction

Optimum Functional Joint Position

Optimum disc position
- Properly interposed with the thin middle zone between the condyle and the eminence
Optimum Functional Joint Position

Optimum joint position
- Condyles are in their most superoanterior position in the articular fossa, resting against the posterior slopes of the articular eminences, with the articular discs properly interposed.
- A musculoskeletally stable position
- C.R. defined by Dawson

Optimum Functional Tooth Contacts

Musculoskeletally stable position:
- Is achieved only when muscles are in harmony with a stable occlusion
- Even contact on teeth in closure in CR

Optimum Functional Tooth Contacts

Direction of force on teeth
- PDL response
  - Vertical force – tension
  - Horizontal force - tension & pressure
Optimum Functional Tooth Contacts

Direction of force on teeth
- PDL response
- Osseous response
  - Pressure - destructive
  - Tension - acceptable

- Vertical forces achieved by:
  - Tripodized contacts
    - Cusp tip-to-flat surface
    - Force is applied to a surface which is perpendicular to the long axis of tooth
    - More easily achieved than tripodization
Lever Systems

- Amount of force on teeth
- Lever Systems

Which Lever System is the Mandible?

To which tooth can the most force be applied due to the lever?
Optimum Functional Tooth Contacts

- Control Occlusal Force
- Centric Force
  - Best - Posterior Teeth
    - due to force being applied along long axes.
  - Worst - Anterior Teeth
    - due to loads being applied oblique to the long axes.

Optimum Functional Tooth Contacts

- Control Occlusal Force
- Eccentric (Excursive) Force
  - Best - Canines
    - Crown/root ratio
    - Greater sensory input
    - Weaker forces due to lever
    - Reflex reduction in muscle force
  - Worst - Posterior Teeth
    - Forces oblique to long axes
    - Less sensory input
    - Stronger forces due to lever
    - Reflex increase in muscle force

Occlusal Scheme Goals for Natural Dentitions

- Avoid mediotorusive contacts
- Avoid protrusive contacts on posterior teeth
- Centric contacts even or slightly heavier on posterior teeth
Occlusal Schemes

- Balanced Occlusion
- Cuspid Protected Occlusion
- Anterior Group Function Occlusion
- Unilateral Balanced Occlusion
- Mutually Protected Occlusion
- Dynamic Individual Occlusion

Balanced Occlusion
- All teeth touch bilaterally
  - In Centric
  - And in Excursive
- For complete dentures
- No longer used in fixed prosthodontics

Cuspid Protected Occlusion
- Aka “canine rise,” “cuspid disclusion”
- Only working side canines touch in lateral excursive
- Often found in natural dentitions
- This is a preferred occlusal scheme for natural dentitions.
Occlusal Schemes

- Anterior Group Function Occlusion
  - Aka “Anterior Guidance”
  - Working side anterior teeth touch in lateral
  - Used when cuspid is weak or missing

- Unilateral Balanced Occlusion
  - Aka “Group function”
  - Working side posterior teeth touch in lateral excursive movement
  - Most desirable group function consists of the canine, premolars and MB cusp of the first molar
  - Contact posterior to MB cusp of first molar is detrimental - Why?
  - Typically used when patient has:
    - Class II Div I
    - Anterior Open Bite

- Mutually Protected Occlusion
  - In centric relation occlusion the posterior teeth protect the anterior teeth by carrying the brunt of the vertical forces
  - In excursive movements, the anterior teeth protect the posterior teeth by carrying the excursive (oblique) forces
  - Used for reconstruction
  - This is a preferred occlusal scheme for natural dentitions.
Occlusal Schemes

- Dynamic Individual Occlusion
  - The occlusion is considered acceptable if the patient is functioning efficiently and without pathosis - Okeson

Occlusal Schemes

- Dynamic Individual Occlusion
  - The occlusion is considered acceptable if the patient is functioning efficiently and without pathosis - Okeson
  - As a clinician, you must know what pathosis looks like in order to use this approach effectively.

Postural Influence on Tooth Contact

- Mandibular postural position
- Normal upright position
- Head extended position
- Alert feeding position
Postural Influence on Tooth Contact

- Mandibular postural position
  - Also known as “physiologic rest position”
  - Usually 2 – 4 mm below intercuspal position

Postural Influence on Tooth Contact

- Normal upright position

Postural Influence on Tooth Contact

- Head extended position
  - Face upward 45 degrees
  - Swallowing
    - Go into CR when swallowing – even if CR ≠ MI
  - All teeth should contact evenly
Postural Influence on Tooth Contact

- Alert feeding position
  - Head forward approx. 30 degrees
  - Eating Position
  - Long centric (Dawson)

Postural Influence on Tooth Contact

- Alert feeding position
  - Head forward approx. 30 degrees
  - Eating Position
  - Long centric (Dawson)
  - Misinterpretation: That CR is an area or a range
  - CR is always a single position defined by the joint
  - Long Centric influences Mx anterior lingual fossae
  - Patients with Long Centric require greater concavity of the lingual fossae
  - All teeth should contact evenly

Summary of Optimum Functional Occlusion

- Centric Closure Position
  - No deflective contacts in CR
  - CR = MI = CRO
  - Bilateral even contact of posterior teeth
  - Vertical forces carried by the long axis of posterior teeth
  - Point – Flat Surface
  - Tripodization
  - Freedom in the alert feeding position
  - Neuromuscular release
Summary of Optimum Occlusion

- Centric closure position
- Eccentric positions
  - Best teeth guide lateral movements
  - Canine rise
  - Anterior guidance
  - Group function
  - No medioinvasive (non-working) contacts
  - No posterior contacts in protrusive

Summary of Mutually Protected Occlusion

- CR = MI = CRO
  - Posterior teeth bear the vertical forces
  - Anterior teeth have even or slightly light occlusal contact
  - Anterior teeth bear the horizontal forces
    - Anterior teeth disclude all posterior teeth in lateral movement
    - Anterior teeth disclude all posterior teeth in protrusive movement

Weepy Wilma