Fundamental Occlusal Principles

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3 ways to build an occlusion

- Teeth
- Muscles
- Joints

1. Teeth

Advantages
- Easy
- Requires no extra education or tools
- Works

Disadvantages
- It doesn't always work
- Leaves occlusal disharmony
- Danger - if you do the wrong tooth
- Leaves posterior interference

2. Muscles

Advantages
- More comfortable position
- Multiple teeth can be restored at one time

Disadvantages
- Can requires you to prep a lot of teeth
- Leaves posterior interference

3. Joints

Advantages
- Same place every time
- Restore one or all teeth
- Can be used at any vertical dimension
- Only way to have an interferences free occlusion

Disadvantages
Where is it?
Not sure how to find it?

Factor!
*FULLY SEATED JOINT
Perfect stability between
• Joints
• Muscle
• Teeth

**Centric Relation**
Using the joint to guide the path of closure.

**Inverted Tripod Concept**
Centric relation is the relationship of the mandible to the maxilla when the properly aligned condyle disk assemblies are in the most superior position against the eminentiae... irrespective of tooth position or vertical dimension.

At the most superior position the condyle assemblies are also **braced medially**... thus centric relation is also the midmost position

Factor 2
*No posterior interferences*
Elements of Condyle

Muscles of Mastication

- Superficial masseter
- Medial pterygoid
- Deep masseter
- Temporalis

**Self Centering** - condyle will seat in its most superior position when masticatory muscles contract.

**Key point**…
Condyles can not move forward, backward, or medially from CR without moving downwardly

Disk Positioning

Factor 3
*Lateral pterygoid muscles relaxed*
Disk Movement

<table>
<thead>
<tr>
<th>Lateral Pole</th>
<th>Medial Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Translation</td>
<td>Rotation</td>
</tr>
<tr>
<td>Balancing</td>
<td>Working</td>
</tr>
</tbody>
</table>

Joint Diagnosis

<table>
<thead>
<tr>
<th>Pole</th>
<th>Piper Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateral Pole</td>
<td>I</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>Sometimes Clicks</td>
</tr>
<tr>
<td></td>
<td>III A</td>
<td>Lateral Pole Click (reducing joint)</td>
</tr>
<tr>
<td></td>
<td>III B</td>
<td>Lateral Pole Lock (non reducing joint)</td>
</tr>
<tr>
<td>Medial Pole</td>
<td>IV A</td>
<td>Medial Pole Click (reducing joint)</td>
</tr>
<tr>
<td></td>
<td>IV B</td>
<td>Medial Pole Lock (non reducing joint)</td>
</tr>
<tr>
<td></td>
<td>V A</td>
<td>Perforation Acute (disk perforation)</td>
</tr>
<tr>
<td></td>
<td>V B</td>
<td>Perforation Chronic</td>
</tr>
</tbody>
</table>

Red Flags for Dangerous joints

- If you put in an anterior deprogrammer and the patient gets worse
- When the patient opens wide they deviate significantly to one side
- Facial asymmetry
- The patient has very limited opening
- Most posterior molars are very flat from wear
- Wear on anterior teeth that do not touch

Requirements for A Balanced Occlusion

- TMJ at treatable position
- Stable contacts (or substitutes) on all teeth in CR
- Separation of all posterior from CR or ACP
- Anterior guidance in harmony w/ Envelope of Function
Clinical Exam

Joint & Muscle Questions:
- Do you have a history of injury to your face?
- Are you aware of any joint problems?
- Does or has your jaw ever clicked or popped?
- Has your jaw ever locked open or closed?
- Does your face get tired or sore when eating or chewing gum?
- Do you get headaches? How often, when, and where?

Tests:
- Load test (deprogrammer)
  - Load test
  - Diagnostics
  - Educational

<table>
<thead>
<tr>
<th>Load Testing</th>
<th>Tension/pulling</th>
<th>Tender/pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light</td>
<td>Lateral pterygoi</td>
<td>Retrodiscal tissue</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm</td>
<td></td>
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</tbody>
</table>

- Range/path of movement
- Clicks and/or crepitus
- Muscle palpation
- Doppler auscultation
- Clench test

Materials for CR Record
Lucia Jig (greatlakesortho.com)
Whale Tails (greatlakesortho.com)
Quick Bite (www.clinicianschoice.com)
Red & Blue articulating paper
Triad
Definitions

Patho-function
It does not provide a normal function or add towards the quality of life for our patients.
i.e. Bruxing or Clenching

Function
It provides for a quality of life for our patients.
i.e. Chewing, Speech, Teeth touching during swallowing

Width to Length Ratio

Showed a 78% Width to Length Ratio with a standard deviation of 0.03. It did not provide for the gingival sulcus.

82% = width x 1.22 = length
or
80% = width x 1.25 = length

Key point: It does not tell us the position of the incisal edge!

Form = Function
Developing the contours and position of the maxillary central incisors.

The Facial Gingival 1/3
The Facial Incisal 1/3
The Incisal Edge
How do you get the room in the anterior when you don’t have it?

Two ways to accomplish this.

1) Decrease the overbite
2) Increase the overjet

Orthodontics

1) Intrusion of upper
2) Intrusion of lower
3) Intrusion of both
4) Buccal movement of upper
5) Lingual movement of lower
6) Movement of both

Raise the VDO
Limited by the need of full coverage.

Centric Relation
If the patient has a protrusive slide.

Anterior Guidance

E.H. Williamson (1983)
Understanding the chewing stroke

The chewing stroke is lateral. It is guided by the steepest lateral tooth.

i.e: A balancing or work interference will be the guiding stroke. If you have proper canine guidance it will be on the canine.

Research:

Faulkner, KDB, J. of Oral Rehab., 1989
Mongini, F., Cranio; 1984
To purchase go to www.thefunctionofteeth.com

A very good source for how the teeth function during chewing
Esthetic Treatment Planning

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Facial Analysis

Treatment Alternatives
Orthognathic surgery

Diagnosis
Retrognathic
Prognathic
Mid-face deficient
Long lower 1/3 face

Start Outside
What’s the skeletal profile?
What is the lip dynamic?
Analysis of the Gummy Smile

5 basic reasons for the gummy smile:
Anterior over eruption
Wear with compensatory eruption
Short upper lip
Vertical maxillary excess
Hyper-mobile lip

Required photos:
Full face lips at rest
Full face profile lips at rest
Exaggerated “E” position

These reasons can be better organized in two categories:
Facial/lip related
Short upper lip
Vertical maxillary excess
Hyper-mobile lip
Dental related
Anterior over eruption
Wear with compensatory eruption
Altered passive eruption

Rule out dentally related reasons first. Ask three questions:
Is there excess wear?
Does the anterior gingival plane consistent with the posterior gingival plane?
Is the width to length ratio of anterior teeth normal?
Short upper lip
Commissure and philtrum heights will differ 3 mm or greater
Interlabial space greater than 5 mm

Vertical maxillary excess
Interlabial space greater than 5 mm
Long lower 1/3 of face in comparison to middle and upper independently

Hyper-mobile lip
Commissure and philtrum heights will have less than 3 mm difference
Interlabial space less than 5 mm

Anterior Smile:
Are the upper incisors edges in the right position?
Are the upper incisors the correct proportion?

Treatment Alternatives:
Restore
Reposition (ortho)
Reshape
Surgery

Diagnosis:
Upper incisor inclination
Upper incisor edge position
Width to Length ratio/Gingival levels

Are the incisor edges in the right position?
Check Horizontally
Check Vertically
Neutral zone determines tooth position
Supported by upper lip
Determined by lower lip
Too far forward
Too far back
Too long
Too short
Vertical Position (see image below)

Right proportions:
• Check width to length ratio

Width / Length = 82%
100 / 82 x width = The length of the tooth
1.22 x width = The length of the tooth
1 ½ Mandibular central incisor = Maxillary central incisor

Posterior Smile
Is the buccal corridor deficient?
Is there a gingival step?