

Fundamental Occlusal Principles

William "Bo" Bruce, DMD



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attending this lecture.**

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3 ways to build an occlusion

- Teeth
- Muscles
- Joints

1. Teeth

Advantages

- Safe
- Easy
- Predictable (adaptable)

Disadvantages

Limited number of teeth
Replicates current symptoms
Danger - if you do the wrong tooth
Leaves posterior interference

2. Muscles

Advantages

Reproducible
Multiple teeth can be restored at one time

Disadvantages

Leaves posterior interference
Often requires large quantity of dentistry

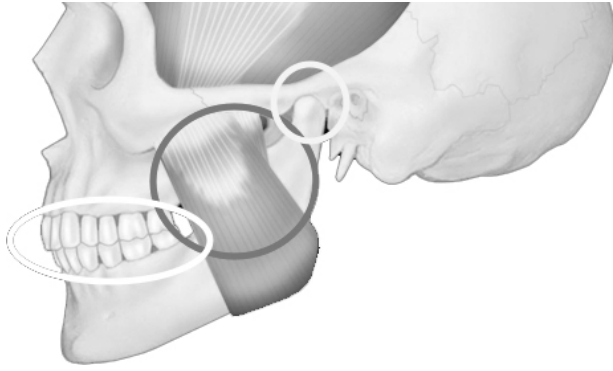
3. Joints

Advantages

Reproducible
No interferences
Convenient
Multiple teeth can be restored at one time
Can be used at any vertical dimension

Disadvantages

Requires a knowledge of the TMJ
Confidence



Perfect stability between

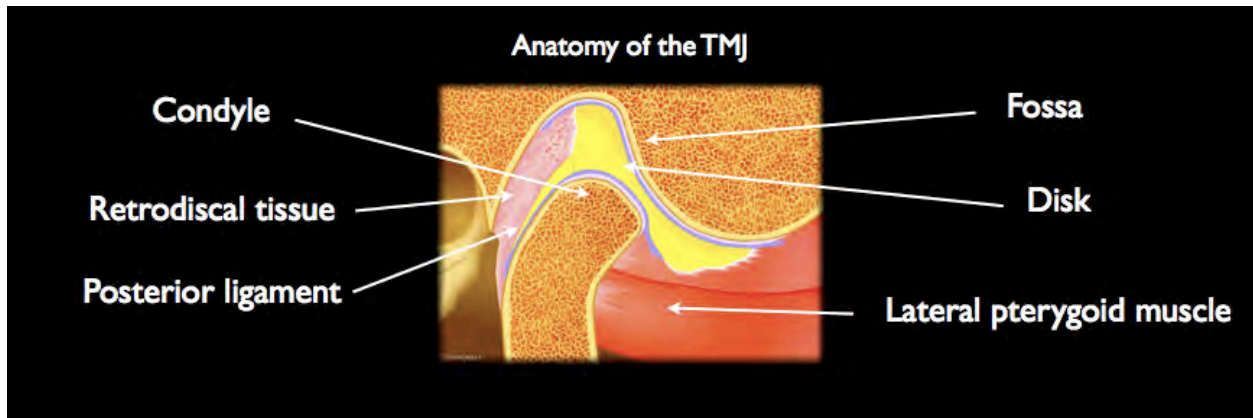
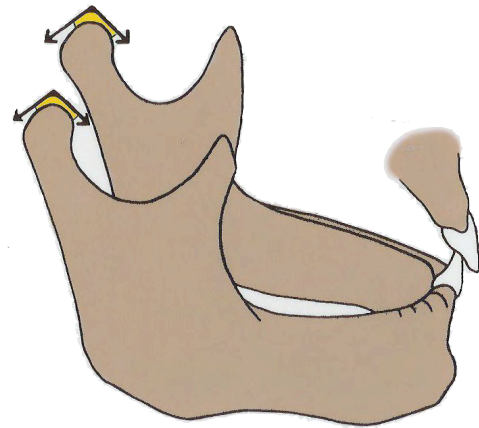
- Joints
- Muscle
- Teeth

Centric Relation

Using the joint to guide the path of closure.

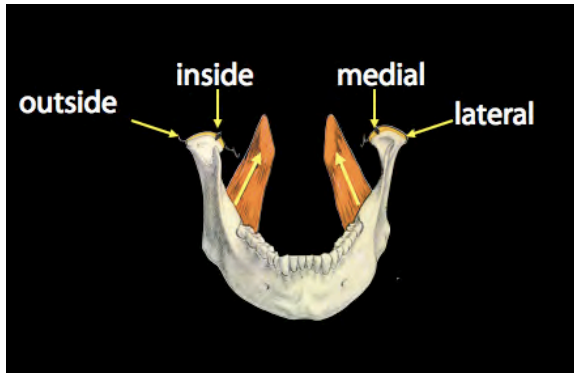
Inverted Tripod Concept

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 disk assemblies are also **braced medially**...thus centric relation is also the midmost position

Elements of Condyle



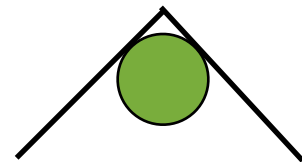
Muscles of Mastication

- Superficial masseter
- Medial pterygoid
- Deep masseter
- Temporalis

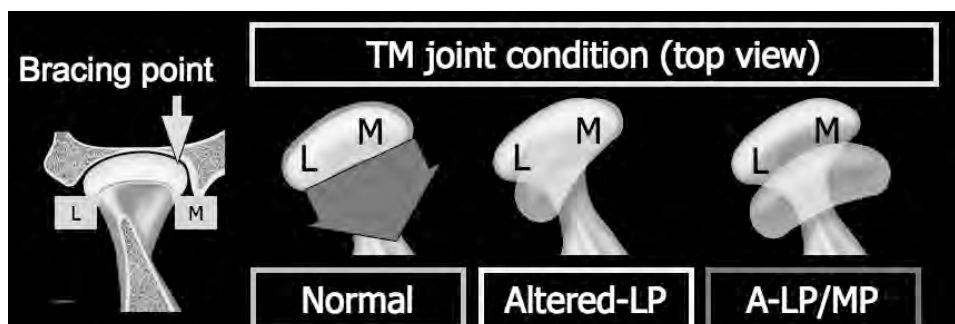
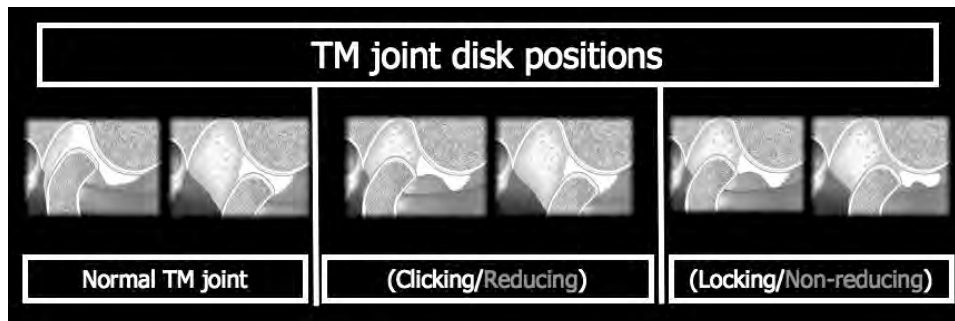
Self Centering - condyle will seat in its most superior position when masticatory muscles contract.

Key point...

Condyles can not move forward, backward, or medially from CR without moving downwardly



Disk Positioning



Disk Movement

Lateral Pole

Translation
Balancing
Protrusive

Medial Pole

Rotation
Working

Joint Diagnosis

Pole	Piper Stage	Description
Lateral Pole	I	Normal
	II	Sometimes Clicks
	III A	Lateral Pole Click (reducing joint)
	III B	Lateral Pole Lock (non reducing joint)
Medial Pole	IV A	Medial Pole Click (reducing joint)
	IV B	Medial Pole Lock (non reducing joint)
	V A	Perforation Acute (disk perforation)
	V B	Perforation Chronic

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
- 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

Load Testing

Light

Tension/pulling

Lateral pterygoi

Medium

Tender/pain

- Retrodiscal tissue

Firm

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

Materials for CR Record

Lucia Jig (greatlakesortho.com) 255-023

Whale Tails (greatlakesortho.com) 255-027

Quick Bite (Clinicians Choice)

Red & Blue articulating paper

Triad (Dentspy) 89304

Esthetic Treatment Planning

William "Bo" Bruce, DMD



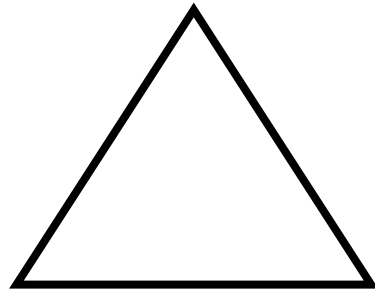
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Facial Analysis



Anterior Smile

Posterior Smile

Facial Analysis

Treatment Alternatives

Orthognathic surgery

Diagnosis

Retrognathic

Prognathic

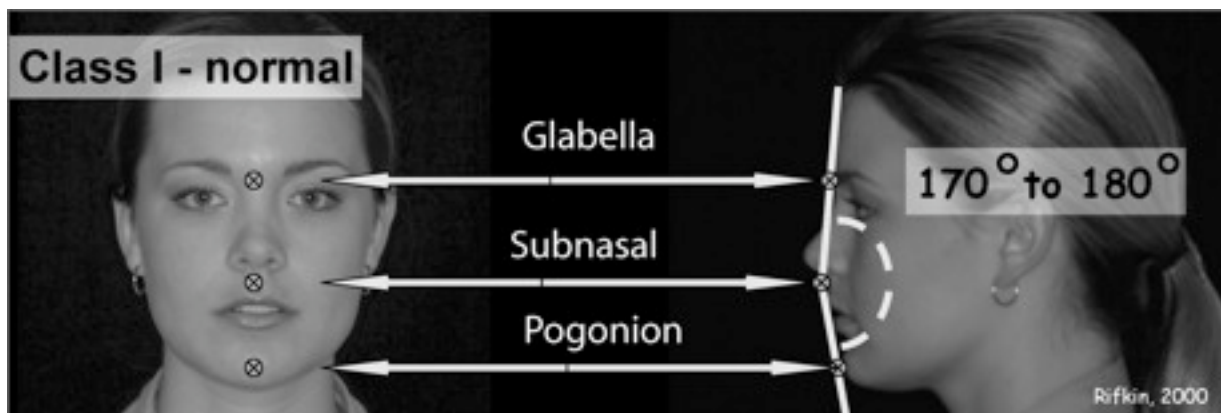
Mid-face deficient

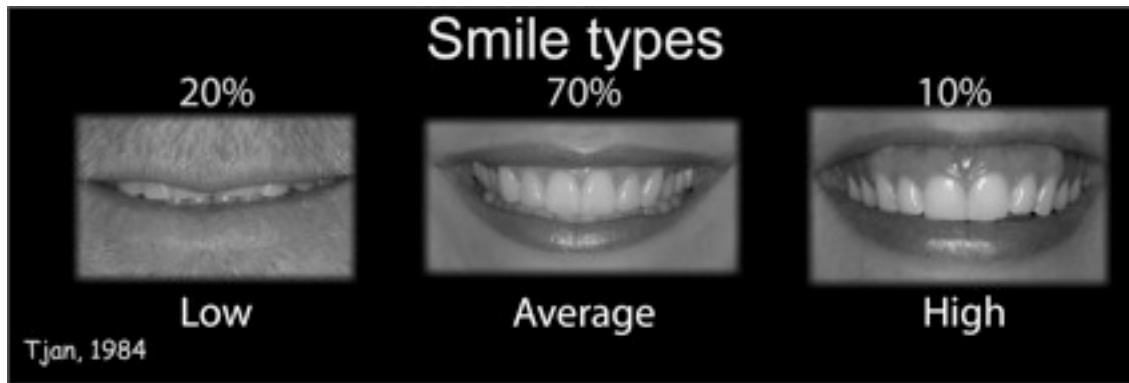
Long lower 1/3 face

Start Outside

What's the skeletal profile?

What is the lip dynamic?





Analysis of the Gummy Smile

Six basic reasons for the gummy smile:

- Anterior over eruption
- Wear with compensatory eruption
- Altered passive 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:

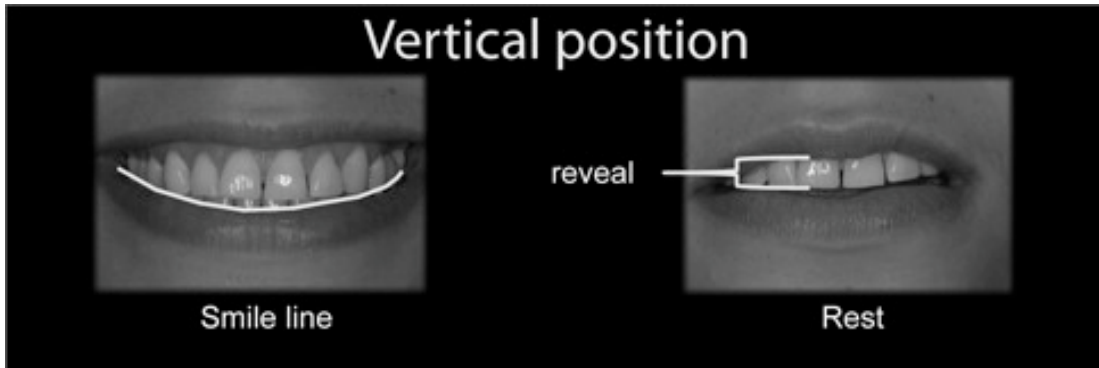
Upper incisor inclination
Upper incisor edge position
Width to Length ratio/Gingival levels

Are the incisor edges in the right position?

Check Horizontally
Check Vertically

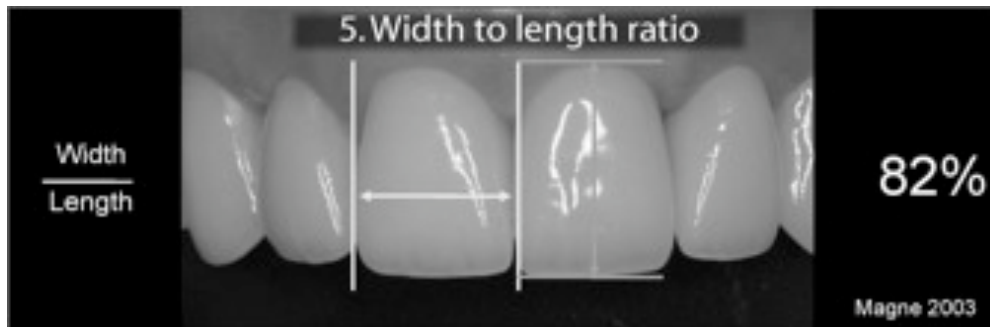
Neutral zone determines tooth position

- 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%
- $100 / 82 \times \text{width} = \text{The length of the tooth}$
- $1.22 \times \text{width} = \text{The length of the tooth}$
- $1 \frac{1}{2} \text{ Mandibular central incisor} = \text{Maxillary central incisor}$

Posterior Smile

- Is the buccal corridor deficient?
- Is there a gingival step?