

Fundamental Occlusal Principles

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**Education
Simple
&
Relevant**

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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

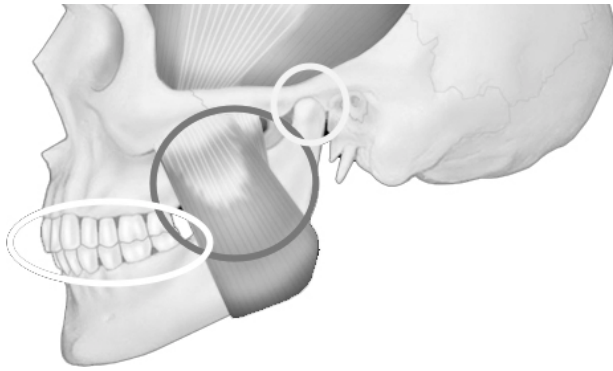
Disadvantages

Where is it?

Not sure how to find it?

Factor !

*FULLY SEATED JOINT



Perfect stability between

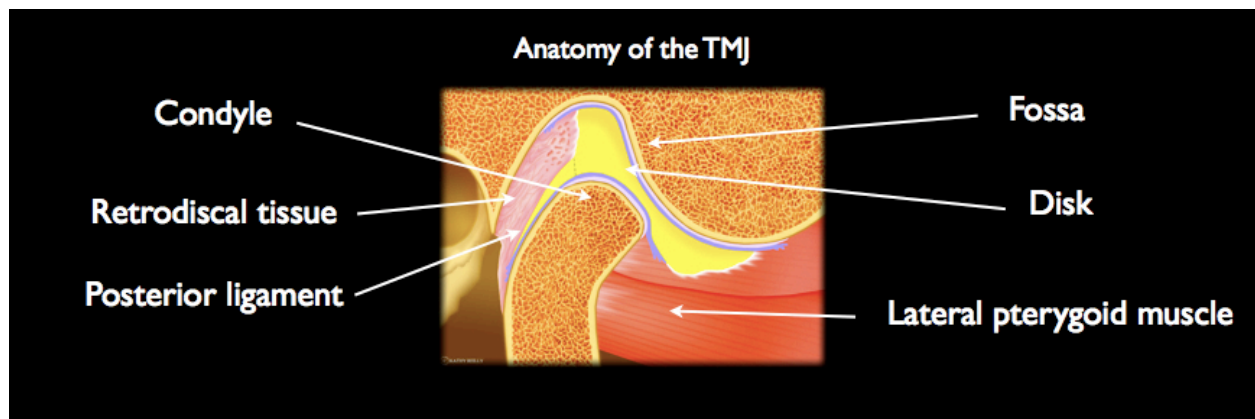
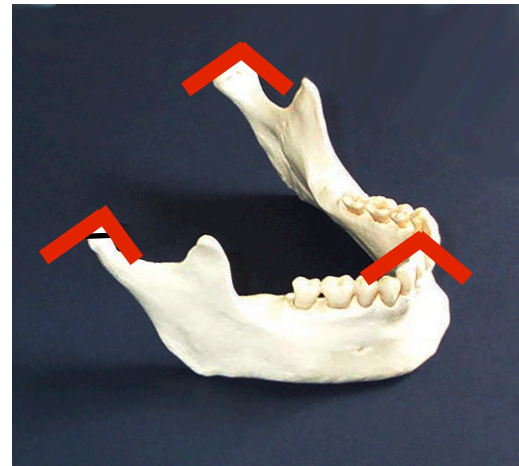
- Joints
- Muscle
- Teeth

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

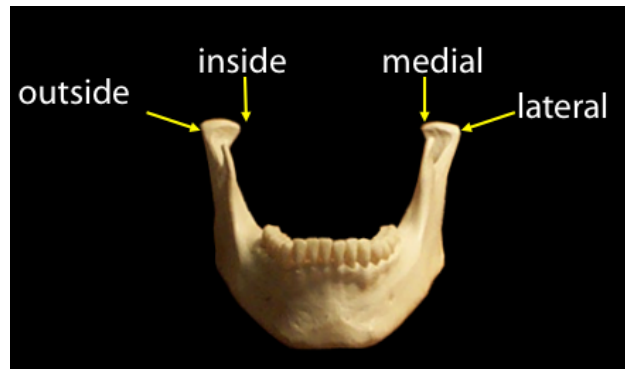
Muscles of Mastication

- Superficial masseter
- Medial pterygoid
- Deep masseter
- Temporalis

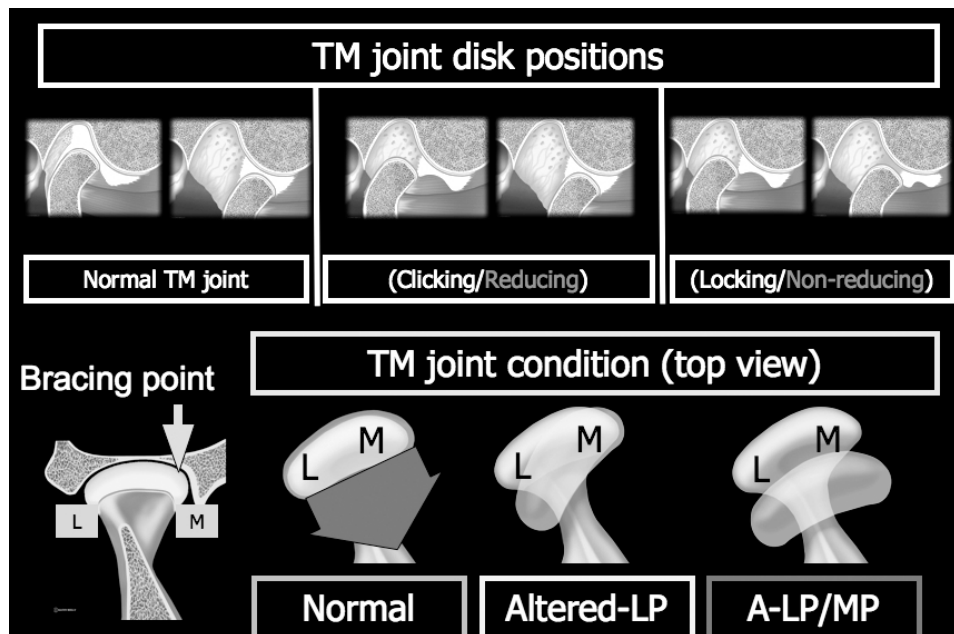
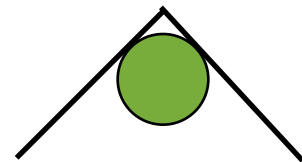
Self Centering - condyle will seat in its most superior position when masticatory muscles contract.

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

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
- 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

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)

Whale Tails (greatlakesortho.com)

Quick Bite (www.clinicianschoice.com)

Red & Blue articulating paper

Triad

Definitions

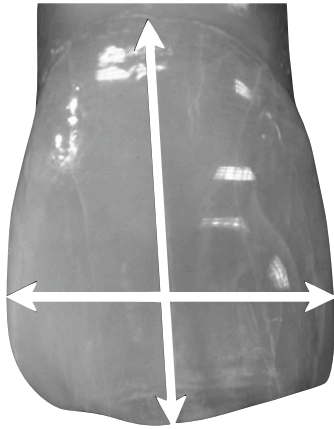
Patho-function

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



Mange P. (2003)

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

$82\% = \text{width} \times 1.22 = \text{length}$

or

$80\% = \text{width} \times 1.25 = \text{length}$

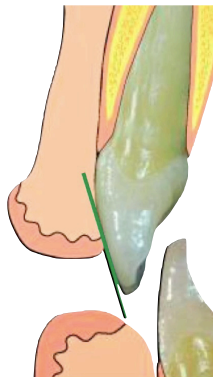
Key point: It does not tell us the position of the incisal edge!

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

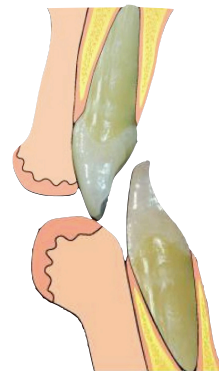
The Facial Gingival 1/3



The Facial Incisal 1/3



The Incisal Edge

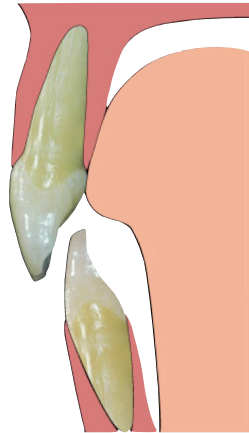
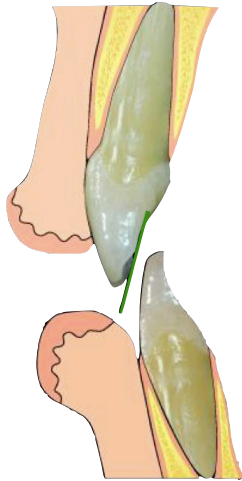


The Incisal Edge

The Lingual Incisal 1/2

Cingulum

Lingual Gingival 1/3



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.

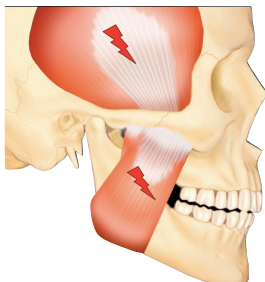
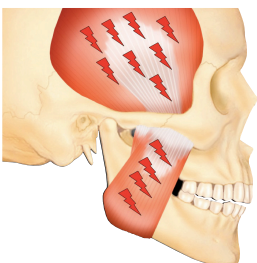
Centric Relation

If the patient has a protrusive slide.



Anterior Guidance

E.H. Williamson (1983)

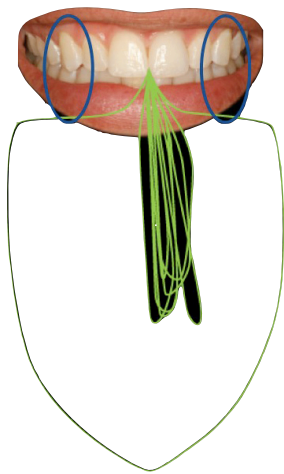


Understanding the chewing stroke

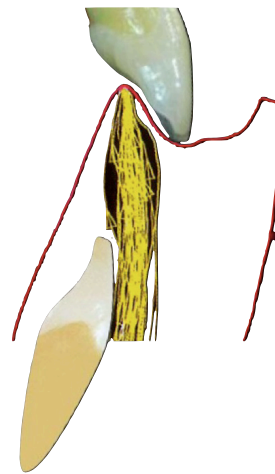
The chewing stroke is lateral. It is guided by the steepest lateral tooth.

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

Lateral chewing stroke



No anterior upward chewing stroke



Research:

Faulkner, KDB, J. of Oral Rehab., 1989

Mongini, F., Cranio; 1984

Lundeen, H.C., Gibbs, C.H. , The Function of Teeth, L and G Publishing.

To purchase go to www.thefunctionofteeth.com

A very good source
for how the teeth function
during chewing

Esthetic Treatment Planning

William “Bo” Bruce, DMD



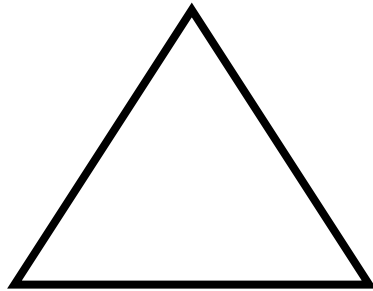
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Facial Analysis



Anterior Smile

Posterior Smile

Facial Analysis

Treatment Alternatives

Orthognathic surgery

Diagnosis

Retrognathic

Prognathic

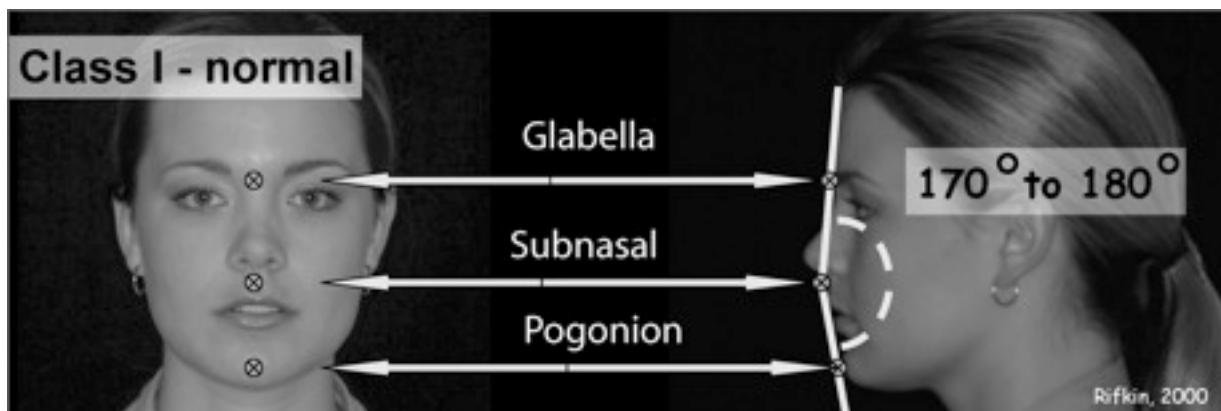
Mid-face deficient

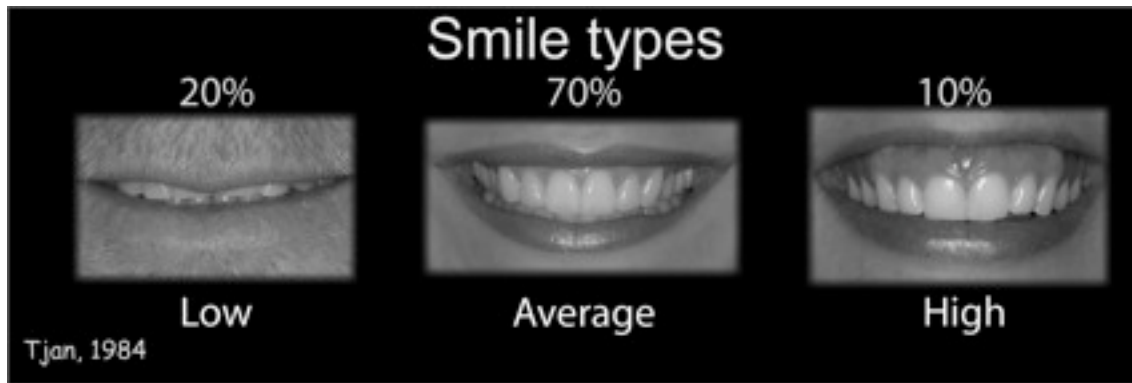
Long lower 1/3 face

Start Outside

What's the skeletal profile?

What is the lip dynamic?





Analysis of the Gummy Smile

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

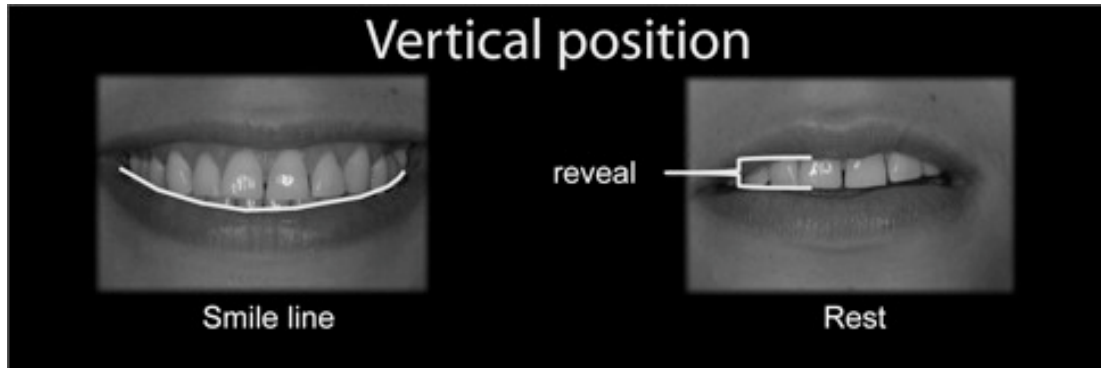
Too far forward

Too far back

Too long

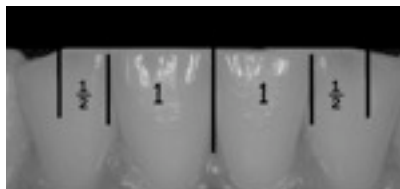
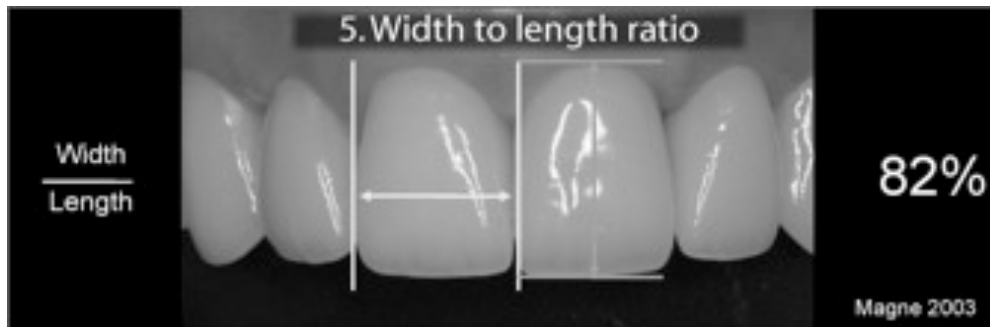
Too short

Vertical Position (*see image below*)



Right proportions:

- Check width to length ratio



Width / Length = 82%

$100 / 82 \times \text{width} = \text{The length of the tooth}$

$1.22 \times \text{width} = \text{The length of the tooth}$

$1 \frac{1}{2}$ Mandibular central incisor = Maxillary central incisor

Posterior Smile

Is the buccal corridor deficient?

Is there a gingival step?

