Understandable Occlusion for All Aspects of Dentistry

Stuart@OrtonJones.telinco.co.uk
Sojinstitute.co.uk
The Complete Occlusion Presentations

1a An Introduction to Occlusion
1b Anterior Guidance
1c Excursive Movements
1d The Principles of Occlusion
1e Functional Occlusal Anatomy
1f Studying an Occlusion
1g Occlusion in Implantology
2 New Patient Examination
3 Articulators
4 Occlusal Adjustment Kit
5 J/A Study Model Adjustment
6 Holland, Study Model Adjustment
7 Holland Clinical Adjustment
8 Headaches and the TMJ
9 Clicks and Headaches
10 Patient Evaluation
11 Treatment of Headaches and Temporomandibular Joint Problems
12 Treated Patients
Quality Dentistry
Time Management

Dental Health
The Concept of Mystery Makers
Mystery Makers are Lecturers who cause Partial or Total Confusion amongst their Audience
They either do not know what They are talking about or cannot communicate in an Understandable Language or they deliberately confuse to raise their Own Importance.
Mystery Makers do not care whether anyone understands what they are Lecturing about
They tend to use Confusing Technical Terms when Common Language could be used
Mystery Makers assume that People understand the Terminology
They are using
and use Acronyms not known to the Audience
Examples of Acronyms in Occlusion

- CRO
- CR
- CO
- ICP
- RCP
Another Example
ROM
Range of Movements
Name Droppers are People who drop Important People’s Names into Conversations or Lectures to make People think that they themselves are Important.
CRO, CR, CO, ICP, RCP Droppers

People who drop Acronyms into Conversations or Lectures resulting in Confusion and a Feeling of Inadequacy
Mystery Makers have made a Great Job of Confusing People about Occlusion
Chess Mahjong and Bridge are Games that extend the Human Brain to the Limit
In Dentistry
Occlusion extends the Human Brain to the Limit
The Objective of this Presentation is to Clear away Some of the Myths in Occlusion
Occlusion taken in Small Sections becomes understandable
Functions of a Dentition
Speaking
Eating
Swallowing
Smiling
Biting
Parafunction
Parafunction
Activities when the Teeth contact other than when Eating
Bruxing  (Grinding of Teeth)
Clenching
Bruxing and Clenching are Tension Relieving Phenomena
Total Time of Tooth Contact in a 24 Hour Period during Eating
4 Minutes
Total Time of Tooth Contact in a 24 Hour Period during Bruxing and Clenching
4 Hours
Of All the Functions of a Dentition

Speaking
Eating
Swallowing
Smiling
Biting
Parafuction
Parafunction causes the Greatest Stress on the Dentition
The Purpose of Occlusal Management

is to produce as Stress Free an Occlusal System as possible
Eating causes Minimal Stress on the Dentition
The Purpose of Joints
is to allow Two or More Bones
to move in Relation to Each Other
with the Minimum Amount of Energy
Release
The Effect of Ligaments
is to Limit the Movement of Joints
within their Functional Range
Joints Ideally Function
within the Limit’s of Joints’ Ligaments
The Anatomy and Function of the Temporomandibular Joint
Head of the Condyle
Glenoid Fossa
Articular Eminence
Layer of Cartilage
Articular Disc
Innervated Anterior Aspect
Non-innervated Middle Aspect
Innervated Posterior Aspect
Attachment to the Posterior Aspect of the Glenoid Fossa
Attachment of the Disc to the Neck of the Condyle
Lateral Pterygoid Muscle
Attachment of the Lateral Pterygoid Muscle to the Neck of the Condyle
Attachment of the Lateral Pterygoid Muscle to the Articular Disc
Synovial Cavities
Upper Compartment
Lower Compartment
The Ligaments of the Temporomandibular Joint that limit it’s Movements
Capsular Ligament
Capsular Ligament
Temporomandibular Ligament
Stylomandibular Ligament
Sphenomandibular Ligament
All these Ligaments
Limit the Movements
of the Temporomandibular Joint
Muscles of Mastication
Lateral Pterygoid Muscle
Attached to the Neck of Condyle
Attached to the Articular Disc
and the Lateral Pterygoid Plate
lateral pterygoid

O: superior head - infratemporal surface of sphenoid greater wing
in inferior head - lateral surface of lateral pterygoid plate

I: anterior portion of condylar neck and TMJ capsule
Lateral Pterygoid Muscle

masseter
temporalis
lateral pterygoid
medial pterygoid
Masseter Muscle
Attached to the Angle of the Mandible

Masseter Muscle
Masseter Muscle and the Zygomatic Arch
Masseter Muscle

masseter
temporalis
lateral pterygoid
medial pterygoid
Attached to the Angle of the Mandible

masseter
temporalis
lateral pterygoid
medial pterygoid
and the Zygomatic Arch

masseter
temporalis
lateral pterygoid
medial pterygoid
Temporalsis Muscle
Temporalis Muscle

Attached to the Coronoid Process
and the Temporal Bone
Temporalis Muscle

masseter
temporalis
lateral pterygoid
medial pterygoid
Medial Pterygoid Muscle

masseter
temporalis
lateral pterygoid
medial pterygoid
medial pterygoid

O: medial surface of lateral pterygoid plate; pyramidal process of palatine bone; maxillary tuberosity

I: posterior and lower part of medial surface of ramus angle of mandible
Attached to the Medial Aspect of the Angle of the Mandible
Attached to the Lateral Pterygoid Plate
The Palatine Bone and the Maxillary Tuberosity
Pterygoid Hamuli
Lateral Pterygoid Plates
Medial Pterygoid Muscles
Muscle Actions
Lateral Pterygoid Muscle

Opens the Jaw
Masseter Muscle

Closes the Jaw
Temporalis Muscle
Closes the Jaw
Medial Pterygoid Muscle
Closes the Jaw
Effect of Muscle Contraction on the Joint in the Closed Position
Masseter Muscle

Lifts Head of the Condyle Upwards and Forwards
Temporalis Muscle

Lifts Head of the Condyle Upwards and Forwards
Medial Pterygoid Muscle
Lifts Head of the Condyle Upwards and Forwards
The Overall Effect on the Joint
Head of the Condyle is moved Upwards and Forwards
The Forces are directed from the Head of the Condyle
To the Cartilaginous Layer on the Head of the Condyle
To the Non-innervated Cartilage of the Disc
To the Cartilaginous Layer on the Glenoid Fossa
To the Base of the Skull
When the Head of the Condyle is in this Position
It is known as being in Centric Relation
Centric Relation
The Relationship of the Mandible to the Maxilla
When both Condyles are in their most Superior Position in the Fossa
Irrespective of Tooth Position
When tapped together in Centric Relation
only One Tooth may touch
On Further Closure

The Teeth will slide into
Maximum Intercuspidation
An Interference in Centric Relation stimulate increased Bruxing and Clenching
This may cause

- Occlusal Wear
- Cervical Crevicing (Notching) due to bending of Teeth
- Fracture of Teeth
• Bone Loss
• Loosening of Teeth
• Muscle Spasm
• Headaches
• Temporomandibular Joint Problems
A Centric Relation Appliance
As Many Opposing Posterior Teeth as possible Occlude in Centric Relation
If an Occlusal Appliance is fitted and adjusted to occlude in Centric Relation

Patients tend to tap their teeth together in Centric Relation
This can be verified by

• Tapping the Patient in Centric Relation on One Coloured Articulating Paper

• Then having the Patient tap rapidly on a Different Coloured Paper
The Markings tend to Coincide
Indicating that without the Influence of Interferences
Patients tend to close into Centric Relation
Case 1
Note the Red and Blue Dots coincide
Case 1
Case 1
Case 2
Case 2
Case 2
Case 3
Case 3
Centric Relation
is the Most Physiological Position
for the Condyle
in Most Circumstances
The Normal Opening and Closing Movements of the Mandible
The Closed Position
The Initial Hinge Movement
The Beginning of Translation
The Fully Open Position
The Closed Position
Anterior Displace Discs
The Posterior Attachment of the Disc has been torn allowing the Disc to fall off the Front of the Head of the Condyle
At Rest the Disc

is Anterior to the Head of the Condyle
An Anterior Displaced Disc
The Disc is displaced Anteriorly
The Closed Position
As the Patient opens

The Disc bunches up in Front of the Head of the Condyle
As the Patient opens to Almost Full Opening, the Disc Flips into place on the Head of the Condyle.
As the Patient closes
the disc remains on the Head
of the Condyle
until the Jaw is almost closed
As the Patient is almost closed
the Disc flips of the Front again
The Disc has clicked off Anteriorly
The Patient is not in True Centric Relation
Maximum Intercuspidation
The Relationship of the Upper and Lower Arches
when the Teeth are in Maximum Intercuspidation
irrespective of Jaw Relationship
Maximum Intercuspidation
Centric Relation Occlusion
When the Jaws are in Centric Relation
and the Teeth are in Maximum Intercuspidation Simultaneously
Stable Centric Stops

Mesial

Distal
Stable Centric Stops

Opposing Cusp Tip

Mesial

Distal
Stable Centric Stops

Opposing Cusp Tip

Mesial

Distal
Stable Centric Stops

Opposing Cusp Tip

Mesial

Distal
Stable Centric Stops

Opposing Cusp Tip

Mesial

Distal
No Slide Present

Opposing Cusp Tip

Mesial

Distal
This is a Stable Centric Contact or Centric Stop

Opposing Cusp Tip

Mesial  Distal
Stable Centric Stops
Tooth Contacts that do not change Position
When the Patient is closed into Centric Relation
then bites firmly
Unstable Centric Contacts with a Posterior Slide

Opposing Cusp Tip

Mesial  Distal
Unstable Centric Contacts

Opposing Cusp Tip

Mesial  Distal
Unstable Centric Contacts

Opposing Cusp Tip

Mesial

Distal
Slide Backwards to Centric Relation

Opposing Cusp Tip

Mesial

Distal
Slide Backwards to Maximum Intercuspidation

Opposing Cusp Tip

Mesial

Distal
This forces the Head of the Condyle Backwards against the Posterior Innervated Aspect of the Disc
This may result in Referred Pain interpreted as a Headache or as Earache
**Unstable Centric Contacts with an Anterior Slide**

- Opposing Cusp Tip

- Mesial
- Distal
Unstable Centric Contacts

Opposing Cusp Tip

Mesial

Distal
Unstable Centric Contacts

Opposing Cusp Tip

Mesial  Distal
Slide Forwards to Maximum Intercuspidation

Opposing Cusp Tip

Mesial  Distal
Slide Forwards to Maximum Intercuspidation

Opposing Cusp Tip

Mesial

Distal
Slide Forwards to Maximum Intercuspidation

Opposing Cusp Tip

Mesial  Distal
Centric Contacts
Any Contacts in Centric Relation
These Contacts are Unstable
When the Lower Jaw closes the Teeth will slide into Maximum Intercuspidation.
Maximum Intercuspidation

Centric
Maximum Intercuspidation
Unstable Centric Contacts

When a Tooth contacts on a Slope in Centric Relation
and as the Lower Jaw closes further the Teeth slide Out of Centric Relation into Maximum Intercuspidation
If the Jaw closes in Centric Relation directly into Maximum Intercuspidation
And There is No Slide
These are Stable Centric Contacts in Centric Relation Occlusion
These Contacts are known as Centric Stops
These Contacts are Known as Centric Stops
These Contacts are Known as Centric Stops
The Ideal Fossa Design
Flat Areas onto which Cusp Tips can make Stable Contacts
There should be No Fissures in the Central Fossa
Cusp Tip Design
Working Cusp Tips should be Round and Pointed Not Fat
Lingual Cusp Tips should be Low to avoid being Interferences in Excursive Movements.
Upper Buccal Cusp Length is determined by Appearance.
and
Sometimes Function

Centric
Methods of obtaining Centric Relation
The Desired Position of the Head of the Condyle
The Dawson Hold
The Tips of the Fingers
The Thumbs on the Chin
This is an Acquired Technique requiring Practice and Patience
It is a Skilled Technique that overcomes the Neuromuscular Control of the Patient to allow the Head of the Condyle to move Freely in Centric Relation.
It is not a Forced Procedure
Reverse Pressure Technique
Press down on the Chin
Have the Patient close
Placing the Tongue at the Back of the Palate
This is a Less Accurate Method
Tip of Tongue at Back of the Palate
Placing the Tongue at the Back of the Palate

- This is the most inaccurate Method of obtaining Centric Relation
- Try this Technique when all other Methods have been unsuccessful
Detecting Centric Interferences

• Using the Dawson Hold
• Close the Patient until the First Teeth touch
• Ask the Patient to say which Teeth touch First
Detecting a Slide into Centric Occlusion from the First Contact in Centric Relation

- Using the Dawson Hold
- Close the Patient until the First Teeth touch
- Ask the Patient to close
Detecting a Slide from Centric Relation to Maximum Intercuspidation

Ask the Patient what they felt whether thy felt a Slide

A Slide will also be felt in the Fingers
Close the Patient in Centric Relation until First Contact.

have the Patient close into Centric Relation.

Ask the Patient what they felt.

A Slide will also be felt in the Fingers.
Centric Interferences may also be detected by

- having the Patient tap together rapidly with their Lips open
- Listen for a Clattering Sound
- Similar to the Sound of Castanets
- This is the Tap Tap Tap Tap Test
Other Terms used in Occlusion
The Most Retruded Position

• A Commonly used Term referring to Centric Relation
• A Mandible in Centric Relation can be Retruded out of Centric Relation
The Most Retruded Position

• The Head of the Condyle is forced Posteriorly
• Limited by the Ligaments of the Temporomandibular Joint
The Mandible is then no longer in Centric Relation

The Term “Most Retruded Position” is therefore unsatisfactory
The Habitual Position

The Position that the Patient closes together by Habit
The Habitual Position
This is determined by the Adaptation of the Neuro-musculature to avoid Occlusal Interferences
By removing the Interferences

The Patient’s Muscles relax

and the Jaws close into a Different Position
The Term Habitual Position
is therefore not a Reliable Position
The Term “Habitual Position”
is therefore not useful
Bite of Convenience

- The Position that the Patient closes into. (Centric Occlusion)
- There is Nothing Convenient about This Position
- The Patient has no Choice but to close into This Position
By removing the Interferences
The Patient will close into a Different Position
This Term is therefore Unsatisfactory
How to Study an Occlusion
by the Use of Study Models
mounted in Centric Relation
and
by Clinical Examination
Clinical Evaluation check the Following

- Interferences in Centric Relation
- Non-Functional Contacts
- The Anterior Guidance
Evaluation of Study Models
Set up Two Sets of Study Models in Centric Relation
Two Sets of Study Models are mounted in Centric Relation
Two Sets of Impressions are taken
Centric Records
Taking
Use a Relatively Soft Bendable Wax
Cut the Wax into a Rectangle
Making the Wax Template
Have the Patient bite and grind on the Wax Template
Press the Wax up against the Upper Central Incisors
The Indentations of the Upper Central Incisors help in the re-location of the Wax Template in the Patient’s Mouth later.
Indentations of the Upper Central Incisors
Wax Template Trimmed

Handle
Wax Template Trimmed
Cut close to the Buccal Cusps
This helps prevent dislodgement by the Cheeks later
Apply Vaseline to the Occlusal Surfaces of the Teeth
Apply Vaseline to the Occlusal Surfaces of the Teeth
Apply Vaseline to the Occlusal Surfaces of the Teeth
Apply Vaseline to the Occlusal Surfaces of the Teeth
Apply Vaseline to the Occlusal Surfaces of the Teeth
Apply Vaseline to the Occusal Surfaces of the Teeth
Record only 4 Points on the Centric Record

- These should be Stable Points
- Not on Slopes
- The Points should be Located as Far Apart as Possible
Examples of Locations of the Holes

- The Palatal Cusps of Second Molars
- Opposite the Centre of the Occlusal Surface of the Lower Second Molar
Examples of Locations of the Holes

• The Buccal Cusp of the Lower First Premolar
• Opposite the Marginal Ridge of the Upper First Premolar
The Study Models should be Stable when located firmly in the Centric Record.
Four Small Holes cut in the Template
Handle folded up to Prevent the Back Teeth Touching
Zinc Oxide and Eugenol Impression Paste ready to Mix
Add a Drop of Water to the Mix
This Speed up the Mix
Zinc Oxide and Eugenol Paste added to the Four Holes
Add to Both Sides of the Template
Wait till the Zinc Oxide and Eugenol Paste is almost set
Before placing the Template into the Patient’s Mouth
This helps prevent the Paste sticking to the Teeth
Insert the Template
Close the Patient into Centric Relation
Tap the Lower Jaw into the Paste in Centric Relation
Note the Cusp Tip Indentation
Note the Cusp Tip Indentation
The Patient has bitten into the Record
The Patient may have moved out of Centric Relation
The Patient has bitten into the Record
For Study Models take 2 Records
Mounting Models in Crown and Bridgework
One Tooth Prepared
No Record needed
Mount in Centric Occlusion
by fitting the Upper and Lower Models together
One Tooth Prepared
No Record needed
Mount in Maximum Intercuspidation
by fitting the Upper and Lower Models together
One Tooth Prepared
No Record needed
Mount in Maximum Intercuspidation
by fitting the Upper and Lower Models together
Two Teeth Prepared
No Record needed
Mount in Maximum Intercuspidation
by fitting the Upper and Lower Models together
Posterior Teeth Prepared
This will be Unstable when fitting Upper and Lower Models Together
Take a Sectional Record in the Mouth
Mount the Working Models using this Record
Single Unit Mounting
Squash Bites

• do not record Maximum Intercuspidation accurately
• They are therefore not useful for anything
Facebows are taken to mount Upper Models in the same Relationship to the Articulator Condylar Assembly as the Upper Arch is to the Temporomandibular Joint.
A Facebow Record is taken
Two Sets of Study Models are mounted in Centric Relation
One Set is kept as an Original Record
The Other Set is equilibrated and Waxed Up for Treatment Planning Purposes
Uses of Centric Relation

• Reliable Reference Position
• Starting point for Occlusal Analysis
• Starting Point for Restorative Dentistry
• Starting Point for Complete Denture Construction
The End