Complete Dentures

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Diagnostic Indices for Edentulous Patients

1) Maxillary/Mandibular Alveolar Ridge *Height* and *Morphology*
2) Maxillo-mandibular Relationship
3) Muscle Attachments

Base on diagnostic indices, **Pre-prosthetic Procedure** may be indicated for new edentulous or denture-wearing patients

- Discomfort
- Abused tissues
- Lack of retention
- Loss of VDO

Pre-prosthetic procedure

1) Non-Surgical
2) Surgical
Non-Surgical Pre-prosthetic Procedures

1) Rest for the supporting tissues
   (Denture removal for 48-72 hours)
2) Occlusal correction of the old denture
3) Good nutrition
4) Conditioning of the patient’s musculature
5) Temporary soft liners (Min. thickness of 2.0 mm)
6) Finger or toothbrush massage of supporting tissues
7) Vertical dimension correction of old dentures
Surgical Pre-prosthetic Procedures

1) Correcting conditions which prevent prosthetic function such as:
   a) Hyperplastic tissues, Epolis fissuratum and Papillomatosis
   b) Unfavorable Frenular attachments
   c) Pressure on mental foramen
   d) Pendulous maxillary tuberosities
   e) Insufficient interarch space requiring surgical corrections
   f) bony prominences or undercuts of ridges

2) Enlargement of denture-bearing area
   a) Vestibuloplasty (vestibular extensions with or without soft tissue grafting)
   b) Ridge augmentations (Hard tissue/bone grafting)

3) Placement of dental implants
Denture Retention:

- Maximal extension of the denture base
- Maximal intimate contact of the denture base and its basal seat
- Muscular factors (neutral zone concepts) help in retention and stability of dentures. (Buccinators, orbicularis oris, intrinsic and extrinsic muscles of the tongue)

Mucosal support to masticatory loads

- 22.96 cm² in edentulous maxillae.
- 12.25 cm² in edentulous mandible.
- Consists of mucosa, submucosal, periosteum and residual alveolar bone.
- Natural dentition with PDL: 45 cm² per arch
Role of Saliva

- Lubricant
- Chemical buffer capacity
- Enzymes contribution to food breakdown
- Anti-bacterial and antibodies
- Moisture maintenance
- Regulation of water balance
- Cleansing
Common causes of hyposalivation

- Medications
- Radiation treatment
- Sjogren’s Syndrome
- Dehydration

Management of hyposalivation

- Improve mucous saliva from the palate by drinking 2 L of water
- Chewing or exercising vigorously
- Estrogen or Pilocarpine medications
- Saliva Substitutes
What are the signs indicating vertical dimension of occlusion needs to be increased in a denture?

- Prognathic facial appearance or protrusion of mandible
- Excessive freeway space of greater than 5.0 mm
- Angular Cheilitis- inflammation of the angles of the mouth causing redness and production of fissures called Perleche
- Significant wear on denture teeth of C/C
- Denture teeth cannot be seen
- Phonetics of patient
What are the direct sequelae caused by wearing a complete denture?

- Residual ridge reduction
- Gagging
- Altered taste perception
- Mucosal reactions (denture stomatitis, Candida infections)
- Burning mouth syndrome
- Oral galvanic currents
- Periodontal disease on abutment teeth
What are the *etiology* and predisposing factors of Denture Stomatitis (*inflammatory papillary hyperplasia*)?

<table>
<thead>
<tr>
<th>Etiology and Predisposing Factors</th>
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<tbody>
<tr>
<td>Dentures in the oral cavity day and night</td>
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<td>Microorganisms</td>
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<td>Trauma</td>
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<td>Poor oral hygiene</td>
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<tr>
<td>High carbohydrate intake</td>
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<tr>
<td>Reduced salivary flow</td>
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<tr>
<td>Malnutrition (iron, folate, vitamin B12)</td>
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<td>Immunosuppression</td>
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<tr>
<td>Radiation therapy</td>
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<tr>
<td>Diabetes mellitus</td>
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<td>Use of antibiotics</td>
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<td>Malignancies (acute leukemia, agranulocytosis)</td>
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<td>Corticosteroids</td>
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<td>Old Aging patients</td>
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What is “clinical remounting”?

**Definition:**
A method to relate prostheses to an articulator for analysis and to assist in development of occlusal equilibration.

**Indications:**
1) To compensate for malocclusion induced by the dimensional changes during processing of the heat processed acrylic.
2) Evaluation or adjustments of occlusion.
Aside from unbalanced occlusion, what factors may cause discomfort for patient on insertion of denture?

**Technical Issues:**

- Pressure areas from processing dimensional changes
- Irregularities in the intaglio surfaces of the dentures
- Irregular sharp angle or borders
- Sharp ridges or nodules of resin
- Inadequate inter-occlusal space
Aside from unbalanced occlusion, what factors may cause discomfort for patient on insertion of denture?

**Patient related Issues:**

- Inability of patients to adjust to new dentures
- Bruxism
- Poor ridge form (sharp bony areas)
- Nutritional deficiency
- Poor tissue tolerance (due to systemic diseases i.e. diabetes)
- Endocrine imbalance
What are the stress-bearing areas resisting vertical forces on complete dentures?

Mandible:

- Buccal shelf area (primary stress-bearing area) (the more access and the greater the surface area the better the support)
- Retromolar pad
- Alveolar ridge contours (the wider the more support)
- Amount of attached keratinized mucosa (the more present the better the support)
What are the stress-bearing areas resisting vertical forces on complete dentures?

**Maxilla:**

- Palatal shelf area and Ruggae contour (primary stress-bearing area)
- Amount of keratinized mucosa
- Alveolar ridge contours
Factors Affecting Denture Stability

**Stability:** Resistance to laterally oriented dislodgment forces.

*A denture with good stability remains secure in place when it is subjected to horizontal dislodging forces.*

**Stability of Mandibular Denture:**

- Alveolar ridge height
- Floor of mouth contour (favorable vs. unfavorable)
- Tongue position (anterior vs. retruded)
- Neuromuscular control
- Presence of flabby (mobile ridges)
Factors Affecting Denture Stability

Stability: Resistance to laterally oriented dislodgment forces.

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Stability of Maxillary Denture:

- Alveolar ridge height
- Presence of movable/flabby tuberosities
- Presence of flabby (mobile) ridges
Factors Affecting Denture Stability

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A denture with good stability remains secure in place when it is subjected to horizontal dislodging forces.

Other Factors Involved in Stability:

- Level of retention
- Occlusion *(interfering vs. non-interfering)*
- Tooth position/arrangement *(concept of neutral zone)*
- Form and contour of polished surfaces
- Neuromuscular Coordination *(related to neutral zone)*
Factors Affecting Denture RETENTION

Retention: Resistance to dislodgment forces in a vertical direction away from the bearing surface in the opposite direction of its insertion.

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<td>- Tongue position</td>
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### Retention of Maxillary Denture

- Shape of the palatal vault (*peripheral seal*)
- Drape of the soft palate - House classification (*peripheral seal*)
- Quality and quantity of saliva (*peripheral seal*)
- Compressibility of posterior palatal seal area (*peripheral seal*)
- Presence of well shaped tuberosities
- Height of alveolar ridge (*resistance to lateral displacement*)
OVERDENTURES

Advantages:

- Maintaining the residual ridge.
- Enhanced stability and retention of denture.
- Maintaining proprioceptive sensation / occlusal awareness
- Psychological support for the patients.
- Less trauma to supporting tissues
Disadvantages:

- Need for more oral hygiene commitment
- Increased rate of caries and periodontal disease
- Decreased available interarch space
- Potential weakness in acrylic resin denture
- Increased cost of treatment
**OVERDENTURES**

**Abutment preparations for overdentures:**

- Maximal coronal reduction of abutment
- Simple, short, convex abutment root surface preparation is needed with or without casting
- Provision of an attachment mechanism on a cast coping
OVERDENTURES

Problems with Overdentures:

- Loss of abutments: periodontal disease -70%, caries-25%
- Unfavourable gingival response around abutment teeth
- Loosening of overdenture retentive mechanisms

Complaints for Overdentures:

- Loosening of the overdenture retentive mechanism
- Decay of the abutments
- Traumatized soft tissue due to abutment and loose denture
How to determine the Vibration line?

a) Valsalva maneuver for the blow line:
   have patient hold his nose and attempt to blow through it. This blow line is a close approximation to the junction of the hard and soft palate.

b) Have the patient say “ah” to vibrate the soft palate.
Where is the vibration line in regards to the fovea palatinea?

Posterior border of denture = vibrating line of soft palate

Two indentation formed by coalescence of ducts called Foveae Palatinae. The vibrating line of the soft palate is located slightly ANTERIOR to the Foveae Palatinae. However, it can be ON or slightly POSTERIOR. The vibrating line and width of the posterior palatal seal depend on the soft palate form. The bead of denture is 1-1.5mm high and 1.5 mm broad at the base. This bead is 2.0 mm anterior to the end of the denture. The narrow and sharp bead will sink easily into the soft tissue to provide a seal against air being forced under the denture.
Final Impression Techniques

**Functional impression:** Applying same amount of pressure in impression taking as during chewing.

**Mucostatic impression:**
- Impression taken with Zinc oxide eugenol impression material
- Minimal pressure in a semi-dry mouth
- Retention is mainly provided with surface tension

**Selective Pressure Technique:**
- Combines the principles of both pressure & non pressure methods

* The non-stress bearing areas are recorded with the least amount of pressure and selective pressure is applied to certain areas of the maxilla and mandible that are capable of withstanding the forces of occlusion.
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Determination of Vertical Dimension

Mechanical methods:

1) **Pre-extraction records**: profile radiographs, casts of teeth in occlusion, facial measurements.

2) **Ridge Relations**: Incisive Papilla to mandibular incisors, parallelism of ridges, measurement of former dentures.
Determination of Vertical Dimension

**Physiological methods:**

1) **Rest position** *(Vertical Dimension of Rest):*
   - Freeway space of 2-4 mm in the first premolar region.
   - Asking patient to swallow, relax lower jaw, part lips to view space between the teeth.

2) **Phonetics:** “s” sounds to evaluate average speaking space

3) **Esthetics and phonetics**

4) **Swallowing Threshold**

5) **Tactile sense and patient perceived comfort:** Neuromuscular perception

6) **Facial support for VDO versus VDR with dots on face**
Importance of the sound “S”

Closest Speaking Space: *(Pound / Silverman-speaking centric)*

- There should be 1-1.5 mm of clearance between incisal edges of teeth when patient is unconsciously repeating the letter “S”.
- It shows the relationship of the anterior teeth to each other.
- It is considered to be a dental and alveolar speech sounds which bring mandible to the most forward position during speech.
- To establish VDO, the s sound provides information on the inter-incisal separation, vertical distance (1-1.5 mm) referred to as the “Closest Speaking Space” by Silverman.
Possible causes of denture base porosity after processing:

1) gaseous porosity *(due to rapid heating and monomer evaporation)*
2) contraction porosity
3) inadequate pressure *(during flask closure)*
4) insufficient amount of dough
5) improper mixing
- Maxillary retention due to peripheral seal
- Reducing gag reflex due to firm contact with palatal tissues
- Reducing food entrapment or accumulation
- Compensating for processing dimensional shrinkage
- Bulk of acrylic for strength in posterior aspect of denture
What can be done to minimize monomer content in Poly Methyl-methacrylate (PMMA)?

A) Increase processing temperatures
B) Longer processing and curing time
C) Soaking the denture in water for a few days to allow monomer to leach out
D) Heat cure instead of cold curing
Indications for Tissue Conditioners:  (*i.e. Coe-soft*)

- Atrophic & senile tissues, resorbed or thin sensitive mucosa.
- Sensitive areas over nerve, ruggae or bony projections.
- Chronic bruxism or clenching.
- Patients with Xerostomia.
- To engage the bony undercuts or tissue pockets to enhance retention or stability of the prosthesis.
- Temporary coverage of a recent surgical site.
- Functional impression material.
Contraindication for Tissue Conditioners

- Drastic loss of VDO
- An altered plane of occlusion
- Short denture borders
- Dramatic changes in tissues
- Irretrievable centric occlusion
- Dissatisfying original esthetics
- Denture base not accurately extended
SOFT LINER (i.e. Coe-Comfort) versus TISSUE CONDITIONER (i.e. Coe-Soft)

The main difference is the **Viscosity**.

- A tissue conditioner is LESS viscous and will flow more due to low viscosity. The soft liner will be MORE viscous and flow less due to high viscosity.

- Also remember that:
  - soft-liner is **Long-term**
  - tissue conditioner is **Short-term**
Indications for Long term Soft Liners

Soft liner permits wider dispersion of forces and absorption of functional and para-functional forces.

1) chronic pain & soreness between denture base and tissues
2) Sharp, thin heavily resorbed ridges with severe bony undercuts
Ideal Long-term soft liner *(Silicone soft liners, PEMA)*
(maximum use of 1 year)

- Biocompatibility
- Good dimensional stability
- Low water sorption and water solubility
- Good wettability by saliva
- Permanent softness compliance and viscoelasticity
- Adequate abrasion resistance and tear resistance
- Good bond to denture base
- Simple to manipulate
- Color stable and good esthetics
- Inhibits colonization of fungi and other microorganisms
Indications to Reline or Rebase:
• Immediate denture 3-6 months after fabrication
• Residual ridge has resorbed
• Cannot afford new dentures
• Stress for patient to make a new denture

Contraindications of Reline or Rebase:
• When excessive resorption occurred
• Abused soft tissue
• TMJ problems
• Poor denture satisfaction or unsatisfactory jaw relations
• Severe bony undercuts
• Badly worn or broken denture teeth
• Incorrect occlusal plane
Anatomical structures in contact with the lingual flanges of mandibular dentures

The Mandibular Lingual Vestibule Area:

1) **Anterior lingual vestibule / sublingual crescent area:** This part is influenced by the genioglossus muscle, lingual frenum and sublingual glands.

2) **Middle vestibule / mylohyoid area:** It is the largest area and influence by the mylohyoid muscle.

3) **Distalinalgual vestibule / lateral throat / retromylohyoid area:**
   a) Anterior: mylohyoid muscle
   b) Lateral: pear shaped retromolar pad
   c) Posterolateral: superior constrictor muscle
   d) Posteromedial: Palatoglossus muscle
   e) Medial: tongue
Denture Balanced Occlusion

It is a bilateral, simultaneous, anterior-posterior occlusal contact of the teeth in centric and eccentric positions.

Advantages:

- Bolus of food in mouth with teeth cut through to contact every few fractions of a second.

- Teeth make contact many thousands of times a day in both eccentric nonfunctional mandibular movements and centric positions. (i.e. Swallowing)

- Ensures even pressure in all parts of the arch which maintains the stability of the dentures.
A denture with monoplane occlusion has:

- Zero condylar Inclination
- Zero incisal inclination,
- No cusp inclination,
- Flat occlusal plane,
- No vertical overlaps,
- No vertical overlap
Monoplane Occlusion

**Advantages:**

- More adaptable for unusual jaw relations
- Denture teeth can be set in cross bite
- Mandible does not get locked in one position
- Greater comfort and efficiency
- Improves denture stability
- Relining and rebasing will be easier
- Modification of horizontal & vertical relations is easier
Monoplane Occlusion

Disadvantages:

- Less efficient mastication
- Aesthetically inferior
- Clogging of occlusal surfaces
- Poor food penetration
- Difficult to establish balanced occlusion
Indications of monoplane occlusion:

1. Class II and III malocclusion
2. Severe residual ridge resorption
3. Excessive interarch distance
4. Poor neuromuscular skills
5. Poor patient adaptability
Selective Grinding on Denture Delivery

Objectives of selective grinding:

- To make C.R. = M.I.P.
- To redirect occlusal forces along the axes of the teeth
- To distribute occlusal forces to as many teeth as possible
Selective Grinding Procedure

Protrusive: BULL, DUML
a) Reducing DL inclines of maxillary buccal cusps
b) Reducing MB inclines of mandibular lingual cusps

Latertrusvie side: BULL
a) Reducing lingual inclines of buccal cusps of maxillary teeth
b) Reducing buccal inclines of lingual cusps of mandibular teeth

Mediotrusive side: carefully select the cusps
a) Maxillary lingual cusp, reduce DB inclines
b) Mandibular buccal cusp, reduce ML inclines
c) Never grind on both cusps
End of Complete Denture Presentation