Over denture

The overdenture is a removable complete or partial denture prosthesis constructed over existing teeth, root structure and/or dental implants. (GPT.9, 2017) The overdenture is also called overlay denture, overlay prosthesis or super imposed prosthesis.

The important goals of overdenture:

1. Maintains teeth as part of the residual ridge:
   - More support

Overdentures can be classified into:

1. Tooth supported over denture: a complete or PRD supported by retained roots that is intended to provide improved support, stability, tactile & proprioceptive sensation & to reduce ridge resorption.

2. Implant supported overdenture: an implant overdenture connects to cylinder-like configurations (called implants) that have been surgically implanted into jaw bone. The denture appears like traditional prosthesis and the part of the denture overlying implants is modified to retain various attachments that receive implant extensions projecting above the gingiva.

Tooth supported over denture:

Overlay denture, overdenture, telescopes denture, and biologic denture are among the many terms used to define the tooth-supported complete denture.

Advantages of overdenture prosthesis:

1. Preserving the remaining residual ridge by decreasing the rate of bone resorption.
2. Preservation of the abutments as part of the residual ridge to gain support.
3- Preserving the response of proprioceptive exist in the periodontal membrane of the abutment tooth.

4- The modified teeth provide a definite vertical stop for the denture base.

5- Horizontal and torque forces are minimized.

6- Stability and support are increased.

7- Patient acceptance and Psychological Benefits.

8- A Simple Approach to the Problem Patient.

9- fewer post insertion problems

10- Convertibility & effective management .

11- Periodontal Maintenance.

12- Provide retention through the attachments.

**Disadvantages of overdentures:**

1. The susceptibility of the overlaid teeth to caries is high.

2. Periodontal disease of the retained teeth.

3. Bony undercuts of the alveolar ridge are often found adjacent to retained teeth

4. Encroachment beyond the denture space.

5. Overdenture construction is time consuming and expensive

**Indications:**

1- Few remaining teeth unsuitable for fixed or removable partial dentures.

2- Remaining teeth present with unhealthy periodontal condition.

3- Patients with class II or class III Angle's classification.

4- Patients presenting abnormal jaw size large maxillary or mandibular bone defects.

5- The construction of over-denture is an alternative line of treatment to single dentures opposing few natural teeth.

6- Patients presenting congenital defects as cleft palate, microdontia, amelogenesis or dentinogenesis imperfecta or partial anodontia.
7. Congenitally missing teeth.

**Contraindications:**

1. Poor oral hygiene.
2. Interarch space inadequate to accept the denture and the abutments.
3. Mentally and/or physically handicapped
4. Periodontally involved remaining teeth
   a. Class III mobility that is due to the loss of alveolar bone that cannot be corrected
   b. Soft tissue and osseous defects
   c. Inadequate zone of attached gingiva
   d. Excessive reduction of the adjacent residual alveolar ridge as a result of elimination of osseous defects
   e. Patients who will not keep the retained teeth free of plaque.
5. The contraindications for endodontic treatment for the remaining teeth:
   A. Vertical fracture of the root or roots.
   B. Mechanical perforation of the root.
   C. Internal resorption that has perforated through the side of the root.
   D. Broken instrument in the root canal.
   E. Horizontal fracture of the root below the bony crest.
6. Time & economy.

**Tooth supported overdenture can be classified according to the time expected to the denture to be worn, into:**

1. Immediate overdenture
2. Transitional or intermediate overdenture
3. Definitive (Remote) overdenture

**Use of the Overdenture Concept in Other Areas:**

**Congenital and Acquired Defects:**
The OD application can afford a very workable and relatively simple solution to patients with selected problems. The important benefit is that the technique is totally reversible, such as cleft palate, microdontia, amelogenesis or dentinogenesis imperfecta or partial anodontia.

**Partial Overdenture:**

The use of an overlayed tooth that might otherwise be extracted to give posterior support to a distal extension base or to provide anterior support for a large anterior supply on a PD renders obvious support advantage.

**Advantages:**
- Preserve alveolar ridge.
- Possibly: support, proprioreception, retention, stress distribution.

**Disadvantages:**
- Poor oral hygiene, caries & periodontal disease.
- Soft tissue undercuts: effect the esthetics & retention.
- Breakage of denture: because it thin, stress concentration over abutments.

**Selection of abutment teeth:**
- one per quadrant.
- Not adjacent teeth.
- Usually mandibular cuspids & premolars.
- Max. cuspids frequently cause esthetic & retention problems due to soft tissue undercuts.
Classification of tooth-supported dentures is based on the method of abutment preparation:

1- NONCOPING ABUTMENTS

- coronal height of 2 to 3 mm
- convex or dome-shaped surface
- require endodontic therapy.

2- ABUTMENTS WITH COPINGS

A- Short cast copings:

- 2 to 3 mm long
- endodontic therapy
- cast coping has a post fitted to the canal

B- Long cast copings:

- 5 to 8 mm long
- conservative reduction
- greater level of osseous support.

3- ABUTMENTS WITH ATTACHMENTS

SUBMERGED VITAL ROOTS

1- solution for caries, gingivitis, periodontitis

2- vital roots are transacted and reduced to 2 mm below the crestal bone

3- covered by a mucoperiosteal flap
Problems:

A- dehiscences over the retained roots. B- pulpal pathosis.

**Patient selection:**

- Partial dentures or overdentures
- If the remaining natural teeth are capable of supporting a fixed or removable prosthesis, then this form of treatment must be considered the primary one
- Young Patients
- Economics.

**Sequence of treatment:**

*a- Assessment:*

- Clinical Examination,
- Study Models
- Radiographs

*b- Treatment Planning*

**Abutment selection:**

1. **The periodontal status**

   - minimum mobility.
   - have acceptable bone support, 5-7mm.
   - amenable to periodontal therapy.

2. **Acceptability of the tooth or teeth for endodontic treatment**

   a) inter-occlusal distance.
   b) the crown-root ratio.

3. **The number and position of the teeth in the arch:**

   - Two teeth in each quadrant (canine or first premolar & a 2nd molar in each quadrant)
   - The tripod is the next most favourable form.
   - two teeth in each arch.
one tooth in one arch.

PERIODONTAL TREATMENT: include:

 INITIAL THERAPY

 SURGICAL THERAPY

-root planning with direct visual access.
-surgical reduction of periodontal pockets by gingivectomy and/or flap procedure.
-surgical crown lengthening.
-Widening of the attached gingiva through mucogingival surgery.

1-Simple Tooth Modification and Reduction

-teeth are merely reshaped to eliminate undercuts

-reduced in vertical height

Indication:

1-good oral hygiene with a low caries index
2-vital pulps must be receded sufficiently
3-partially anodontic patient
4-severe abrasion of teeth
5-sufficient interocclusal distance

2-Tooth Reduction and Cast Coping:

• minimum reduction in the crown: root ratio

• A cast coping are made after reducing the teeth to prevent sensitivity or as caries control

Indicated when the teeth have:

1 – Adequate bony support
2 – Good periodontal prognosis
3 – Adequate interocclusal distance

3-Endodontic Therapy and Amalgam Plug:
• reduced (1-2mm) gingival level
• endodontic therapy

4-Endodontic Therapy and Cast Coping:
• shallow dome shape with the margin slightly supragingival
• recurrent decay on the exposed dentin when there is a history of carious involvement.
• short post .

5-Endodontic therapy with cast coping utilizing some form of attachment:
• patients with a favourable prognosis
  \( b \)– low caries index
  \( c \)– proper home care
  \( d \)– good periodontal health
  \( e \)– Adequate bony support
  \( f \)– Available inter-ridge distance

6-Endodontic treated tooth with prefabricated retentive element:
• simple and inexpensive
• temporary fixation of overdentures
• spherical retentive element attached to a threaded post (Dalbo-Rotex system)

7- The telescopic overdenture:
• endodontically treated, reduced slightly
• smoothed and polished.

Impression of the abutment teeth:

One –stage technique with supporting element:
Abutment teeth without root copings, the full-arch impression is made as soon as the abutments are prepared. Root copings without retentive elements, the impression is made after final cementation of the copings. It covers all of the ridge except for any undercut areas near the abutment teeth.

**RECORD BASES:**

Incorporation of the metal bearing in the record base. The shape of the base must correspond to that of the future overdenture, i.e., it should not cover the facial marginal gingiva in the abutment region.

**Few select cases the rim can be temporarily fixed to the abutments for greater stability:**

1- dowel copings and retentive elements already present from previous treatment.

2- When directly mountable retentive elements have been inserted prior to registering maxillomandibular relations.

**Criteria for Designing the Base:**

- Not unnecessarily promote plaque accumulate
- Not mechanically traumatize the marginal gingival.
- Not impede the performance of good oral hygiene.
- Not interfere with normal function of the tongue, lips and cheeks.
- Not interfere with esthetics or speech
- Permit modifications and additions with moderate technical effort.

**DESIGNS THAT LEAVE THE PERIODONTIUM UNCOVERED:**

The base does not cover the gingiva, and the artificial teeth are prepared to fit directly upon the roots or the dowel copings:

1- Bases that are circumdentally open

2- Bases that are facially and proximally open.

Temperatures in the gingival sulcus are significantly higher under closed bases that cover the gingival margin than with open designs. Gingival reaction was always
most severe where the denture base covered the gingival margin & least severe in uncovered gingival margins, caused by a reaction in the gingival circulation.

**Basic rules of overdenture base design:**

1. Cover as little of the marginal gingiva as possible
2. Border the proximal spaces with metal.
3. The greater the number of abutment teeth and the better their prognosis, the more open the construction may be.

**Advantages of a base designed that it does not cover the gingiva:**

1- precludes direct mechanical trauma.
2- reduce plaque retention around the abutment.
3- it possible to clean the proximal surfaces of the root coping with interproximal brushes with the prosthesis in place.
4- prevents a suction effect: combined with inadequate coping shape and poor oral hygiene, would lead to hyperplastic proliferation (suction hyperplasia).
5- prevents undesirable vacuum retention in maxillary overdentures with retentive attachment.

**Disadvantages:**

1- increased risk of fracture of the base.
2- Unfavourable spatial relationships that do not permit extensive proximal openings.
3- Aesthetic considerations.
4- increased food impaction in the open proximal spaces.
5- Speech problems such as sigmatism.
6- Poor prognosis for the abutment teeth, making probable an early conversion to a CD.

**Denture Base Design, Function and Aesthetics:**

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The normal position and function of the lips and cheeks as well as their natural relation to the residual ridge, are maintained only when the denture base does not cover the ridge facial to the abutment teeth.

**Facially over bulked denture bases may be manifested through:**

1. Increased food entrapment under the base.

2. Greater difficulty for the cheek muscles to position the food bolus between the teeth.

3. Interference with lip movement during speech.