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

**Overdentures can be classified into:**

1. **Tooth supported over denture.**
   a complete or partial removable denture supported by retained roots that is intended to provide improved support, stability, and tactile and proprioceptive sensation and to reduce ridge resorption. (Mosby. Mosby's Dental Dictionary. Elsevier, 2004.).

2. **Implant supported overdenture.**
   An implant over-denture connects to cylinder-like configurations (called implants) that have been surgically implanted into jaw bone.

**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 the abutments as part of 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
   Occlusal forces can be reduced

Coronally modified / restored & frequently endodontically treated teeth, distributes stress, increases stability & masticatory function

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

3. Encroachment beyond the denture space.

4. 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 - Esthetics & masticatory function improved.

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

5- Congenitally missing teeth.

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

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

**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-Pt who 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.

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.
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
  - proprioception
  - retention (eventually)
  - stress distribution

Disadvantages

- Poor oral hygiene - caries and periodontal disease
- Soft tissue undercuts
  - esthetics
  - retention
- Breakage of denture
  - thin
  - stress concentration over abutments
Selection of abutment teeth

- One per quadrant
- Not adjacent teeth
- Usually mandibular cuspids and premolars
- Maxillary cuspids frequently cause esthetic and 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 transected 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 Patient

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) interocclusal distance
   (b) the crown-root ratio

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

Two teeth in each quadrant (canine or a first premolar and a second molar in each quadrant)
The tripod is the next most favourable form
two teeth in each arch or
one tooth in one arch
PERIODONTAL TREATMENT include

- INITIAL THERAPY
- SURGICAL THERAPY
  - Root planing with direct visual access
  - Surgical reduction of periodontal pockets by gingivectomy and/or flap procedures
  - Surgical crown lengthening
  - Widening of the attached gingiva through mucogingival surgery

TEETH PREPARATION

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 anadotnic 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

1 – low caries index
2 – good periodontal condition
3 – normal coronal height to the teeth and normal interocclusal distance

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
  1 – low caries index
  2 – proper home care
  3 – good periodontal health
  4 – Adequate bony support
  5 – Available interridge 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)

**Impressions 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

[Type text]
One -stage technique with existing retentive element

Zinc oxide-eugenol paste or elastomer the materials used.

Pre-existing retentive elements

Transfer matrices are set in place on the involved retentive elements and picked up in the impression

**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 and least severe in uncovered gingival margins.

**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 abutments.
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- Esthetic 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 complete denture.

Denture Base Design and Function

Denture Base Design and Esthetics
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 overbulked 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.

Design of the Base in Edentulous Areas

Modifications

- Any overextension, that might be tolerated or even indicated in a complete denture, must be avoided.
- Areas the artificial teeth may abut directly against the edentulous ridge for a better aesthetic effect.

- In some types of ridges e.g., Club-shaped", border extensions are dictated by the path of insertion of the retentive attachments. The base must end at the survey line (height of contour) of the ridge because further extension would allow the trapping of food in the undercut areas.
**Cast Reinforcing Frameworks**

The presence of mechanical attachments and the interruption of the denture flange near abutments reduce the cross sectional area of the denture and increase the danger of fracture. This weakness should not be compensated for by

1. by thickening the acrylic resin
2. prefabricated metal reinforcers

**Circumdentally opened design**

**Advantages**

1. possible to clean the abutments without removing the denture.
2. The base cannot traumatize the gingiva around the abutments.
3. minimal extension of the base

**Disadvantages**

- very complex
- The risk of fracture is greater
- The possibilities are limited for modifying and adding to the denture when abutment teeth are lost.

**Indications**

- abundant space over the abutments
- a good prognosis

Facially and proximally open design

- have enough rigidity only if they incorporate custom cast reinforcing frameworks.

**Advantages**

- less involved technical construction,
- the reduced risk of fracture and
- the ease of modification when an abutment is seldom causes any problem with phonation or food retention.
Disadvantage
1-difficulty in cleaning
2-The greater extension of the denture base (psychological disadvantage)

Indications
*Poor prognosis
*speech problems
*extensive tissue loss in the anterior region
*unfavourable spatial relations

RECORDING MAXILLOMANDIBULAR RELATIONS
- Erroneous registration of the horizontal relations will have its first destructive effect on the abutment teeth
- shearing or lifting forces on the abutments leads to increased tooth mobility and, the loss of the abutment teeth.

TEETH SELECTION
- The posterior tooth form is determined by
  (1) the teeth in the opposing arch and .
  (2) the concept of occlusion the dentist desires to use
  material composition of the artificial teeth
1-over the abutment teeth should be acrylic resin.
2-opposing arch have gold occlusal surfaces, the occlusal surfaces of the artificial teeth should be either gold or acrylic resin, preferably gold.
3-opposing arch have had the occlusal surfaces restored with porcelain, the artificial teeth preferably should be porcelain.
4-opposing arch are natural teeth not restored with gold or porcelain, acrylic resin artificial teeth are preferred.

Tooth Arrangements
- Overdenture occlusal form corresponds to that of a complete denture
  1-minimize the non-physiologic effects of occlusal forces
  - Position of the artificial teeth within the envelopes of action of tongue, cheeks and lips.
- Harmony between the cusp inclines and the movements of the mandible.
- Multilocal autonomous stabilizing contact during mastication. (that traumatic occlusion leads to further periodontal destruction) 2-overdenture may have to be converted into a complete denture when and if the remaining teeth are lost.
TRYING IN THE TEETH.

At this appointment perform the following procedures:

1. Verify the jaw relation records.
2. Make eccentric jaw relation records and adjust the articulator.
3. Assure aesthetic acceptability by the patient.
4. Verify phonetic acceptability.

Mounting the Attachments

- The amount of space available for an attachment can now be reliably evaluated for the first time.

The tongue space not be reduced or altered because of the size or location of an attachment.

- A retentive element should be mounted as near the center of the dowel-coping as possible.

The path of insertion of a rigid element should be approximately parallel to the long axis of the root.

Denture Insertion

- Use pressure disclosing paste to locate contacts between the female member in the denture base and the male abutments. There should be no contact except between the convex surface of the metal bearing and the concave bearing surface of the coping.

- Evaluate the tissue side of the denture base and the borders for pressure areas and overextension.
. Perfect the occlusion by remounting the dentures and selectively grinding the teeth.

- **PLACEMENT OF OVERDENTUR ATTACHMENTS**
  
The traditional technique involves using cold cure acrylic powder and liquid with a brush to place acrylic in the access holes of the overdenture.

- porosity and voids are discovered when the overdenture is first removed from the mouth.

A quick and reliable method of placing cold cure acrylic and using a disposable syringe when transferring the attachments to the overdenture chairside.

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**Oral Hygiene instruction**

- Motivating and instructing the patient in the care of the overdenture is of the utmost importance for its long term success.

- The oral hygiene procedures practiced by the patient following placement of the overdenture should be an uninterrupted continuation of the home care measures learned during the preliminary treatment phase.

- Mechanical cleansing
- Chemical aids
- Fluoride in gel
- Chlorhexidine

[Type text]
Care of the overdenture

- ordinary toothbrush or a special denture brush
- Tooth pastes with low abrasiveness and non-alkaline soaps
- Denture cleansers (mostly peroxide based) are a useful adjunct
- Candidacies (moniliasis) can be treated by immersing the denture in a 0.2%chlorhexidine solution for 10-15 minutes every day

Factors affecting Attachment selection: in overdenture

1. Available inter-arch space.
2. Crown root ratio and alignment of the roots.
3. Type of coping.
4. Vertical space available.
5. Number of teeth present.
6. Amount of bone support.
7. Location of abutments.
8. Location of the strongest abutments.
9. Whether the overdenture is a tooth supported or tooth-tissue-supported.
10. The type of the opposing dentition whether it is complete denture, overdenture, fixed appliance or natural dentition.
11. The maintenance problems and the cost.
12. Clinical experience and personal preference.
TYPES OF ATTACHMENTS

1- Stud Attachments
   - Intra radicular

   **Zest anchor attachment**

   - Extra radicular
     - Ceka Revax

   preci Clix OD
   - Direct Placement or cast coping
     - A new overdenture attachment system that allows the user to replace both the male (threaded sphere) and Female. The females engage the undercuts of the sphere to allow for superior retention & less wear on the height of the contour.

2- Bar attachments
   - The purpose of the bar attachments are splinting of the abutment teeth and retention and support of the prosthesis

   **Bar units**: They have rigid fixation where there is no movement between the bar and overlying sleeve and hence can be classified as tooth borne

   **Bar joints**: 
Permit rotational movement between sleeve and bar utilizing more of the residual ridge for support
e. g. Hader Bar
This bar can serve either as a bar joint or a bar unit or as stud. It consists of preformed plastic bars and clips. The plastic bar is attached to the coping wax-up and is casted with the coping. The plastic clips can be imbedded in the denture base to gain retention.

3- Magnet Attachments
cobalt-samarium magnet built into the denture base and a magnetisable dowel -coping or keeper plate of a palladium cobalt-nickel alloy
they may corrode and also wear due to abrasion
**Implant Overdenture**

The denture appears like a traditional prosthesis. However, that part of the denture overlying implants is modified to retain various semi-rigid attachments that receive implant extensions projecting above the gum. This arrangement helps keep a denture securely in place while eating, speaking and during other oral activities, but still allows easy self-removal of the denture for cleaning purposes.

There are two phases to this process.

The first is a surgical phase consisting of two stages,

and the second is a prosthetic phase (making the implant denture).

**The surgical phase**

**Surgical insertion stage**

Implants are completely inserted into precise preparations in jaw bone. While there are various implant configurations, they are essentially cylindrical in shape and made of pure titanium metal.

After implants are inserted into jaw bone, gum tissue over the implant is closed with sutures in most cases.

While a minimum of two implants may be inserted for an acceptable outcome, a person may be planned to receive three or more depending upon individual needs and anatomical limitations. More implants will give additional support and retention to the implant denture.
Healing and surgical exposure stage

During healing, an existing or temporary denture may continue to be worn after adjustments have been made to adapt to the surgerized site. If the existing denture cannot be altered sufficiently, a provisional prosthesis should be fabricated.

At the end of the healing stage, the top of the implant is exposed by removing gum tissue directly over it.

An extension that is then screwed into the exposed implant projects slightly above the gum tissue.

After adjustments, an existing denture can be worn over an implant extension while the gum heals.

However, the denture must be reshaped to conform to surgical site contours in order to avoid unnecessary pressure areas on the newly surgerized site.

The prosthetic phase (making the implant denture)

A precision superstructure is fabricated that is screwed into the implant extensions. This superstructure may have various interface configurations ranging from interconnecting metal bars to specially shaped singular extensions.

A denture is fabricated with special provisions on the inside surface to receive various types of attachments (interlocks). Depending on the attachment, they interact in various ways with the superstructure. For example, a metal or plastic attachment may clip onto metal superstructure bars, a nylon receptacle may receive a specially configured implant extension, and so forth.
The attachment/superstructure configuration helps to securely maintain a denture while eating and speaking, and still allows a person to comfortably and easily remove the prosthesis for cleaning purposes.

### DISADVANTAGES OF THE COMPLETE REMOVABLE DENTURE.

- Extensive detail required for proper fabrication
- Lack of stability (especially in mandible)
- Lack of retention (especially in mandible)
- Continued loss of alveolar bone leading to further instability and lack of retention
- Patients using such dentures may be led to believe professional dental care no longer is needed
- Lack of chewing function when ill-fitting
- Social concerns (slippage, unnatural appearance)

### ADVANTAGES OF THE IMPLANT-SUPPORTED OVERTURE.

- As few as two to four implants may be used for support
- Good stability
- Good retention
- Improved function
- Improved esthetics
- Reduced residual ridge resorption
- Simplest implant-supported prosthesis
- Possible incorporation of existing denture into the new prosthesis
DISADVANTAGES

1. Increased hygiene requirement to prevent peri-implant inflammation.
2. Attachments wear with repeated insertion and removal.
3. Increased the cost.
4. Possible loss of the implant due to potential movement and irritation from a removable prosthesis.
5. Need periodic relines for most patients.
6. Psychological problems associated with removable prosthesis.

**FIXED PROSTHESIS OR REMOVABLE OVERDENTURE**

- The removable implant denture may present certain advantages over a fixed implant prosthesis such as:
  1. Decreased costs associated with fewer implants.
  2. Easier access for oral hygiene procedures,
  3. Improved facial support via denture flanges, and,
  4. Particularly in the maxillary arch, improved esthetics and phonetics.

**TYPES OF IMPLANT OVERDENTURE**

1. Implant retained and tissue born over denture
2-Implant retained and implant born overdenture:

*The selection of a specific attachment depends on various factors:*

1. The type of overdenture to be fabricated.
2. The relative importance of stability and retention.
3. The condition of the residual alveolar ridges.
4. The length of the implants used.
5. The aesthetic requirements.
6. The dexterity of the patient to being able to insert and remove the prosthesis.
7. The psychological needs of the patient.
8. The position of the implants within the ridge.

*Essential maintenance needs*

As might be expected, exemplary oral hygiene is essential to helping prevent the development of disease around implants that could cause their failure.

Implants, superstructure, attachments and the over-denture must be checked and professionally maintained by a licensed dental professional on a regular basis. Attachments often need periodic...
adjustment or replacement due to wear.

While the implant over-denture approach is complex and expensive, the value received by an individual usually far exceeds monetary considerations.

**How long will implant over-dentures last?**

An implant may last for a lifetime (current reports show many implants lasting twenty years) or deteriorate in a few years — many factors are involved that reduce the life expectancy of implants, such as oral hygiene, general health, habits such as smoking, grinding, and so forth.

The superstructure or implant extensions may need to be replaced after five years. Depending on the implant system used, some parts may need to be replaced annually, or sooner, because of wear or deterioration. These time frames are generalities. The dental profession continues to strive for long-term durability.

---------GOOD LUCK-----

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