

University of Basrah
College of Dentistry
Department of prosthetic dentistry

5th stage / lec 15

Dr. Hasanein Al-namel

Over denture

The overdenture: is any removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants; a dental prosthesis that covers and is partially supported by natural teeth, natural tooth roots, 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
 - a. More support
 - b. Withstands more occlusal load.
 - c. Retention improves
2. Decrease in the rate of bone resorption. Alveolar bone exists as a support for teeth.
3. An increase in the patient's manipulative skills in handling the denture.

- **Indications of Overdenture.**

1. few remaining teeth unsuitable for fixed or removable partial dentures.
2. Remaining teeth present with unhealthy periodontal condition.
3. Patients presenting congenitally missing teeth and congenital defects as cleft palate, microdontia, amelogenesis or dentinogenetic imperfecta or partial anodontia.
4. Patients with class II or class III Angle's classification - Esthetics & masticatory function improved.
5. Patients presenting abnormal jaw size large maxillary or mandibular bone defects.
6. The construction of over-denture is an alternative line of treatment to single dentures opposing few natural teeth.





- **Contraindications of Overdenture:**

1. Poor oral hygiene.
2. Inter-arch space inadequate to accept the denture and the abutments.
3. Mentally and \or physically handicapped.
4. Cost and time considerations.
5. When other treatment modalities promise superior results.
6. Lack of patient acceptance.

- **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
8. A Simple Approach to the Problem Patient.
9. fewer post insertion problems
10. Convertibility & effective management.
11. Periodontal Maintenance. (By distributing the applied forces over the remaining teeth) physiological stimulation.
12. Provide retention through the attachments.

- **Disadvantage of overdenture:**

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 over contoured (bulky denture) or under contoured flanges especially in canine eminence.
4. Encroachment interocclusal distance beyond the denture space.
5. Overdenture construction is time consuming and expensive.

- **Overdenture Classification: Overdentures can be classified into:**

1. **tooth supported**

A complete or partial removable denture supported by tooth or retained roots that is intended to provide improve support, stability and tactile and proprioceptive sensation and to reduce ridge resorption. The tooth -supported over denture is also called overlay denture, telescopes denture and biological denture are among the many terms used to define the tooth-supported complete denture.



2. implant supported

The denture appears like traditional prosthesis. However, that part of the denture overlying implants is modified to retain various attachments that receive implant extensions projecting above the gum.



- **Classification of tooth supported overdenture Based on the method of abutment preparation:**

1. Non coping abutment

- a. The tooth is reduced to a coronal height of 2 to 3 mm.
- b. The crown is contoured to a convex or dome shape.
- c. The tooth is endodontically treated and filled with amalgam or composite restoration.



2. Abutment with coping preparation

- a. a coping is a cover for the exposed tooth surface.
- b. Cast metal copings with a dome shaped surface and a chamfer finish line at the gingival margin.



Figure 2: Copings cemented over 33 and 43

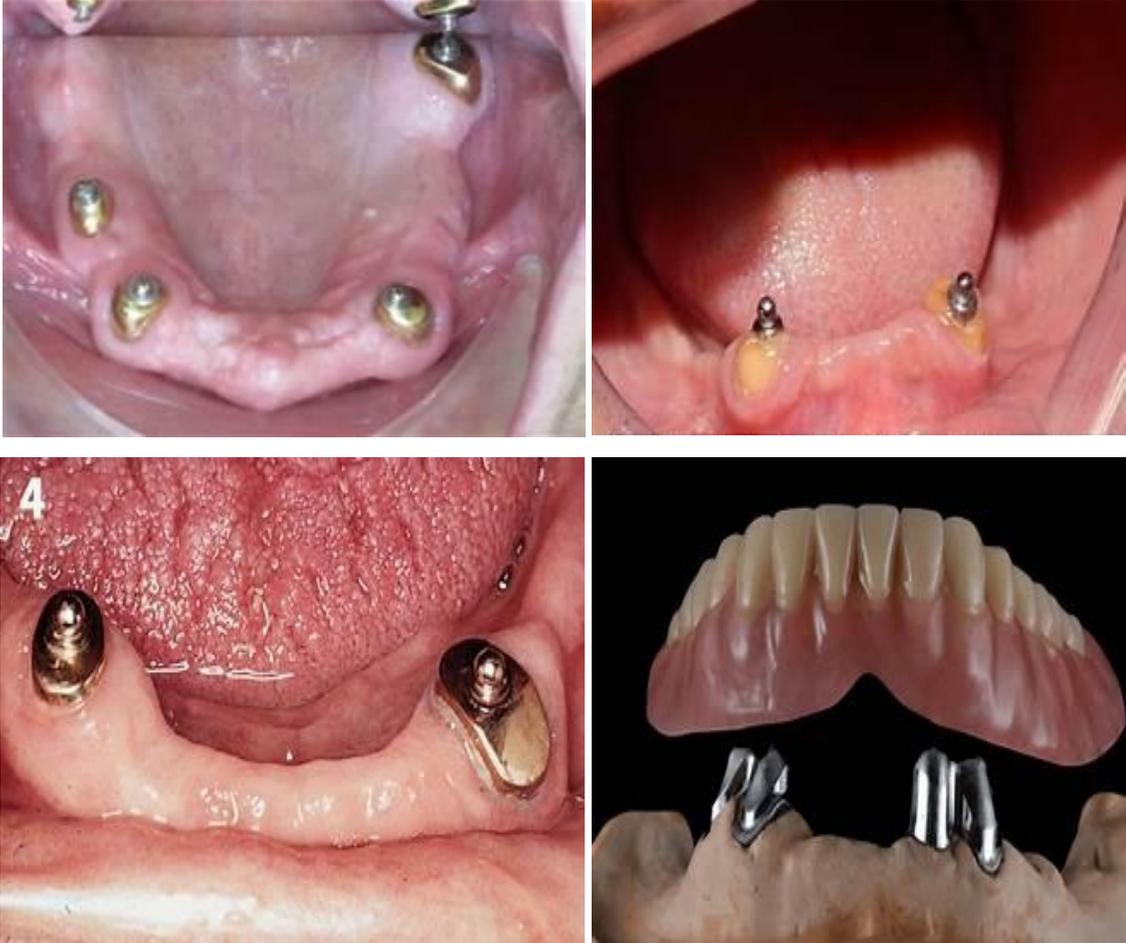
There are two types of copings:

- Short copings: Short cast copings 2 to 3 mm long (cast coping has a post is fitted to endodontically treated canal).
- Long cast copings :5 to 8 mm long abutment, Endodontic treatment is not a must (abutment is prepared. Conservatively to prevent pulp involvement to receive the cast). Greater level of osseous support.

3. Abutments with attachment

- a. Attachment is small precision device

- b. Most attachment are secured to the abutment by cast coping.
- c. Objective to improve retention of denture base.
- d. Consisting of 2 parts: Male and Female



4. Submerged Vital Roots

This additional abutment category, this method is innovative attempt to overcome some problems associated with the more conventional overdenture abutments included caries, gingivitis, periodontitis and the need for endodontic therapy. This method included vital roots are transected and reduced to 2mm below the crestal bone and covered by mucoperiosteal flap.



5. Abutments with telescopic crown

- a. Abutment teeth are either vital or endodontically treated & contoured to tapered configuration.
- b. Tapered metal copings constructed & cemented over abutments
- c. Denture constructed with metal crowns having veneered facings to have paralleled abutment, uneven spaces between abutments, useful for obturators. The advantage was retention and stability. Disadvantages bulky crowns.



• Classification of over denture based on the type of the over denture

1. Immediate overdenture: The remaining teeth are reduced to accept the overdenture (on the cast), the overdenture are constructed prior to the preparation of abutment teeth and is inserted after the preparation.

2. Transitional or intermediate overdenture: Used for patient in transition or preparation phase until permanent overdenture constructed or patient with old partial denture and add new artificial teeth using self-cure acrylic resin.
3. definitive overdenture: Conventional complete over denture constructed over one or more abutment teeth. Could be made entirely of acrylic resin or in conjunction with metal bases.

- **Uses of overdenture concept in other areas**

The overdenture approach has applications besides the obvious replacement of complete denture therapy or extensive restorative dentistry such as Congenital and acquired defects. Patients presenting with such anomalies as cleft palate microdontia, amelogenesis imperfecta etc....the overdenture 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 overlaid tooth that might otherwise be extracted to give posterior support to distal extension base or to provide anterior support for a large anterior supply on a partial denture renders obvious support advantage.

- **Sequence of Treatment of Patient Who Need an Overdenture**

1. Assessment of the patient
 - a. History (general and oral).
 - b. Clinical examination (visual and digital examination, radiographic examination and study model of the arch).
2. Treatment plan
3. Evaluation the abutments

- a. Periodontal status. Minimum mobility. Have acceptable bone support, 5-7mm, and enable to periodontal therapy. Periodontal treatment includes: Initial therapy. Surgical therapy. Root planning 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.
 - b. Endodontic considerations the tooth must be treated endodontically to allow for sufficient reduction of clinical crown, ideally patient with single rooted teeth with only one canal are the best candidate although multirooted teeth can also be used.
4. The number and position of abutment teeth in the arch: In maxillary arch incisors are used, at least one tooth per quadrant should be present, ideal is 2 teeth per quadrant. The stress is distributed over a rectangular area, A tripod approach can also be used, most commonly used teeth in the mandible for abutment Canine, because of its Position, and large surface area, The Canine response, Time period of retention of the tooth, less susceptibility to periodontal breakdown, fewer anatomical and positional difficulties

- **Abutment Preparation**

- 1. **Simple Tooth Modification and Reduction:** The teeth are reshaped to eliminate undercuts and to reduce the vertical height. This technique is often used in partially anandontic patient or in patient with sever abrasion of teeth.

- **Indication:**

- 1. Good oral hygiene with low caries index
- 2. Vital pulp.
- 3. Partially anandontic patient.
- 4. Sever abrasion of teeth.

5. Sufficient interocclusal distance.

2. Tooth Reduction and Cast Coping

Cast copings are made after reducing the teeth to prevent sensitivity or as caries control. Endodontic is not done on these teeth; this technique is used when there is adequate bony support and good periodontal prognosis.

- **Indication:**

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

3. Endodontic Therapy and Amalgam Plug

It is indicated when there is normal coronal height to the teeth and normal interocclusal distance with little or no loss of vertical dimension, endodontic therapy to the abutment then reduced (1-2) mm at gingival level to receive an amalgam type restoration.

4. Endodontic Therapy and Cast Coping

Shallow dome shape with the margin slightly supra-gingival. Recurrent decay on the exposed dentin when there is a history of carious involvement. The retention is gained from a short post that is placed within the root canal.

5. Endodontic Therapy with cast coping utilizing some form of attachment

Over denture retained by attachments offer the patient the idea of a fixed removable bridge instead of a denture. The abutments are prepared as in short-coping but with long intraradicular post to prevent root-coping dislodgment. Two attachments are enough to retain a denture, third attachment add unnecessary complexity and weakens the denture.

6. Endodontic treated tooth with prefabricated retentive element

It is a simple and inexpensive way to temporary fixation of overdenture. (Spherical retentive element attached to a threaded post). Ex. (Dalbo-Rotex system). The disadvantage of this type is that the omission of a protective coping increases the risk of carious destruction and root fracture.

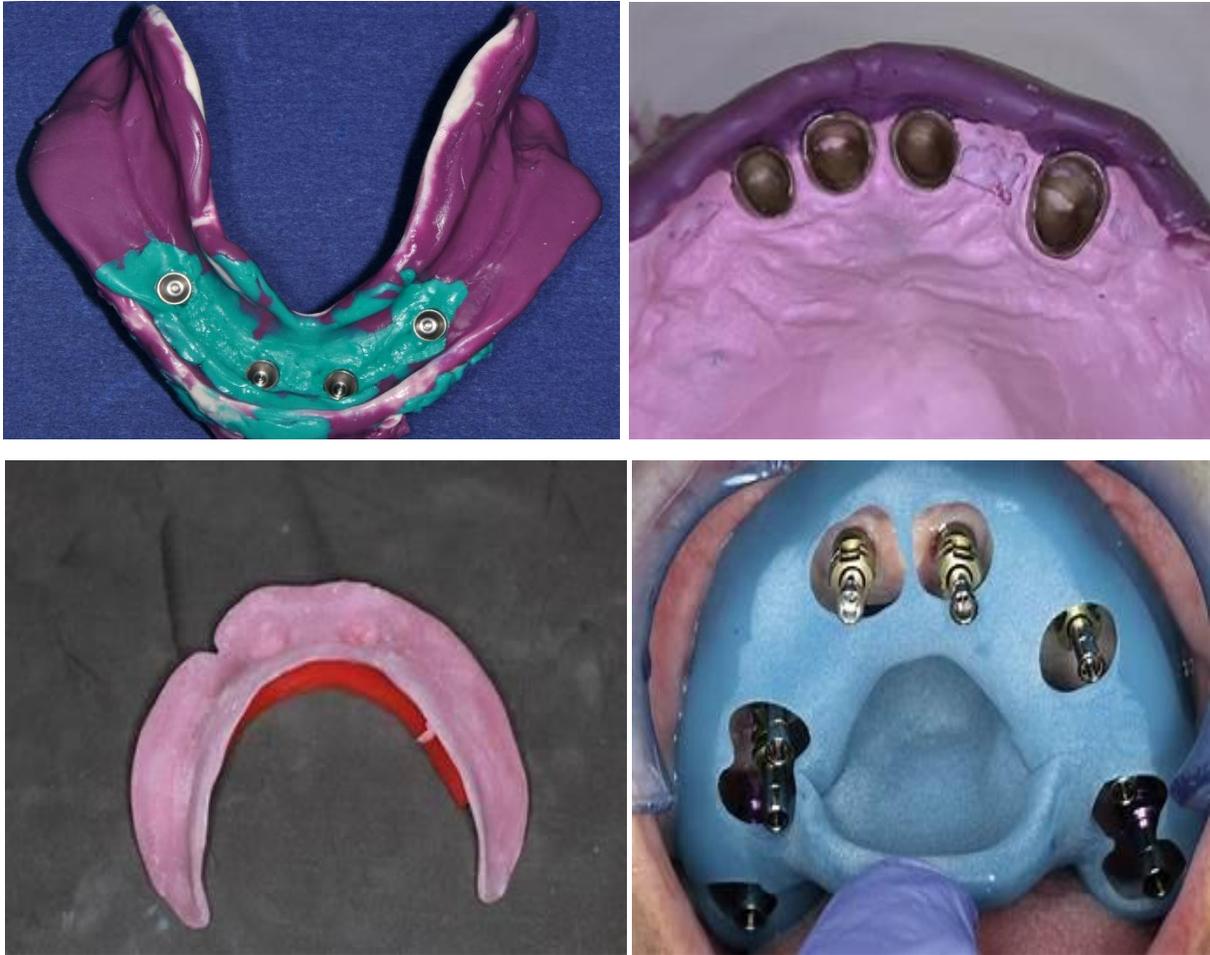
- **Impressions of the Abutment Teeth**

- 1. One –stage technique with supporting element**

For designs that rest on abutment teeth without root copings, the full-arch impression is made as soon as the abutments are prepared. When root copings without retentive elements, the impression is made after final cementation of the copings, the full arch impression is made in a custom tray similar to one for conventional complete denture. It covers the entire ridge except for any undercut areas near the abutment teeth that could not be utilize for the future denture base any way. The impression is made using Zinc oxide-eugenol paste or elastomer in the same manner as in the edentulous arch.

- 2. One -stage technique with existing retentive element**

A single step full arch impression in Zinc oxide-eugenol pastes or elastomer the materials used for overdenture that will rest on Pre-existing retentive elements Transfer matrices are set in place on the involved retentive elements and picked up in the impression. this is making it possible to incorporate retentive elements analogs in the working cast, used custom tray similar to these used for complete denture, the tray must touch neither the root coping nor the transfer matrices. Record base the only difference in the construction of the record bases for tooth –supported overdenture and conventional dentures is the incorporation of the metal bearing in the record base. The shape of the record base must correspond to that of the future overdenture, i.e., it should not cover the facial marginal gingiva in the abutment region.



- **Denture Base designing**

Criteria for Designing the denture base must prevent or decrease

- a. plaque accumulation.
- b. traumatize the marginal gingival.
- c. the performance of good oral hygiene.
- d. interfere with normal function of the tongue, lips and cheeks.
- e. interfere with esthetics or speech



1. 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

a. Bases that are circumdentally open

b. Bases that are facially and proximally open.

• **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 (circumdentally open)**

1. precludes direct mechanical trauma.

2. Reduce plaque retention around the abutments.

3. Possible to clean the abutments without removing the denture. it possible to clean the proximal surfaces of the root coping with interproximal brushes with the prosthesis in place.

4. minimal extension of the base

5. prevents a suction effect combined with inadequate coping shape and poor oral hygiene, would lead to hyperplastic proliferation (suction hyperplasia).

6. prevents undesirable vacuum retention in maxillary overdentures with retentive attachment.

• **Disadvantages**

1. increased risk of fracture of the base

2. Unfavorable spatial relationships that do not permit extensive proximal openings

3. Esthetic considerations
4. very complex
5. The risk of fracture is greater
6. The possibilities are limited for modifying and adding to the denture when abutment teeth are lost.
7. increased food impaction in the open proximal spaces
8. Speech problems such as sigmatism
9. Poor prognosis for the abutment teeth, making probable an early conversion to a complete denture

- **Indications**

1. abundant space over the abutments
2. a good prognosis

- **Advantages of a base designed that it does not cover the gingiva**
Facially and proximally open design

Have enough rigidity only if they incorporate custom cast reinforcing frameworks.

1. less involved technical construction
2. the reduced risk of fracture.
3. 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**

1. Poor prognosis
2. speech problems
3. extensive tissue loss in the anterior region

4. unfavorable spatial relations

- **Implant supported overdenture**

An implant retained overdenture is an alternative form of treatment to the fixed implant prosthesis. The denture may attach on a cast bar fixed to abutments, or it may attach to individual abutments. Patient can remove the overdenture for cleaning. Due to an increased awareness of the variety of clinical situations, bone density, biomechanics, and patient's desires, and an ever-growing number of patients benefit from additional retention and support through the help of implant supported overdentures.

- **Type of implant overdenture**

1. implant-retained and tissue-born overdenture It depends primarily on residual alveolar ridge for support. The implants will provide support in the area of the arch in which they are placed when loading is directed over them, this type need a smaller number of implant (depending on the quality and quantity of the bone for maxilla and mandible)
 - a. 2-4 implants -----for mandible
 - b. 3-4 implants-----for maxilla
2. implant –retained and implant –born overdenture It does not depend on tissue support but depended on implant to bear the total occlusal loading. This type requires the use of sufficient number of implants to accommodate the load placed on the prosthesis. The minimum number of implants required:
 - a. 4 implants ----- for mandible
 - b. 6-8 implants-----for maxilla

- **Indication of Implant supported overdenture.**

1. The patient's general health allows only a short surgical procedure.

2. Atrophic ridge, therefore objective improvement cannot be expected by fabrication of new conventional dentures.
3. Patient has worn removable dentures previously.
4. Edentulous patients who are no longer able to wear complete dentures.
5. The patient is basically satisfied with complete dentures but wants the security of increased retention.
6. Economics: the patient is either unwilling or unable to bear the expense of a fixed reconstruct.

- **Contraindication:**

1. Systemic conditions.
2. Inadequate bone substance for placement of at least two implants.
3. Unrealistic patient expectation.
4. Mental disorders.
5. Pregnancy
6. radiation to the implant site
7. Improper patient motivation

- **Consideration that determines the type of implant supported overdenture**

1. Patients desire.
2. The quality and quantity of the bone in the arch.
3. The opposing occlusion.
4. The amount of inter-arch distance.
5. Economic considerations.

- **Advantages of implant supported over denture:**

1. Prevent bone loss.
2. Maintain facial esthetics.

3. Reduce or eliminate prosthesis movement.
4. Create reproducible centric relation occlusion.
5. Eliminate soft tissue abrasions.
6. Improve prosthesis retention.
7. Increase occlusal force.
8. Improve prosthesis retention.
9. Improve chewing efficiency.
10. Improve speech compared with dentures.

• **Disadvantages of implant supported over denture:**

1. Eliminate bone grafting or implants with poor prognosis for fixed restorations.
2. Some patients want implants primarily because they do not want to be able to remove the prosthesis. This would not satisfy the psychological needs of these patients to feel that the prosthesis is part of their body.
3. Lack of sufficient inter-arch space makes an overdenture system more difficult to fabricate than a porcelain fused to metal fixed prosthesis and more prone to component fatigue and failure.

• **Requirements of implants used:**

1. Distance between bar-connected implants must be no less than 8 to 10mm, so that the lengths of the bar segments between implants are sufficient for proper placement of the retention clips.
2. Arrangement of the implants should be as symmetrical as possible.
3. Points of emergence of all implants should lie at the same height.
4. In mandible, two implants may be sufficient.
5. In maxilla, more than two implants recommended.

• **The removable implant supported denture may present certain advantages over 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.
4. Improved esthetics and phonetics, particularly in the maxillary arch.