

## 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. 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
  - Withstands more occlusal load
  - Retention improve
- 2- Decrease in the rate of bone resorption .Alveolar bone exists as a support for teeth.
- 3- Retaining the proprioception
- 4- An increase in the patient's manipulative skills in handling the denture.

### **Indication of overdenture**

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

**Contraindication**

- 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.

**Advantage 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.
- 12- Provide retention through the attachments

**Disadvantage of overdenture**

1. Caries susceptibility
2. Bony undercuts: -over contoured (bulky denture) or under contoured flanges. (Ridge is often found adjacent to retained teeth which lead to bulky denture and over contouring especially in canine eminence area).
3. Over denture construction is time consuming and expensive procedure.
4. Encroachment of interocclusal distance.
5. Periodontal disease of the retained teeth

**Overdenture Classification****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**

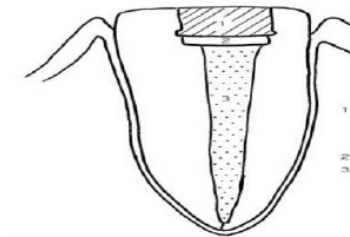
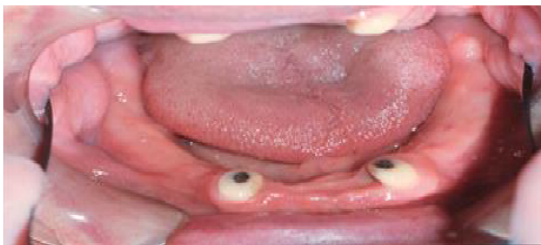
The denture appears like traditional prosthesis. however, that part of the denture overlying implants is modified to retain various attachments that receive implant extensions projecting above the gum.



## Classification of tooth supported overdenture Based on the method of abutment preparation

### 1. Non coping abutment

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



### 2. Abutment with coping preparation

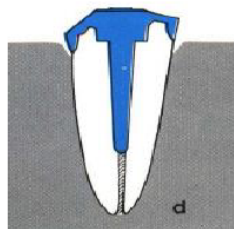
- A coping is a cover for the exposed tooth surface.
- Cast metal copings with a dome shaped surface and a chamfer finish line at the gingival margin



There are two types of copings:

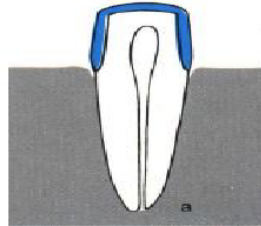
#### A- Short cast copings

2 to 3 mm long (cast coping has a post is fitted to endodontically treated canal).



**B-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**

- ❖ Attachment is small precision device
- ❖ Most attachment are secured to the abutment by cast coping.
- ❖ Objective to improve retention of denture base.
- ❖ Consisting of 2 parts
  - Male
  - 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. The disadvantage of these method dehiscences over the retained roots and pulp pathosis.



### 5-Abutments with telescopic crown

- Abutment teeth are either vital or endodontically treated & contoured to tapered configuration.
- Tapered metal copings constructed & cemented over abutments
- Denture constructed with metal crowns having veneered facings.

**Indicated** 1) unparallel abutment 2) uneven spaces between abutments 3) useful for obturators

**Advantage** increased 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

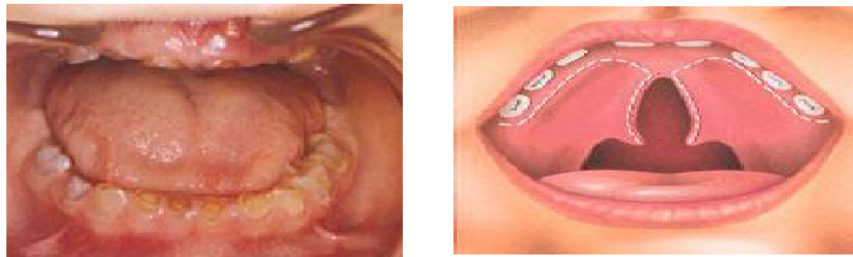
Conventional complete over denture constructed over one or more abutment teeth. Could be made entirely of acrylic resin or in conjunction with metal bases .

### Uses of overdenture concept in other areas

The overdenture approach has applications besides the obvious replacement of complete denture therapy or extensive restorative dentistry

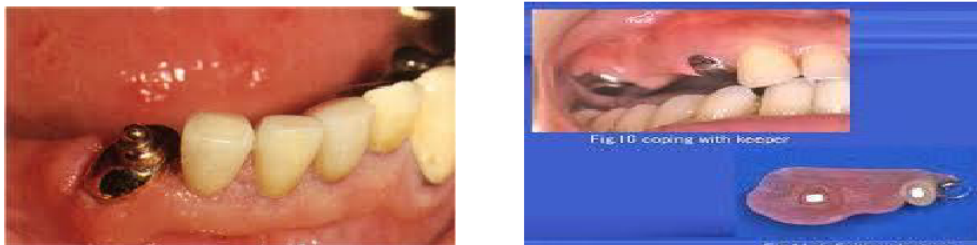
#### **Congenital and acquired defects:**

Patients presenting with such anomalies as cleft palate microdontia amelogenesis imperfect 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**

#### **A-Assessment of the patient**

1. History (general and oral)
2. Clinical examination (visual and digital examination, radiographic examination and study model of the arch)

**B-Treatment plan**

Evaluation the abutments

1-Periodontal status

2-Endodontic considerations

3-The number and position of abutment teeth in the arch

**1-periodontal status**

- Minimum mobility
- Have acceptable bone support, 5-7mm
- Amenable to periodontal therapy

**2--endodontic consideration**

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.

**3-the number and position of the 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 ,reasons – Position, Large surface area, The Canine response, Time period of retention of the tooth, less susceptibility to periodontal breakdown, fewer anatomical and positional difficulties .periodontal treatment include.

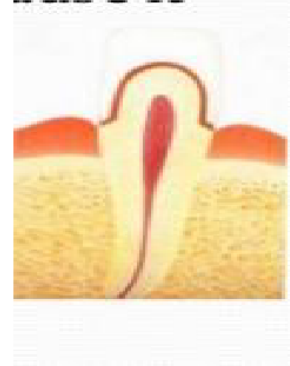
**Abutment Preparation****1-Simple Tooth Modification and Reduction**

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:**

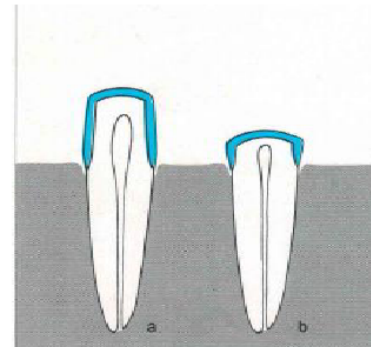
1. Good oral hygiene with low caries index
2. Vital pulp
3. Partially anodontic patient
4. Sever abrasion of teeth
5. Sufficient interocclusal distance.

**2- Tooth Reduction and Cast Coping**

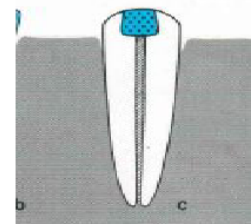
Cast copings are made after reducing the teeth to prevent sensitivity or as caries control. Endodontic is not done on these teeth; this technique is used when there is adequate bony support and good periodontal prognosis.

**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.

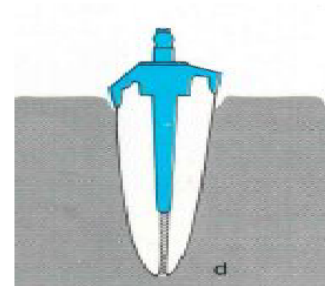
**4-Endodontic Therapy and Cast Coping**

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 afixed 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's third attachment add unnecessary complexity and weakens the denture.



### 6-Endodontic treated tooth with prefabricated retentive element

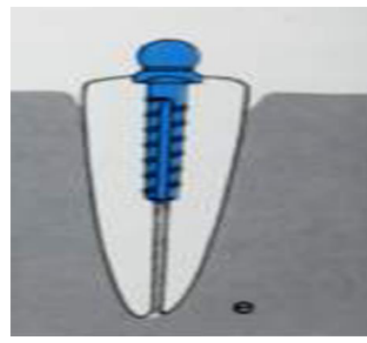
It is a simple and inexpensive way to temporary fixation of overdenture.

(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

#### 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 try 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 Zincoxide-eugenol paste or elastomer in the same manner as in the edentouls arch.



#### One -stage technique with existing retentive element

Asingle step full arch impression in Zincoxide-eugenol paste 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 make it possible to incorporate retentive elements analogs in the working cast, used custom tray similar to these used for complete denture ,the try 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 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

#### 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 is 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 hyper plasia )
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

### 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

1. very complex
2. The risk of fracture is greater
3. 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 .
- 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
- unfavorable spatial relations

### 2-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, It need less number of implant (depending on quality and quantity of maxilla and mandible bone)

✚ 2-4 implants -----for mandible

✚ 3-4 implants-----for maxilla

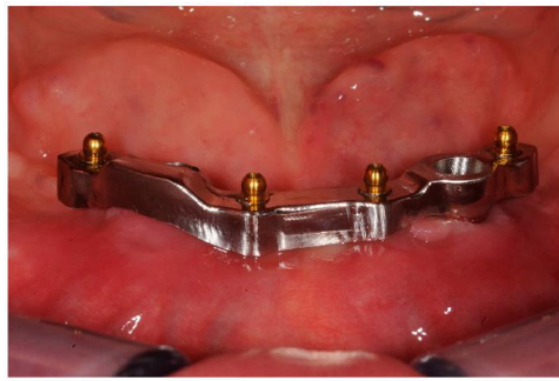
#### 2-implant –retained and implant –born overdenture

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 implant required:

☒ 4 implants ----- for mandible

☒ 6-8 implants-----for maxilla

**Indication of Implant supported overdenture.**

1. The patient's general health allows only a short surgical procedure.
2. Residual ridge will permit the insertion of at least two implants
3. Patient has no exaggerated, unrealistic expectations for success.
4. Patient has worn removable dentures previously
5. Economics: the patient is either unwilling or unable to bear the expense of a fixed reconstruct.

**Contraindication:**

- 1) Systemic conditions on.
- 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) Unrealistic patient expectation
- 8) Improper patient motivation



### Consideration that determine 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.

### 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

