OVERDENTURES

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INTRODUCTION

• With increasing stress on preventive prosthodontics, the use of over dentures has reached a point where it is now a feasible alternative to most treatment plan outlines in the construction of a prosthesis for patients with remaining teeth.
INTRODUCTION...Contd..

• The overdenture, a complete or partial denture prosthesis constructed over existing teeth or root structure, is not a new concept in a technical approach to a prosthodontic problem. Indeed its use dates back to 100 years.
DEFINITION

• Definition: A removable partial or complete denture that covers and rests on one or more remaining natural teeth, roots, and or/dental implants.
An alternative way to define an over denture

- A dental prosthesis that replaces the lost or missing natural dentition and associated structures of maxilla and or mandible and receives partial support and stability from one or more modified natural teeth.
Synonyms

• Overlay dentures
• Onlay dentures
• Hybrid dentures
• Superimposed dentures
• Telescoped dentures
• Biologic dentures
• Coping prosthesis
HISTORY

• 1856 – LEDGER prescribed a prosthesis resembling an overdenture. His restorations were referred to as plates covering fangs, but the principle was similar.

• 1888 – EVANS described a method for using roots to retain restorations

• 1896 – ESSIG described a telescopic-like coping.

• 1870 – there is also evidence to suggest that overdentures were being made in the UK.
1906 – HUNTER said whatever the reasons for retaining roots, they were normally devitalized. This type of construction therefore lost favor when the focal sepsis scare was at its peak.

1916 - PEESO was employing removable telescopic crowns at this time. Later on, the bar type of construction was developed.
**GOALS**

- There are 3 important goals of overdentures:

| Maintains teeth as part of the residual ridge | 1. More support  
| 2. Withstands more occlusal load  
| 3. Retention improve |
| Decrease in the rate of resorption | Alveolar bone exists as a support for teeth |
| Retaining the proprioception | An increase in the patients manipulative skills in handling the denture |
Overdentures

Tooth supported

implant supported

non Coping

cooping

attachments

stud

bar

magnets
CLASSIFICATION

BASED ON TYPE OF OVERDENTURE

1. Immediate overdenture

2. Transitional overdenture
ADVANTAGES, DISADVANTAGES, INDICATIONS AND CONTRAINDICATIONS
ADVANTAGES

- Preservation of alveolar bone.
- Preservation of proprioceptive response.
- A simple approach to a problem patient.
ADVANTAGES

• Simplicity of construction – ease of obtaining accurate records and superior denture stability

• Support

• Periodontal maintainence.
ADVANTAGES

• Retention
• Open palate possible
• Cost effective
ADVANTAGES

• Ideal occlusion

• Superior patient acceptance

• Less trauma to supporting tissues
ADVANTAGES

• Convertibility

• Conversion to complete denture
DISADVANTAGES

- Caries susceptibility.
- Bony undercuts: overcontoured and undercontoured flanges.
- Encroachment of interocclusal distance.
- Demand for meticulous oral hygiene
- Esthetics
INDICATIONS

ALLEN A. BREWER

“Although the presence of few remaining teeth one of the major indications for overdenture, as many abutments as possible are retained in the arch”
INDICATIONS

• Patients with poor prognosis for complete dentures

• In maxilla – in cases with excessive vertical overlap of anterior teeth

• Unilateral overdenture with bone loss is excessive on one side of the arch
CONTRAINDICATIONS

• Lack of patient acceptance

• Lack of proper oral hygiene and periodontal tissue maintenance

• When other treatment modalities promise superior results

• Cost considerations
EXAMINATION, DIAGNOSIS, TREATMENT PLANNING AND PROGNOSIS
EXAMINATION OF THE OVERDENTURE PATIENT

• History and records

• Visual and digital examination – pathology, health of the supporting tissues

• Radiographic examination
TREATMENT PLANNING

• When indicated fixed partial dentures are the treatment of choice, however the prospective overdenture patient usually does not have properly distributed, healthy teeth with suitable crown root ratios.
ABUTMENT SELECTION

• *Chronology of tooth loss*

Maxilla > Mandible
Maxilla – posterior > anterior
Mandible – posterior > anterior
ABUTMENT SELECTION
– Chronology of tooth loss

• Initial stages of tooth loss –
  Maxillary overdenture versus the complete component of mandibular natural teeth

• Later stages – mandibular overdenture versus maxillary complete edentulous arch

• Maxillary and mandibular complete denture
Evaluate for

1. Periodontal status
2. Caries susceptibility
3. Potential for endodontic treatment
4. Positional considerations
PERIODONTAL CONSIDERATIONS

Mandibular canine, First premolar versus Second premolar

Number of roots, presence and condition of the furcation, quantity and uniformity of the investing alveolar bone.
Role of endodontic treatment in the preparation of abutment

- Esthetic result
- Improvement of Crown-root ratios
- Permits use of tilted and malposed teeth and hemi sectioned or root-amputated molar teeth as abutments for overdentures.
LOCATION OF ABUTMENT TOOTH – Positional considerations

*Position of tooth in the arch and its position between the buccal and lingual cortical plates*

- In areas of maximum force and ridge resorption potential
- Best choice of abutment is canines and premolars
LOCATION OF ABUTMENT TOOTH – Positional considerations

– 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.
Quadret and Tripod configurations

• Maxillary arch – The two Centrals and the canines/ premolars.

• Ideal when opposing mandibular anteriors exist

• When only single incisor remains – Tripod – less mechanical advantage.
OVERDENTURE ABUTMENT MANAGEMENT

1. Non coping preparation
2. Coping preparation
3. Attachments
NON COPING ABUTMENTS

• 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
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

<table>
<thead>
<tr>
<th><strong>Short copings</strong></th>
<th><strong>Long copings</strong></th>
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</thead>
<tbody>
<tr>
<td>2-3mm long.</td>
<td>5-8 mm long</td>
</tr>
<tr>
<td>RCT done.</td>
<td>RCT is not a must</td>
</tr>
<tr>
<td>Copings are with a post.</td>
<td>Copings are long</td>
</tr>
<tr>
<td>Canals filled with GP</td>
<td></td>
</tr>
</tbody>
</table>
CAST CROWN COPINGS
ATTACHMENTS FOR OVERDENTURES
ATTACHMENTS IN OVERDENTURES

- Attachments are small precision devices.
- They are incorporated to provide some additional benefits like retention and support.
- More retention can be gained by lengthening the post and the use of pins.
- It consists of two units: Male and female.
REQUIREMENTS FOR THE ATTACHMENTS

• The patients should have a low caries index
• Perform proper home care
• Sound periodontal health
• Abutment teeth with proper bone support
DISADVANTAGES OF ATTACHMENTS

• Added time
• May cause increased stress on the tooth
• More difficult to construct
• Requires careful manipulation by the patients. Therefore is not of use for the mentally and physically handicapped
DISADVANTAGES OF ATTACHMENTS

- More expensive
- Reconstruction in the case of damage is difficult
- Added risk to the abutment due to caries and periodontal disease if poor oral hygiene is performed by the patient
STUD ATTACHMENTS

• Male stud – soldered to the base which is a coping covering the prepared tooth stump
• Female housing – this is embedded in the acrylic of the OD or it is soldered to substructure in the OD
• Male and female attachments may be either resilient or non resilient
**GERBER ATTACHMENT**

- **Rigid**
  - Expensive
  - Torque on the tooth if the base moves due to improper impression or reduced adaptability

- **Resilient**
  - less torque, complex in its design and construction

**Advantages:**
- Easily replaceable
- Male units can be removed by unscrewing the threads and other attachment can be fixed
RIGID TYPE GERBER ATTACHMENT

• Most popular and widely used

• Male post threaded onto a screw attached to a soldering base

• Female: overall housing containing a retention spring

• Retention is by means of a spring clip in the female engaging a groove in the male section
RESILIENT FORM GERBER ATTACHMENT

- Male stud: has a soldering base with a different retention post
- Female housing: contains a mounting ring, bushing, and a retention ring with a spring
- More bulky - adequate inter occlusal space must be present
- Complicated to use and frequent replacement of the ring is essential
- Torque can occur if denture base support is inadequate
DALBO ATTACHMENT

- Rigid, resilient or the stress breaker type
- Male part is soldered to the tooth and the housing to the base
- The rigid type has a cylindrical male unit with a rounded head
- The resilient is the smallest and the most commonly used.
- Rotational and vertical movement possible because of relief spacers between the units
- Retention in this is by the flexible arms of the female unit fitting over the undercut head of the male unit
**CEKA ATTACHMENT**

- Male part affixed to the tooth and has a rounded shape wider at the top and split vertically into 4 sections. They are flexible and can be compressed.

- Female housing fits over this.

- The attachment can also be constructed with a different type of retention male that has a space between the parts to allow both rotational and vertical movements.

![Diagram of CEKA Attachment](attachment.png)
ZEST ANCHOR

- Ideal for interim overdenture
- Derives its retention from within the root
- A post prep is made within the root and the female sleeve is cemented into place
- Male portion consists of a nylon post and a ball head attachment to the overdenture as a chair side procedure.
- The post is placed in the sleeve and the overdenture is placed over it with a self cure resin
<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
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<tr>
<td>Overcomes any space problem</td>
<td>Caries susceptibility as no coping placed</td>
</tr>
<tr>
<td>Leverage to the abutment tooth is reduced</td>
<td>Nylon stud can bend preventing seating</td>
</tr>
<tr>
<td>Attachment procedure is simple</td>
<td>To correct this frequent recall visits are necessary</td>
</tr>
<tr>
<td>Parallelism is not necessary if more than one tooth is used due to the flexibility of the nylon</td>
<td>When eating foods without the OD can cause food to stagnate in the female part</td>
</tr>
</tbody>
</table>
ROTHEMAN ATTACHMENT

• **Types**: resilient and non resilient
• Resilient allows both vertical and rotational movement
• The male part consists of a groove deeper at one end than the other
• The housing contains a ‘C’ shaped ring the ends of which fit in the deepest part of the retaining groove

• **Adv**:
  – no need for parallelism when >1 copings are used
  – Attachment is easy

• **Disadv**:
  – Due to lingual bulk, the denture is thin and this leads to denture fracture
INTROFIX ATTACHMENT

• Tall stud attachment composed of a solder base an adjustable split male post and a female housing
• Design is simple and provides frictional attachment between the two parts
• Male stud has a longitudinal split that can be attached to provide more or less retention
• This is replaceable as it is screwed to the solder base
• The lengthy stud can produce a torque potential
• So used in only a totally tooth supported system or OD with excellent support
• The other attachments of importance:
  – Schubiger attachment
  – Ancrofix attachment
  – Quinlivan attachment
BAR ATTACHMENTS

• The purposes of using bars are:
  – Splinting of abutment teeth
  – Retention and support of the prosthetic appliance

• There are 2 types:
  – Bar units which are the rigid type
  – Bar joints which allow some movement of the rotational type. utilizes the residual ridge for support
BAR ATTACHMENTS
HADER BAR

• Can serve as stud or a bar
• It can serve as both bar joints and units
• Preformed plastic bar which is attached to the coping wax up and cast
• Preformed plastic clips which are embedded in the denture base
• Since the bar and clip are bulky, enough space is required
DOLDER BAR

• **Bar unit:**
  - preformed bar with parallel sides and rounded top soldered to the coping
  - Sleeve is present in the denture bases
  - Retention is due to friction
  - If the post of the copings cannot be made parallel to seat the soldered bar then a schubiger unit is used
  - Because of the parallel walls and close adaptation, rotation is not possible

• **Bar joint:**
  - Egg shaped bar with a spacer. This allows some movement
  - Difficult to adapt to tissue contour and bulky
Baker Clip

- A small U shaped clip of 11 and 14 gauge to fit over the wire of the same gauge

- Wire is soldered over to the post coping

- The clip is placed on the wire

- It is then picked into the denture using a self cure resin
ACKERMAN CLIP AND CM CLIP

- It consists of a round bar soldered to the post copings

- The clip fits over the bar

- It in addition has retention wings for engagement of the clip into the resin if the overdenture

- Spacer is supplied, so both rotational and vertical movements are allowed

- It is an excellent choice because of the ease of fixation and the small size
Advantage and disadvantage of rigid and resilient type of attachment
MAGNETS

- **Detachable keeper element:**
  - made of stainless steel that is fixed to the abutment teeth
  - This can be done by:
    - Cementing in a preformed keeper after preparation of the tooth
    - Screwing in a preformed keeper
    - Casting a root cap and dowel keeper and cementing that to place

- **Denture retention element** has a paired, cylindrical Co-Sm magnets axially magnetized and arranged with their opposite poles adjacent.
MAGNETIC RETENTION

Fig. 26-13. Keeper element should be tested for ease of fit in cavity before cementation. Magnetic retention element is used as magnetic handle and is gripped with a strip of matrix material is interposed.
IMPLANT SUPPORTED OVERDENTURES
INTRODUCTION

• 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.
• Pt. 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.
PROSTHETIC OPTIONS IN IMPLANT DENTISTRY

• **FP 1** Fixed, replaces only the crown; Looks like a natural tooth.
• **FP 2** Fixed, Replaces the Crown and a Portion of the Root.
• **FP 3** Fixed, Replaces Missing Crowns and Givngival Color and Portion of the Edentulous Site
• **RP 4** Removable, overdenture Supported Completely Byimplants.
• **RP 5** Removable, overdenture supported by both soft tissue and implant.
INDICATIONS – Implant supported overdenture

- Atrophic ridge, therefore objective improvement cannot be expected by fabrication of new conventional dentures.
- Edentulous patients who are no longer able to wear complete dentures.
- The patient is basically satisfied with complete dentures but wants the security of increased retention.
- The patient’s general health allows only a short surgical procedure.
• Residual ridge will permit the insertion of at least two implants
• Patient has no exaggerated, unrealistic expectations for success.
• Patient has worn removable dentures previously
• Economics: the patient is either unwilling or unable to bear the expense of a fixed reconstruction.
CONTRAINDICATIONS

• Patient selection for implant-supported overdentures is best established on the basis of the following exclusion criteria;
  – Reduced intellectual capacity to the point that communication is difficult or impossible
  – Mental disorders or unresolved emotional problems.
  – Abuse of medications and drugs
  – Inadequate bone substance for placement of at least two implants
  – Systemic conditions that are absolute
• **ABSOLUTE:**
  – Chemotherapy
  – Uncontrolled metabolic disorders
  – Long-term antibiotic and steroid therapy
  – Immunosuppression
  – Intolerance of adrenaline in LA.

• **RELATIVE**
  – Diabetes
  – Prior radiation therapy
  – Anticoagulation therapy
• The presurgical evaluation of an overdenture patient has the following goals:
  – To avoid interference between the prospective positions of the implants, the attachments, and the denture base.
  – To optimize placement of the implants in relation to bone mass and anatomical structures
  – To distribute the implants so that the attachment devices are reasonably arranged
• The greatest available height of bone is located in the anterior mandible, between the mental foramina or anterior loops of the mandibular canal when present.

• The available bone of the anterior mandible is divided into five equal columns of bone serving as potential implant sites labeled A, B, C, D, and E, starting from patient’s right side.
NUMBER OF IMPLANTS

• Two or four implants are usually used to anchor an overdenture. There is a increasing tendency to place only two implants, especially in the mandible,
  – Economic considerations
  – General conditions of the patient.
  – Simplification of the surgical procedure to the necessary minimum
  – Clinical experience indicating that two implants provide enough retention.
REQUIREMENTS

• 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.
• Arrangement of the implants should be as symmetrical as possible.
• Points of emergence of all implants should lie at the same height
• In mandible, two implants may be sufficient
• In maxilla, more than two implants recommended
OVERDENTURE MOVEMENT

• Prosthesis movement may occur in one to six directions: occlusal, gingival, facial, lingual, mesial and/or distal.

• The actual OD movement may be completely different from the one provided by independent attachments.

• Prosthesis movement is evaluated while in place but can be removed.
| PM - 0 | IF PROSTHESIS IS RIGID WHILE IN PLACE BUT CAN BE REMOVED |
| PM - 2 | HINGELIKE PROSTHESIS MOVEMENT PERMITS ACTION IN TWO PLANES |
| PM - 3 | SYSTEM THAT PERMITS APICAL MOVEMENT AND A HINGE MOTION |
| PM - 4 | SYSTEM ALLOWS A RANGE OF MOTION IN A MESIAL, DISTAL, FACIAL AND LINGUAL DIRECTION. |
| PM - 6 | PERMITS ALL RANGES OF PROSTHESIS MOVEMENT |
### Mandibular overdenture treatment option

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Removable Prosthesis Type 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>OD-1</td>
<td>Implants in the B and D positions, independent of each other.</td>
<td>Ideal anterior and posterior ridge form. Cost is a major factor. Retention only PM-6.</td>
</tr>
<tr>
<td>OD-2</td>
<td>Implants in the B and D positions, rigidly joined by a bar.</td>
<td>Ideal posterior ridge form. Ideal denture. Cost is a major factor. Retention and minor stability PM-3 to PM-6.</td>
</tr>
<tr>
<td>OD-3 A</td>
<td>Implants in the A, C, and E positions, rigidly joined by a bar if posterior ridge form is good.</td>
<td>Ideal posterior ridge form. Ideal denture. Retention and moderate stability PM-2 to PM-6 (two-legged chair).</td>
</tr>
</tbody>
</table>
OD-3 B  Implants in the B, C, and D positions, joined by a rigid bar when posterior ridge form is poor.

Division C–h anterior bone volume. Poor posterior ridge form. Retention and minor stability PM-3 to PM-6.

OD-4  Implants in A, B, D, and E positions, rigidly joined by a bar cantilevered distally about 10 mm.

Patient desires greater retention, major stability, and support. PM-2 to PM-6 (three-legged chair).

OD-5  Implants in the A, B, C, D, and E positions, rigidly joined by a bar cantilevered distally about 15 mm.

Patient has high demands or desires. Retention, stability, and support PM-0 (four-legged chair).
Maxillary Treatment Options

• **Option 1** edentulous maxilla with 4-6 implants of 3 are positioned in premaxilla

• **Option 2** edentulous maxilla with 7-10 implants for support
ATTACHMENTS

• FEMALE PORTION - PROSTHESIS
• MALE PORTION – IMPLANTS
• BAR ATTACHMENT SYSTEMS
  – MECHANICAL
    • CLIPS
    • STUD
    • O-RINGS
  – MAGNETIC
• UNCONNECTED FIXTURE OPTIONS
  – MECHANICAL
    • MAGNETIC
BALL (O-RING) ATTACHMENT

- COMPONENTS
  - O RING(OD PART)
    - SILICONE, NITRILE, FLUOROCARBON, ETHYLENE-PROPYLENE
  - METAL ENCAPSULATOR
    - STAINLESS STEEL
  - O RING POST(IMPLANT PART)
    - MACHINED TITANIUM ALLOY OR A CAST PRECIOUS METAL
MAGNET ATTACHMENTS

- Rare-earth element magnets (denture part)
- Neodymium-iron-boron alloy or samarium cobalt alloy
- Corrode quickly in oral fluids
- So encased in protective coating
- Protected during processing
- Ferromagnetic keeper made of ferromagnetic alloy (implant part)
BAR ATTACHMENTS

• Purpose of bar is to anchor the prosthesis
• Movable retention mechanism – round bar and the egg-shaped bar by dolder (bar joint)
• Rigid bars are U-shaped (sliding attachment bar)
• **MOVABLE RETENTION**
  - Allow the denture to rotate around the bar’s axis
  - Posterior ridge segments become loaded by the denture
  - If round bar is bent between two implants or multiple implants are connected with round bar segments two or more axis or rotation result, prevent rotation

• **RIGID BARS**
  - Rigid regardless of number of implants
  - Posterior ridge remain virtually unloaded
  - More load to be borne by implants
MAINTENANCE CARE

• HYGIENE CHECKLIST:
  – Evaluate hygiene
  – Identify and chart problem areas
  – Place bar and screws in ultrasonic cleaner
  – Remove plaque with rubber cup
Remove calculus with special scalers of hard plastic

- Reinforce oral hygiene instructions
- Practice with the patient
- Evaluate cleanliness of the prosthesis
- Clean the denture in an ultrasonic cleaner
PROSTHETIC FOLLOW UP CARE

- Occlusion (remounting records)
- Base (relining)
- Pressure spots
- Bar (loose screws)
- Bar clips (broken, loose)
- Female retainers and clips remounted with acrylic resin
- Signs of wear
ADVANTAGES

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

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 psychologic need 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.
CONCLUSION

• The over denture described are a deviation from the normal dental treatment methods.

• These, are definitively advantageous to the patient and therefore should be undertaken whenever the clinical situations provide a opportunity.
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THANK YOU