Barker (1861) reported first use of Overdentures to the American Dental Convention.

An overdenture is a removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants. The implants or modified natural teeth provide for additional support, stability; and retention of the overdenture than the edentulous ridges alone can provide. This is particularly advantageous in the mandibular arch, where edentulous ridges may resorb at a rate four times greater than that of the maxillary arch.

It is also known as Hybrid dentures or tooth-supported complete dentures.

Retaining natural teeth as abutments for dentures can considerably reduce the progress of residual ridge resorption. Multiple abutments can be used for this purpose. Even abutments which are coronally modified or restored can be used. Endodontic treatment is usually done for most cases.

The stress concentration can be shared between the denture bearing areas and the abutments. These overdentures can reduce the impact of residual ridge resorption, loss of occlusal stability, loss of aesthetics and compromised mastication.

A) Natural teeth that have been prepared to serve as overdenture abutments.
B) Two implant fixtures with attachments help maintain bone, and provide retention and stability for complete dentures.

**Indications for Overdentures:**
1- For better support and aesthetics in morphologically compromised dental arches.
2- Cleft palate cases
3- Dentures for patients with maxillofacial trauma.
4-Patients with worn-out dentition
5-For congenital anomalies like microdontia, amelogenesis imperfecta, dentinogenesis imperfecta and partial anodontia.
6-Patients with abnormal jaw size and position where orthognathic surgery is contraindicated.

This treatment is usually indicated for:
• **Group I:** Patients with few remaining teeth that may be healthy or periodontally involved, with intact or grossly destroyed crowns.
• **Group 2:** Patients with severely compromised dentition. Selective extraction should be carried out after a thorough examination of the patient.

**General Considerations during Diagnosis and Treatment Planning for an Overdenture:**

**Maintenance of Periodontal Health:**
Once an overdenture is planned and constructed, it is the duty of the patient to maintain his teeth free from plaque. The dentist should check for pocket formation around the abutments. Failure to do this may lead to the loss of an abutment.

**Reduction in Crown-root Ratio:**
Reduction in crown size during abutment preparation can be beneficial for the tooth, as it reduces the crown-root ratio and decreases the leverage forces acting on the tooth.

**Success of Endodontic Therapy:**
Endodontic therapy may be necessary for most abutment teeth because they need extensive crown reduction. A two-to-four week interval should be provided after completion of endodontic therapy in order to determine its success before starting further treatment.

**Adaptation and Coverage of Denture-Bearing Area:**
The denture base should be well adapted to the soft tissues in order to prevent accumulation food debris and to evenly distribute the force acting on the denture.

**Design of the Denture:**
As the denture base for overdentures are thin, they have to be reinforced with metal. At the same time they should be easy to fabricate and maintain.

**Ease of Use:**
The patient should be able to easily insert and remove the denture without any harm to the denture base or the abutment tooth.
Advantages of Overdentures:
1- Maintains the integrity of the residual ridge.
2- Improves the retention and stability of the denture.
3- Improved proprioception leads to better neuromuscular control. This helps in regulating the biting force over the denture.
4- Psychological effect on the patient as extraction can be avoided.
5- It can almost be used universally.
6- Even if there is abutment failure, the abutments can be extracted and the overdenture can be relined and used as a conventional complete denture.

Disadvantages of Overdentures:
1- Nutritional counselling, oral hygiene measures and fluoride application should be carried out periodically.
2- High incidence of caries and periodontal disease around the overdenture abutments.
3- Frequent reviews are needed to verify the health of the supporting tissues of the overdenture abutments.
4- More expensive than conventional dentures because:
   a- Endodontic therapy and coronal restorations may be needed for certain overdenture abutments.
   b- Most cases need a cast metal denture base, as acrylic is weaker.
   c- Additional designing and laboratory work is needed.
5- Cannot be used in cases with reduced interarch space, bony undercuts adjacent to the abutments, etc.
6- Improper maintenance of the overdenture may lead to periodontal breakdown of the overdenture abutments and the patient may lose all his remaining teeth.

Patient Selection
Possibility of a Fixed or Removable Partial Denture
If the periodontal condition and position of the remaining teeth favour the use of a fixed partial denture or removable partial denture, then an overdenture should not be considered for that patient.

Condition of the Abutment Teeth
The crowns of teeth should be free from caries. There should be sufficient width of attached gingiva around the abutments. The abutment should be free from any periodontal disease.
Age of the Patient

Overdentures are always recommended for young patients because they have a favorable psychological effect.

Abutment Teeth Selection

As the outcome of the treatment does not depend on the number of teeth retained, the dentist must evaluate the cost of treatment. That is he can preserve the ideal teeth and extract the remaining to reduce the cost of the prosthesis. The factors to be considered are:

Periodontal Status

1- Periodontally-compromised teeth with horizontal bone loss have a better prognosis than the ones with vertical bone loss.
2- A favourable crown-root ratio should be present in cases with slight tooth mobility.
3- A circumferential band of attached gingiva is an absolute necessity for an overdenture abutment.

Abutment Location

1- Canines and premolars are frequently selected as overdenture abutments.
2- As the anterior alveolar ridge resorbs easily under stress, anterior teeth are not usually selected.
3- Maxillary incisors can be used as overdenture abutments, if the mandibular arch is intact.
4- At least one tooth should be retained in a quadrant to maintain the health of the oral tissues.
5- The number and location of the abutment teeth and the status of the opposing one should be evaluated during treatment planning.

Endodontic and Prosthodontic Status

• Usually anterior teeth (canines and premolars) are preferred as overdenture abutments as they are easier to prepare and economical too.
• When there is pulpal recession or calcifications along with extensive tooth wear, endodontic therapy can be avoided.

Basic Principles to be followed

• The abutment teeth should be surrounded with healthy periodontal tissue.
• Maximum reduction of the coronal portion should be done to attain a better crown-root ratio and avoid interference during placement of artificial teeth. Endodontic therapy may be done if needed.
• A simple tooth preparation without any internal attachments can be done in a single visit. This can be done for elderly patients and medically compromised patients. It is less expensive than copings.
• Treatment should be accompanied with fluoride gel application and other oral hygiene measures.
• Gold copings or crowns and sleeve coping retainers can be given for grossly destructed abutments after assessing the patient’s susceptibility to caries.
Gold coping can be prepared with posts and retentive pins after evaluating on the amount of tooth structure above the gingival attachment.
• Attachments may be added to the cast copings for additional retention. These attachments may be resilient or non-resilient types.
• These additional components complicate the design and increase the cost of treatment.

Three types of abutments preparation: (a) root face or gold coping just above mucosal level. (b) an attachment. (c) A thimble shaped coping.

Oral Hygiene Status
• The patient should be motivated to maintain adequate oral hygiene, as poor oral hygiene can lead to the loss of the abutment.
• Regular reviews should be done to evaluate the oral hygiene and the oral health maintenance measures should be revised if needed.
• Regular fluoride gel application is mandatory.

Types of Overdentures
There are two types of tooth supported overdentures namely:
• Tooth supported conventional complete overdenture.
• Tooth supported immediate insertion complete overdenture.
Clinical Procedure for Tooth Supported Conventional Complete Overdenture
An outline of the clinical procedures has been enumerated here:
• Surgical removal of teeth with hopeless prognosis.
• Periodontal treatment of the patient.
• Endodontic treatment of abutment teeth.
• Crown reduction of the abutment.
• Fluoride application over the prepared teeth.
• Copings are fabricated and cemented if needed.
• Impressions are made and the denture fabrication is similar to a conventional complete denture.
• On the tissue surface of the fabricated denture, the areas adjoining the gingival margins have to be trimmed/relieved in order to avoid impingement. This area is later lined with resilient liner to close the dead space between the gingiva and the denture.

Clinical Procedure for Tooth Supported Immediate Insertion Complete Overdenture:
The procedure is similar to a conventional immediate denture except for the following steps:
• The crowns of the teeth to be used as abutments are reduced to the desired form in the master cast. The teeth to be extracted are trimmed up to the gingival margin in the master cast.
• The overdenture is fabricated over this master cast.
• Endodontic treatment of the abutment teeth is done a few days prior to the insertion.
• The crown reduction of the abutment teeth is done during the insertion appointment. Crown reduction is guided by the preparation done in the master cast.
• The teeth planned for extraction are removed atraumatically and the immediate overdenture is inserted.

IMPLANT-SUPPORTED OVERDENTURES
Implants are the latest trend in prosthodontics these days. Implants are used as a part of removable and fixed partial dentures. They play an important role in complete dentures too. Some patients will not be able to wear their dentures irrespective of its perfect contour. These patients are termed as "Mal-adaptive". The implant-supported denture can be designed for these patients.
م.م. طارق حاسم محمد
جامعة تكريت – كلية طب الأسنان