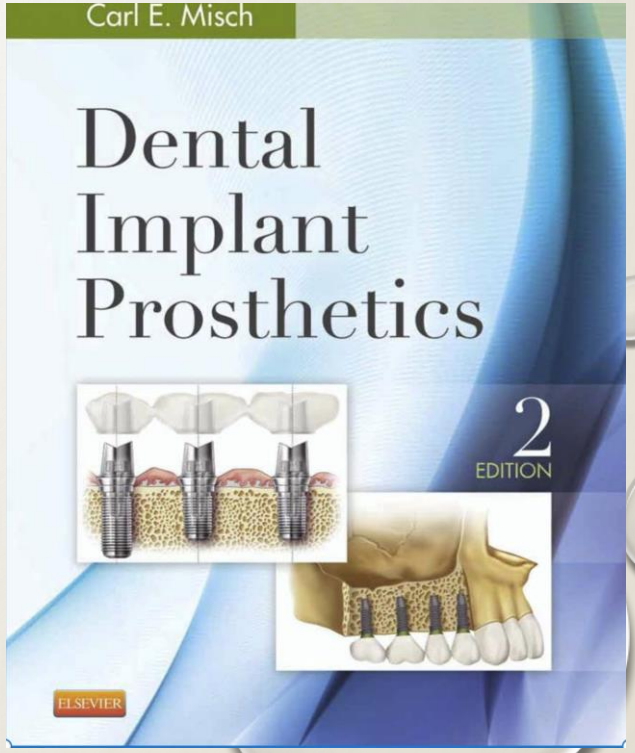
Mandibular and Maxillary Implant Overdenture

Dental Implant Prosthetics, 2 edition, Carl E. Misch, Chapter 29



Overdenture Option 1

The first treatment option for mandibular overdentures (OD-1) is indicated primarily when cost is the most significant patient factor, it is important to note the patient's desires should also be minimal, and the bone volume in both the anterior and posterior regions should be abundant (division A or B). The posterior ridge form should be an inverted U shape, with high parallel walls for good to excellent anatomical conditions for conventional denture support and stability

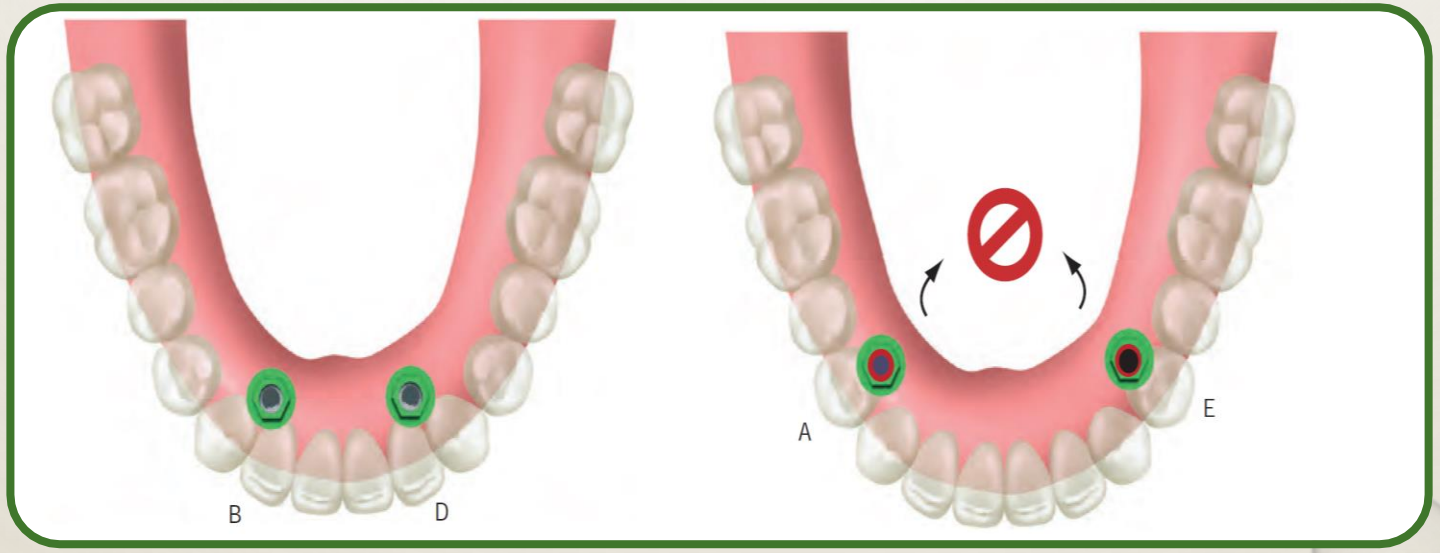
Overdenture Option 1

Patient Selection Criteria: OD-1

- Opposing a maxillary full denture
- Anatomical conditions are good to excellent (division A or B anterior and posterior bone)
- Posterior ridge form is an inverted U shape
- Patient’s needs and desires are minimal, primarily related to lack of prosthesis retention
- Edentulous ridge not square with a tapered dentate arch form
- Cost is the primary factor
- Additional implants will be inserted within 3 years

Overdenture Option 1

The problem associated with the existing denture should relate primarily to the amount of retention, not stability or support. In addition, the opposing arch should be completely edentulous and restored with a traditional complete denture. Under these more ideal intraoral conditions, two implants may be inserted in the B and D positions.



Overdenture Option 1

The implants remain independent of each other and are not connected with a superstructure. The overdenture attachment primarily improves retention and gives little additional support or stability to the prosthesis. The stability of the restoration is slightly improved in the anterior section by the implants, and the posterior inverted U shape regions from the ridge form are required to improve this factor.

The support of the OD-1 restoration is provided primarily from the buccal shelf in the posterior and the ridge in the anterior, similar to a traditional denture. The stability and support of the prosthesis are gained primarily from the anatomy of the mandible and prosthesis design, which is similar to a complete denture.

In the past, most two-implant overdentures positioned the implants immediately anterior to the mental foramen in the A, E position. Positioning of the implants in the B and D position is a much better prosthetic option in OD-1 than positioning in the A and E regions.

Overdenture Option 1

Kennedy-Applegate class 1 patients often are restored with an anterior FP and a class 1 removable partial denture. This eliminates the unfavorable rocking leverages that exist when replacement denture teeth are anterior to the fulcrum line. Independent implants in the A and E positions are implant locations in the first premolar region, which is more posterior to the anterior fulcrum line of the anterior teeth, and allow a greater amplitude of rocking of the restoration. When using B and D implants (which is similar to the natural canine positions), the anterior movement of the prosthesis is reduced.

Overdenture Option 1

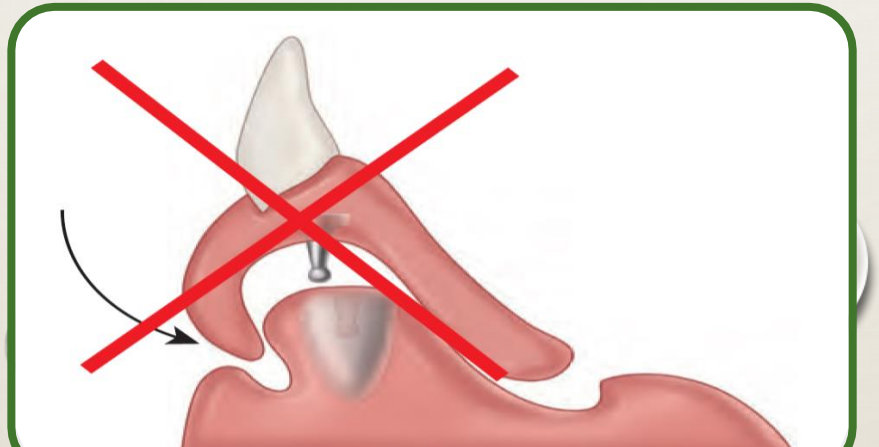
The patient's primary advantage with treatment option OD-1 is reduced cost. The two implants are usually the fewest implant number, and no connecting bar reduces the prosthetic appointments and the laboratory costs. The existing prior denture may even be adapted with an intraoral rebase and pickup procedure around the implants and attachments. This further reduces the fee. On occasion, the connecting bar for the other treatment options may not be passive, and additional complications may ensue. Because this option does not have a connecting bar, there may be fewer bar-related complications. In addition, hygiene procedures are facilitated with independent implants. The two independent implant retention system often has more prosthetic-related complications. There are several reasons the complication risk is increased. The implants should be perpendicular to the occlusal plane because the goal is to allow the posterior regions of the overdenture to rock downward and load the soft tissue over the mandibular buccal shelves for support. The hinge rotation should be at 90 degrees to the rotation path; otherwise, one side is loaded different than the other. In addition, because only two implants sustain the occlusal load during function or parafunction, minimization of the forces to the implant components and crestal bone by placing them in the long axis of the implant body and perpendicular to the occlusal plane is ideal.

Overdenture Option 1

The two independent implants should be positioned at the same occlusal height parallel to the occlusal plane. If one implant is higher than the other, the prosthesis will disengage from the lower implant during function and rotate primarily on the higher implant. This situation will accelerate the wear of the O-rings or attachments. In addition, because the higher implant receives the majority of the occlusal load, an increased risk of complications may occur, including abutment screw loosening, marginal bone loss around the implant, and implant failure. The implants should be equal distance off the midline. If one implant is more distal (farther from the midline), it will serve as the primary rotation point or fulcrum when the patient occludes in the posterior segments. As such, the more medial implant attachment will wear faster, and the more distal implant will receive a greater occlusal load.

Overdenture Option 1

When the patient bites in the anterior region, the more anterior implant acts as the fulcrum, and the posterior attachment more rapidly wears. The two implants in this treatment option should be parallel to each other. The path of insertion of the prosthesis should also be similar to the path of insertion of the attachments. When the implants are not parallel, the first attachment to engage wears less, and the second attachment rubs along the side of the male and increases the wear rate. When the path of insertion of the restoration is different than the attachments (as when a facial undercut below the crest exists), the attachments will wear prematurely. The facial undercut will direct the path of insertion of the restoration.



Overdenture Option 1

It should be noted that the edentulous residual ridge may be square, ovoid, or tapering. The dentate arch form is also divided into square, ovoid, and tapering categories and may be different than the ridge form. When a tapered dentate arch form is supported by two independent implants in a square residual ridge form, the anterior teeth are cantilevered anteriorly from the implant retentive system. More implants are required in this dentate–ridge form combination to help stabilize the prosthesis, and the OD-1 option will have a considerable disadvantage.

Overdenture Option 1

The individual implants have more prosthetic complications than when they are joined together with a bar. As a consequence of additional maintenance risks, independent implants should be used less frequently than implants joined together with a bar. Attachments in a connection bar may be placed by the laboratory in similar horizontal, vertical, and axial planes much easier than the surgeon placing the implants. It is emphasized the available mandibular bone should be division A or B bone for independent implants. The connecting bar used for OD-3, OD-4, and OD-5 raises the attachment farther from the tissue so the CHS from the incisal edge to attachment is less and the prosthesis is more stable to lateral forces.

Overdenture Option 1

The opposing arch for an OD-1 mandibular treatment option should be a traditional complete denture. The bite forces are reduced when the patient is completely edentulous before treatment. The maxillary denture has some movement during function and acts as a stress reliever. The instability of the maxillary denture and mandibular OD-1 overdenture is shared. The support requirements of the posterior regions of the mandible are reduced when opposing a complete denture. Hence, the opposing arch should be a complete denture when OD-1 is the treatment option.

Overdenture Option 1

The OD-1 is used as a treatment option when patients understand that a connecting bar or additional implants are beneficial but financial constraints require a transition period of a few years before placing additional implants. The ultimate goal in the treatment plan is to convert OD-1 patients to a RP-4 or FP with more implant support and stability before the loss of the posterior bone in the mandible occurs behind the foramina. As soon as the patient can afford two more implants, the implants should be placed in the A and E position, and all four A, B, D, and E implants should be connected with a bar that may be cantilevered to the posterior and help reduce the posterior bone loss.

Overdenture Option 1

If an additional implant may be inserted (after the A, B, D, E), it may be positioned in the C position or if bone height and width distal to one mental foramen are adequate, the additional implant may be positioned in one of the first molar regions. With implants in the A, B, C, D, E positions or A, B, D, E and molar positions, the connected implants and cantilevered bar will result in a RP-4 or fixed restoration and will help maintain posterior bone. The bar may be cantilevered to provide posterior support with four or more implants because of the greatly improved anteroposterior distance (A-P spread) between splinted implants and the increase in implant number.

THANK YOU