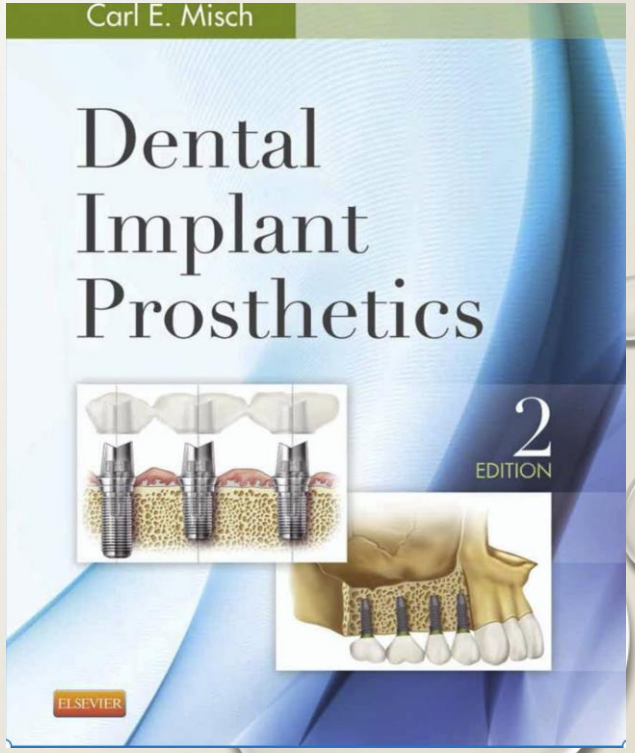
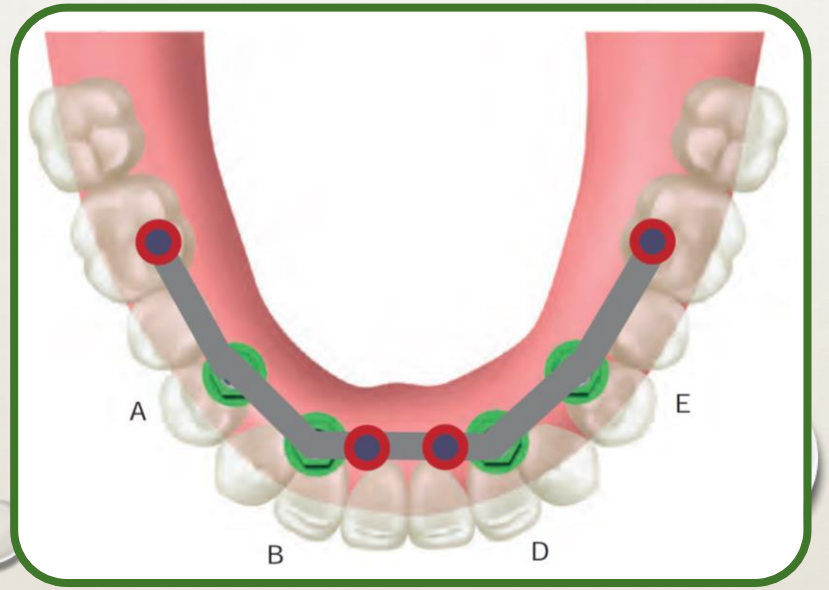
Mandibular and Maxillary Implant Overdenture

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



Overdenture Option 4

4 implants are placed in the A, B, D, and E positions. This is often the minimum number of implants when the patient has opposing maxillary teeth, or C–h anterior bone volume with CHS greater than 15 mm. These implants usually provide sufficient support to include a distal cantilever up to 10 mm on each side if the stress factors are intermediate to low.



Overdenture Option 4

The cantilevered superstructure is a feature of the four or more implant treatment options in a completely edentulous arch for three reasons:

- increase in implant support compared with OD-1 to OD-3.
- The biomechanical position of the splinted implants is improved in an ovoid or tapering arch form compared with OD-1 or OD-2.
- The additional retention provided by the fourth implant for the superstructure bar, which limits the risk of prosthetic screw loosening and other related complications of cantilevered restorations.

Overdenture Option 4

As a general rule, the posterior cantilever from anterior implants may be equal to the A-P distance when other stress factors are low to moderate. The mandibular arch form may be square, tapering, or ovoid. The arch form relates to the A-P distance of AE and BD implants. Square arch forms limit the A-P spread between implants and may not be able to counter the effect of a distal cantilever. A square arch form often results in an A-P distance of 4 mm or less. Under these conditions, a minimum cantilever should be designed. Therefore, distal cantilevers are significantly reduced for square arch forms. In a mandibular ovoid to tapering arch form, the A-P spread between implants in the A, E and D, B positions is greater and therefore permits a longer distal cantilever. This A-P spread is usually 8 -10 mm in these arch forms and therefore often permits a cantilever up to 10 mm from the A and E positions.

Overdenture Option 4

The A-P spread is only one factor to determine the length of the cantilever. When stress factors such as occluding forces are greater, the cantilever is decreased. Parafunction, opposing arch, masticatory dynamics, and CHS affect the amount of force on the cantilever. For example, when the crown height is doubled, the moment forces are doubled. Therefore, under ideal, low-force conditions (crown height less than 15 mm, no parafunction, older female patient, opposing a maxillary denture), the cantilever may be up to 1.5 times the A-P spread for OD-4 overdentures. When the force factors are moderate, the cantilever should be reduced to 1 time the A-P spread. The amount of distal cantilever is related primarily to the force factors and to the arch form, which corresponds to the A-P spread.

Patient Selection Criteria: OD-4

- Moderate to severe problems with traditional dentures
- Needs or desires are demanding
- Need to decrease bulk of prosthesis
- Inability to wear traditional prostheses
- Desire to abate posterior bone loss
- Unfavorable anatomy for complete dentures
- Problems with function and stability
- Posterior sore spots
- Opposing natural teeth
- C–h bone volume
- Unfavorable force factors (parafunction, age, size six, crown height space >15 mm)

Overdenture Option 4

The patient benefits from the four-implant option because of greater occlusal load support, lateral prosthesis stability, and improved retention. The prosthesis loads the soft tissue over the buccal shelf and the first and second molars and retromolar pad regions. Therefore, the amount of occlusal force on the implant system is reduced because the bar does not extend to the molar position, where the forces are greater.

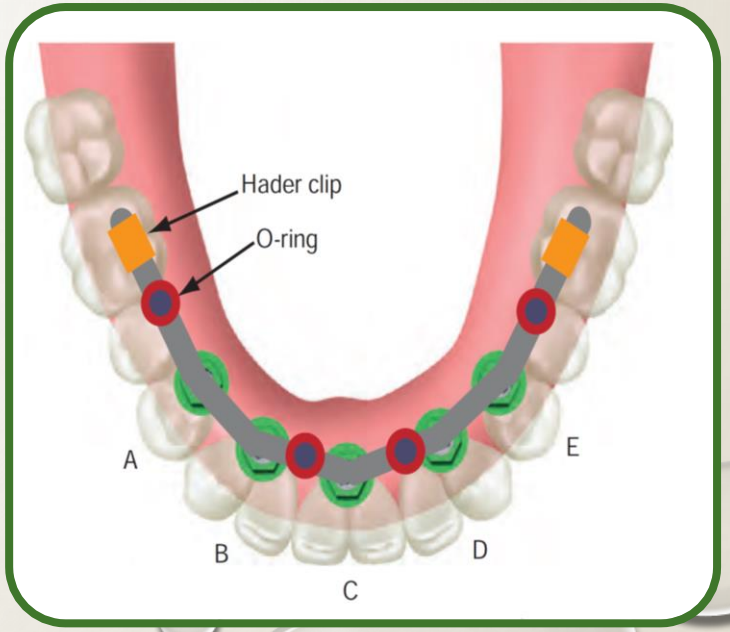
The OD-4 treatment option is the lowest treatment rendered when the patient has maxillary teeth. The greater vertical and horizontal forces to the mandibular IOD require anterior disclusion in excursions to decrease the bite force. As such, more anterior implants are required under these conditions. The next treatment plan option for the patient with a moderate financial budget is to add an additional implant in the future in one of the first molar positions (preferred) or the C position.

Both of these options increase the A-P spread to fabricate a RP-4 prosthesis with an enhanced implant system support. The goal is to convert all patients eventually to a RP-4 or fixed restoration to prevent posterior bone loss and its associated disadvantages (including esthetics of the posterior facial regions).

Overdenture Option 5

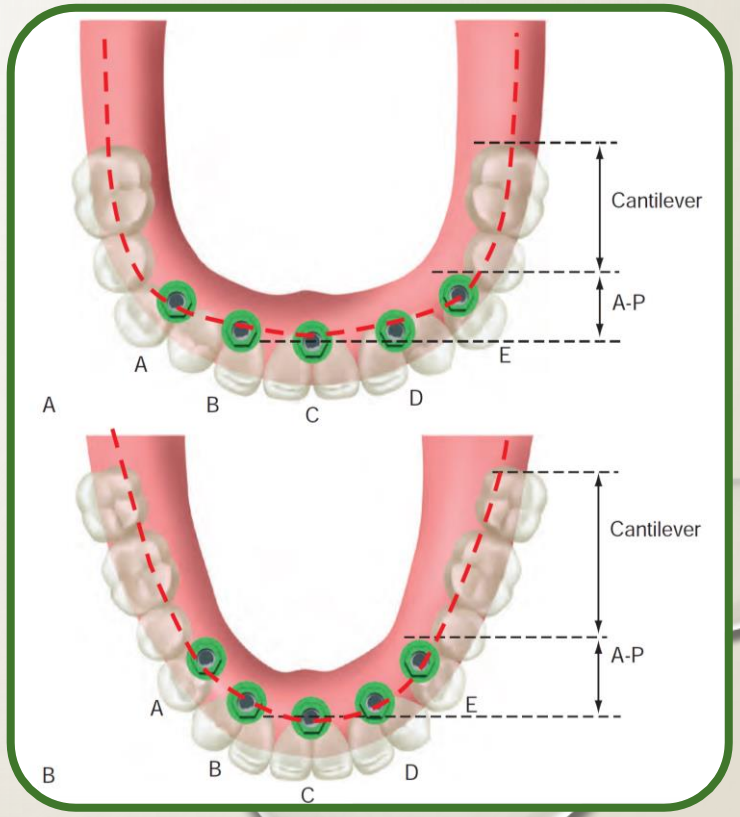
In the OD-5 treatment option, five implants are inserted in the A, B, C, D, and E positions. The superstructure is usually cantilevered distally up to two times the A-P spread (if almost all of the stress factors are low) and averages 15 mm, which places it under the first molar area.

The amount of the distal bar cantilever is related to the A-P distance. The forces exerted on cantilevered bar designs and implants have been studied by several authors. A constant finding is that the most distal implants receive stresses two to three times greater than the other implants. The highest concentration of stresses is at the level of the crest distal to the most distal implant on the loaded side. No statistical differences were found between different implant lengths. The stresses increase with the length of the cantilever. Therefore, stress factors need to be evaluated carefully and pondered before an extended cantilever is designed. Stresses are magnified in direct proportion to the length of cantilever and should be planned carefully based on the patient's force factors and the existing anatomy.



Overdenture Option 5

The A-P distance is greater than in OD-4 because the C implant is often more anterior than the B and D implant sites. A square ridge form usually has an A-P spread of less than 5 mm and should have a minimum cantilever even with five implants joined together. An ovoid arch has an A-P spread from 5 to 8 mm, and a tapered arch form more than 8 mm. In these situations, a cantilever of two times this distance is indicated when force factors are not excessive.



Patient Selection Criteria: OD-5

- Moderate to severe problems with traditional dentures
- Needs or desires are demanding
- Need to decrease bulk of prosthesis
- Inability to wear a traditional prosthesis
- Desire to abate posterior bone loss
- Unfavorable anatomy for complete dentures
- Problems with function and stability
- Posterior sore spots

- Moderate to poor posterior anatomy
- Lack of retention and stability
- Soft tissue abrasion
- Speech difficulties
- More demanding patient type
- Maxillary teeth or fixed implant prostheses
- Angle's class II division I mandible restored to class I

THANK YOU