



# Treatment Planning: Implant-Supported Partial Overdentures

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## ABSTRACT

When multiple anterior teeth are missing, many options of replacement are available. Traditionally, the choice was between a fixed or removable prostheses. Today, with the predictability of dental implants, the options of tooth replacement range from removable partial dentures to implant-supported fixed prostheses.<sup>1,2</sup>

The choice of which restoration that will best provide occlusion and esthetics depends on multiple factors including the number and location of missing teeth, the residual ridge form in relation to the replacement teeth, the relationship of the maxillary and mandibular anterior teeth, the condition of teeth adjacent to the edentulous span, the amount of bone available for implant placement, the patients "smile line" and display of teeth, lip support, and financial constraints.<sup>3-6</sup>

When there is minimal loss of the ridge contour, restorations that emerge from the ridge are the most functional and esthetic restorations, adhesive-type fixed partial dentures, conventional fixed partial dentures, and implant-supported restorations can be indicated with the choice of restoration dependent on a risk benefit and cost benefit analysis. When there is a loss of ridge contour due to residual

ridge resorption or trauma, the decision becomes more complex as not only does the tooth structure need to be replaced, the ridge form also has to be replaced. (Figures 1 and 2). This can be assessed clinically as illustrated by Figures 1 and 2 where a discrepancy in arch form and ridge form in relation to the adjacent teeth and/or opposing arch can be observed. Other considerations are lip support and display of the teeth when smiling.

This article presents a case and rationale for implant-supported partial overdentures. Many authors have written on the merits of complete overdentures. The complete overdenture has proven to be an improvement over conventional complete prostheses with respect to chewing efficiency, patient comfort and satisfaction.<sup>7-10</sup> In partial edentulism, the implant-supported overdenture has several advantages, some in common with a removable partial denture.



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**F**actors that are similar to removable partial dentures as a choice would be unrestored abutment teeth, poor condition of abutment teeth, and long edentulous spans. Many patients prefer not having their abutment teeth prepared for fixed partial denture retainers, especially if their abutment teeth are largely unrestored and not in need of restorative care. Specific to anterior edentulous areas, excessive residual ridge loss from trauma or residual ridge resorption are also factors to consider since esthetics can be paramount in the anterior area (Figures 3-5). The relationship of the edentulous ridge areas to the opposing occlusion will dictate the length and inclination of the prosthetic teeth. The teeth, in turn, can impact lip support and lip esthetics. In order to reconstruct residual ridge deficiencies, grafting procedures have been described to improve residual ridge forms.<sup>11-14</sup> Unfortunately, these procedures are not always completely successful. Increasing ridge width is often accomplished with more certainty than increasing the height of the ridge. Distraction osteogenesis is a method to accomplish increased height of the ridge, however, increased width may also be required and a bone graft may have to be performed.<sup>15,16</sup> There also remain some patients who are resistant to multiple surgical procedures and protracted treatment times. For these patients, removable partial dentures or implant-supported overdentures can be an esthetic, functional restoration with the denture flange compensating for the missing ridge tissues.

Partial overdentures supported by natural dentition are not new to dentistry. Many authors have described tissue bars attached to teeth adjacent to



**Figure 1.** Articulated casts indicating severe ridge resorption and deficiency replacement pontics would have to procline severely to obtain horizontal overlap of the maxillary incisors.



**Figure 2.** Occlusal view illustrating loss of ridge tissue, which also requires replacement for esthetics.



**Figure 3.** Anterior view of fixed partial denture replacing teeth Nos. 7-10. Note proclination of maxillary incisors.



**Figure 4.** Tissue bar in place of patient in Figure 3.

the edentulous span and having the pontic section clip onto the tissue bar. The pontic section incorporates a flange, thus allowing the teeth and missing tissue to be restored.<sup>17-21</sup> This type of restoration is complex and difficult to maintain. Failure of any part of the restoration is difficult to manage and often will result in a remake of the restoration to include the fixed portion (Figure 6).

Implant-supported overdentures, in many situations, may provide all the benefits of a removable partial denture and conventional partial overdenture while reducing the maintenance requirements and having the prostheses independent from the rest of the dentition. This also allows unrestored teeth adjacent to the edentulous

span to remain intact and the overdenture prostheses to be maintained separately. Moreover, the implant-supported overdenture uses the implants as support for the restoration and not the remaining teeth or mucosa. When seated, the prostheses is rigidly attached to the implants, providing a more secure restoration for the patient. Another advantage is that the surgical placement of the implants for this type of restoration is less demanding as the implants do not have to be related to individual teeth. The only requirements for use of the implant-supported partial overdenture are that sufficient inter-occlusal space exists to accommodate the restoration and sufficient bone is available to receive the implants.



**Figure 5.** Improved esthetics with reorientation of pontics and a flange to replace missing ridge tissue.



**Figure 6.** Assembled restoration in Figure 5 prior to insertion. Note thickness of flange replacing lost ridge tissue and the complexity of the restoration making maintenance difficult.



**Figure 7.** Initial presentation of patient with teeth Nos. 9 to 12 missing and severe ridge defect.

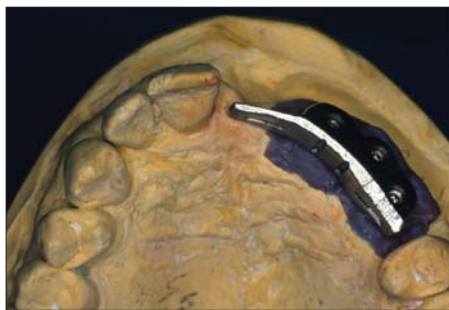


**Figure 8.** Implants in position.

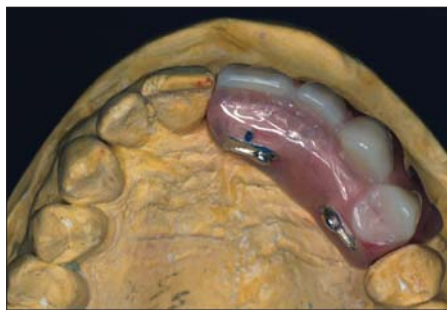
### Case Presentation

A patient presented with a history of trauma to the maxilla. Teeth Nos. 9 to 12 were avulsed and significant ridge loss resulted as evidenced clinically (Figure 7). The patient presented with a removable partial denture and was satisfied with the esthetics of the restoration. However, he desired a more stable prostheses that would provide similar esthetics. The patient was provided with treatment options to restore the missing alveolar ridge tissue, which would require multiple surgeries. He elected to have an implant-supported overdenture to restore the missing teeth and tissue. Sufficient implants were planned to support a fixed prostheses as the occlusal forces would be borne by the implants alone and not shared with tissues. The

distribution of the implants was planned to maximize stability of the prosthesis to avoid an axis of rotation (Figure 8). After a suitable time to allow implant integration, a substructure bar was fabricated. The substructure was verified for passivity to the implants with a screw test where one screw was placed on one of the terminal implants and the fit of the bar evaluated radiographically. Then, the superstructure bar and overdenture were fabricated to fit over the tissue bar. When seated, the restoration was rigidly fixed to the underlying tissue bar by way of locking swivel clips (Figure 10). While seated, and with swivel clips locked, the prostheses was rigidly fixed to the substructure bar and implants, but could easily be removed when the clips were unlatched. The arch form and dentition



**Figure 9.** Substructure on cast, occlusal view.



**Figure 10.** Overdenture in place over substructure, note how the flange compensates for the severe ridge defect.



**Figure 11.** Intraoral view of prostheses in place.



**Figure 12.** Extraoral view of prostheses. It is always difficult to manage the tooth-prostheses interface when there is severe tissue loss and the tooth is left unrestored.

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was restored with the partial overdenture (Figures 9, 10). The bar and prostheses were delivered to the patient, who was satisfied with the stability and esthetics of the restoration.

### Summary and Conclusions

Implant-supported overdentures can provide many of the same advantages of removable partial dentures when restoring lost teeth and alveolar tissue. Implant-supported overdentures have the added advantage of obtaining their support from the implants, and having minimal tooth and tissue coverage. These factors will often favor the use of implant-supported overdentures and should be considered when contemplating treatment options. CDA

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