

Prosthodontics

NEWSLETTER

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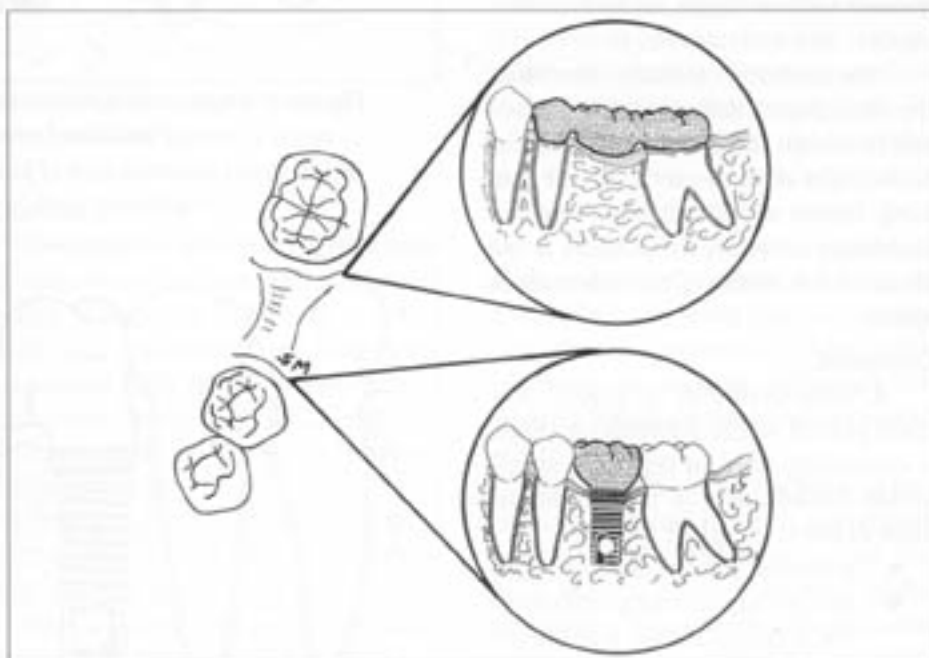
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Treatment planning for partial edentulism is less straightforward today.
See *Treatment of Bounded Edentulous Spaces*, inside.

Treatment of Partial Edentulism

At one time, planning the replacement of missing teeth for the partially edentulous patient was relatively straightforward. A fixed partial denture was considered optimal treatment and a removable partial denture the less desirable alternative. Nevertheless, recent studies and advances in materials and methods have substantially complicated the decision-making process. This issue of *Prosthodontics Newsletter* reviews several recent articles related to the treatment of partial edentulism.

**NEW LOCATION
FALL 2000**

Implant Replacement of Single Molars

A recent clinical report on implant prosthodontics described the replacement of a single mandibular molar with two different approaches. One patient was restored with two standard-diameter implants that supported a single molar. The other patient was treated with a single wide-diameter implant and a molar crown.

The authors carefully described the clinical and laboratory procedures and reviewed the advantages and disadvantages of each method. One limiting factor to the double-implant technique noted by the authors is the mesio-distal width of the edentulous space.

Comment

A wide-diameter implant, centrally placed in the edentulous ridge, is commonly used to replace a single molar. Disadvantages of the single, wide-diameter implant include:

- potential for screw loosening
- smaller supporting platform for the artificial crown (cantilevering effect)
- potential for mesial and distal food-trap embrasures (Figure 1).

The double-implant design improves the resistance to screw loosening and widens the supporting area to reduce the cantilevering effect. However, the small tunnel-shaped embrasure between the two implants is difficult to clean (Figure 2). Commonly, the mesio-distal width of the edentulous space will not accommodate two implants, so this approach is only possible when the space is somewhat large.

When there is adequate inter-tooth space to place two implants, the space can also be restored with two splinted premolar crowns (Figure 3). The two splinted premolars will resist

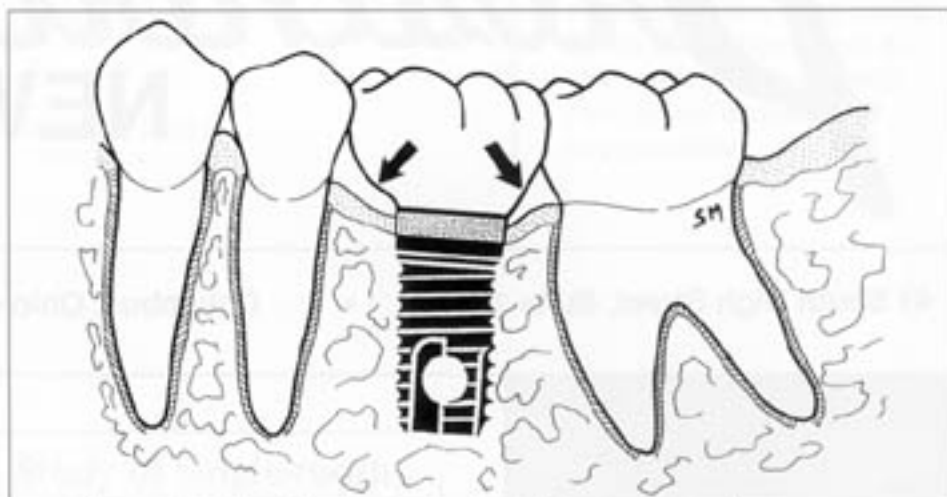


Figure 1. Single wide-diameter implant that supports a molar crown can result in mesial and distal embrasures that are food traps (arrows). Recalcitrant accumulation of food interproximally can cause root caries on adjacent teeth or periodontal inflammation.

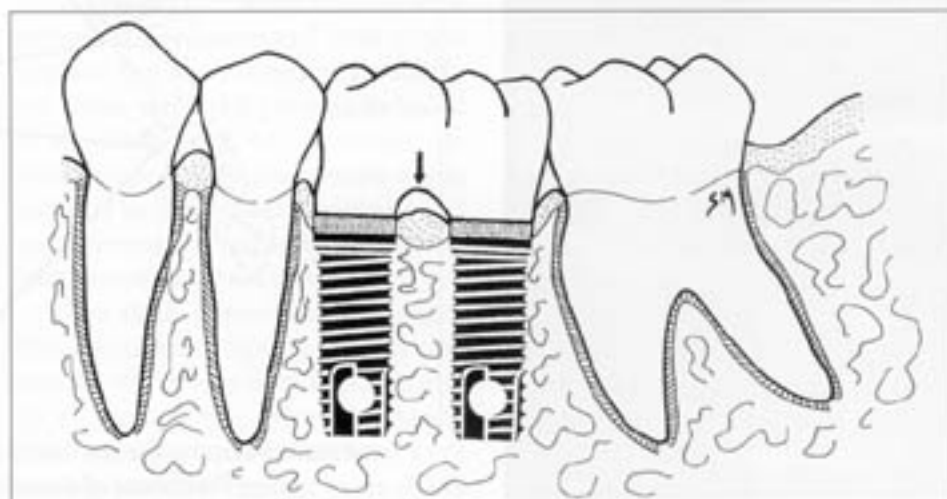


Figure 2. When adequate space exists, two standard-diameter implants can support a single molar; nevertheless resultant tunnel-embra- sure (arrow) can impede oral hygiene.

screw loosening, and the embrasure between the two artificial crowns can be made more accessible for oral hygiene. The smaller occlusal tables of the premolars will further reduce the cantilevering effect and improve the biomechanics.

Blatz MB, Strub JR, Gläser R, et al. Use of wide-diameter and standard-diameter implants to replace single molars: Two case presentations. *Int J Prosthodont* 1998;11:356-63.

Analyzing the Status of Dentition and Nutritional Intake

A recent study examined the nutritional intake of 638 middle-aged men and compared the results to the number of remaining teeth and the presence or absence of replacements for any missing teeth.

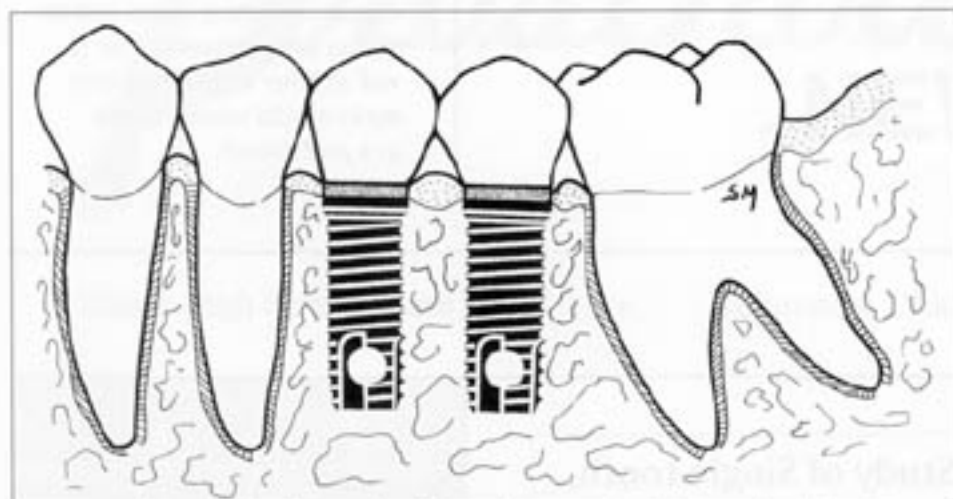


Figure 3. An alternative design when two implants are placed is prosthesis with two splinted premolars.

An intact dentition was present in 114 men. Missing teeth were replaced with one or two removable partial dentures in 123 men. A partially compromised dentition (compromised on one side only) was present in 101, with a compromised dentition in 224 men. The remaining men wore complete dentures.

Dietary intake was obtained from a diet history, and masticatory function was also objectively measured. Results were analyzed and compared to the recommended dietary allowances (RDA) for nutrients.

Results indicated that consumption of calories, protein and fiber tended to decline with declining status of the dentition. Patients treated with complete dentures consumed the fewest calories.

Masticatory performance was positively correlated with intakes of dietary fiber and most vitamins and minerals. Mean intakes of dietary fiber, zinc, magnesium and calcium were below the RDA levels for all categories of dentition.

The number and location of missing teeth and the presence of removable dentures were important predictors of nutritional intake.

Comment

Nutritional intake can positively or negatively influence the general health of patients. Diets high in fiber, fruits and vegetables have long been associated with reducing risk factors for cancer. A diet high in fat will significantly increase the risk of cardiovascular disease.

The results of this study suggested that the overall quality of the patient's diet correlated to the quality of the dentition. Patients with well-functioning, intact dentitions had the best diets.

Adequately restored dentitions produced results similar to intact dentitions. Masticatory performance, a predictor of the adequacy of the diet, can also affect a patient's quality of life by allowing the selection of a variety of nutritious foods.

Replacement of missing teeth in partially edentulous patients appears to not only have a positive effect on their dental health, but also to favorably affect their general systemic health.

Krall E, Hayes C, Garcia R. How dentition status and masticatory function affect nutrient intake. *JADA* 1998;129:1261-9.

Treatment of Bounded Edentulous Spaces

A bounded edentulous space is a condition where a tooth is extracted and teeth adjacent to the edentulous space remain. Dentists have been taught that loss of a tooth will interrupt the integrity of the dental arch and lead to future problems that may include loss of additional teeth. For this reason, most dentists recommend replacement of missing teeth as soon as possible after extraction.

This retrospective study evaluated the survival of teeth adjacent to 569 bounded edentulous spaces. Data were obtained from the records of three treatment centers. All patients selected for the study had been examined after a minimum of three years following extraction, although the range of follow-up time periods varied greatly.

Results indicated that the vast majority of teeth adjacent to edentulous spaces during the duration of the study were not lost. Treatment of the edentulous space with a fixed partial denture (FPD) produced a statistically significant modest improvement in the survival of adjacent teeth. Treatment with a removable partial denture (RPD) did not result in a statistically significant increase in survival.

Comment

This study allows the evaluation of data from a relatively large number of patients. Such retrospective studies are becoming more popular in dentistry. They are much less expensive than randomized, controlled clinical trials where the method of treatment is randomly assigned and patients are followed from the onset of the study. In a retrospective study, the experimental design and data analysis occur after treatment has been provided.

Next:

- Retainer design of resin-bonded FPDs
- Strength of carbon-fiber posts
- Role of beryllium in nickel-chromium alloys

Our next report features a discussion of these claims and the studies which support them, as well as other articles exploring topics of vital interest to you as a practitioner.

There are, however, a number of limitations to any retrospective study. In this particular study, the investigators only reviewed records and did not examine the patients themselves. The only criterion for "problems" was loss of a tooth. Other undesirable clinical outcomes, such as periodontal disease, malocclusion or hypermobility of teeth, were not reported.

In addition, because the method of treatment was not random but selected by the dentists and patients, bias was inevitable. Teeth with the best prognosis would more likely be chosen as abutments to FPDs, whereas those with a poorer prognosis may have been used as abutments for RPDs.

Finally, replacement or the lack of replacement of missing teeth is elective and is strongly influenced by factors such as economic conditions. Socioeconomic status probably had a major influence on the treatment methods being selected. A total of 290 edentulous spaces were not restored, while 124 were restored with FPDs and only 37 with RPDs. A more uniform distribution of treatment methods may have improved the statistical power of the experiment and altered the results.

Shugars DA, Bader JD, White BA, et al. Survival rates of teeth adjacent to treated and untreated posterior bounded edentulous spaces. JADA 1998;129:1089-95.

Study of Single-tooth, Implant-supported Crowns

A prospective study of prosthetic complications associated with a new implant system was recently published. There were 168 patients included in the study with 432 posterior implants placed. All implants were manufactured by Bicon Dental Implants and were restored with free-standing (unsplinted) artificial crowns.

The study period was four years. The cumulative implant success rate was 90.0% for maxillary implants and 96.8% for implants placed in mandibles. Prosthetic complications were uncommon. Over the four years, 0.74% of the abutments loosened, 0.50% of the abutments fractured, and porcelain fractures occurred in 2.47% of the artificial crowns.

Comment

The implant system studied has a unique abutment-connection design that incorporates a locking-taper system. The abutment has a post with a 1.5° to 2° taper that frictionally locks into a socket contained in the implant with a comparable taper. Most contemporary implant systems depend on a screw joint to attach the abutment to the implant.

The investigators strongly favor this locking-taper design and assumed that the extremely low rate of short-term prosthetic complications was the result of the frictional fit between the abutment and implant. Studies of screw-retained implant-abutment systems have reported substantially higher complication rates.

Although the study was four years in duration, there is no information on the mean follow-up time for the restorations. Nevertheless, it can be assumed that the majority of the restorations were followed for less than two years. From these results, it appears that this new system can reduce the incidence of short-term prosthetic complications with single implant-supported crowns.

Muftu A, Chapman RJ. Replacing posterior teeth with freestanding implants: Four-year prosthodontic results of a prospective study. JADA 1998;129:1097-1102.

Do you or your staff have any questions or comments about Prosthodontics Newsletter? Please write or call our office. We would be happy to hear from you.