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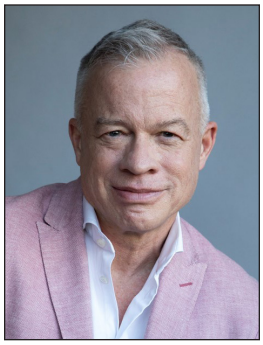

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Prosthodontics Newsletter™
Focusing on Dental Implants

Treatment Design and Implant Overdenture Outcomes

When practitioners prescribe implant overdentures, many treatment decisions—including choice of attachment systems, number of implants, functional loading protocol and prosthesis design—have a major impact on therapeutic outcomes. Optimized treatment requires a clear understanding and correct application of these factors during treatment planning. This issue of Prosthodontics Newsletter visits recently published evidence that will better prepare the practitioner to consider scientifically based outcome expectations during treatment planning for edentulous patients.

Restoration Type and Quality of Life

While patients tend to prefer a fixed prosthesis over a removable one, fixed prostheses are typically more complicated, more invasive and more expensive, but evidence has been lacking about the impact of restoration choice on oral health-related quality of life (OHRQoL).

Kusumoto et al from the Showa University School of Dentistry, Japan, used the Japanese version of the Oral Health Impact Profile (OHIP-J) to compare patients' OHRQoL after receiving fixed complete dentures or removable overdentures. They analyzed data from 72 patients (36 with fixed complete dentures, 36 with either 2 removable overdentures or a maxillary conventional complete denture and a mandibular overdenture). In addition to overall OHIP scores, they analyzed subscores in 4 dimensions:

- oral function
- orofacial pain
- orofacial appearance
- psychosocial impact

Lower OHIP scores indicated better OHRQoL.

Patients receiving fixed complete dentures had lower OHIP scores, but the difference between the groups was not statistically significant. Oral function and orofacial pain dimension scores were lower in the fixed complete denture group; scores in the orofacial appearance and psychosocial impact dimensions were lower in the overdenture group. None of these differences achieved statistical significance.

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Restoration Type and Quality of Life

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Comment

These results showed that OHRQoL was equivalent, regardless of type of restoration. A large-scale, randomized controlled trial is needed to confirm these findings; but based on current knowledge, the choice of implant-supported fixed complete dentures or implant-supported overdentures for restoring the dentition in edentulous patients should be based on factors other than OHRQoL.

Kusumoto Y, Tanaka J, Miyoshi K, et al. Impact of implant superstructure type on oral health-related quality of life in edentulous patients. Clin Implant Dent Relat Res 2020;22:319-324.

Maxillary Overdentures With Stud Attachments

Long-term studies have demonstrated excellent results for removable implant-supported overdentures in the mandible, while less successful results have been seen for similar restorations in the maxilla. Compromised bone quality and quantity may create a less favorable environment for implants. Evidence based on systematic reviews recommends using ≥4 implants to support maxillary overdentures (see "Maxillary Overdentures: How Many Implants?" in this newsletter). Although bar-retained maxillary overdentures have a high survival rate, little evidence exists on treatment outcomes for unsplinted overdentures.

Lian et al from Shanghai Jiao Tong University, China, performed a retrospective study comparing outcomes in patients whose edentulous maxillae were restored with implant-supported overdentures retained by stud attachments or by bar attachments. All patients received 4 maxillary implants accompanied, when necessary, by guided bone regeneration. The implants were restored after a 3- to 6-month healing period. At the final follow-up (median, 82 months), implant survival, peri-implant clinical parameters, peri-implant bone resorption and prosthetic maintenance requirements were recorded, along with patient satisfaction levels.

Implant survival rate was >90%, with no significant difference between the groups. No significant differences were seen between the groups for peri-implant bone resorption, gingival index or modified sulcus bleeding index; modified plaque index was significantly higher in the bar-retained group. The amount of prosthetic maintenance was equivalent in both groups; the most frequently required maintenance in the stud-retained group involved changing stud denture caps and relining overdentures, while, in the bar-retained group, it was reactivation of the bar clip and relining overdentures. Patient satisfaction was equally high in both groups.

Comment

This study found few significant differences in outcomes between patients receiving stud-retained or bar-retained maxillary 4-implant–supported overdentures. Given the ease of cleaning and repairing them, stud-retained overdentures should be considered a viable solution when planning treatment.

Lian M, Zhao K, Wang F, et al. Stud vs bar attachments for maxillary four-implant–supported overdentures: 3- to 9-year results from a retrospective study. Int J Oral Maxillofac Implants 2019; 34:936-946.

Maxillary Overdentures: How Many Implants?

Implant-supported overdentures represent a satisfactory and functional prosthetic rehabilitation at a reasonable cost. The first choice for an edentulous mandible should be a 2-implant–supported overdenture. But no such consensus exists about how many implants should support an overdenture in an edentulous maxilla. Di Francesco et al from Campania University Luigi Vanvitelli, Italy, undertook a systematic review of the relevant literature and performed a meta-analysis of the data in an attempt to answer this important question.

The authors searched for randomized controlled trials, along with prospective and retrospective studies of ≥10 edentulous patients treated with maxillary implant-supported overdentures with a ≥2-year follow-up. They found 28 studies published between 2000 and 2017 that met the inclusion criteria. Four of these studies were carried forward

Table 1. Survival rates of maxillary implants and overdentures by number of implants placed.

No. of implants	Survival rate	
	Implants	Overdentures
>4	96.4%	99.4%
4 splinted	94.9%	96.1%
4 unsplinted	98.3%	98.4%
<4	92.9%	100%

to contribute to the quantitative analysis. The number of implants placed in the maxilla ranged from 2 to 8 per patient, although no study published after 2008 placed >6 implants in any patient.

Implant survival rate ranged from 73.5% to 100%; maxillary implant-supported dentures with 4 unsplinted implants had the highest implant survival rate. Studies of restorations with 4 splinted implants had a wider variance of survival, but almost all of these studies reported an implant survival rate of >95%. The survival rate for the maxillary overdentures was quite high and was not affected by the number of implants placed (Table 1).

Patient satisfaction scores were consistently high, regardless of the number of implants used and the anchorage system employed. A meta-analysis of 4 studies involving 730 implants that compared overdentures retained with 4 splinted implants and those retained with >4 splinted implants showed no significant differences between the 2 groups.

Comment

Although the number of implants placed did not appear to influence overdenture survival rates, restorations using ≥4 implants led to higher implant survival rates. Future large-scale, standardized prospective randomized clinical trials are needed to determine the ideal number of implants for maxillary implant-supported overdentures.

Di Francesco F, De Marco G, Carnevale UAG, et al. The number of implants required to support a maxillary overdenture: a systematic review and meta-analysis. J Prosthodont Res 2019;63:15-24.

Patient Satisfaction With Implant-Supported Overdentures

While clinical outcomes of dental implant therapy are extremely important, too often patient-reported outcomes have been overlooked. Innumerable studies have shown that implant-retained overdentures are an effective clinical solution for edentulous patients. But to avoid technical complications and adverse effects, overdentures require a higher level of maintenance care by the patient than do fixed implant-supported prostheses, which may have a negative impact on their oral health-related quality of life (OHRQoL).

As patients age, it may become more difficult for them to maintain the level of oral hygiene needed to keep implant-supported overdentures in good working order. Zhang et al from the University of Hong Kong conducted a prospective study that collected patient-reported outcome measures (PROMs), along with clinical outcomes, in a cohort of patients ≥60 years old who received 2-implant–supported mandibular overdentures to replace deficient complete dentures.

Each patient in the original group received new complete dentures; patients who remained dissatisfied with their dentures after 3 months were offered implant-supported mandibular overdentures. Outcomes were evaluated 6 months after restoration and annually thereafter up to 5 years. At each recall, clinical results (assessment of denture quality, and number of procedures and complications) and PROMs (based on 2 satisfaction questionnaires) were recorded.

At 5 years, cumulative implant survival rate was 99%. Both denture quality and occlusion showed significant improvement over baseline, with the scores for mandibular denture quality >98% and maxillary denture quality >91% at 5 years. Technical complications and adverse events were highest in the first year; about half these problems occurred in <20% of patients. The level of patient dissatisfaction plummeted 6 months after receiving their implant-supported overdentures; patients continued to report very low dissatisfaction scores through the 5-year follow-up.

Comment

After 1 year in service, technical complications and other adverse effects had no significant effect on long-term patient satisfaction. Two-implant–supported mandibular overdentures were a reliable and effective treatment for edentulous patients that significantly improved their OHRQoL.

Zhang Y, Chow L, Siu A, et al. Patient-reported outcome measures (PROMs) and maintenance events in 2-implant-supported mandibular overdenture patients: a 5-year prospective study. Clin Oral Implants Res 2019;30:259-274.

Outcomes for Immediately Loaded Overdentures

Ideally, the use of an immediate loading protocol for implant-supported overdentures carries several advantages: it reduces the number of surgeries, leading to a reduction of morbidity; shortens the amount of time needed until prosthetic restoration; lowers the patient cost for restoring masticatory functional occlusion; and improves esthetics. Long-term implications and outcomes have not been available. Alfadda et al from King Saud University, Saudi Arabia, assessed clinical and patient-based outcomes of immediately loaded 2-implant bar-retained mandibular overdentures after 14 years of follow-up.

A group of 35 patients each received 2 endosseous implants. While the patients underwent surgery, their existing complete dentures were hollowed out and relined, then returned to the mandible in direct contact with the newly placed implants. Ten days later, a bar/clip system was retrofitted to the overdenture. As a control group, the researchers chose 16 patients with conventionally loaded implants who were matched to the experimental group by age, implant type, prosthesis type and length of follow-up.

The primary outcome measure was implant success rate; secondary outcome measures included patient satisfaction, measured using the Denture Satisfaction Scale, and oral health-related quality of life, measured by the Oral Health Impact Profile questionnaire (OHIP-20).

All 35 patients who received the immediately loaded overdentures participated in the 10-year follow-up; 19 were available at the 14-year follow-up. At 10 years, only 4 of the 70 implants had failed, for a success rate of 94%. No further implant failures were seen at 14 years. These results were not significantly different from those in the control group (Table 2). The patients reported significant improvement in mandibular, functional and total scores for denture satisfaction at both 5 years and 14 years; their total OHIP-20 scores also improved significantly, as did their functional and psychological subscores.

Table 2. Implant success rates.

Group	Implants placed	Implants failed	Success rate
Conventional/delayed loading, 14-year follow-up	32	0	100%
Immediate loading			
14-year follow-up	38	4	89%
10-year follow-up	70	4	94%

Comment

This study showed that immediate loading of implant-supported mandibular overdentures is a predictable treatment approach that provides results comparable to those obtained using a conventional loading approach.

Alfadda SA, Chvartszaid D, Aldosari AA. Clinical outcomes of immediately loaded implant-supported overdentures: a long-term prospective clinical trial. J Prosthet Dent 2019;121:911-915.

In the Next Issue

The art and science of optimal hygiene for dental implants

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

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.