- Nonetheless, reline/rebase procedures remain very much in use, since bilateral distal extensions in mandibular implant overdenture prostheses need to be serviced as an integral part of oral health maintenance protocols, eg, reline procedures, albeit not as frequently as when implant abutments are not present.
- An unintended sequel in managing edentulous patients with implant-supported overdentures has been that implants sometimes allow less than ideal prostheses to function. It must not be forgotten that the loss of a natural dentition and its prosthetic replacement (irrespective of the prescribed protocol) remains a significant transition with psychologic and biologic unknowns. Dentists need to be astute at communicating with their patients to best assist them with such changes and the different prosthodontic options available. Furthermore, the recent

introduction of digital denture planning and manufacture may assist dentists to provide an even more predictable treatment outcome for their patients.

Bibliography

- Zarb GA, Hobkirk J, Eckert S, Jacob R. Prosthodontic Treatment for Edentulous Patients, 13th ed. St Louis: Elsevier, 2013.
- Gonzalez MAG, Abu Kasim NH, Naimie Z. Soft skills and dental education. Eur J Dent Educ 2013;17:73–82.
- Zarb GA, Schmitt A. The edentulous predicament, II: Longitudinal effectiveness of implant supported overdentures. J Am Dent Assoc 1996;127:59–65.
- Lozada, JL, Garbacea A, Goodacre CJ, Kattadiyil MT. Use of a digitally planned and fabricated mandibular complete denture for easy conversion to an immediately loaded provisional fixed complete denture. Part 1. Planning and surgical phase. Int J Prosthodont 2014;27:417–421.

Implant Overdenture Therapy for the Edentulous Patient

Dr Francesco Bassi

University of Turin, CIR Dental School, Turin, Italy

- In the mid- to late-1980s post-Brånemark implant era, implant-supported and retained overdentures (IODs) were clinically prescribed as an interim measure whenever fixed treatment was neither feasible nor affordable or as a result of the loss of two or more of the usually prescribed five to six implants. The latter number had been promoted and presumed necessary to provide ideal support for a fixed prosthesis. However, numerous early reports appeared that attested to the efficacy of planned, as opposed to default IOD treatment—especially for edentulous mandibles.
- Subsequent specific overdenture studies using both in vitro and in vivo research designs reported enhanced patient-perceived self-esteem, sensitivity receptors, prosthesis stability, and retardation in the rate of alveolar ridge reduction. It was, therefore, tempting for the profession to go so far as to suggest that the edentulous mandible should be best and routinely managed with implant overdenture therapy.
- Empirical discussions and debates continue regarding the benefits of different technical prosthodontic approaches and philosophies, eg, resilient versus rigid retentive designs. Resilient retention mechanisms are widely recommended for the anchorage

of overdentures to implants, based on the assumption that this will protect implants from overload. However, in vivo research measurements of patients with two mandibular implants supporting an overdenture do not suggest a compelling preference for one type of anchorage device or retention mechanism over another; they are all arguably equally efficient. A popular belief among dentists is that implants splinted via bars may contribute to load sharing and ensure osseointegration longevity. The accompanying figures are examples of the range of frequently employed, and readily available, retention design techniques (Figs 1 to 4).

- A simple and prudent clinical overdenture protocol that may be applied to virtually all eligible edentulous patients would include these considerations:
 - Considerable clinical support for a mandibular IOD protocol based on two splinted or unsplinted dental implants is reported as a popular and perhaps even optimal approach. However, a few recent reports also underscore the merits of prescribing only one implant.
 - 2. Maxillary IOD treatment tends to focus on the need for a minimum of four preferably splinted implants to provide the necessary retention and support, especially when adjunctive hard palate support cannot be recruited into the planned design.
 - Considerations influencing the choice of an attachment system are numerous and include the number of supporting implants and their distribution over the ridge, type, and size of preferred ball abutments; length of planned bar segments;



Fig 1 Clinical examples of retention designs: **(a)** with two balls (Nobel Biocare SDCA 527-0 SDCA 4-mm diameter) and **(b)** with a bar attached/splinted to two implants.



Fig 2 Another clinical example of mandibular edentulous implant-supported overdenture (IOD) management with two ball attachments (Nobel Biocare REF 31906 2.25-mm diameter).



Fig 3 Clinical examples of **(a)** a bar on six implants with three ball attachments (Tima Unor) and **(b)** an occlusal view of the actual IOD. The metal part, corresponding to the Tima attachment, enables the clinician to assess the amount of the extension needed to support the lip.



Fig 4 Mandibular IOD, in which the O-ring (Nobel Biocare DCA 109-0) in the right female attachment is worn out and has lost its retentive elasticity. It had to be substituted with a new one.

number of matrices; and the degree of residual ridge resorption.

- Implant abutment availability that ensures denture retention and stability should not be employed to compensate for technically and functionally inadequate dentures.
- Optimal complete denture fabrication techniques should be preferably combined with short surgical interventions that minimize patient and tissue stresses, thereby optimizing and expanding the technique's potential.
- 6. Esthetic objectives can be frequently addressed and achieved with greater ease by using the overdenture technique. This can be particularly difficult to accomplish with a full-arch maxillary fixed implant prostheses prescription, especially when moderate to advanced residual ridge resorption has occurred.
- 7. Esthetic complete denture design should not be compromised by the location of implants and their connection to the attachment system.
- Reconciling the osseointegration technique with traditional, time-proven overdenture protocols launched an entirely new and efficient way of dealing with mandibular edentulism, particularly for patients who had demonstrated a maladaptive prosthetic experience. However, the harsh realities of global socioeconomic aspects of the edentulous

populations that could benefit most from the service preclude its routine prescription: This cohort simply cannot afford it. It is tempting to suggest that a better treatment option for edentulous patients, especially those with mandibular denture adaptation problems, may very well be a complete maxillary denture opposing a mandibular overdenture—whenever a patient can afford it.

Recommended Reading

- Menicucci G, Lorenzetti M, Pera P, Preti G. Mandibular implantretained overdenture: A clinical trial of two anchorage systems. Int J Oral Maxillofac Implants 1998;13:851–856.
- Pera P, Bassi F, Schierano G, Appendino P, Preti G. Implant anchored complete mandibular denture: Evaluation of masticatory efficiency, oral function and degree of satisfaction. J Oral Rehabil 1998;25:462–467.
- Raghoebar GM, Meijer HJ, Slot W, Slater JJ, Vissink A. A systematic review of implant-supported overdentures in the edentulous maxilla, compared to the mandible: How many implants? Eur J Oral Implantol 2014;7(suppl 2):S191–S201.
- Attard NJ, Zarb GA. Long-term treatment outcomes in edentulous patients with implant overdentures: The Toronto study. Int J Prosthodont 2004;17:425–433.
- Walton JN, Glick N, MacEntee MI. A randomized clinical trial comparing patient satisfaction and prosthetic outcomes with mandibular overdentures retained by one or two implants. Int J Prosthodont 2009;22:331–339.
- Sadowsky S. Treatment considerations for maxillary overdentures: A systematic review. J Prosthet Dent 2007;97:340–348.

Volume 28. Number 3. 2015 | **301**

© 2015 BY QUINTESSENCE PUBLISHING CO, INC. PRINTING OF THIS DOCUMENT IS RESTRICTED TO PERSONAL USE ONLY. NO PART MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM WITHOUT WRITTEN PERMISSION FROM THE PUBLISHER.

Copyright of International Journal of Prosthodontics is the property of Quintessence Publishing Company Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.