

- In summary, pure bruxism appears to be a relatively uncommon finding but presents considerable clinical challenges that are not easily overcome.

### Bibliography

- Lobbezoo F, Lavigne GJ. Do bruxism and temporomandibular disorders have a cause-and-effect relationship? *J Orofac Pain* 1997;11:15–23. Review. PubMed PMID: 10332307.
- Bartlett DW, Smith BGN. Definition, classification and clinical assessment of attrition, erosion and abrasion of enamel and dentine. In: Addy M, Embery G, Edgar M, Orchardson R, Tooth Wear and Sensitivity. London: Martin Dunitz, 2000;87–93.

- Lavigne GJ, Khoury S, Abe S, Yamaguchi T, Raphael K. Bruxism physiology and pathology: An overview for clinicians. *J Oral Rehabil* 2008;35:476–494. Review. PubMed PMID: 18557915.
- Manfredini D, Lobbezoo F. Role of psychosocial factors in the etiology of bruxism. *J Orofac Pain* 2009;23:153–166. Review. PubMed PMID: 19492540.
- Manfredini D, Lobbezoo F. Relationship between bruxism and temporomandibular disorders: A systematic review of literature from 1998 to 2008. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2010;109:e26–e50. Review. PubMed PMID: 20451831.

## On Coping with Inherent Edentulous Management Shortcomings

Dr Aaron Fenton

*University of Toronto, Toronto, Ontario, Canada*

- Edentulism, coupled with increasing life expectancy, has already created a patient population that is coping for a longer time with the adverse consequences of alveolar bone loss—residual ridge resorption (RRR). Dentists developed several therapies to address this challenging reality and prolong the useful life of the complete denture service. They introduced specific, routine, well-proven clinical and laboratory protocols—relines, rebases, and repairs—the so-called 3Rs of removable prosthodontics, which have proven their efficacy and effectiveness over many decades of service. When combined with subsequent refinements such as soft liners and functional impression materials, improved wear resistant tooth materials, denture adhesives, and the more recent digital denture assessments and impressions, dentists have demonstrated impressive ingenuity and sustained ability to provide excellent traditional removable prosthodontic services.
- Moreover, in the 1970s, the dental overdenture concept of retention of selected and strategically located tooth roots to improve a complete denture's stability and function was introduced as an alternative to outright edentulism. Clinical experience and documented research underscored the merits of retaining natural teeth to serve as abutments under complete dentures, or else under extensive or distal extension areas of removable partial dentures. The premise was that occlusal forces of a functional and parafunctional nature that exert an adverse

influence on denture-supporting tissues need to be attenuated or reduced, and the applied protocol frequently facilitated an improved prosthetic experience for several quasi-edentulous patients. The retained teeth abutments could be few or numerous, coronally modified or restored, and frequently endodontically prepared. The objective was to distribute stress concentration between retained teeth abutments and denture-supporting tissues and enhance their retention.

- Prosthodontic educators around the world quickly recognized that the technique helped reduce the impact of some complete denture-wearing uncontrollable consequences: RRR, loss of occlusal stability, undermined esthetic appearance, and compromised masticatory function. The technique was also popularly regarded as a gentler transition to the completely edentulous state. The time-dependent favorable outcomes with the overdenture technique led to routine prescription of the technique. However, a mere decade later, dental implants were recognized as acceptable therapy, and the overdenture protocol of retaining a few but perhaps questionable tooth roots was quickly eclipsed by osseointegrated titanium teeth analogs that were not vulnerable to either caries or periodontal disease. The well-established and reliable protocols of traditional prosthodontic care rapidly blended into dental implant-based therapy with compellingly documented, time-dependent successful outcomes. The net result of the osseointegration technique's introduction was the possibility of converting patients with maladaptive prosthetic experiences into ones with adaptive overdentures when implants are used to stabilize “offending” prostheses. As a result, the twin techniques (traditional complete denture fabrication with natural teeth or implant abutments) now offer dentists and patients an enriched repertoire of prosthodontic therapy.

- 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:
  1. 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.
  3. 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;

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.