

Re-visiting Edentulism: Complete Removable Dentures vs Implant Overdentures

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ABSTRACT

Edentulism is both, disabling and handicapping. Despite improvements in prosthetic treatment and geriatric epidemiology, complete removable dentures remain the standard of care. Implant-retained overdentures were proposed as a practical alternative, however, with limitations as is highlighted in this briefing, aiming to shed more light on the urgent need for their inclusion in our day-to-day professional practices.

Keywords: Edentulism, Conventional dentures, Implant overdentures, Patient satisfaction

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Edentulism, in general, is a condition where all natural teeth are lost, predominantly as a result of debilitating oral diseases such as dental caries and periodontitis. It is the terminal outcome of a multi-factorial process involving both, biological factors and patient-related factors. Tooth loss can be disabling and handicapping, according to the WHO (1) since complete tooth loss limits two of the necessary functions for survival (ability to eat and speak) and for some other individuals, it restricts them from participating in social activities and hence compromising their overall quality of life. Further, edentulism is often perceived as the main feature of premature ageing. Today, it is still considered a major public health problem disturbing millions throughout the globe where, for example, it is estimated that the American adult population in need for 1 or 2 complete dentures will increase from 33.6 million adults in 1991 to 37.9 million in 2020. In the United Kingdom, it is projected that by the year 2038, complete edentulism will constitute 6% of the total population, reflecting millions of adults in need for treatment (1, 2). This also exhibits the availability and accessibility of dental services along with the current standards of care. On the other hand, it is well recognized that, even with well-fabricated tissue-supported prostheses, (Figure 1a)

masticatory efficiency is reduced, especially with hard or tough textured foods (2, 3). This in part largely explains the low satisfaction levels of patients with their existing dentures (mainly, mandibular). Other reasons include: decreased sense of taste and flavor perception, irritated oral mucosa, pain, noise while eating, gagging, compromised speech and appearance. Further, the resulting compromised dietary selections, negative drawbacks on past life styles; collectively influences the nutrition profile and over-all general health, well-being and quality of life (Q_oL) of patients, clearly amplified in the elderly/geriatric population. Hence, prosthodontic rehabilitation represents a considerable challenge to the dental profession.

Now, despite the vast improvements in (a) implant-related surgical/prosthetic predictability; (b) increased long-term clinical success and (c) enhanced patient education and acceptability for replacing missing dentition, conventional removable dentures (CRDs) continue to represent the *first* therapeutic option offered (frequency) to the edentate in many places around the World, commonly due to the following reasons:

- Inadequate jaw morphology (extent of bone resorption) and poor quality of bone
- Need for surgical intervention (bone grafts, sinus lifts, etc.)

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- Long treatment period and associated high costs

RISK FACTORS: POPULATION/ SAMPLE DEPENDANT?

A recent study in a Japanese institutionalized elderly population aimed at examining the risk factors for tooth loss and edentulism showed that males are more likely to be edentulous than females (4). In another German study (5) among

the elderly in Pomerania, edentulism was significantly associated with age, low education level, low income, smoking and alcohol abuse. Gender did not seem to be a risk indicator of edentulism. Shah (6) investigated gender differences in an Indian elderly community-based study. Denture wearers were mainly men. The best demographic predictors of edentulism were associated with current (income level) and lifelong (age, origin, level of education, and marital status) factors. In another cross-sectional French study (7) of the long-term institutionalized elderly, general health problems as well as a poor oral condition were significant risk indicators for tooth loss suggesting number of remaining teeth has a strong effect on oral health-related Q_oL. Furthermore, while the completely edentate seems to be at risk for multiple systemic disorders, whether the development of such conditions is causal or casual has yet to be determined, according to Felton (8).

expectations from the professional oral health community (2).

A 10-year old Consensus: mandibular 2-implant overdentures for standard of care Almost a decade has passed since the renowned McGill consensus statement on overdentures have been issued recommending simple mandibular 2-implant overdentures or IOD's (Figure 1b) as *standard of care* for edentulous patients (10). The statement indicated that: "As a minimal treatment objective, the mandibular two-implant overdenture should be considered as a first choice standard of care for edentulous patients." In fact, overwhelming evidence suggests that, in comparison to CRDs, 2-IODs can improve the

- Oral-health-related Q_oL,
- Nutritional state and ultimately, the
- Over-all Q_oL of edentulous patients where they have also been shown to modify their diets and daily habits (including leisure and sexual activities), favorably. This can be further clinically explained by the everyday-growing literature reporting the beneficence of 2-IODs in terms of
- Support,
- Comfort
- Retention, even so with *equivalent* efficacy/functioning outcome when compared to the relatively more complex and costly 3- or 4-IODs and in
- Individual satisfaction levels when compared to fully-fixed mandibular prosthesis. Further, 2-IODs improved the
- Perceived facial appearance and
- When given choice, patients *tend* to prefer them over CRDs even if offered newly-fabricated CRD replacements. Finally, it was concluded that although 2-IODs do *not* eliminate the impairment, it can practically eradicate the disability and handicap previously associated with edentulism (2). Given this ample superiority verification in functional and psychological parameters: Why do we still offer and fabricate CRDs? Why do they continue to be included in dental school under-/post-graduate curriculums?

GOOD OR BAD NEWS?

The *good* news is that the elderly population today demonstrates a higher education and income levels than their ancestors and forebears. Along comes an increased interest in esthetic dentistry and utilization of dental services. Oral health is changing from just healthy dentition to increased self-esteem, improved health, and premium oral function (speech, smile, chewing, and swallowing). The elderly population will continue to seek dental services because it has been shown that dental visits by older adults are correlated to having teeth, not age. In a recent survey of the impact of older individuals on *private* dental practices, a significant contribution was demonstrated to the number of visits and services provided when compared to the <65 population (9). The *bad* news is that although older adults are experiencing an increased life expectancy, they do suffer from many variable diseases. So, while dietary quality plays a major role in preventing or delaying the onset of chronic diseases, such an anticipated sharp escalation in numbers of elders can be projected to exhibit a parallel increase in edentulous rates and later on, demands and

Edentate Mandible

a **b**

CRD vs. IOD

<p>Pros</p> <p>Non-invasive Easily replaceable ↓ time and cost (least)</p>	<p>Pros</p> <p>Minor invasiveness Improved Stability Improved Chewing Improved Speech ↑ Self-Confidence Improved Q_oL** Cost-effective (long-run)</p> <p>**Quality of Life</p>
<p>Cons</p> <p>Loose-fitting Eat/Speech Difficulty ↓ Taste Sensation ↓ Flavor Perception ↓ Self-Confidence Lower Q_oL** Worse Health Status</p> <p>↑ Maintenance Need Ongoing Resorption ↑ Irritation/Discomfort Oral Sore Spots Pain: nerve exposure</p>	<p>Cons</p> <p>↑ Maintenance Need In-Clinic Cleaning ↑ Treatment Time (often negligible) Some Dietary Limitations ↓ Taste Sensation (Maxillary IODs)</p> <p>Combination of Tissue- and Implant-Support Posterior Bone Loss Evident</p>

Figure 1: Comparison of Current Treatment Options for the EDENTATE Mandible: (a) Complete/Conventional Removable Dentures or CRDs and (b) Implant-Supported Overdentures or IODs

CURRENT STATUS AND CLOSING REMARKS

Oral rehabilitation with a simple mandibular 2-IOD seems to offer an uncomplicated and *possibly* cost-effective (long-term) opportunity to overcome the poor nutritional and Q_oL profiles of people wearing CRDs. It is an evident growing trend in the literature leading practitioners in all populations around the Globe to shift and replace their therapeutic philosophies in what they offer and deliver to their edentate patients. However, (1) possible accessibility, (2) relative high cost and (3) the quite complex maintenance efforts for implant restorations (compared to CRDs) implying more often recall visits appear to still hinder their acceptance and practice as *standard of care* for the edentate patient. Changes in attitudes toward dental care and dentists, patient's willingness-to-pay (perhaps more favorable when in installments, for superior treatment

options), advancements in dental restorative technologies and taking patient-related factors in the decision-making process should represent the major determinants of satisfaction, preference and treatment outcomes seen in practice and in future training and literature.

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