



Surgical techniques used in the rehabilitation of partially edentulous patients with atrophic posterior mandibles: A systematic review and meta-analysis of randomized controlled clinical trials



Paolo Toti ^{a, b}, Saverio Marchionni ^{a, c}, Giovanni Battista Menchini-Fabris ^{a, b},
Simone Marconcini ^{a, c}, Ugo Covani ^{a, b}, Antonio Barone ^{d, *, 1}

^a Department of Surgical, Medical, Molecular and Critical Area Pathology, University of Pisa, Via Paradisa 2, 56124 Pisa, Italy

^b Tuscan Dental Institute, Fortis Dental Center, Via Padre Ignazio da Carrara 39, 55042 Forte Dei Marmi, Italy

^c Azienda Ospedaliero-Universitaria Pisana, Via Paradisa 2, 56124 Pisa, Italy

^d Unit of Oral Surgery and Implantology, Department of Surgery, University of Geneva, Rue Barthélemy-Menn 19, 1205 Genève, Switzerland

ARTICLE INFO

Article history:

Paper received 7 January 2017

Accepted 21 April 2017

Available online 27 April 2017

Keywords:

Partially dentate mandible

Posterior mandible

Atrophic area

Dental implant

Vertical augmentation

ABSTRACT

Purpose: Given the lack of general consensus in the literature regarding the best method to rehabilitate partially edentulous patients with extended atrophic edentulous sites in the posterior zone of the mandible, and with a residual ridge height less than 8 mm (with or without bone augmentation procedures), the aim of this systematic review was to analyze all the relevant randomized clinical trials (RCT), and, by means of a meta-analysis of the collected data, draw some conclusions regarding the best available treatments for the rehabilitation of posterior edentulism in partially dentate mandible.

Materials and methods: An electronic search was conducted in the MEDLINE and Cochrane Oral Health Group databases for studies published between January 2000 and September 2015 with the use of relevant keywords and hand-searching. All identified publications were screened by the authors according to the Cochrane Data Collection Form for Intervention Reviews. Collected outcomes such as biological complications, vertical ridge changes, implant and prosthetic failure were studied by subgroups analyses.

Results: An initial search yielded 81 potential articles, of which 12 studies were chosen for inclusion. Short implants seemed to be effective in limiting incidence of the biological complications (RR: 2.822; 95% CI: 1.809–4.403; $p < 0.0001$) and degree of ridge height reduction (difference in means of 0.052 mm; 95% CI: 0.026–0.079 mm; $p < 0.0001$) when compared with long implants placed in augmented bone. Implants placed in augmented areas with the use of onlay block grafts seemed to behave worse than implants placed in the augmented sites regardless of the augmentation procedures. However, this difference did not reach statistical significance.

Conclusion: Findings from subgroup analyses revealed that (1) short implants placed in the posterior atrophic areas of partially edentulous mandibles were associated with superior outcomes compared with long implants in augmented bone, such as lower rate of biological complications and of peri-implant bone loss; whereas (2), there was no evidence that onlay augmentation was inferior to any of the other augmentation techniques employed.

© 2017 Published by Elsevier Ltd on behalf of European Association for Cranio-Maxillo-Facial Surgery.

* Corresponding author. School of Dental Medicine, Department of Surgery, University of Genève, Rue Barthélemy-Menn 19, 1205 Genève, Switzerland. Fax: +41 22 372 76 04.

E-mail address: Antonio.Barone@hcuge.ch (A. Barone).

¹ Formerly: Department of Surgical, Medical, Molecular and Critical Area Pathology, University of Pisa, Via Paradisa 2, 56124 Pisa, Italy.

1. Introduction

This paper sets out the results of a systematic review of the literature on the best treatment to rehabilitate posterior edentulism in the partially edentulous mandibles. Treatment with endosseous standard implants (also known as “long implants”) has been widely accepted as a reliable and suitable method for oral rehabilitation of edentulous patients. Generally, the placement of a standard length implant without bone augmentation requires a minimum residual

bone height of 8 mm. However, a successful implant treatment in the mandible can be limited in posterior regions due to insufficient bone height, which substantially increases the risk of damaging the inferior alveolar nerve (Barone et al., 2012).

To overcome the issue of bone loss in long-term edentulous subjects many rehabilitation strategies have been developed, from non-standard implants placed in pristine bone to replacement with long implants after bone augmentation procedures (Calvo-Guirado et al., 2015; Esposito et al., 2015). When the residual bone height above the mandibular canal ranged between 6 and 8 mm, standard implants could not be placed and the use of non-standard implants (shorts or blades) might be considered clinically appropriate without bone augmentation (das Neves et al., 2006; Romeo et al., 2014). Short implants were considered effective in rehabilitation of patients with an atrophic posterior mandible; they were well-tolerated by patients, inasmuch as they were fast, cheap, and less prone to morbidities, even if several authors did not agree upon the long-term positive outcomes which were associated with short implants. In fact some studies reported that short implants, when they were placed in posterior jaws, achieved favorable outcomes in terms of survival rate (Omran et al., 2015; Schincaglia et al., 2015; Thoma et al., 2015); however, other authors reported that short implants exhibited a lower survival rate compared to standard implants (Queiroz et al., 2015). Unfortunately, the available information was too weak to draw conclusions regarding the long-term prognosis for short implants (Esposito et al., 2014).

On the other hand, in patients whose residual ridge height was less than 6 mm, bone augmentation procedures became mandatory (Amorfini et al., 2014) even though it was unclear which rehabilitation strategy was the best. Therefore, as far as bone augmentation techniques are concerned, this clinical scenario proved the situation was more intricate. In fact, bone loss could be corrected with different methods, ranging from grafting techniques (Barone et al., 2017; Sbordone et al., 2015; Martuscelli et al., 2014) to distraction osteogenesis (Chiapasco et al., 2007). For example, Esposito and co-workers compared the outcome of prostheses supported either by short implants placed in pristine sites or by long implants placed in augmented bone, in severely atrophic alveolar ridges in patients with a residual height ranging between 5 and 8 mm; that is, the amount of bone required to place short implants but not enough for the standard implants. They concluded that there were no significant differences either in failure or in complication rates (Esposito et al., 2014); however, in the selected patients, they confirmed that mandibular implants exhibited a significant difference in marginal bone loss between short (1.30 mm) and long implants (1.48 mm) one year after loading (Esposito et al., 2014). Furthermore, other authors investigated the effectiveness of short implants placed in pristine bone and of long implants placed in grafted bone, highlighting favorable results in terms of postoperative complications but not in terms of survival rate for short implants placed in the posterior mandibular areas (Felice et al., 2012).

When bone volume augmentation procedures were described, numerous studies have compared different grafting materials; the comparison between the autogenous and xenogeneic bone grafts did not show any difference in terms of vertical bone gain as well as marginal bone loss of implants placed in the augmented bone (Cordaro et al., 2011; Felice et al., 2009a,b).

A viable alternative to bone grafting in the treatment of the severely resorbed maxillae was alveolar distraction osteogenesis. This method achieved good results in correcting vertically deficient edentulous ridges, maintaining the obtained bone gain over time, and guaranteeing high rates of survival and success of implants placed in the distracted areas (Chiapasco et al., 2004).

Nevertheless, bone augmentation techniques presented several drawbacks that should be considered: (1) vertical ridge

augmentation was more time consuming; (2) the healing phase was longer; (3) it was more expensive; and (4) it exhibited more complications compared with short implants (Chiapasco et al., 2007; Felice et al., 2010). In addition, augmentation surgery needed an experienced surgeon, due to the anatomical difficulties inherent in rehabilitating the posterior atrophic mandible.

As previously mentioned, the literature does not agree on the best rehabilitation strategy for posterior atrophic mandibles with a residual ridge height of between 5 and 8 mm, and shows even less consensus on what the best bone augmentation technique is for posterior mandibular areas.

The main objective of the present systematic review was to evaluate, in partially edentulous mandibles, (in terms of success rate, predictability and bone loss around implants) which is the best treatment option to replace posterior missing teeth between standard implants placed in augmented bone vs. short implants placed in pristine bone in the rehabilitation of atrophic posterior mandibles. The secondary aim was to compare standard implants placed in augmented bone with autogenous onlay blocks vs. standard implants placed in augmented bone with any of the other augmentation procedures that did not involve onlay blocks.

2. Materials and Methods

2.1. Search Strategy

The data for this systematic review and meta-analysis were processed following PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) principles (Moher et al., 2010); the introductory set of studies related to the topic “surgical strategies for rehabilitation on the posterior mandible” was obtained through an electronic search of the MEDLINE (Pubmed via the search engine Entrez <<http://www.ncbi.nlm.nih.gov/sites/gquery>>) and Cochrane Oral Health Group databases.

Relevant articles published between January 1st, 2000 and July 30th, 2016 were searched using the relevant keywords and respective Boolean logic operators (AND, OR, NOT) used in the above-mentioned databases:

- (1) *human AND mandible AND posterior*
- (2) *bone AND graft*
- (3) *inlay OR onlay OR interpositional OR autogenous OR xenogeneic*
- (4) *allogeneic AND material*
- (5) *augmentation*
- (6) *vertical OR horizontal*
- (7) *guided AND bone AND regeneration*
- (8) *distraction AND osteogenesis*
- (9) *nerve*
- (10) *transposition OR lateralization OR tunneling*
- (11) *short AND implant*
- (12) *2 AND 3*
- (13) *5 AND 6*
- (14) *9 AND 10*
- (15) *4 OR 7 OR 8 OR 11 OR 12 OR 13 OR 14*
- (16) *1 AND 15*

An additional manual search was performed directly from the websites of the following scientific journals:

Clinical Implant Dentistry and Related Research
Clinical Oral Investigations
Clinical Oral Implants Research
European Journal of Oral Implantology
European Journal of Prosthodontics and Restorative Dentistry

Download English Version:

<https://daneshyari.com/en/article/5640067>

Download Persian Version:

<https://daneshyari.com/article/5640067>

[Daneshyari.com](https://daneshyari.com)