

International Journal of Dental Science and Innovative Research (IJDSIR) IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 6, Issue – 6, December - 2023, Page No. : 01 - 05

Nasal floor augmentation on the survival rate of dental implants - A literature review

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Citation of this Article: Dr Narala Sanjana, Dr Harshvardhan, Dr Aditi Soni, Dr Amar Shaw, "Nasal floor augmentation on the survival rate of dental implants - A literature review", IJDSIR- December - 2023, Volume – 6, Issue - 6, P. No. 01 -05.

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Type of Publication: Review Article

Conflicts of Interest: Nil

Abstract

The aim of this work is to assess the clinical outcomes of implants placed after a nasal floor elevation procedure. A systematic review was conducted where question such as : "In patients undergoing dental implant placement in the maxillary anterior region, Do implants placed after nasal floor elevation have a different survival from those implants placed without grafting procedures? Five articles were finally selected, including 130 patients and 408 implants. The weighted mean follow-up was 1 to 6 years, and the weighted survival rate after this period was 97.64% (range: 89.2%-100%). In atrophic anterior maxillary region, bone height reconstruction through nasal floor augmentation is the best surgical procedure for dental implants with long term survival rate within the range 89.2% to 100%. Nasal floor elevation is a method of augmentation of or maxilla by raising the base of nose .In patients undergoing dental implant placement in the nasal floor region implants placed after nasal floor augmentation have a different survival from those implants placed without any bone grafting procedures. Within the limitations of this study, implants placed after a nasal floor elevation present a good survival and a low range of complications. The present review summarizes evidence from comparative followup studies on patients receiving dental implants on nasal floor augmentation with average mean follow-up of 6 years.

Keywords: Nasal Floor, Dental Implant, Anatomic Variations.

Introduction

In the past, removable appliance was the only possible way to replace missing teeth. Dental implant has emerged as first line of treatment in recent years for replacing missing teeth as they have natural looking restoration, long term survival and success rate. Implant placement in maxilla is limited by decreased bone height and width due to teeth loss ,proximity of anatomical structures, sinus and nasal cavity, in such cases various procedure are proven to be successful for correcting the above defects of which nasal floor augmentation is the procedure to be done in anterior atrophic maxilla cases. Augmentation is defined as the act of adding to or increasing the shape, size, function, or strength of something. Bone resorption after tooth loss can be a difficult task for implant placement and less chances of implant survival in long run. The dental implant placement in atrophic maxilla is demanding due to severe resorption in alveolar ridge area. This article aims to review the outcome of dental implant after nasal floor augmentation. In atrophic anterior maxillary region, bone height reconstruction through nasal floor augmentation is the best surgical procedure for dental implants with long term survival rate within the range 89.2% to 100%. Nasal floor elevation is a method of augmentation of or maxilla by raising the base of nose. Nasal floor elevation through autologous bone grafts or inorganic osteoconductive bone rafts to increase the length of nasal floor has been in dental practice over years with high success rates with excellent clinical results .This procedure includes flap elevation in anterior maxillary region and nasal floor elevation through intraoral access using freer elevator, filing autologous bone graft material in the nasal cavity, implant alignment in the second stage (standard length or short), followed by flap repositioning with bone graft materials such as bovine bone graft material. The complications in this procedure are bleeding, swelling ,hematoma ,rhinitis ,nasal mucosa perforation. The adequate detection of anatomic variations and appropriate treatment can alleviate the failures observed in implants placed in the nasal cavity. The factors that are taken into consideration are bone grafts (autologous, non autologous ,composite, implant placement). This

procedure has few limitations such as graft should not exceed 6mm,cannot be performed in cases such as epistaxis, chronic recurrent rhinitis, chronic allergy, previous septum repair, compromised mental and general health, systemic diseases, radiotherapy, chemotherapy patients.. Nasal floor augmentation procedure is cost effective, minimally invasive technique, with reduced postoperative complications.

In summary more data are needed to understand the long term influence of bone substitute type, presurgical bone height, and the membrane perforation during nasal floor elevation on the treatment outcome of implants and bone grafts.

Methodology

The Study Design: The following focused research question in the participants (P),index test (I),reference standard(R) and target condition (T)format was proposed "nasal floor augmentation on survival of dental implants ".studies evaluating the usage of augmentation technique before placement of dental implant on long time survival of implants with least chances of failure were included.

Eligibility Criteria

Inclusion Criteria: The inclusion criteria were as follows :-

Study design: In vivo studies-observational studies /clinical trails comparing the diagnostic accuracy of usage of augmentation technique before dental implant placement lead to the good survival of dental implant.

Participant characteristics: edentulous patients diagnosed with less residual bone height has trouble or less survival chances on survival of dental implants.

Outcome measurement: diagnostic accuracy includes sensitivity ,specificity ,accuracy ,determined using different methods in respective of the methods of quantifying the outcome - articles written in English

Dr Narala Sanjana, et al. International Journal of Dental Science and Innovative Research (IJDSIR)

language - articles published from 2010-2023are dat

Exclusion Criteria: The exclusion criteria is as follows:-

1) Nonclinical studies :-in vitro studies and animal studies reporting about a single intervention were also excluded

2) studies done on individual more than 45 years of age

3) studies not fully available in the database

available as free full text.

4) articles only reporting abstracts were also excluded

5) studies not reporting primary outcomes of accuracy ,sensitivity ,and specificity as well as where primary outcomes are not possible to calculate from the given raw data

Search Protocol And Search Selection

A comparative electronic search was performed till 31st march 2023 for the studies published within the last 10 years (from 2010 to 2023) using the following databases:-pubmed and EBCOhost to retrive articles in English language. The searches in the clinical trails

database ,cross referencing and grey literature were conducted using google scholar, greylist and opengrey.In addition to the electronic search ,a hand search was also made and reference list of the selected articles were screened.

Search Statergy

Appropriate key words and medical subject heading (MeSh)terms were selected and combined with Boolean operators like AND .the search strategy used was as follows;(augmentation technique used in dental implant procedure)

The search and screening ,according to previously established protocol were conducted by two review authors .A two phase selection of articles was conducted. In phase one ,two reviews reviewed titles and abstracts of all articles .Articles that did meet inclusion criteria were excluded .In phase two ,selected by same reviewers .Any disagreement was resolved by discussion .when mutual agreement between two reviews was not reached ,a third reviewer was involved to make final decision .

Author	Country	Sample	Mean	Follow	Outcome Assessed	Conclusion
(Year)		Age (N)	Age(Year)	Up		
Tara L	california	10	48-84	1 year	To evaluate the	nasal floor augmentation-
Aghaloo					survival and success of	can be successfully used
(2016){31}					dental implants placed	to augment edentulous
					in nasally grafted	maxillary ridge with high
					maxillae with	implant SRs.
					osteoconductive bone	
					substitute	
Georgios N	london	637	43.4	3 years	To evaluate the	maxillary sinus floor
Antonoglou					survival and success of	augmentation seem to
(2016)					dental implants placed	have a low frequency of
{33}					in nasally grafted	manageable
					maxillae with	complications.
					osteoconductive bone	
					substitute	

Dr Narala Sanjana, et al. International Journal of Dental Science and Innovative Research (IJDSIR)

Ting M	CHINA	130	48	6 years	To assess the bone	Autogenous bonegraft
rice(2017)(3)					grafts that aid in	used in augmentation
					increase in bone heiht	technique has a good
					ultimately leading to	survival rate in implant
					success of	placement
					augmentation	
					technique	
Malick R	INDIA	130	55.25	6 years	To assess efficacy of	Nasal floor augmentation
(2023) {3}					the nasal floor	can be considered as a
					augmentation on	best treatment
					survival of dental	option.However,the more
					implants	information need to be
						collected.

Discussion

Following tooth removal, an unavoidable consequences like bony resorption, inflammatory bone loss, peri implantitis are more occurring around dental implants. Inflammatory reaction results in complete bone loss which results in failure of new implant without bone reconstruction. Considering these factors with aesthetic concerns and functional demands implant placement in such conditions is quite challenging. In such cases, nasal floor augmentation can be a best solution. Possible complications such as bleeding, swelling, rhinitis, pain, hematoma, infection, displacement might occur. A prevalent option to increase the amount of available bone prior to the implant placement is augmentation of nasal floor. Nasal floor augmentation technique propose an elevation of the nasal mucosa through an intraoral access, filling the nasal cavity with autologous bone where the bone augmentation with bone graft is done in first stage and implant placement in the second stage. The osteoconductive bone substitute for nasal floor augmentation is the more reliable procedure. Many factors are known to effect the survival rate of dental implant such as surgical procedure and technique, grafting material. The evidence based decision making on how to provide and elicit the patient best possible treatment modality is still impaired.

The aim of this review was to summarize and assess the efficacy and outcome of nasal floor augmentation on survival rate of dental implant by systematically reviewing the available literature. In patients undergoing dental implant placement in the nasal floor region implants placed after nasal floor augmentation have a different survival from those impalnts placed without any bone grafting procedures .The present review summarizes evidence from comparative follow-up studies on patients receiving dental implants on nasal floor augmentation with average mean follow-up of 6 years.

Tara L Aghaloo conducted study in the year 2016 on 6 patients with a follow up of 1 year, from the age range 48 to 84 with mean age 71.2 with the post loading follow up with the mean range of 14.2 months. Ninety percent of the responses to the treatment had a score of 7 or greater. Study conducted by georgious N antonoglou in the year 2016 with a follow up of 3 years on 637 patients with the mean age of 43.4 years to assess the good

Dr Narala Sanjana, et al. International Journal of Dental Science and Innovative Research (IJDSIR)

survival of dental implants after nasal floor augmentation with less complications. Ting M rice conducted study in the year 2017 with the mean age 48 years ,follow up of 6 years assessed the autogenous bone graft used in the augmentation procedure has a successful survival of dental implant. Malick R conducted study in the year 2023 on 130 patients while a total of 408 implants were placed in patients with the mean age of 52.2 years concluded that of nasal floor augmentation of the anterior atrophic maxilla is the more reliable method when residual bone height is insufficient. proven it as excellent survival rate of dental implant with less frequent complications.

The results from the reports had an excellent survival rate of 100% with no complications and all studies suggested that Nasal floor augmentation might serve as a reliable method for Implant placement. All studies concluded that nasal floor augmentation might serve as an effective and safe procedure. There is a need to conduct more follow-up studies on the efficacy of nasal floor augmentation on the survival rate or success of dental implants.

Conclusion

The results of this review indicate the implant placed after nasal floor augmentation technique present a good survival and low range of complications and it can be considered as a predictable treatment modality in atrophic conditions which help in the stability and no complications with survival rates ranging from 89% to 100% . However, due to the scarcity of literature, more studies should be carried out on proving the efficacy of nasal floor augmentation on survival rate or success of dental Implants.

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