



Current Status on Zygomatic Implants: A Literature Review

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Background

Zygomatic implants were introduced to dentistry by Branemark in 1988 to provide implant therapy for patients with a severely atrophic maxilla. The zygoma implant allows for the prosthetic rehabilitation of patients with extensive defects of the maxilla caused by tumor resections, trauma and congenital defects which result in atrophied maxillary ridges. Zygomatic implant therapy offers prosthetic options with minimal or no grafts. The Zygoma implant ranges from 30mm to 60 mm in length. Widths typically are in the 3.5-mm to 4.5-mm diameter range.

The two most common surgical approaches include intrasinus (Fig.1) and extrasinus (Fig.2).¹ Surgical complications exist in both approaches and include sinusitis, asymptomatic radiologic changes of the sinus, oroantral fistula formation, temporary paresthesia, vestibular cortical fenestration, postoperative periorbital hematoma/edema and moderate nasal bleeding for 1 to 3 days.^{1,2,3,6} The associated complications do not seem to affect the high success rate of the implant.^{1,3,6}

Prosthetic complications include abutment and prosthetic screw loosening, abutment and screw fracture, provisional fracture, metal frame fracture and prosthesis fracture.^{1,2,3,4,6} Despite these complications the success rates are high.^{6,7,8}

Objectives

The purpose of this poster presentation is to provide a literature review of the current concepts in the surgical and prosthetic management of zygomatic implants.

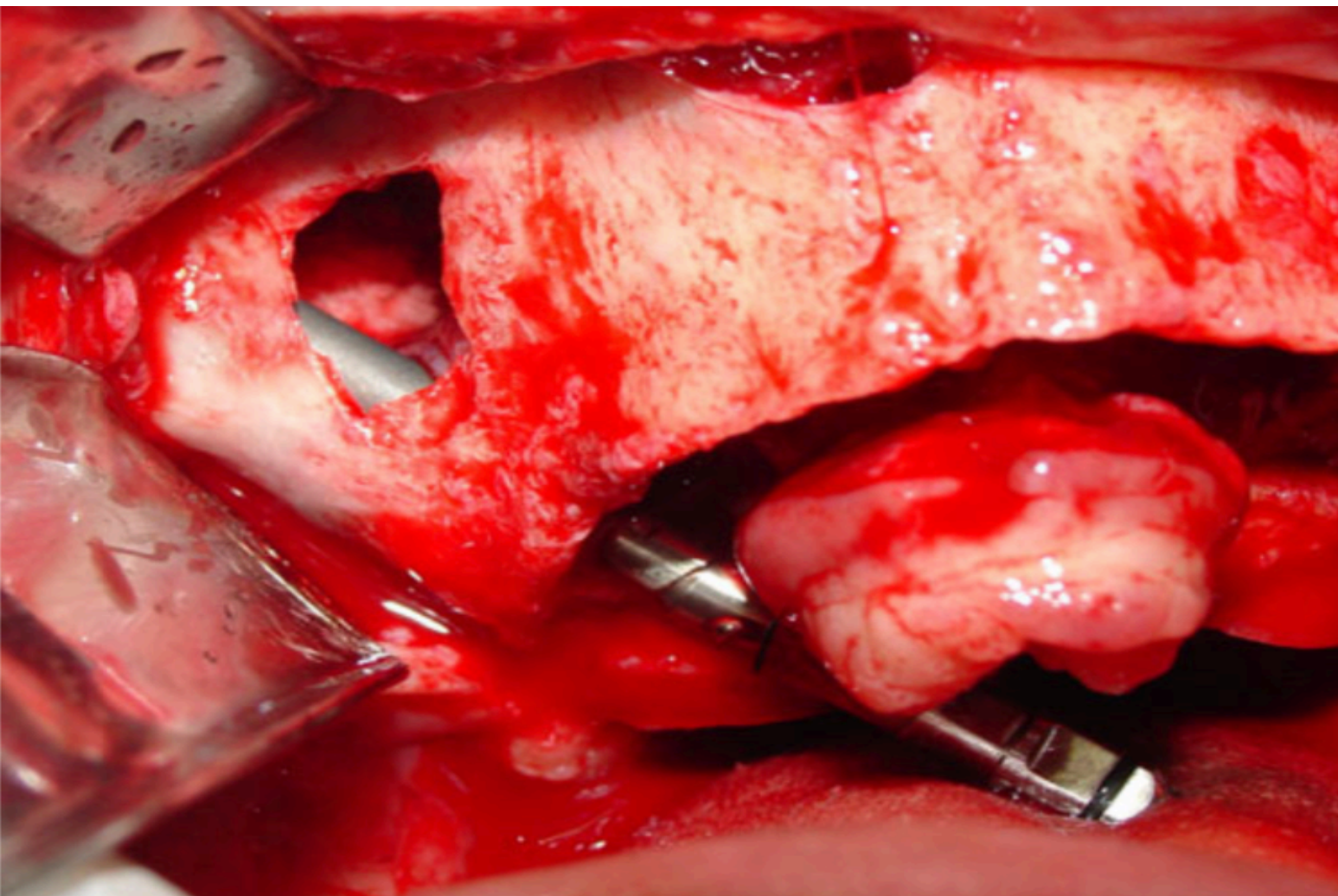


Fig 1. Intrasinus Zygoma Implant

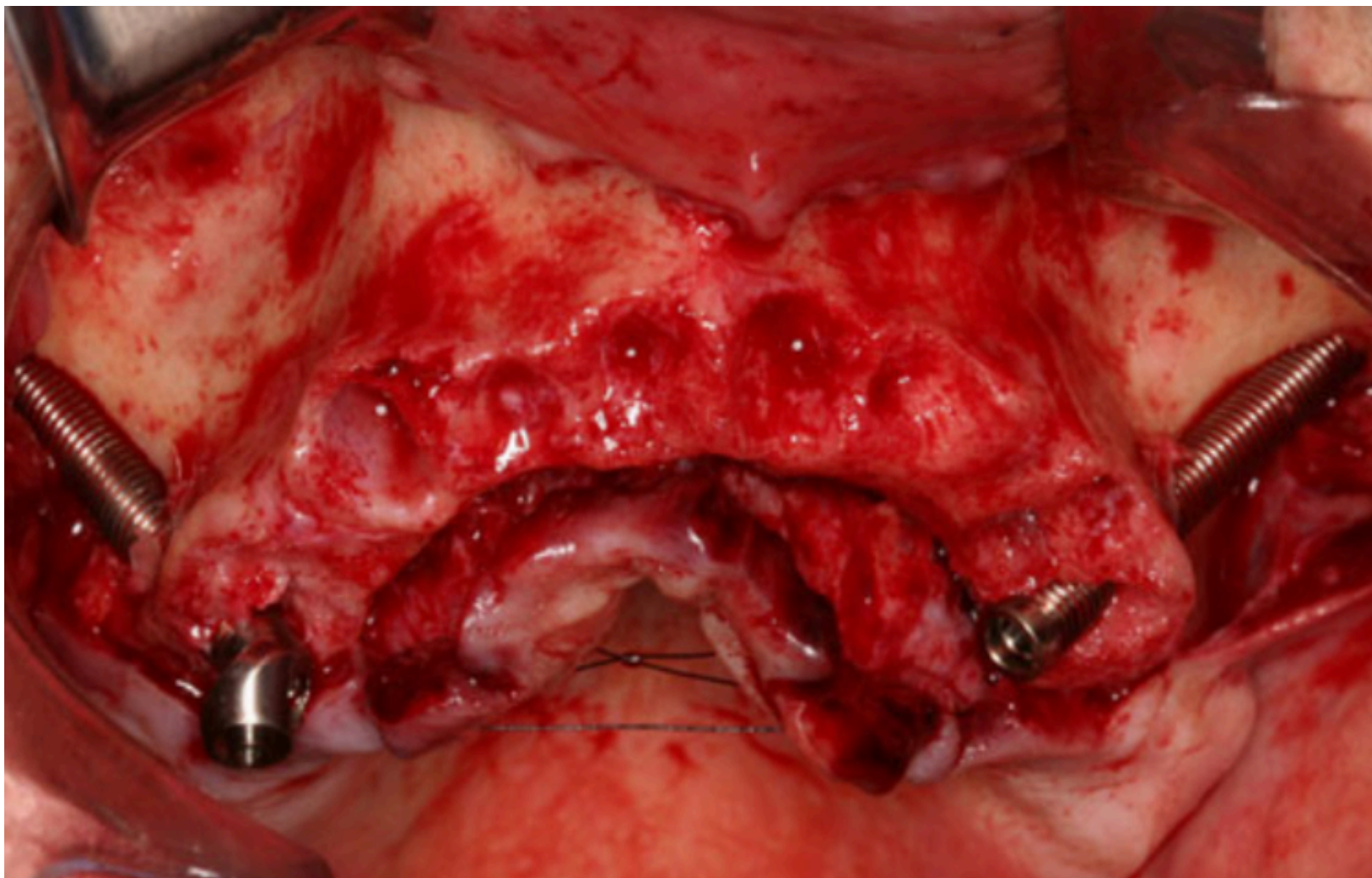


Fig 2. Extrasinus Zygoma Implants

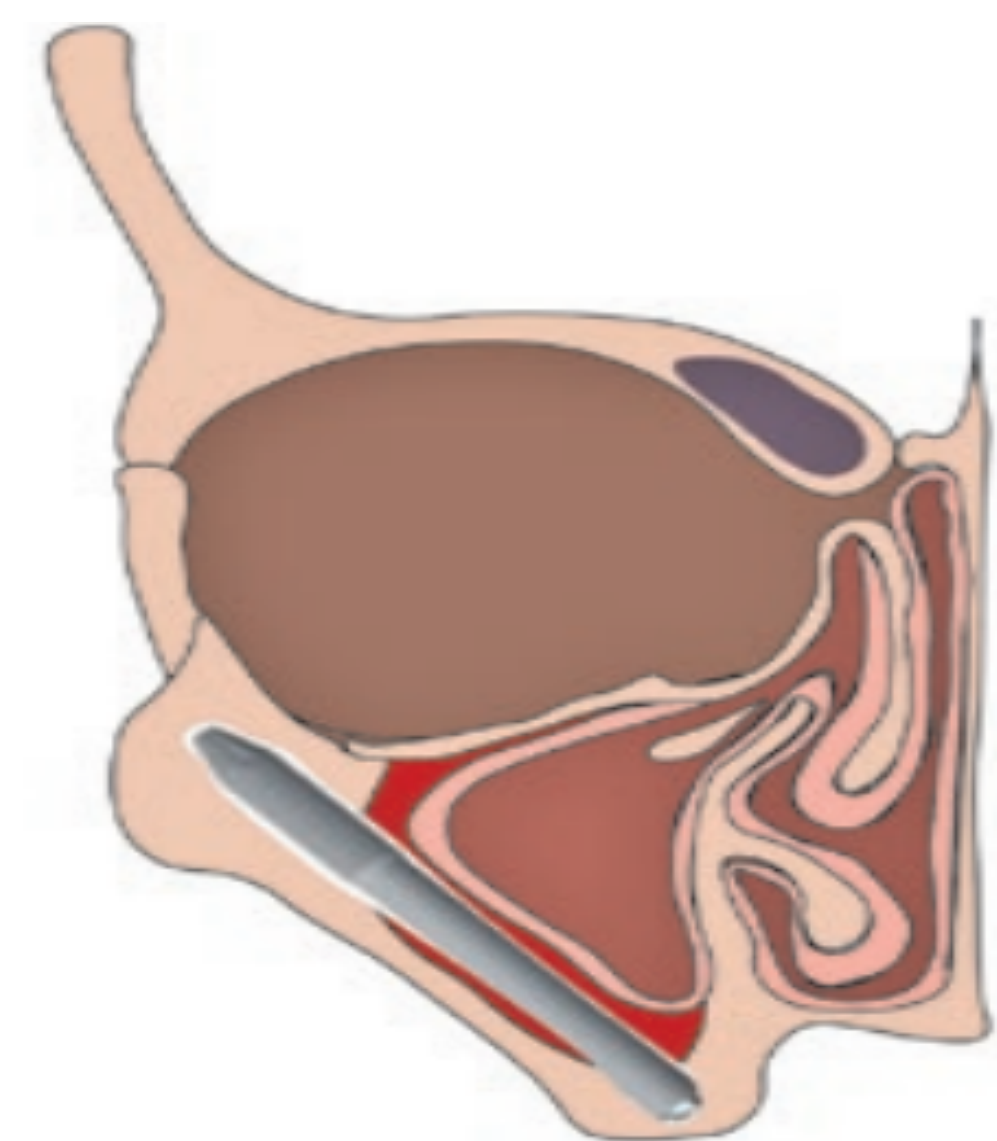


Fig 3. Intrasinus Zygoma Implant Illustration¹¹

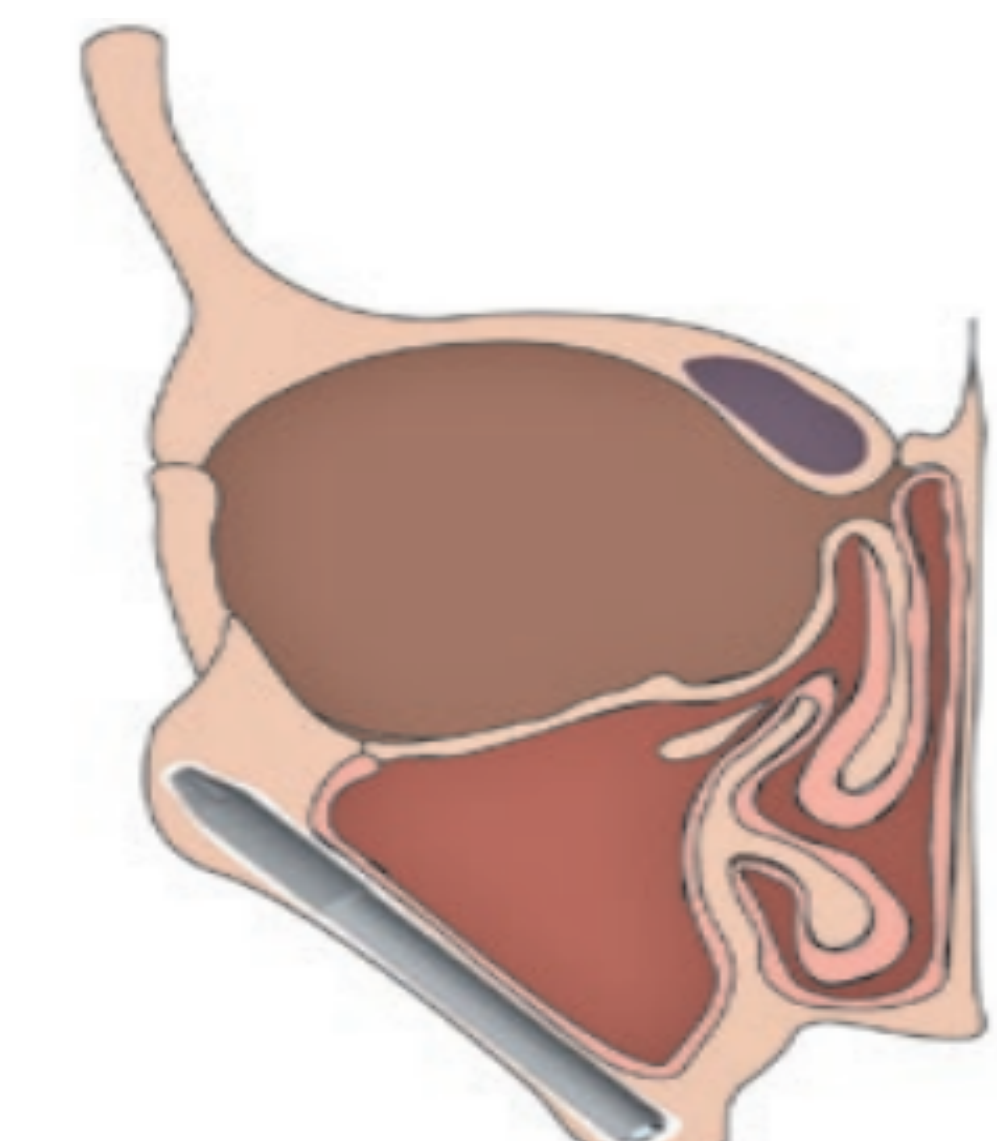


Fig 4. Extrasinus Zygoma Implant Illustration¹¹

Methods

A PubMed search was performed from 2010 to 2020 utilizing the following keywords: “zygomatic implant,” “zygoma implant”, and “zygomatic implant prosthesis”. The search yielded 382 articles, which were reviewed to select clinical trials, literature reviews and systematic review studies related to dental zygomatic implants. This resulted in 10 articles consisting of 6 systematic reviews and 4 literature review articles.

Results

The review of the surgical techniques for the zygomatic implants showed that the intrasinus technique is the most commonly used method, with a success rate ranging from 96-100%. Two studies found the surgical success rate of the use of four zygomatic implants (quad zygoma implant) therapy to be 96-98%. With zygomatic implants, immediate loading protocol was the preferred method. The most common surgical complication was sinusitis and was reported from one systematic review as having a 7.6% incidence rate.

Four of the ten articles reported on the types of prosthesis designs. The screw-retained splinted fixed partial denture design was more prevalent in the selected studies accounting for more than 91%. Only 8% of the patients in the selected study received an overdenture prosthesis on zygomatic implants. The reported prosthetic success rate ranged from 96-100%.

Table of results

Article	Surgical Technique	Surgical Success Rate	Surgical complications	Prosthetic Success Rate	Prosthetic Complications
Chrcanovic et al 2013	Intrasinus Extrasinus	Intrasinus - 98.1% Extrasinus - 99%	N/A	N/A	N/A
Goiato et al 2014	Intrasinus	14 studies showed 100% success rate at 6 months 97.86% success rate after 36 months	Sinusitis, oroantral communication, oral fistula, infraorbital swelling, facial edema, paresthesia of infraorbital nerve	N/A	fracture of the artificial teeth and allergy to the metal framework
Wang et al 2015	IntraSinus - Quad Zygoma	96.70%	orbital penetration (1), infection followed by a fistula (1) sinusitis (2) unilateral sinusitis (1) definitive cheekbone hypoesthesia (3) soft tissue inflammation	N/A	One implant “sleeping” because of unfavorable position one fractured abutment screw and 2 fractured prosthesis
Chrcanovic et al 2016	Intrasinus 8 studies - Extrasinus	12 year for all ZI 95.21% Immediate - 98.33% Delayed - 96.86%	Sinusitis - 2.4% Gingival infection - 2.0% Paresthesia - 1.0% oroantral communication - 0.4%	N/A	N/A
Tuminelli et al 2017	30 studies - Intrasinus 8 studies - Extrasinus	96-100%	soft tissue inflammation around the implant abutments, speech complications, hygiene difficulties, chronic rhino-sinusitis.	96-100%	failure of the implant and/or prosthesis, fracture of the implant, screw loosening (abutment and prosthetic)
Centenarro et al 2018	Intrasinus	98% overall 98.6% 2 ZI only 97.4% quad ZI	Stievenart - 3 implants loss Davo/Malavez - None at 14 month Davo/Pons - infection(1),sinusitis(2)	Degidi - 12 month 100% Stievenart - 36 month 100% Davo/Malavez - 100% Davo/Pons- 100% after 5 years	Stievenart - 3 implants failed Davo/Pons - 1 abutment screw fracture and 2 prostheses fracture.
Davo et al 2019	Intrasinus, sinus slot , exteriorized , extramaxillary extended sinus lift	Duarte 2007: 98% at 30 months Steivenart 2010 - 96% at 40 months Davo 2018 - 97%	penetration into the orbital cavity, periimplant mucositis perimplantitis, infection implant apex, sinusitis, paresthesiaa/dysthesia, oral antral communication, fracture of implant	Duarte 2007 - 100% success	loosening of the transepithelial abutments, loosening of the prosthesis fixation screws, and fracture of the prosthetic teeth.

Conclusions

This review has shown evidence for high surgical and prosthetic success rates of zygomatic implants with less than 5-year follow-up period. Zygomatic implants are a viable option for implant therapy in the severely atrophic maxilla.

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