



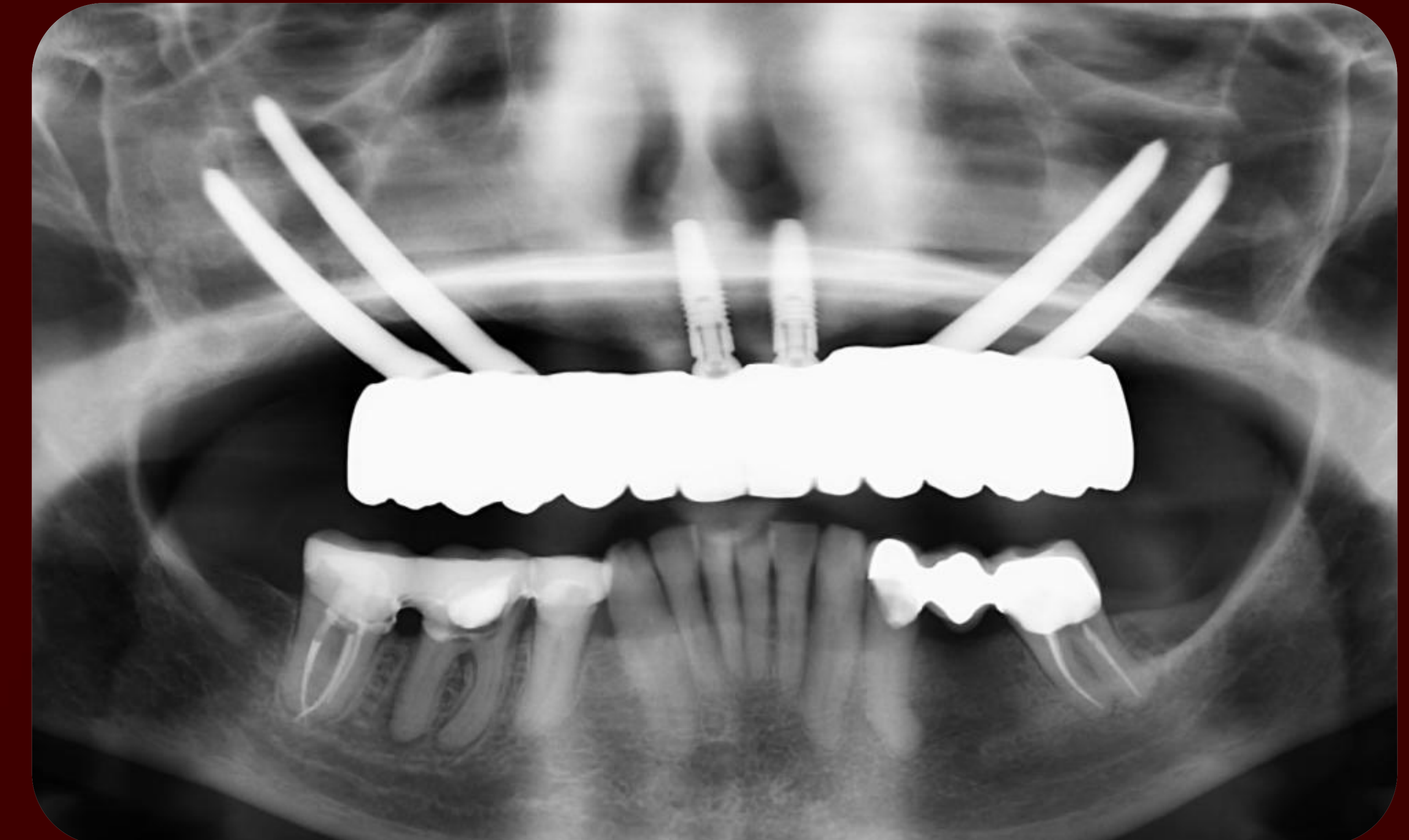
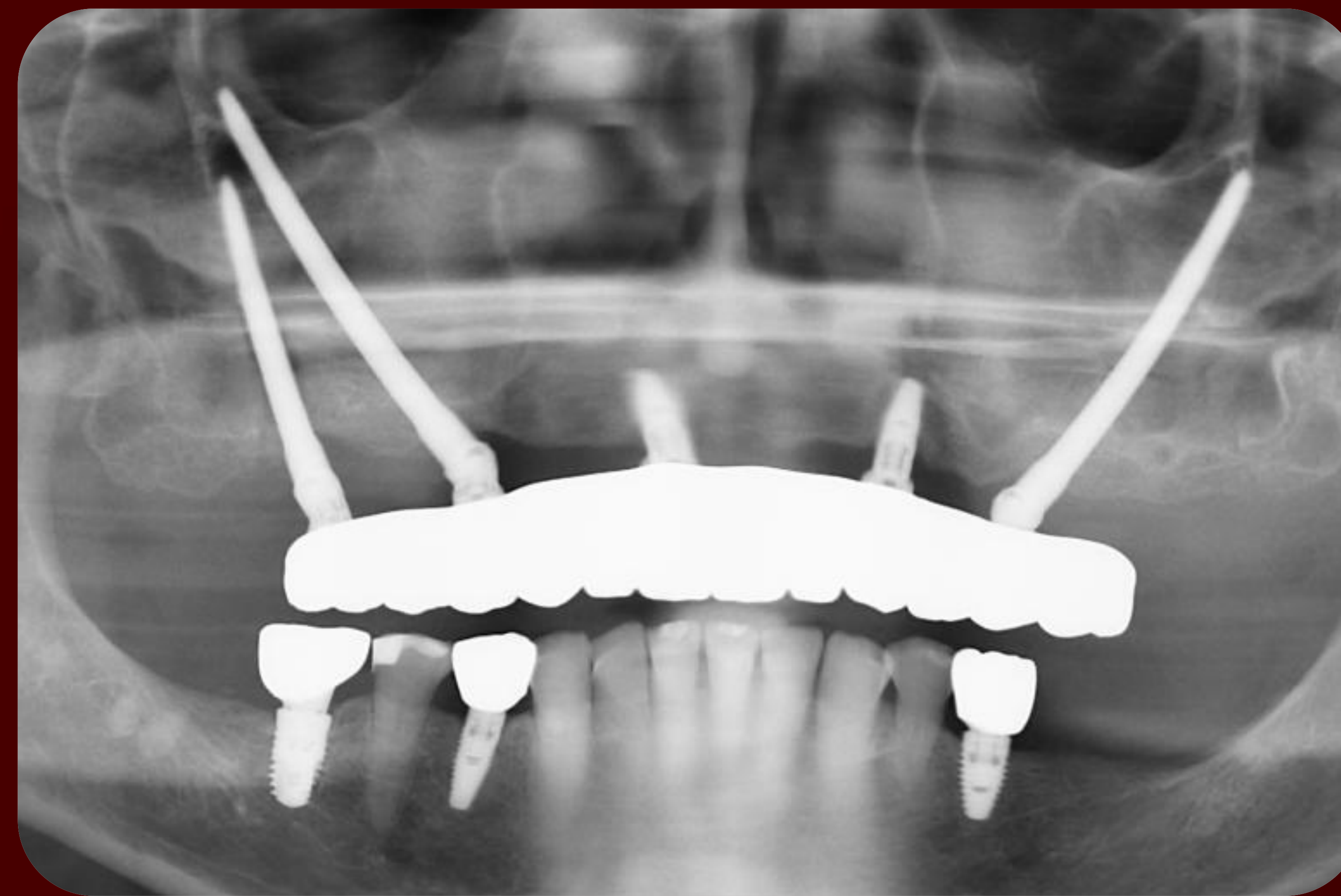
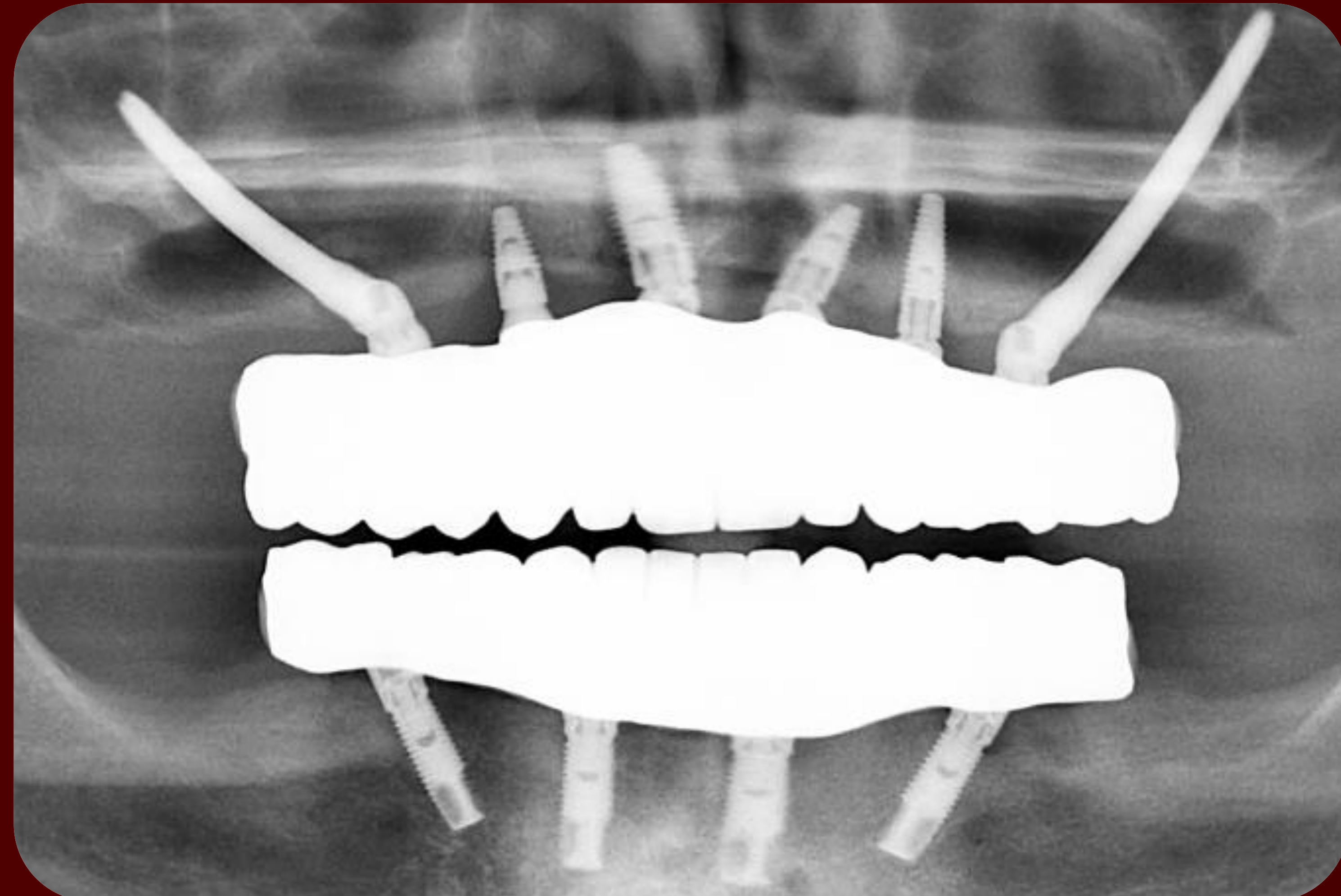
TEXAS A&M UNIVERSITY
College of Dentistry

Factors Influencing Success of Zygomatic Implants Placed in an Institutional Setting: A Retrospective Study



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Academy of Osseointegration Annual Meeting 2026



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Introduction

Implant dentistry has become a successful treatment for edentulism. However, severe maxillary atrophy presents challenges where standard implants alone may be insufficient. While conventional implants show 90-95% success rates, maxillary bone loss progresses posteriorly/superiorly and laterally/medially, with sinus pneumatization limiting available bone. Bone grafts are viable but time-consuming, requiring multiple procedures and extensive healing. Zygomatic implants offer a fast, reliable alternative by bypassing local bone deficiencies and anchoring into dense zygomatic bone.

This technique-sensitive procedure requires a challenging learning curve and proper training. Increased complication risks include sinusitis, soft tissue infections, paresthesia, oroantral fistulas, and orbital/infratemporal invasion due to proximity of anatomical structures. In institutional settings where multiple surgeons gain experience, limited outcome data exists, making evaluation of patient-related risk factors and complications essential for success.

Purpose

The influence of an institutional setting on zygomatic implant outcomes remains unexplored in the published literature. This retrospective study evaluated zygomatic implants placed at Texas A&M University to identify patient-related risk factors and complications associated with implant success.

Methods

Implants Placed in OMS
(January 2017- February 2025)
n= 1,559 Implants

Filtered to Maxillary Implants
(Positions #1-#16)
n= 836 Implants

Patients with maxillary implants placed
n= 585 patients

Implants placed in
(Positions #1-#16)
n= 22 patients; n=69 implants

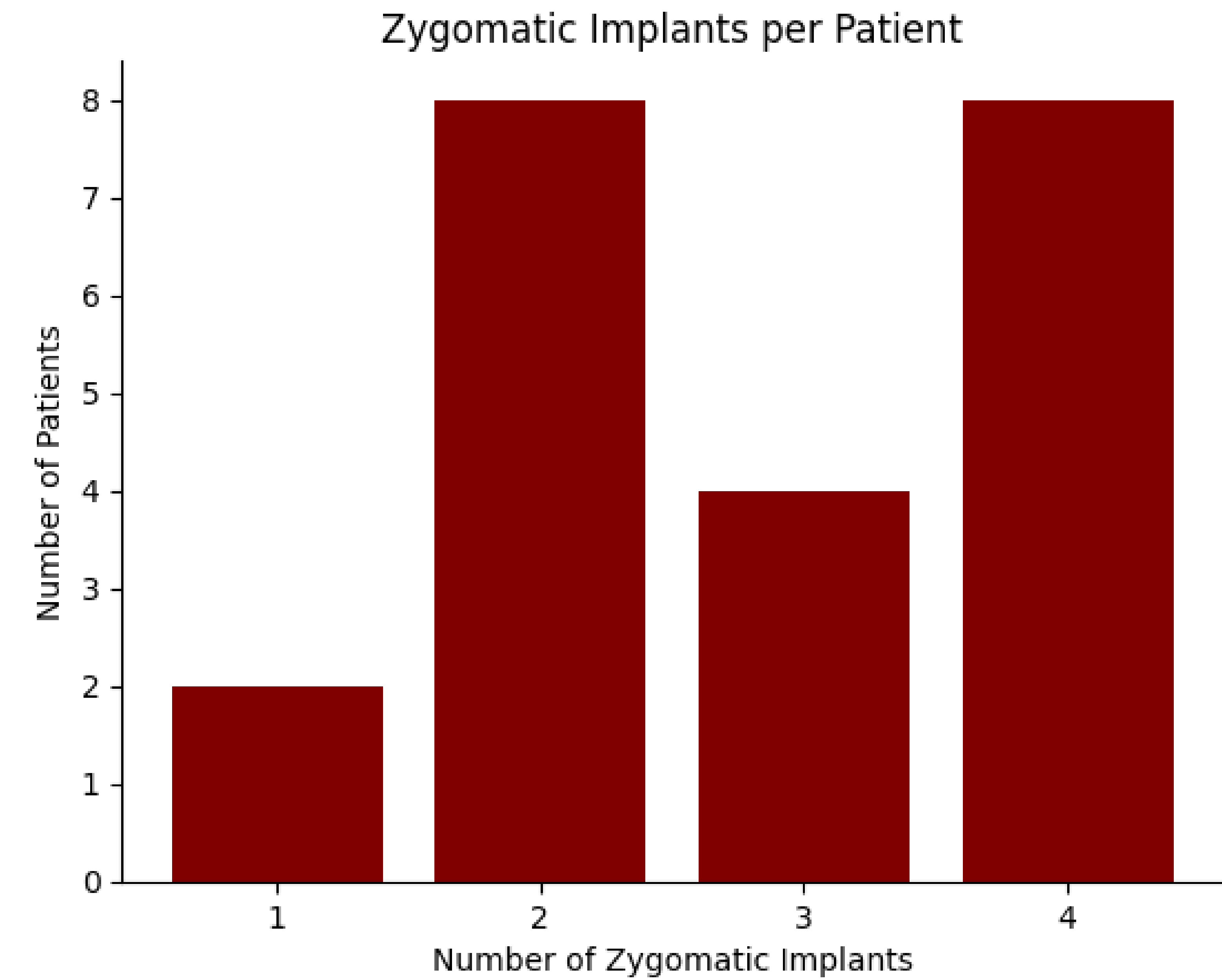
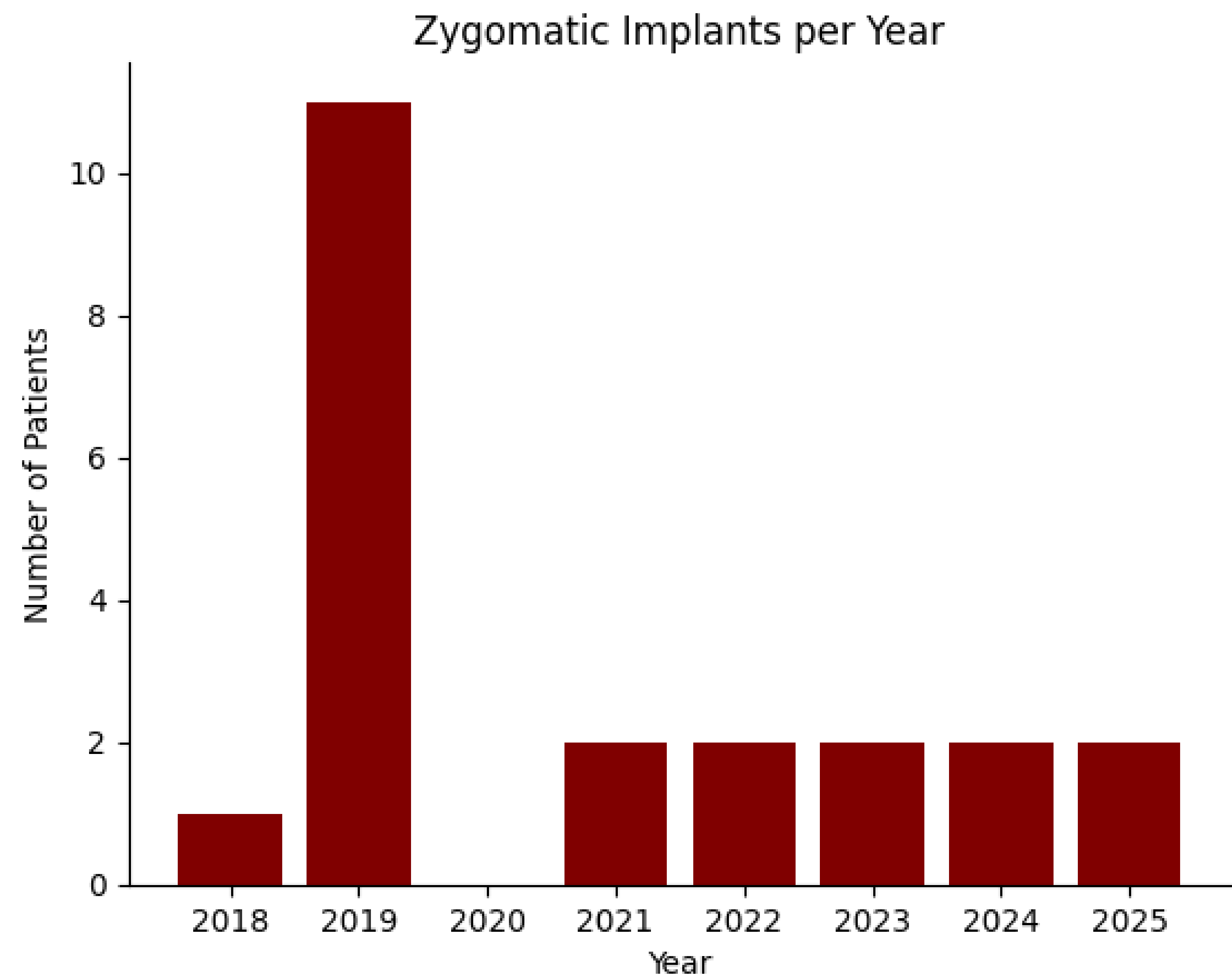
- Inclusion Criteria**
1. Placement of 1 ± zygomatic implants by an OMS resident
 2. Availability of complete surgical and medical record
 3. Minimum of 3-month follow up or documented implant failure

- Exclusion Criteria**
1. Incomplete medical/surgical records
 2. Patients with insufficient radiographic documentation

Data Collection

Category	Variable (Coding)
Demographic	Sex
	Age at implant placement
Medical history	High blood pressure
	High cholesterol
	Diabetes mellitus
	Heart disease / other heart conditions
	Osteoarthritis
	Thyroid disorder
	History of thyroidectomy
	Anxiety or depression
Clinical	Smoking status
	Parafunctional habits / bruxism
	History of periodontitis
	Loading protocol
	Zygomatic implant position
Outcomes	Bone grafting performed
	Sinus involvement
	Implant manufacturer
	Opposing arch
	Soft tissue complications
	Peri-implantitis
	Pain
	Sinusitis
	Prosthesis fracture
	Prosthetic/abutment screw fracture
	Screw loosening
	Paresthesia
	Implant failure

Results





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Results

Characteristic	Value
Age Mean (range)	59.8 (20–79 years)
Sex – Male	12 (54.5%)
Sex – Female	10 (45.5%)
High Blood Pressure	10 (45.5%)
High Cholesterol	7 (31.8%)
Diabetes	3 (13.6%)
Heart Conditions	3 (13.6%)
Osteoarthritis	6 (27.3%)
Thyroid	4 (18.2%)
Anxiety	3 (13.6%)
Depression	5 (22.7%)
Total Joint Replacement (knee/hip)	4 (18.2%)
Acid Reflux	7 (31.8%)
Sleep Apnea	3 (13.6%)
Bruxer	1 (4.5%)
Previous Smoker	7 (31.8%)
Previous Sinus Infections	2 (9.1%)
Maxillary Periodontitis History (reported)	3 (13.6%)
History of Failed Maxillary Implants	8 (36.4%)
History of Sinus Lifts	4 (18.2%)

Complication	Percentage
Sinusitis	4 (18.2%)
Soft tissue complications	4 (18.2%)
Interim Prosthesis fracture	7 (31.8%)
Screw loosening	2 (9.1%)
<i>At least one complication</i>	<i>12 (54.5%)</i>

Failures	
Implant failure	3 (4.3%)
Mode	2 -Failure to osseointegrate 1- Implant fracture
Contributing factors (Same for both patients)	Osteoarthritis Heart Conditions Acid Reflux



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Discussion

- Current evidence suggests that patient-related risks for zygomatic implant failure *mirror* those for conventional implants and include smoking, poorly controlled systemic disease (especially diabetes), history of periodontal disease, and pre-existing sinus pathology, as well as inadequate hygiene and maintenance.
- Specific systemic conditions such as heart disease, osteoarthritis, or GERD have not yet been established as independent predictors of zygomatic implant failure.

Complication	Percentage	Published Ranges
Sinusitis	4 (18.2%)	3-4%
Soft tissue complications	4 (18.2%)	20-40%
Interim Prosthesis fracture	7 (31.8%)	-
Screw loosening	2 (9.1%)	9-11%
At least one complication	12 (54.5%)	20-25%

Biologic Complications

- Sinusitis
- Peri-implant mucositis
- Tissue hypertrophy
- Oroantral fistula/communication
- Paresthesia

Prosthetic Complications

- Screw/abutment loosening
- Screw/abutment fracture
- Prosthetic fracture
- Chipping/loss of veneering material
- Wear/fracture of prosthetic teeth

Conclusions

1. Zygomatic implants in this institutional cohort showed a 95.7% implant-level success rate, comparable to published series.
2. Complications occurred in more than half of patients, with interim prosthesis fracture as the most frequent event, followed by biologic complications including sinusitis and soft-tissue problems.
3. The high prosthetic complication burden emphasizes the need for robust prosthetic design, conservative occlusion, and emphasis on material selection and structured maintenance in residency settings.
4. Implant failure rate was 4.3%. Osteoarthritis, heart conditions, and acid reflux were present in all failure cases, but these associations are based on only two patients and remain exploratory.

Zygomatic implants are a viable option for severe maxillary atrophy in training environments, but larger, prospective studies are needed to better define risk factors and refine protocols.

References & Acknowledgements

- ITI Consensus Statements: (Current Study Failure 4.3%; #2 implants= Failure of Osseointegration, #1= Fracture)
1. Most zygomatic series report implant-level failure rates around 3–4% over 8–12 years.
 2. A higher failure incidence may occur within the first year (2%) compared to that of subsequent years (0.5%/year).
 3. Reasons for failure within the first year were related to a failure to integrate or subsequent loss of integration/stability. Failure within the subsequent years was related to loss caused by biological or mechanical complications.

I would like to express my sincere gratitude to Dr. Elias Kontogiorgos, my committee chair, for his guidance, mentorship, and invaluable insights throughout this research project. I am deeply thankful to my committee members, Dr. Marianela Gonzalez, Dr. Matthew Kesterke, Dr. Jacqueline Chow, for their expertise, constructive feedback, and support. Special thanks to Dr. Gonzalez, for her extensive time throughout the data collection process and Dr. Stephen Parel for his continued support.

