

Importance of Primary and Secondary Orbital Implants in Anophthalmic Socket Rehabilitation

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Abstract: ***Background:** Enucleation or evisceration results in the loss of ocular volume, leading to cosmetic disfigurement and psychological trauma. Orbital implantation is the standard approach to address these issues, performed either at the time of globe removal (primary) or in a delayed fashion (secondary). **Aim:** To emphasize the functional, cosmetic significance of primary and secondary orbital implants and their role in anophthalmic socket rehabilitation. **Methods:** A retrospective study in tertiary care Centre. Comparison of outcomes of primary and secondary orbital implants was studied. **Results:** In our study, three patients have undergone evisceration with primary orbital implant followed by customized orbital prosthesis, and 2 patients have undergone secondary orbital implant followed by customized ocular prosthesis. Good prosthesis motility in primary orbital implant with customized ocular prosthesis of patients. Cosmetic satisfaction reported in all patients' primary orbital implant with customized ocular prosthesis of patients. Volume replacement generally adequate in majority of cases. **Conclusion:** Primary Orbital implantation offers superior outcomes in maintaining orbital anatomy, prosthetic motility, and patient quality of life, secondary orbital implants provide a valuable option for rehabilitation when primary implantation is not feasible.*

Keywords: Orbital implant, primary implant, secondary implant, anophthalmic socket, enucleation, evisceration, prosthesis motility, socket contraction

1.Introduction

Orbital evisceration is the complete removal of intraocular contents with the preservation of both the scleral shell and the extraocular muscle attachments. [Error! Reference source not found.]

It is a drastic step necessitated by trauma, painful blind eye, endophthalmitis, or intraocular malignancy.

Losing an eye due to severe traumas, infection, or end-stage diseases such as intraocular malignancy, glaucoma, or diabetes can be devastating at any age. It may have a major impact on one's self-confidence, self-image, and self-esteem, not only to adapting to monocular vision [Error! Reference source not found.]

While the primary aim is disease control or pain relief, orbital volume loss can result in cosmetic deformities, psychological distress, and functional challenges.

Methods: A retrospective study in tertiary care Centre. Comparison of outcomes of primary and secondary orbital implants was studied.

Preoperative B-scan was done.

All operations were performed by same oculoplastic surgeon after informed consent

For primary orbital implant - Single scleral closure techniques were performed. [Error! Reference source not found.][7]

For secondary orbital implant- additional donor sclera has been used.

Follow Up:

The cosmetic outcome was also analyzed by the operating surgeon for appearance in primary gaze (Eyelid symmetry), its range of movements and fitting. [Error! Reference source not found.]

2.Results

In our study, 3 patients have undergone evisceration with primary orbital implant followed by customized orbital prosthesis (COP) and 2 patients have undergone secondary orbital implant.

Figure	Age / Gender	Indication	Type of Implant	Procedure Done	Outcome
1	45/F	Phthisis bulbi	Primary Orbital Implant	Evisceration with Primary Orbital Implant	Good cosmetic outcome and prosthesis motility
2	25/M	Prephthisical bulbi	Primary Orbital Implant	Evisceration with Primary Orbital Implant	Satisfactory prosthesis fitting and mobility
3	60/M	Endophthalmitis	Primary Orbital Implant	Evisceration with Primary Orbital Implant	Good prosthetic movement and socket volume
4	22/M	Childhood evisceration	Secondary Orbital Implant	Secondary Orbital Implant in phthisical socket	Acceptable cosmesis, slightly reduced motility

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Figure	Age / Gender	Indication	Type of Implant	Procedure Done	Outcome
5	40/M	Childhood evisceration	Secondary Orbital Implant	Secondary Orbital Implant in phthisical socket	Socket well-maintained, mild limitation in gaze



Figure 1 – Left Eye, (a) Pre OP - Phthisis Bulbi, (b) PostOp - Status post evisceration with primary Orbital Implant followed by customized Ocular Prosthesis.



Figure 2 – Right Eye, (a) PreOP - Pre-Phthisical Bulbi (b) PostOp – Status post evisceration with primary Orbital implant followed by customized ocular prosthesis.



Figure 3 - (a) PreOP - Left Eye Endophthalmitis, (b) PostOp – Status post Evisceration with primary Orbital implant followed by customized ocular prosthesis.

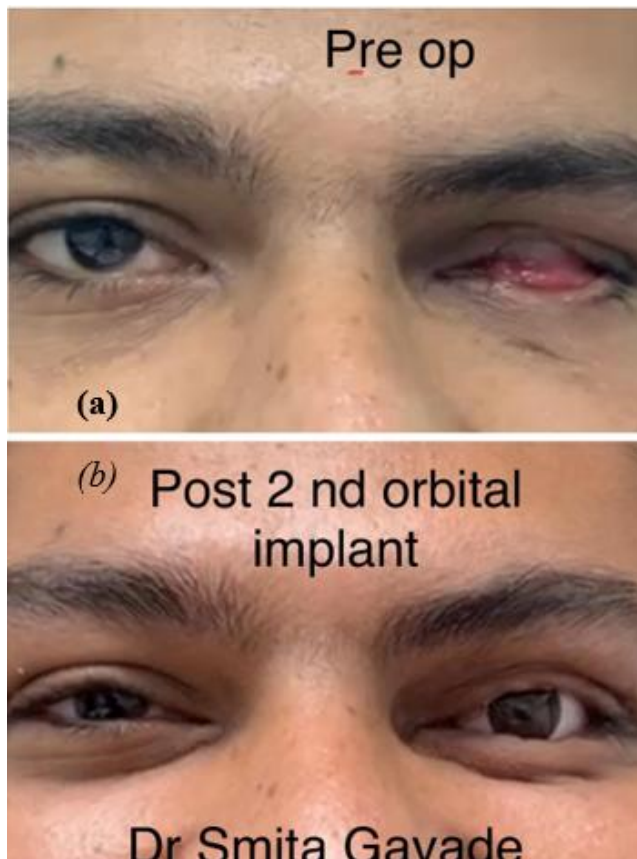


Figure 4 - (a) PreOP – Anophthalmic Socket left eye, (b) PostOp - Secondary Orbital Implant followed by customized ocular prosthesis.

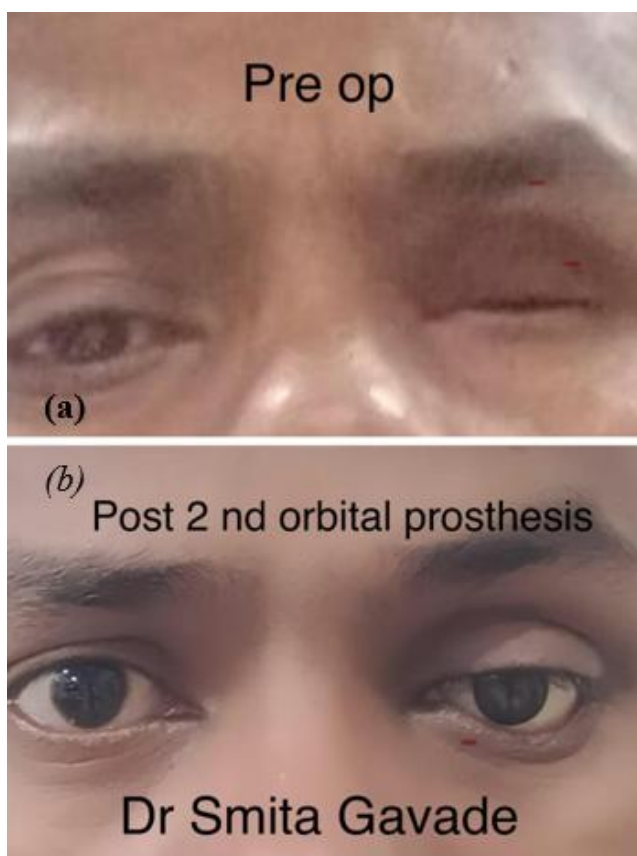


Figure 5 - (a) PreOP - Anophthalmic Socket of Left eye (b) PostOp – Secondary Implant followed by customized ocular prosthesis.

Results summarized in Table 2. ^[4]

Cosmetic result	Primary	Secondary
Eyelid Symmetry	Good	Satisfactory
Orbit Fullness	Good	Good
Sufficient Conjunctiva area	Good	Less
Prosthesis Motility	Good	Satisfactory

3.Case Discussion

Primary orbital implant

A primary orbital implant is indicated in conditions such as ocular tumors, painful blind eyes with no visual potential, and phthisis bulbi. The procedure offers favorable outcomes both functionally and cosmetically. With appropriate conformer use and early prosthetic fitting-typically within 4 to 6 weeks postoperatively-patients often report high levels of self-confidence and satisfaction with facial symmetry. Being a single-stage procedure, primary implantation minimizes the risks associated with two separate surgeries, enables early rehabilitation, and facilitates optimal ocular cosmesis.

[Error! Reference source not found.]

Secondary orbital implant

Secondary orbital implantation is generally performed when a primary implant was not placed during the initial enucleation or evisceration, or when the implant was removed due to complications such as infection, extrusion, or exposure. The most common indication for secondary implantation is phthisis bulbi. Placement of an adequately sized implant into a phthisical scleral shell demands meticulous surgical technique, including relaxing sclerectomies to ensure proper placement within the muscle cone. Failure to perform this step carefully may result in implant exposure.

[Error! Reference source not found.]

Despite these challenges, secondary implantation can achieve satisfactory cosmetic and functional results when performed in a well-healed, infection-free socket. However, prosthesis motility is often slightly reduced due to fibrosis and scarring. Most patients, nevertheless, attain acceptable prosthesis retention, adequate socket volume, and good cosmetic appearance.

The most frequent complication associated with orbital implants is exposure, which may lead to infection and implant extrusion if scleral and conjunctival integrity is compromised. The rate of these complications varies depending on factors such as implant material, size, surgical technique, and pegging.

[Error! Reference source not found.]

Other potential complications include conjunctival dehiscence, infection, migration, and reduced motility. Proper implant sizing, sterile surgical practices, and secure closure techniques are crucial to minimize these risks.

Secondary orbital implantation generally yields good cosmetic and functional outcomes, especially when performed in a well-healed, infection-free socket.

Though prosthesis motility may be slightly reduced compared to primary implants due to scarring and fibrosis, most patients achieve acceptable prosthesis retention, socket volume, and cosmetic appearance.

Primary implants act as a space maintainer and reduce risks such as difficult future prosthesis fitting, need for secondary procedures like mucous membrane grafts or dermis-fat graft.

Complications and Considerations:

Although generally safe, orbital implants may result in:

- Implant exposure or extrusion
- Conjunctival dehiscence
- Infection
- Migration or poor motility

Proper sizing, sterile surgical technique, and secure closure techniques minimize these risks. In this study, we sought to identify quantifiable anatomical features and functional properties related to a successful cosmetic result of primary orbital implant with ocular prosthesis versus secondary orbital implant with ocular prosthesis.

In the present study, we sought to identify anatomical and functional determinants contributing to successful cosmetic results in patients undergoing primary versus secondary orbital implantation followed by an ocular prosthesis.

Our findings demonstrated that patients who underwent primary orbital implantation achieved superior cosmetic outcomes, characterized by better eyelid symmetry and enhanced prosthesis motility, compared to those who underwent secondary implantation.

The fundamental goal of ocular prosthetic rehabilitation is to restore an appearance that patients perceive as natural and cosmetically acceptable.^[Error! Reference source not found.] Our study supports this objective, emphasizing eyelid symmetry as a key determinant of patient satisfaction.

Additional parameters associated with positive cosmetic outcomes included eyelid position, orbital fullness, and prosthesis mobility.

Dave et al. ^[Error! Reference source not found.] evaluated patient satisfaction among anophthalmic individuals and found strong correlations between movement, orbital fullness, color matching, and prosthesis size. Their study also revealed that younger patients were more concerned with aesthetic appearance, prosthesis retention, and comfort than older individuals.^[Error! Reference source not found.]

Our findings are consistent with these observations, as patients receiving primary orbital implants with customized ocular prostheses (COP) reported higher satisfaction and better perceived cosmetic outcomes.^[Error! Reference source not found.]

Secondary orbital implant with COP will help improve patient's self-esteem, as well as the way they are perceived by their friends and family.

Most of the studies have analyzed primary orbital implant with customized ocular prosthesis, or studied about customized ocular prosthesis in an anophthalmic socket, no literature is available comparing primary versus secondary orbital implant followed by COP.

Patients without prosthetic rehabilitation often experience psychosocial challenges, including feelings of shame, sadness, social withdrawal, and self-consciousness.^[Error! Reference source not found.]

Introduction of a secondary orbital implant with COP can significantly improve self-esteem, social confidence, and interpersonal interactions, positively influencing overall quality of life.

While previous studies have assessed outcomes of primary orbital implantation or customized ocular prostheses individually, comparative data between primary and secondary orbital implants followed by COP remain limited. Identifying correlations between clinical parameters and cosmetic results is valuable for ophthalmic surgeons in tailoring treatment strategies, improving surgical planning, and setting realistic postoperative expectations.

4. Conclusion

A primary orbital implant is an essential component of comprehensive anophthalmic socket rehabilitation. It restores orbital volume, improves cosmetic and functional outcomes, enhances prosthesis motility, and reduces the need for further interventions. With advancements in implant materials and techniques, it should be regarded as the standard of care.

Although results of secondary orbital implant with COP are not as good as Primary orbital implant with COP, still it can be considered, to overcome social insecurity and improve confidence in day-to-day life.

Disclosures

The authors declare no conflict of interest.

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