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Original Research Article

A Method of Orienting the Ocular Part of an Orbital Prosthesis: A Pilot Study

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This article describes the use of stainless steel wire clasps framework for retaining an ocular prosthesis in the orbital defect. By incorporating framework core, ocular prosthesis may be more stable and minimizes movement during laboratory procedure.

Keywords: Ocular Prosthesis, Orbital Prosthesis, Framework core, Facial defect, Dental stone.

INTRODUCTION

Posterior indexing method disfigurement to the face can lead to psychological and social problems. Restoring these patients with a facial prosthesis that facades the defect is a very demanding task. Surgical removal of an eye is inevitable in situations like irreparable trauma, malignant orbital tumours, painful blind eye, and sympathetic ophthalmia.[1,2,3] Surgical management includes; evisceration, enucleation, or exenteration. Orbital prosthesis is required to rehabilitate patients following exenteration of eye as this surgical procedure involves enbloc removal of the entire orbit, usually involving partial or total removal of the eyelids.[1,2,3,4,5,6,7]

TECHNIQUE

Make an impression of the mid-facial defect and fabricate a master cast with improved dental stone. A stainless steel wire clasps gauge (0.6mm) (Dentaurum, Germany) was used to fabricate the framework core. The wire was adapted in cross form on the orbital defect of the master cast and the joint of cross was soldered by soldering procedure using orthodontic solder stick (Dentaurum, Germany). The position of the stainless steel framework core was approximately marked on the rear side of the orbital prosthesis (fig. 1).

This framework core acted as a base and also retains the ocular part. An eye shell was selected from an array of stock acrylic eye shells. Inverted anatomic tracing is a technique wherein the individualized contours of the orbital tissues of a patient can be reproduced in the laboratory in the absence of the patient.[8] Facial measurements were used to orient the ocular part in this pilot study (fig. 1). The right eye of the working model was used as a guide gaze. A series of vertical lines were marked on the sound side of the working model; line (A) through the midline of the face and line (B) through the pupil of the right eye. The distance between lines (A) and (B) was measured and a vertical line (B^b) was drawn on the defect side from the midline (A). A horizontal line was drawn passing through the pupil of the right eye (C) and extended through the mid-facial defect on to the left side of face (C^c). The horizontal line ($C–C^c$) helped in orienting the eye shell in correct vertical plane and the vertical lines ($B–B^b$) helped in orienting the eye shell mediolaterally in the mid-facial defect area in the working model.

A 7 x 7 inch Over-Head Projector (OHP) sheet was taken and oriented over the right eye of the working model and the lines (A), (B) and (C) were marked on the OHP sheet to orient the sheet during tracing. With an indelible marker, the periorbital anatomy of the right eye was drawn from the working model (fig. 2). These facial measurements and tracing technique were employed on the working model to assist and to reproduce the contours of the wax pattern of the orbital tissues. Tissue contours like the shape of the upper and lower eyelids, interlid space and the eyebrow shape were traced on the OHP sheet. The transparent tracing was inverted and oriented with lines (A), (B^b) and (C^c) on the surgical defect side (Fig. 2). This was used to sculpt the wax pattern of the orbital prosthesis as the tracing represented the mirror image of the right eye.

The working cast was filled with wax and the eye shell was oriented according to the symmetrical eye using the reference lines fitted to the framework core by using auto-polymerizing resin (GC, Unifast, Japan) (fig. 3). The next step was reproducing the periorbital tissue contours.

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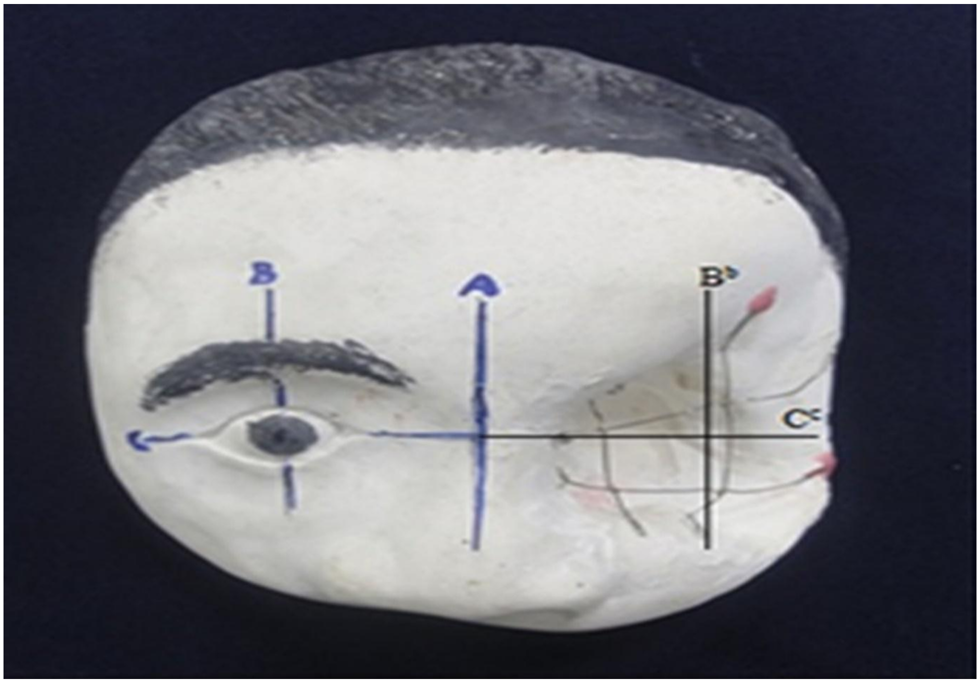

Fig. 1. Frontal view of the master cast with the orbital defect, facial measurements and stainless steel framework core in the defect.

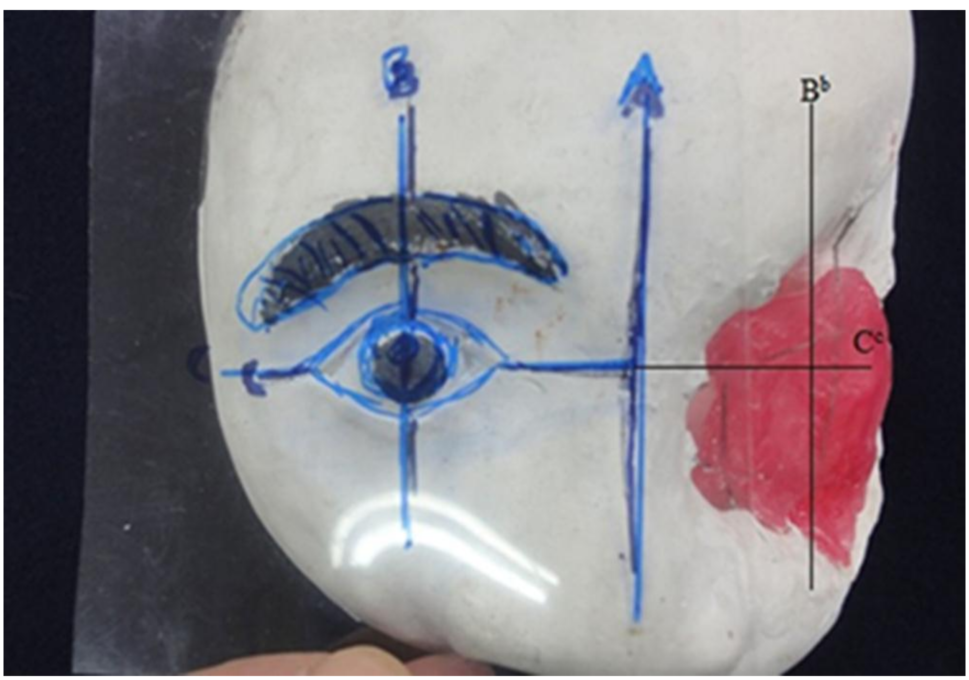

Fig. 2. Inverted anatomic tracing of the periorbital tissue and the right eye.

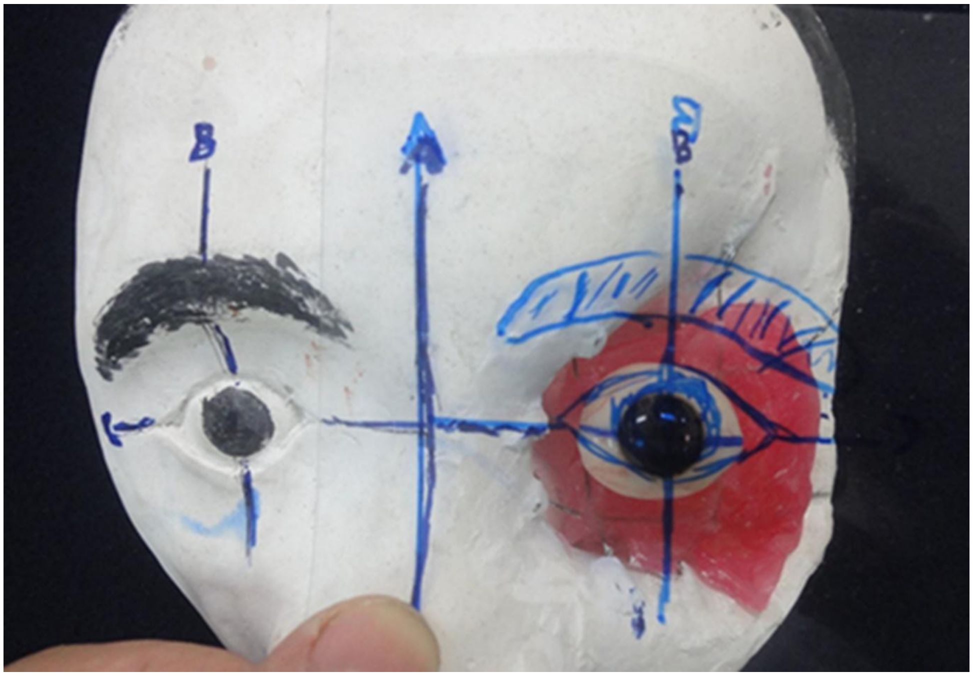

Fig. 3. Tracing of the right eye inverted and oriented on the defect side.

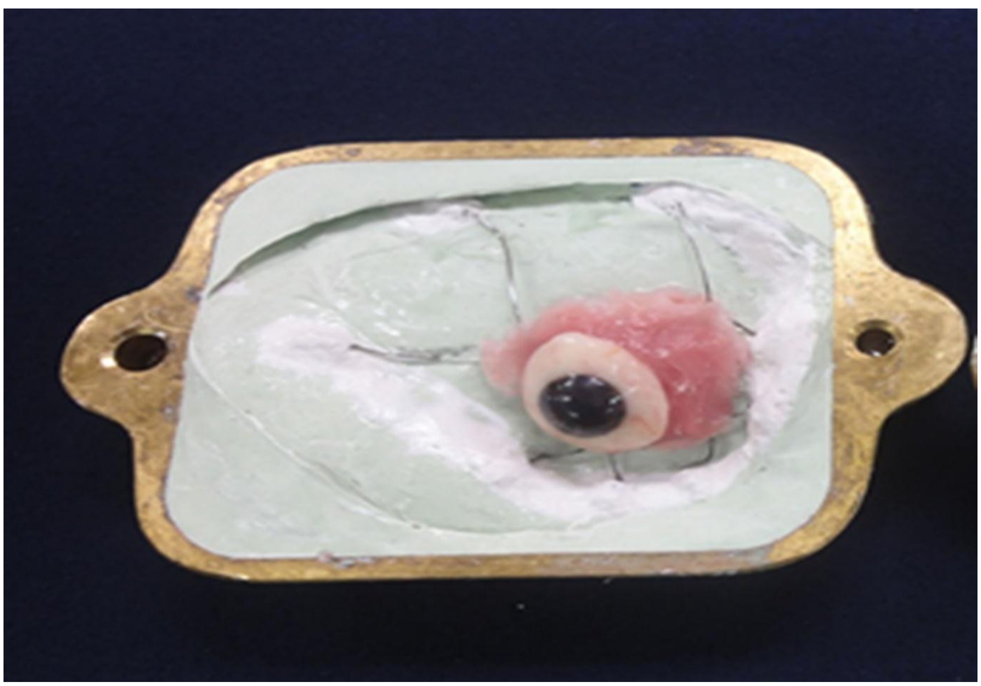

Fig. 4. Eye shell is stable on the framework core after dewaxing.

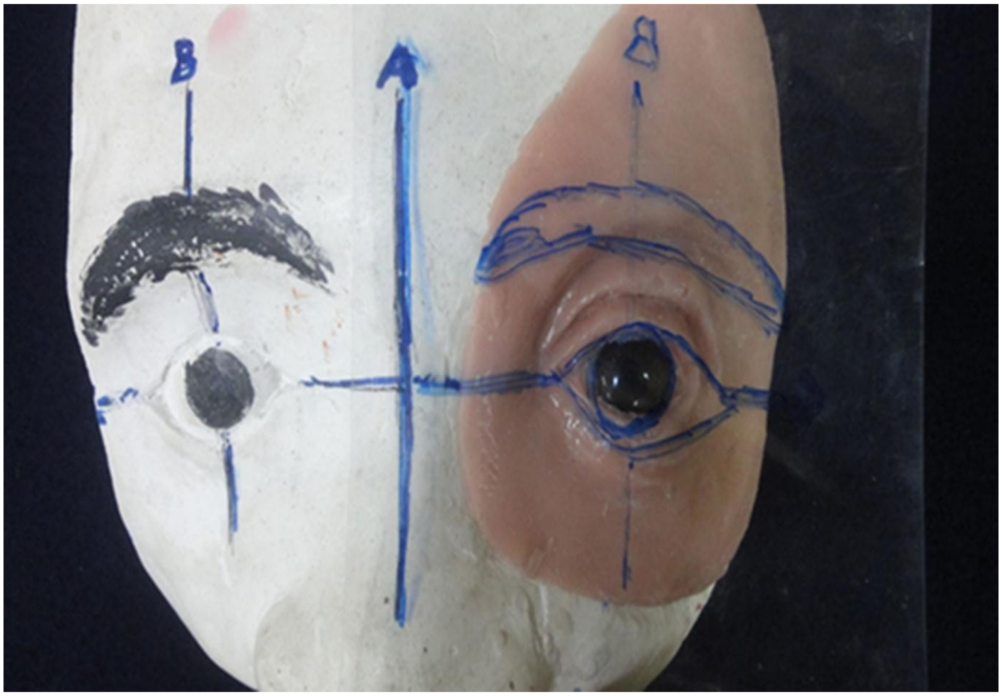

Fig. 5. Orbital prosthesis in the orbital defect after finishing.

Carving the anatomic replica of contiguous soft tissues in a mid-facial is an intricate and protracted procedure. Dental stone was used for mould preparation as it was easy to construct, accurate, and inexpensive. The processing cast along with the indexed pattern was invested in dental stone and dewaxed (fig. 4). Silicone elastomer (VST50F; Factor II Inc, Lakeside, Ariz) was packed and processed in the stone mold. After the complete polymerization of silicone elastomer, the mold was opened, the excess silicone was trimmed, and the edges were smoothed with a trimming kit (Factor II Inc, Lakeside, Ariz) (fig. 5).

DISCUSSION

The challenges faced during constructing an orbital prosthesis are; obtaining a satisfactory working model without tissue compression, proper orientation of the ocular portion in harmony with the remaining eye. The problem of orienting the eye shell in the defect and in harmony with remaining eye was solved using facial measurements.[9] Inverted anatomic tracing technique helped in copying the periorbital tissue details of the remaining eye. The tracing when inverted served as the blueprint for carving the wax pattern for the orbital prosthesis.

This pilot study details the prosthetic rehabilitation of an orbital defect with an orbital prosthesis which was sculpted using inverted anatomic tracing technique.[8] The eye shell was stabilized during processing using stainless steel wire clasps framework core method. It was preferred over anterior indexing as the later mostly results in damaging the corneal surface of the eye shell.[10]

SUMMARY

The difficult task in fabricating an orbital prosthesis is maintaining the position of the eye shell without positional discrepancy during processing. In this study, stainless steel wire clasps framework core was used for stabilising the eye shell during processing.

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