Short Communication

Study of Dimensional Alterations of the Orbit Following Loss of the Eye

Bruno Felipe Gaia, DDS[a]/Cheong Kuo Cheng, DDS[b]/Lineu Perrone, Jr, DDS[c]/
Maria Cecília Montagna Rose, PhD[d]/Beatriz Silva Câmara Mattos, PhD[e]

Purpose: This study aimed to assess the dimensional alterations in the anterior region of the orbit after enucleation or evisceration. ***Materials and Methods:*** Analysis of orbital areas and perimeters of 17 patients with unilateral removal of the ocular bulb was performed, and posteroanterior radiographic examination was carried out by a single specialist, who had been previously calibrated. ***Results:*** Data obtained from measurements confirmed the clinically observed facial asymmetry. ***Conclusion:*** The observation of asymmetry in the anterior orbital area, confirmed by our results, indicates early treatment to prevent orbital disturbances and will aid in the planning of prosthetic rehabilitation. *Int J Prosthodont 2006;19:264–265.*

Facial bones and adjacent structures must develop in perfect synchronization to ensure the normal development of the face. The upper third of the face, which develops from the frontonasal prominence, grows rapidly at first and then ceases to grow around the age of 12. The middle third, on the other hand, grows more slowly.[1] Any interference in the correct order of progression causes developmental defects and malformation. Such deformities can vary by type, intensity, extent, chronology, and etiologic agent, as well as by susceptibility and growth pattern of the affected area. Alterations in the shape and size of the orbit and its content are caused by congenital, traumatic, or pathologic disturbances.[2] Treatment is carried out surgically through evisceration or enucleation and must be completed, whenever possible, with the placement of implants or prostheses, so that loss of the ocular bulb and adjacent structures is esthetically minimized.[3] This study aimed to assess the dimensional alterations in the anterior region of the orbit after enucleation or evisceration.

Materials and Methods

The studied group comprised 17 patients with unilateral removal of the ocular bulb. The authors' experience analyzing patients with healthy eyes revealed such minimal differences that it was felt that the healthy side of these patients' faces could be employed as a "control" group. The patients underwent posteroanterior radiographic examination of the orbit using the Waters-Waldron projection. The radiographs were digitalized using the Adobe Photoshop 2000 program (Microsoft), previously calibrated. Radiographic analysis was carried out using Imagelab 2000 software (Informatics Laboratory Dedicated to Dentistry) (Fig 1). A single specialist, previously calibrated, measured the areas of both healthy and affected orbits of each patient to obtain the areas and perimeters at 10,000 pixels/cm.

[a]*Trainee in Oral and Maxillofacial Surgery, Conjunto Hospitalar do Mandaqui, São Paulo, Brazil.*
[b]*Private Practice, São Paulo, Brazil.*
[c]*Postgraduate Student, Department of Oral Pathology, School of Dentistry, University of São Paulo, Brazil.*
[d]*Professor, Department of Maxillofacial Surgery, Prosthesis and Traumatology, University of São Paulo, São Paulo, Brazil.*
[e]*Associate Professor, Department of Maxillofacial Surgery, Prosthesis and Traumatology, University of São Paulo, São Paulo, Brazil.*

Correspondence to: *Bruno Felipe Gaia, School of Dentistry, University of São Paulo, Rua Borges Lagoa, 512, apt 111-C, Vila Mariana, São Paulo 04038-000, Brazil. E-mail: bgaia@usp.br*

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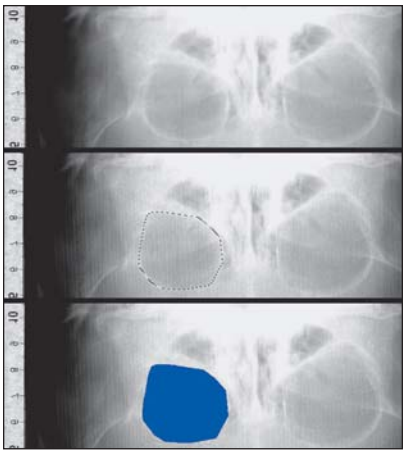

Fig 1 *(left)* Measure of the enucleated socket: *(top)* initial radiograph, *(middle)* tracing of the perimeter, *(bottom)* outlining the area for calculation.

Fig 2 *(center)* Facial asymmetry in patient with right enucleation after trauma.

Fig 3 *(right)* Prosthetic rehabilitation with an ocular prosthesis.

Table 1 Area Measurements (cm^2) of the Enucleated Socket (ES) and the Control Socket (CS)

	ES	CS	Difference between ES and CS
Minimum	7.453	11.065	0.027
First quartile	11.002	12.483	0.286
Median	12.368	13.382	0.947
Third quartile	12.976	14.236	1.675
Maximum	15.594	15.963	3.778

Results

The study sample was subject to variation of some factors, including age group (range = 0 to 74, mean = 43.8 years) and time interval without an ocular prosthesis (mean = 4.73 years). The facial asymmetry clinically observed in the patients was confirmed by data obtained from measurements. The minimum difference observed in the area of the orbit with or without the ocular bulb was 0.027 cm^2 and the maximum difference was 3.778 cm^2 (mean = 1.178 cm^2) (Table 1).

Discussion

The development of new imaging techniques such as computerized tomography allowed for the perfect measurement of facial structures, and, consequently, the measurement of orbital volume. These techniques also allowed for the 3-dimensional reconstruction of all tissues (osseous, muscular, vascular, and tegumental) of this cavity.[4] Despite the continuous development of increasingly effective techniques, the cost of these systems is still very high and clinicians often cannot use them. The anterior orbital area values were obtained by outlining the orbit, thus allowing the evaluation of a region fundamental to prosthetic reconstruction and with great clinical and esthetic importance (Figs 2 and 3). Careful examination of the orbital tissues and subsequent molding of the cavity allow for an individualized prosthesis, reducing the risk of damage caused by an inappropriate prosthesis. Kaltreider[5] showed that overly large prostheses can lead to drooping eyelid or ptosis, while overly small prostheses can lead to severe anterior contraction of the periorbital tissues.

Conclusions

1. The mean variation of 8.43% between the orbital areas of affected and unaffected sides confirms the presence of orbital asymmetry.
2. The observation of asymmetry in the anterior orbital area can aid in the planning of prosthetic rehabilitation, and early treatment is indicated to prevent orbital disturbances.

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