Abstract

The orbitotomy has a central importance in craniofacial surgery. It is indicated for premature craniosynostoses, malformations and tumor surgery. The aim of the treatment is to correct functional disturbances and aesthetic impairments. Anatomical structures must be respected. Functional and anatomical aspects of the orbitotomy in craniofacial surgery are described.

Keywords: Craniofacial surgery, orbitotomy.

1 Introduction

Craniofacial surgery includes the neuro- and viscerocranium. So the orbitotomy is a central part of the operative procedure. In our clinics these operations are performed in close teamwork among neuro- and maxillo-facial surgeons.

We distinguish between total and partial orbitotomy. Total orbitotomy includes the complete mobilization of the orbit [3]. After osteotomy, it can be moved in the desired position. The orbit is rotated, preventing a torsion of the bulb. The inner osteotomy-line should lay deep in the orbital cavity so that the bulb follows the rotation. Partial orbitotomy includes the osteotomy of single bone segments of the orbit. We distinguish between supra- and infraorbital segments.

The coronal incision allows the preparation of the bulb, the canthal ligaments, and the trochlea. The refixation of these structures is not necessary as reattachment takes place physiologically. There is no risk of damaging the supraorbital nerve, due to its position in a fissure. If it is in a canal, the canal must be opened by a chisel or by a luer. We have never seen a lesion of the optic nerve by traction or compression because it is well protected by the surrounding soft tissues.

For the infraorbital osteotomy, the nasolacrimal duct must be dissected and mobilized to allow a safe osteotomy behind this duct. The supraorbital orbitotomy is performed intracranially. The frontal bone segment must first be removed, after which the frontal and temporal dura can be detached. Olfactory nerves are preserved by special osteotomy.

With the exception of the orbital roof, all other bone segments are osteotomized extra-cranially. The infra-orbital nerve is also protected by specially designed osteotomy.

If the paranasal sinuses are opened towards the intra-cranial cavity, they must be covered to prevent ascending infections.

2 Clinical cases

In the following sections indication for procedure of orbitotomy is demonstrated by clinical cases of craniofacial surgery.

Craniostenoses are the principle indication for orbitotomy. In these cases the orbital cavity is too flat. The consequence is bulbar protrusion with incomplete closure of the eye-lids and risk of corneal erosions. Increased intra-cranial pressure can produce papillar edema and, in extreme cases, blindness [1]. We treat this with a standardized fronto-orbital advancement [5] (Figure 1). It is based on osteotomy, reshaping, and advancement of the fronto-orbital region. The osteotomy lines run from the fronto-nasal suture along the orbital roof to the fronto-zygomatical suture [6]. The advancement of the fronto-orbital segments increases the intra-cranial volume so that intra-cranial pressure is normalized [4]. The orbital cavity becomes deeper so that the bulbar protrusion is corrected.
Figure 1. Standardized osteotomy and frontoorbital advancement in craniosenosis with supraorbital orbitotomy.

Figure 2. Frontoorbital advancement combined with Le Fort-III-osteotomy; the entire orbital cavity becomes deeper.

A supra-tarsial fold is formed and the closure of the eye-lids becomes possible. In young children the defect of the orbital roof closes itself by reossification.

In cases with extreme hypoplasia of the mid-face and extreme bulbar protrusion the fronto-orbital advancement can be combined with Le Fort-III-osteotomy in one step (Figure 2). These fronto-orbital maxillary procedures mobilize and advance the mid-face and fronto-orbital segments forward. This technique can correct extreme bulbar protrusion together with the front and the mid-face.

In tumor surgery, orbitotomy is performed especially in order to decompress the optic nerve and reduce the size of tumors. The temporary removal of fronto-orbital bone segments as is carried out in craniosenoses allows a good approach to fronto-basal neoplasias.

The Recklinghausen disease is often combined with a defect of the orbital roof [2], so that the frontal lobe can prolapse and produce a bulbar protrusion. The consequence is a visual impair-

Figure 3. Pre- and postoperative views of anophtalmia; paranasal sinuses are formed to an orbital cavity.

Figure 4. Operating principle of hypertelorisme.