

# Cranio-Orbito-Zygomatic Approach

*Sabino Luzzi<sup>1,2</sup>, Alice Giotta Lucifero<sup>1</sup>, Nunzio Bruno<sup>3</sup>, Matias Baldoncini<sup>4,5</sup>, Alvaro Campero<sup>6,7</sup>, Renato Galzio<sup>8</sup>*

<sup>1</sup>Neurosurgery Unit, Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, University of Pavia, Pavia, Italy; <sup>2</sup>eurosurgery Unit, Department of Surgical Sciences, Fondazione IRCCS Policlinico San Matteo, Pavia, Italy; <sup>3</sup>Division of Neurosurgery, Azienda Ospedaliero Universitaria Consorziale Policlinico di Bari, Bari, Italy; <sup>4</sup>Laboratory of Microsurgical Neuroanatomy, Second Chair of Gross Anatomy, School of Medicine, University of Buenos Aires, Buenos Aires, Argentina; <sup>5</sup>Department of Neurosurgery, San Fernando Hospital, Buenos Aires, Argentina; <sup>6</sup>Servicio de Neurocirugía, Universidad Nacional de Tucumán; Argentina; <sup>7</sup>Department of Neurosurgery, Hospital Padilla, San Miguel de Tucumán, Tucumán, Argentina; <sup>8</sup>Neurosurgery Unit, Maria Cecilia Hospital, Cotignola, Italy

**Abstract.** The cranio-orbito-zygomatic (COZ) approach consists of an extension of the pterional approach characterized by the removal of the superolateral part of the orbital rim and zygoma. This key step tremendously increases the angular exposure to some deep targets and overall surgical freedom to the lesion. In this article we review the technical variations of the COZ approach, mainly focusing on the differential quantitative effects coming from the orbital osteotomy compared to the zygomatic one. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Keywords:** Carotid-oculomotor Window; Optic-carotid Window; Orbito-Zygomatic Approach; Orbitopterional Approach; Pterional Craniotomy; Skull Base Approach; Surgical Anatomy

## Introduction

The cranio-orbito-zygomatic (COZ) approach allows wide exposure of the anterior and middle skull base until the upper clivus.

It involves the addition of an orbito-zygomatic (OZ) osteotomy to the pterional approach. Removal of the OZ bar has three main advantages (1-16). The first is the dramatic increase in the subfrontal and subtemporal view angle for those skull base lesions extensively projecting upward. The second is the shortening of the working distance. The third is obtaining a wide working space with the capability of handling the lesion from different angles.

Herein we overview the different techniques reported for the COZ approach. We also analyze the differential quantitative effects of the orbital and zygo-

matic osteotomy on the angular exposure of the target and overall surgical freedom.

## Indications

The COZ approach is indicated for high-riding large to giant aneurysms of the anterior communicating artery (ACoA) and basilar apex, especially when projecting posteriorly. Large meningiomas of the anterior clinoid and sphenoid-orbital region, large craniopharyngiomas, and giant pituitary adenomas are additional indications. The COZ approach also provides direct access to the ipsilateral crural and ambient cisterns, interpeduncular fossa, ipsilateral cerebral peduncle, and hypothalamic region. Therefore, it is also the most widely used corridor for the treatment of