

## Review Article

# OsiriX software as a preoperative planning tool in cranial neurosurgery: A step-by-step guide for neurosurgical residents

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## Abstract

**Background:** OsiriX (Pixmeo, Switzerland) is an open-source Digital Imaging and Communications in Medicine (DICOM) viewer that is gaining more and more attention in the neurosurgical community because of its user-friendly interface, powerful three-dimensional (3D) volumetric rendering capabilities, and various options for data integration. This paper presents in detail the use of OsiriX software as a preoperative planning tool in cranial neurosurgery.

**Methods:** In January 2013, OsiriX software was introduced into our clinical practice as a preoperative planning tool. Its capabilities are being evaluated on an ongoing basis in routine elective cranial cases.

**Results:** The program has proven to be highly effective at volumetrically representing data from radiological examinations in 3D. Among its benefits in preoperative planning are simulating the position and exact location of the lesion in 3D, tailoring the skin incision and craniotomy bone flap, enhancing the representation of normal and pathological anatomy, and aiding in planning the reconstruction of the affected area.

**Conclusion:** OsiriX is a useful tool for preoperative planning and visualization in neurosurgery. The software greatly facilitates the surgeon's understanding of the relationship between normal and pathological anatomy and can be used as a teaching tool.

**Key Words:** Intracranial aneurysms, meningioma, neurooncology, OsiriX software, preoperative planning in neurosurgery, simulation

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## INTRODUCTION

Correct and detailed preoperative planning is one of the most important prerequisites of successful surgery and is a skill that takes years to master and understand. The difficulty comes from transforming the two-dimensional preoperative radiological black-and-white data into a three-dimensional (3D) image in the surgeon's mind, a view that represents the surgical position of the patient, the small cranial exposure, and the distortion of the normal anatomy caused by the lesion. This process of transforming the data is most difficult at the beginning of one's career in early residency.

Fortunately, modern-day technology provides multiple aids in this regard: sophisticated neuronavigation systems, dedicated software for preoperative planning

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