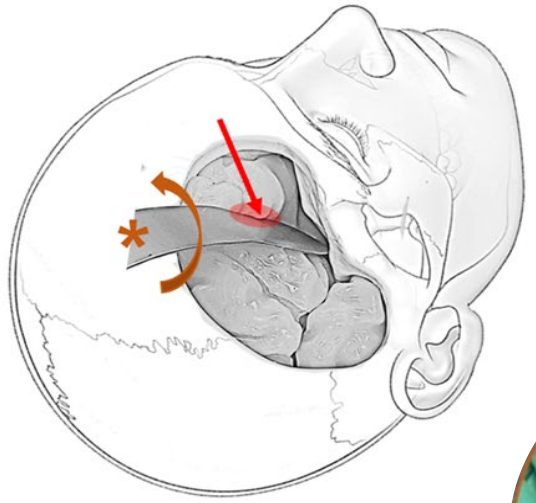
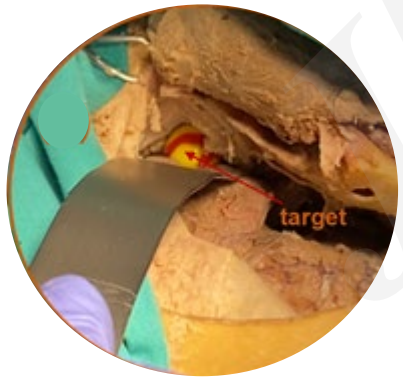
AN EXPANDABLE CHAMBER FOR SAFE BRAIN RETRACTION: new technologies in the field of transcranial endoscopic surgery

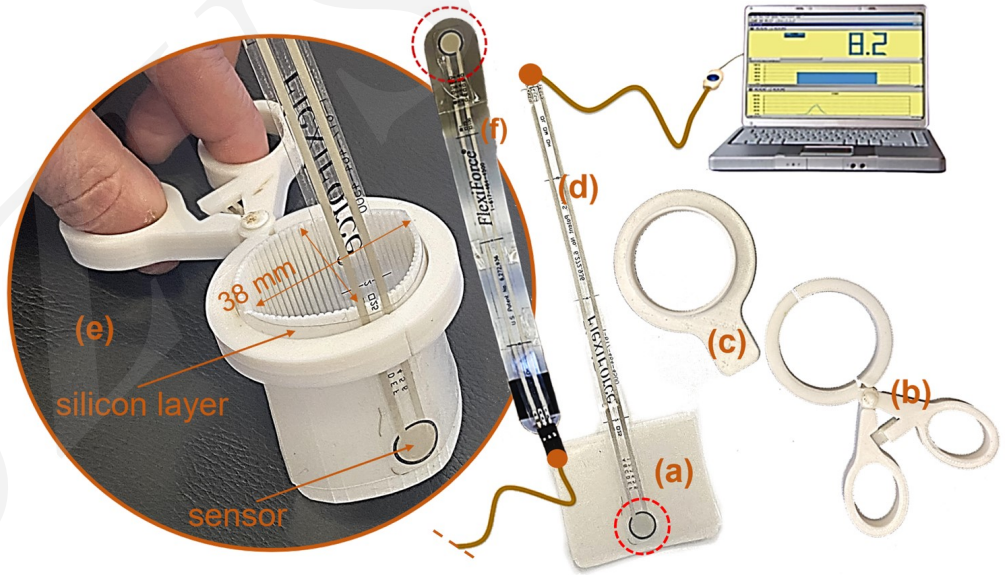
Cerebral retraction is necessary to reach deep-seated brain lesions but can cause damage if not properly positioned.

New method of cerebral retraction: **NEW CHAMBER RETRACTOR** (CR).

The design aims to reduce as much as possible any type of complication related to overpressure at the spatula edge and to maintain safe values of pressure exerted on the parenchyma.





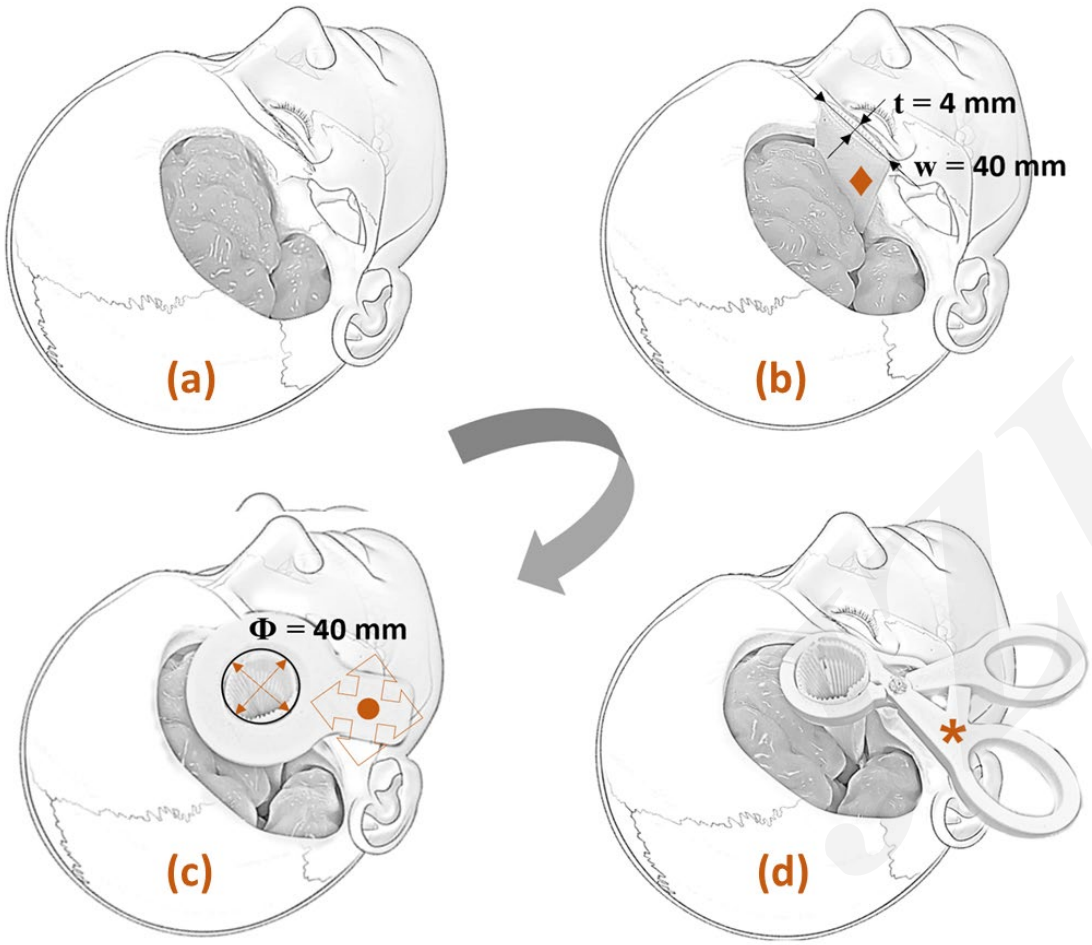


Device and accessories.

a) Chamber retractor.
b) “Klemmer” type forceps for opening the device.
c) Cover accessory for locking the opening at the desired diameter.
d) Optional addition of a retractor fixing system with a pressure sensor.
e) Picture of chamber retractor assembly.
f) Conventional metal spatula with pressure sensor.

Elena ROCA, Anna GOBETTI, Giovanna CORNACCHIA, Oscar VIVALDI, Barbara BUFFOLI, Giorgio RAMORINO.
An expandable chamber for safe brain retraction: new technologies in the field of transcranial endoscopic surgery[J].
Journal of Zhejiang University Science B, 2023, 24(4): 326-335. http://doi.org/10.1631/jzus.B2200557

AN EXPANDABLE CHAMBER FOR SAFE BRAIN RETRACTION:
new technologies in the field of transcranial endoscopic surgery



How to use the NEW CHAMBER RETRACTOR

(a) Unstressed brain configuration

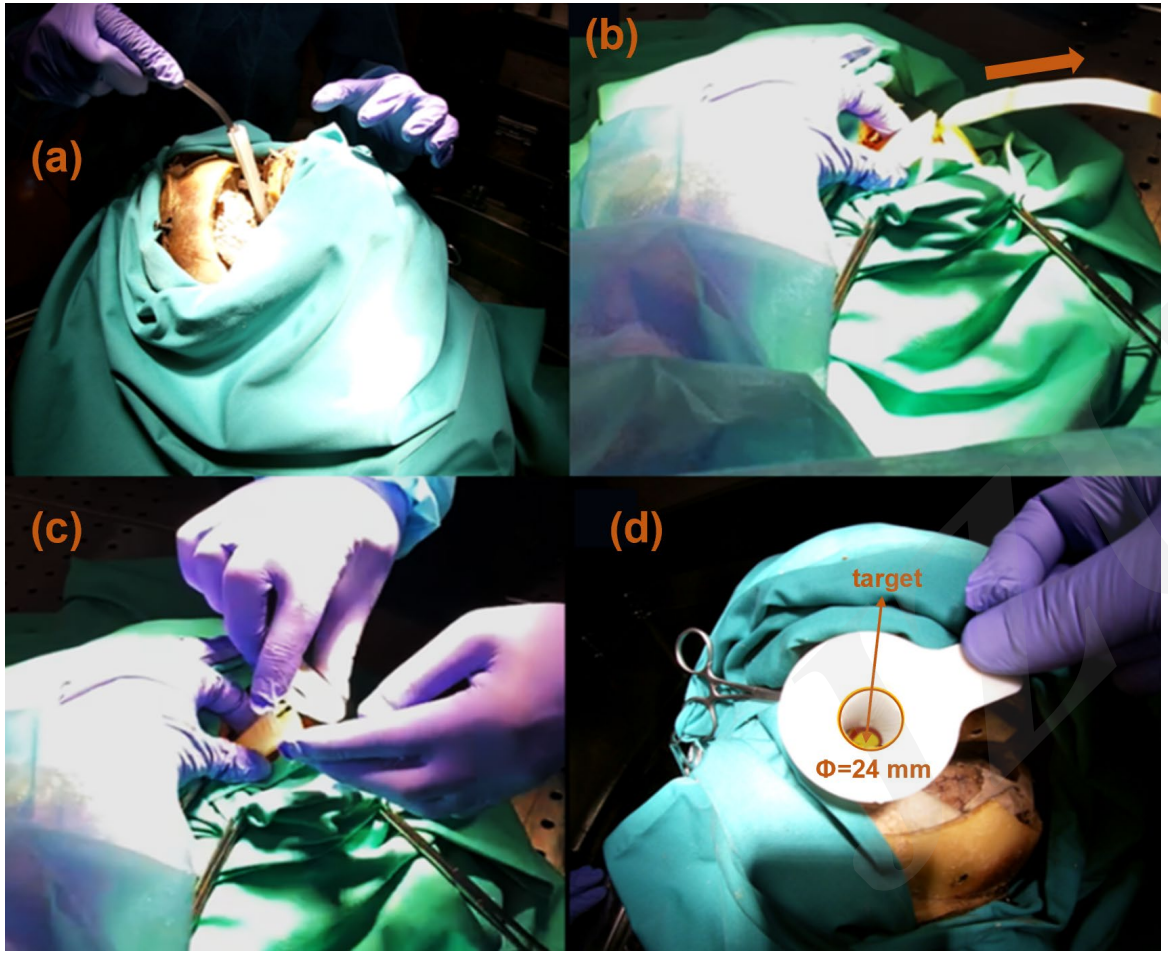
(b) The CR, in its closed configuration, has a rectangular section with dimensions chosen according to the required retraction and work area. The closed chamber inserted at the intracranial point of interest.

(c) The chamber is opened in the required dimensions (es. 40mm)

(d) Brain retracted by the CR.

Elena ROCA, Anna GOBETTI, Giovanna CORNACCHIA, Oscar VIVALDI, Barbara BUFFOLI, Giorgio RAMORINO

AN EXPANDABLE CHAMBER FOR SAFE BRAIN RETRACTION:
new technologies in the field of transcranial endoscopic surgery



EXPERIMENTAL on cadaver

a) Insertion of the chamber retractor in the area of interest using a metal spatula.

b) Removal of metal spatula keeping the retraction chamber in position.

c) Brain retraction by manual opening of the retraction chamber up to the desired diameter.

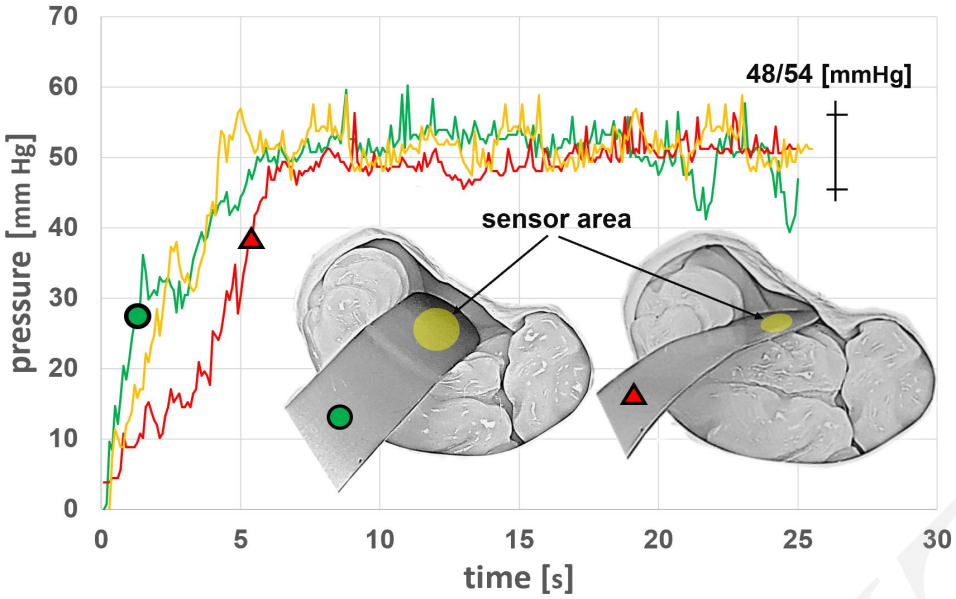
d) Insertion of locking cover.

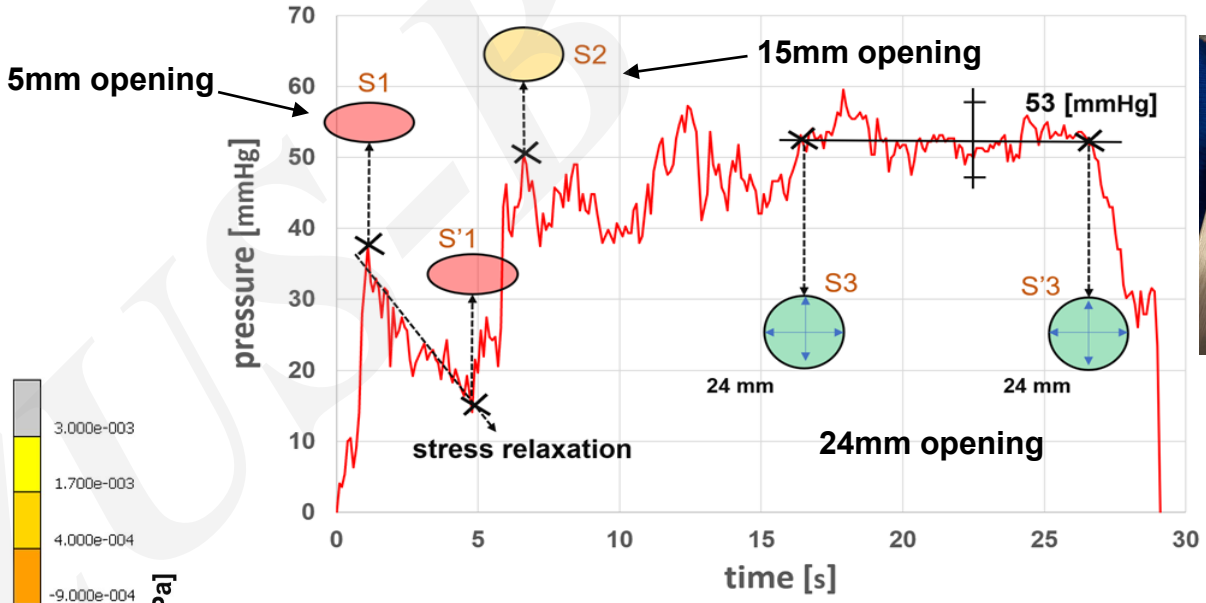
Tests performed on a preclinical model made by UpSurgeon s.r.l. showed **no space perception problems**

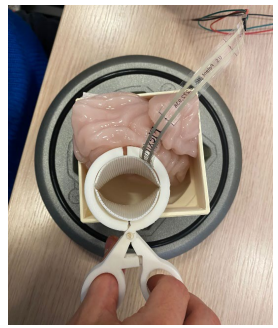
Elena ROCA, Anna GOBETTI, Giovanna CORNACCHIA, Oscar VIVALDI, Barbara BUFFOLI, Giorgio RAMORINO

AN EXPANDABLE CHAMBER FOR SAFE BRAIN RETRACTION:
new technologies in the field of transcranial endoscopic surgery

METAL SPATULA AND CHAMBER RETRACTOR: comparison

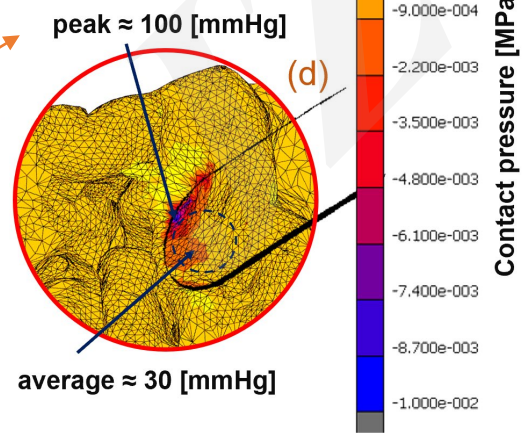






OVERPRESSURE

Contact pressure of the retraction determined by Marc-Mentat© FEM software.



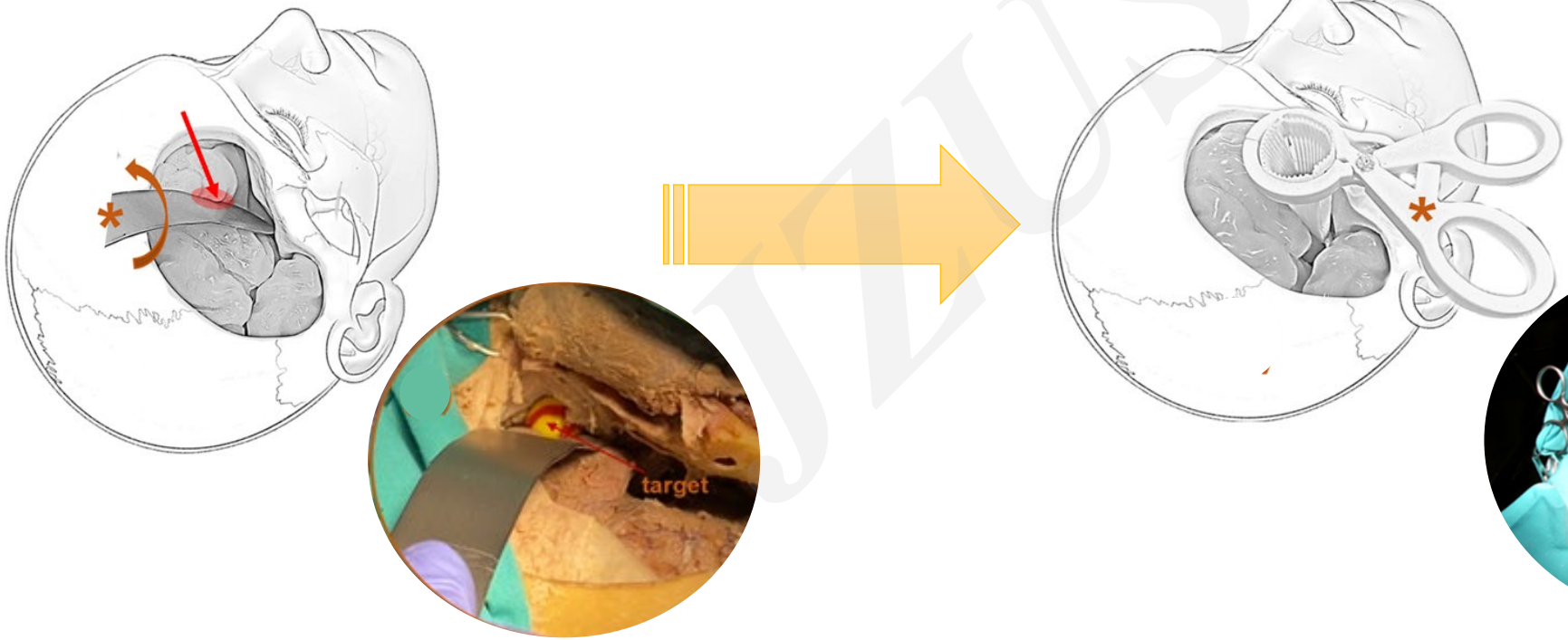
In the maximum expansion configuration, the detected **pressure was about the same as** that detected by the sensor applied to the **metal spatula but without unwanted and dangerous overpressure**.

Elena ROCA, Anna GOBETTI, Giovanna CORNACCHIA, Oscar VIVALDI, Barbara BUFFOLI, Giorgio RAMORINO

AN EXPANDABLE CHAMBER FOR SAFE BRAIN RETRACTION:
new technologies in the field of transcranial endoscopic surgery

Through the use of a new chamber retractor complications can be avoided, thanks to the absence of edges which can cause excessively high pressures on the brain.

Moreover, because of the ability to fix the desired diameter of the chamber, **this retractor could form the basis of a new generation of tubular retractors.**



BRAIN RETRACTION WITH NO DANGEROUS OVERPRESSURES ON THE METAL SPATULA EDGES

Elena ROCA, Anna GOBETTI, Giovanna CORNACCHIA, Oscar VIVALDI, Barbara BUFFOLI, Giorgio RAMORINO