

# Topographic Surgical Anatomy of the Para-Sylvian Anterior Temporal Artery For Intracranial-Intracranial Bypass

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## Introduction

The anterior temporal artery (ATA) is an appealing donor artery for intracranial-intracranial (IC-IC) bypass procedures. However, it may be challenging to identify it in the depths of the sylvian fissure. There is a lack of useful landmarks to help identify the ATA at the surface of the sylvian fissure in currently existing literature. The objective of this report is to delineate the topographic anatomy of the para-sylvian ATA to facilitate its localization using constant bony and cortical references available during a standard pterional approach.

## Methods

Sixteen cadaveric specimens were studied to examine the temporopolar (TPA), anterior temporal and middle temporal arteries (MTA). The topographic anatomy and key relationships of the arteries with surrounding landmarks at the sylvian fissure were recorded. The distance between the point of emergence of the artery from the sylvian fissure to the lesser sphenoid wing (LSW) and anterior tip of the temporal lobe were measured. Also, the course of these arteries at the M3-4 transition in relation to features of the inferior frontal gyrus were recorded.

## Results

The average distances of the TPA, ATA and MTA to the LSW were 3.6, 21.4, and 37mm, respectively. The mean distance from the anterior temporal tip was 14.8, 31.9, and 45.2 mm for TPA, ATA and MTA respectively. The differences between the average distances were statistically significant ( $p < 0.01$ ). In relation to the inferior frontal gyrus, the ATA was observed to be most frequently facing pars triangularis, whereas the TPA was always facing pars orbitalis. The MTA was always found posterior to the junction of pars triangularis and pars opercularis.

## Conclusions

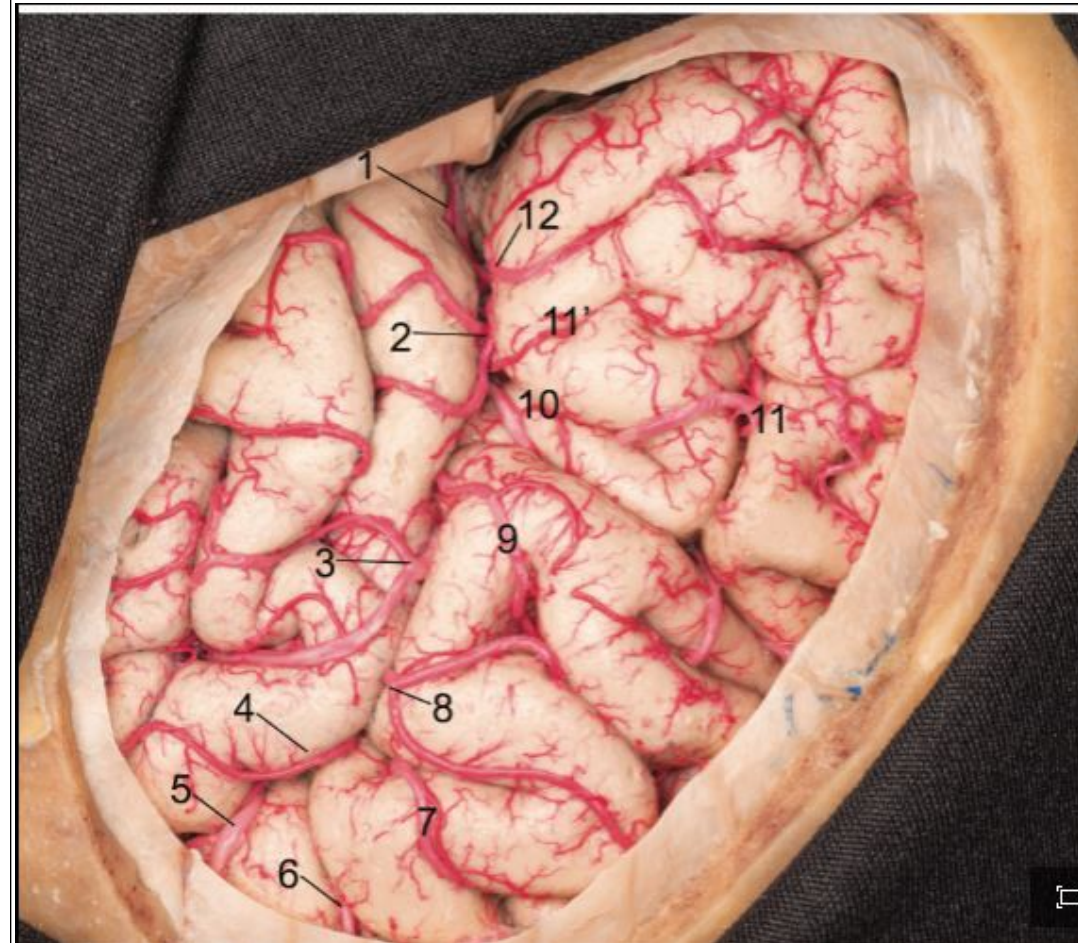
Efficient identification of the ATA in the para-sylvian space can be performed using the evidence provided in this report. The safety and efficiency when harvesting the ATA for IC-IC bypass can be increased using the landmarks and key relationships described.

## Learning Objectives

By the conclusion of this session, participants should be able to:

- (1) Localize the ATA (M4 MCA) before opening the Sylvian Fissure as a donor for IC-IC bypass procedures
- (2) Identify key landmarks to efficiently locate the ATA
- (3) Recognize the potential of the use of ATA as a donor for IC-IC bypass procedures

Figure 1



Surgical simulation of left Pterional Craniotomy, with the cortical branches of the MCA exposed. 1. Temporopolar Artery, 2. Anterior Temporal Artery, 3. Middle Temporal Artery, 4. Posterior Temporal Artery, 5. Temporo-occipital artery, 6. Angular artery 7. Posterior Parietal Artery, 8. Anterior Parietal Artery, 9. Central Artery



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