

ANATOMICAL STUDY OF THE MIDDLE TEMPORAL VEIN WITH SPECIAL EMPHASIS ON ITS CLINICAL IMPORTANCE IN FILLER INJECTION

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Introduction

Understanding the anatomy of the temporal region, specially the middle temporal vein (MTV), is essential for addressing aesthetic concerns related to facial aging. The temporal soft tissues consist of ten layers with varying thickness, housing important neurovascular structures.

Facial tissues undergo aging at different rates, affecting overall facial appearance. Patients often seek aesthetic interventions for issues like soft tissue atrophy, volume loss, and changes in skin texture and color, leading to a hollow or sunken appearance.

Addressing aesthetic concerns in the temporal region may involve interventions such as temporal augmentation with dermal fillers, fat grafting, or surgical treatments like temporal implants. These interventions aim to restore volume and enhancing overall facial aesthetics.

Venous complications of filler injections in the temporal fossa, although rare, posing significant risks. This is attributed to the presence of the large-caliber venous sinus, the MTV.

Aim of the Work

The aim of the present study was to identify the anatomical features of the MTV, its tributaries and to describe the venous dangerous zone in the temporal fossa to avoid severe complications associated with inadvertent intravenous injection of filler during the correction of temporal hollowing.

Materials and Methods

The anatomical study involved the use of fifteen formaldehyde preserved adult human cadaveric heads (with their age ranged from 40 to 75 years old) 10 males and 5 females and three fresh frozen adult male human heads, dissected bilaterally, and obtained from the morgue of the anatomy department of Alexandria faculty of medicine. Curved incision starting above the middle of the superior orbital ridge deviating upward and backward to end behind the ear auricle. Dissection was performed layer by layer carefully to demonstrate the MTV, in order to determine beginning, course, tributaries, diameter, Length, and termination of the MTV which distributed in layer 6 of the temporal region.

Results

The MTV begins as a continuation of sentinel vein (SV) in 77.78%. In 19.44%, the MTV was formed by two transversely oblique veins. In 2.78%, the MTV was formed by two vertical descending tributaries. In the superficial temporal fat pad (STFP), the MTV with its main tributaries was observed to exhibit one of five morphological patterns.

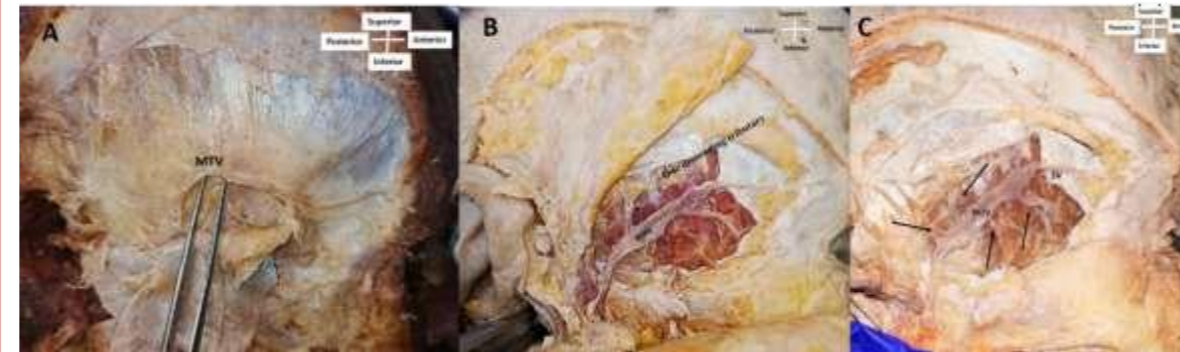


Figure 1: Cadaveric dissection of the right temporal region showing three of the five morphological patterns of the middle temporal vein (MTV) with its main tributaries (black arrows) in which the MTV begins as sentinel vein (SV, 77.78%): (A) showing type 1 morphological pattern of the MTV in which it courses as one curved horizontal trunk in 63.89%. (B) showing type 3 morphological pattern of the MTV in which a main curved horizontal trunk receiving one small descending tributary in 11.11%. (C) showing type 5 morphological pattern of the MTV in which one main curved horizontal trunk courses with two descending tributaries and two smaller ascending tributaries in 2.78%.

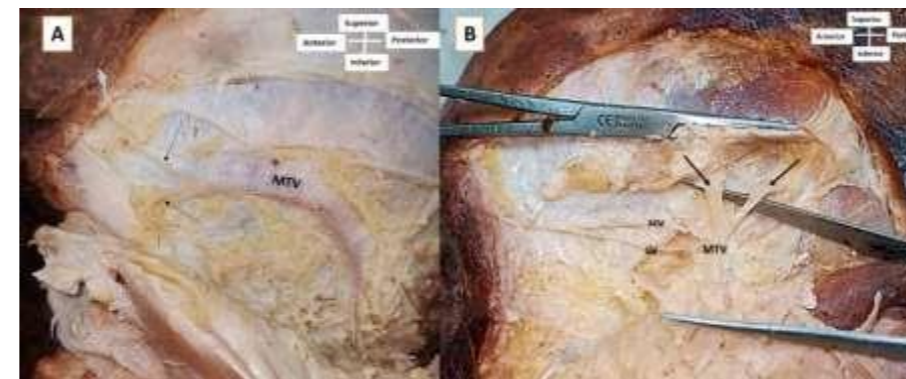


Figure 2: Cadaveric dissection of the left temporal region showing two of the five morphological patterns of the middle temporal vein (MTV) with its main tributaries (black arrows): (A) showing type 2 morphological pattern of the MTV in which two large veins converge to form one curved horizontal trunk in 19.44%. (B) showing type 4 morphological pattern of the MTV with two small descending branches that join the main vertical trunk in 2.78%.

Table 1: Summarizing the distance between the beginning of the MTV and the lateral orbital rim at the level of lateral canthus of the eye, the diameter of MTV at its junction with the superficial temporal vein, the length of MTV from its beginning till its termination, and the distance between the middle of the anterior border of the external auditory meatus and point of meeting between the MTV and the superficial temporal vein.

	Beginning		Diameter		Length		termination	
(mm)	Right	Left	Right	Left	Right	Left	Right	Left
Min. –Max.	42- 65	42- 65	1.45–3.46	1.67–3.50	15-58	15-56	5- 22	5- 22
Mean ± SD	53.61± 8.02	55.72± 7.59	2.42 ± 0.65	2.69 ± 0.60	36.33 ± 12.8	36.67± 12.02	13.28± 5.57	13.89± 5.44
t(p)	1.558(0.138)		1.247 (0.229)		0.236 (0.816)		0.560 (0.583)	

•t: Paired t-test

p: p value for comparing between **Right** and **Left**

Conclusion

The STFP lying between the superficial and deep layers of the deep temporal fascia, contains the contains the MTV, is commonly considered as the safest space for temporal augmentation by fillers which give the best aesthetic result. To safely inject filler in the temporal region and avoid severe complications associated with inadvertent intravenous injection as non-thrombotic pulmonary embolism, it is crucial to identify and avoid the venous dangerous zone where the MTV is located.

Based on the results of the current study, it can be concluded that the venous dangerous zone is located within 1.5 - 3.5 cm above the zygomatic arch. This is because the MTV consistently lies above the most prominent part of the zygomatic arch in all dissected cadavers, with measurements of 22.85 ± 5.32 mm on the right side and 22.19 ± 5.20 mm on the left side. In conclusion, the safe areas for filler injection within the inter-fascial space are within 1.5 cm above the zygomatic arch and, additionally, from 3.5 cm above the zygomatic arch till the temporal crest.