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# Temporal Migraine Surgery: Relevance of Local Blood Vessels in Surgical Technique

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**Abstract** **Background:** A surgical approach to migraine therapy is increasingly being considered and practiced, with reported success rates approaching 90%. Among the trigger sites addressed with this method, the temporal region is undoubtedly one of the most frequently involved. **Methods:** In this study, we describe our surgical approach for the treatment of temporally localized migraine. This technique involves neurolysis of the auriculotemporal nerve (which is never transected) and coagulation of all superficial temporal arterial and venous branches, which are often dilated or ectatic. **Results:** We interviewed 25 patients (22 females, 3 males; ages: [to be specified]) by telephone, all of whom had undergone surgery for migraine at temporal trigger sites. At the 12-month follow-up, the patient-reported resolution of pain averaged 88% (range: 25-100%). Only transient, minor complications (hypoesthesia, local itching) were reported. **Conclusion:** Based on our experience, this approach is supported by the common morphological findings observed and the distinctive symptomatology of this patient population. Fro m a clinical po int o f view, in our experience, the technique described has allowed us to obtain very satisfactory results, with a resolution of the symptoms close to 90% o f cases.

**Key Words** Migraine, temporal neuralgia, migraine surgery, migraine surgery outcomes, vascular approach

## INTRODUCTION

Over two and a half decades have passed since the popularization of a surgical approach for migraine therapy based on the neurolysis of certain extra-cranial trigger points. In a retrospective review of 314 patients who had undergone forehead rejuvenation, Guyuron *et al.* [1] observed that, among 39 patients with migraine headaches prior to surgery, 31 experienced either complete resolution or significant improvement in their symptoms postoperatively. The average follow-up period was nearly four years. Since then, hundreds of studies have been published to validate this approach [2-22]. The results obtained in the same studies clearly show the numero us benefits (economic and related to the quality of life of the patients treated) resulting from the high rates of definitive cure resulting fro m surgical therapy.

Among the many trigger points gradually identified and described, the temporal region is one of the most frequently implicated. The purpose of this manuscript is to present our current surgical approach to treating this anatomical region in migraine patients. In detail, unlike the other surgical appro aches currently in use, we have placed particular emphasis o n the treatment o f lo cal arterial and venous vessels, which, in our opinion, should always be coagulated to obtain a complete and lasting result.

## MATERIALS AND METHODS

The current approach is primarily based on neurolysis or transection, performed either endoscopically or through open techniques, of the auriculotemporal and/or zygomaticotemporal nerves [23-30]. In our experience, involvement of the zygomaticotemporal nerve is rare. Furthermore, compression of the auriculotemporal nerve by adjacent anatomical structures is uncommon and typically does not necessitate an extensive neurolysis. More often, mechanical impingement may occur due to branches of the superficial temporal artery or vein. When this happens, the vessels are often dilated or ectasic (Figure 1). In other cases, the nerves appear completely unencumbered, showing no signs of compression, edema, inflammation, or fibrosis. Conversely, the presence of dilated or even aneurysmal

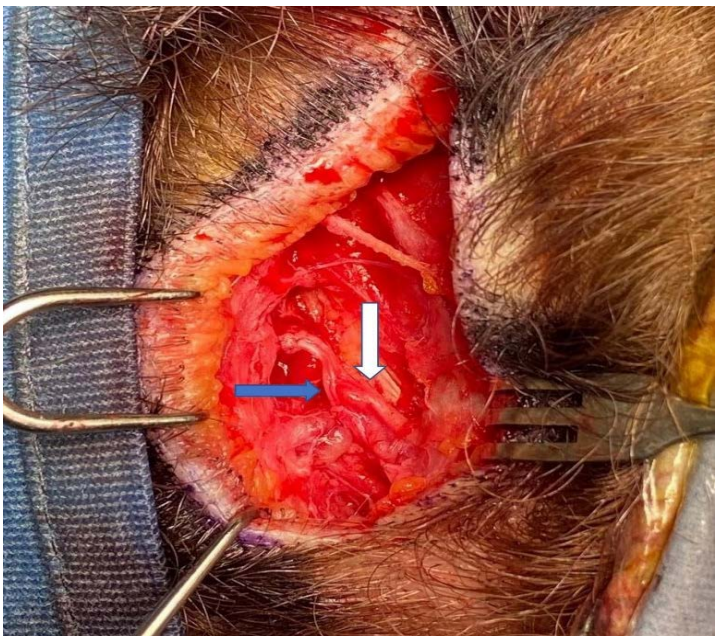

Figure 1: Right tempo ral trig ger po int: right, dilated superficial temporal artery (white arrow) in between two rami of the right auriculotemporal nerve (blue arrow)

Figure 2: Right auriculo temporal nerve (yellow arrow), ectasic superficial temporal artery (blue arrow) and vein (black arrow)

vessels is almost invariably observed (Figure 2) [31]. In any case, vascular involvement is also confirmed by the typical symptoms of these patients, who invariably report throbbing and localized pain. Over the years, our approach in these patients has increasingly focused on coagulating the superficial temporal vessels. Our current technique involves a horizontal skin incision approximately 3 cm long, centered at the intersection of two perpendicular lines [32]: one vertical line passing through the tragus of the ipsilateral ear and one horizontal line tangent to the apex of the auricle. Following adequate tissue dissection, the auriculotemporal nerve is identified, and a complete neurolysis is performed. Then, the various branches of the superficial temporal artery and vein are coagulated. The procedure is completed with a simple suture.

We interviewed 25 patients (22 females, 3 male, ages: 19-71 years) by telephone, all o f who m had undergone surgery fo r migraine at temporal trigger sites, with a follow -up period o f 12 months. Since most of the operated patients we re distributed as residences throughout the country (and therefore at a great distance from the hospital), telephonic follow-ups were opted for. Inclusion criteria were: age >18 years; involvement of temporal trigger point only, no previous migraine surgery procedures. Exclusion criteria were: absence of migraine diagnosis by a Board Certified neurologist, secondary headaches, tension-type headache; cluster headache. Outcomes assessed included pain frequency (days/month), duration (hours/day), intensity (0-10 scale), and patient-reported percentage of pain resolution. A 12 -mo nth follow-up is universally considered correct in evaluating the

effectiveness of migraine therapies. At the time of surgical procedures, all patients signed a detailed informed consent.

## RESULTS

Preoperative headache frequency was 23 (±7) days/month, with a mean duration of 10 hours and a mean intensity of 8.5. At the 12-month follow-up, the patient-reported resolution of pain averaged 88% (range: 25%-100%), mean pain frequency decreased to 7 (±7) days/month, mean duration to 6 (range: 0-8) hours, and intensity to 3 (range: 0-8).

Our surgical approach does not differ significantly from those previously described and performed in major centers worldwide. However, there are two notable differences:

- **We never cut nerves or nerve fibers:** This practice allows us to avoid unpleasant sequelae, such as areas of hypoesthesia, or more concerning complications, such as neuroma, without compromising the procedure's success rate.
- **Complete coagulation of all superficial temporal vessels:** We place particular emphasis on eliminating local vessels based on two main observations:
- The vast majority of patients with temporally localized migraines report a characteristic throbbing pain, strongly suggestive of local vascular involvement.
- These vessels frequently exhibit specific morphological and ultrastructural abnormalities [33-35], strongly indicating their direct role in the pathogenesis of migraines. Additionally, emerging evidence suggests that environmental factors may contribute to vascular remodeling, a key aspect observed in migraine patients [21]. This aligns with our findings, where the presence of dilated and aneurysmal vessels suggests an intrinsic vascular component in the pathophysiology of temporal migraine.

We have never observed sequelae related to this maneuver, such as skin necrosis or localized alopecia. While further studies are certainly required to evaluate the specific contribution of each surgical maneuver to the final outcome, we strongly support the approach described.

A clear weakness o f the study was that its s mall sample size reduced generalizability. Future, larger, multicenter studies are needed , with inclusion of patient satisfaction and quality of life measures, as well as long-term fo llow-ups studies to assess sustainability of outcomes, mo re ro bust co st-effectiveness analysis.

Further studies would also be desirable to compare the described technique with other migraine treatment appro aches.

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