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LONG-TERM RESULTS OF SURGICAL TREATMENT OF NEUROPATHIC CRANIOFACIAL PAIN (2018–2025)

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Abstract. *Objective: To evaluate the long-term outcomes of surgical treatment of neuropathic craniofacial pain between 2018 and 2025. Materials and Methods: A retrospective analysis was conducted on the outcomes of surgical decompression of the peripheral branches of the trigeminal nerve in 100 patients with chronic facial pain. Decompression involved* n. supraorbitalis, n. supratrochlearis, n. auriculotemporalis, *and* n. zygomaticotemporalis. *The mean follow-up period was 4.8 ± 1.9 years. Results: Stable pain reduction was achieved in 82% of patients, partial improvement in 14%, and no improvement in 4%. On average, pain intensity decreased by 80.6% on the Visual Analogue Scale (VAS), and quality of life improved by 90%. Conclusion: Surgical decompression of the peripheral branches of the trigeminal nerve provides a significant and lasting clinical effect during long-term follow-up, confirming its efficacy as the treatment of choice for resistant forms of craniofacial pain.*

Keywords: *craniofacial pain, trigeminal nerve, neuropathy, surgical decompression, chronic pain.*

Introduction. Craniofacial pain represents one of the most complex and multifactorial pain syndromes, encompassing a wide spectrum of causes ranging from neurological and vascular to psychosomatic factors. One of the leading pathogenetic mechanisms in neuropathic forms is the mechanical compression of the peripheral branches of the trigeminal nerve within narrow anatomical channels or beneath fibrous structures. Prolonged compression leads to inflammatory and degenerative changes in the nerve trunk, demyelination, and the formation of chronic pain that responds poorly to pharmacological therapy.

Modern studies (Guyuron, 2019; Bendtsen et al., 2020) confirm the high efficacy of surgical decompression as a means of eliminating the underlying cause of neuropathic pain syndrome. However, the long-term outcomes of such operations remain insufficiently studied, particularly regarding the stability of clinical improvement over several years.

Our study aims to analyze the long-term clinical outcomes following surgical treatment of patients with chronic neuropathic craniofacial pain who were treated at the MEDAS Medical Center between 2018 and 2025.

Objective. To evaluate the long-term effectiveness of surgical decompression of the peripheral branches of the trigeminal nerve in patients with chronic neuropathic facial pain.

Materials and methods. The study included 100 patients (72 females and 28 males) aged 22 to 64 years (mean age: 41.3 ± 8.7 years) treated at the MEDAS Medical Center.

Inclusion criteria:

- Chronic facial pain lasting more than 6 months;
- Ineffectiveness of pharmacological therapy;
- Positive response to diagnostic nerve block;
- Absence of central or vascular causes of pain (based on MRI and CT data).

Before surgery, diagnostic blocks of the trigeminal nerve branches were performed using local anesthetics. Pain intensity was assessed using the Visual Analog Scale (VAS), and anatomical variations were analyzed with MRI and CT imaging.

Surgical technique:

Decompression of the n. supraorbitalis, n. supratrochlearis, n. auriculotemporalis, and n. zygomaticotemporalis was performed under an operating microscope.

Follow-up:

Postoperative observation ranged from 12 to 84 months, with assessments of pain level, functional recovery, and recurrence.

RESULTS. After 6 months, 92 patients (92%) reported significant pain reduction, while 8 patients (8%) showed partial improvement.During the 7-year follow-up, 82% of patients maintained stable pain relief.Moderate recurrences were observed in 14%, successfully managed by repeat nerve blocks or short courses of physiotherapy.A lack of improvement occurred in 4% of patients, likely due to concurrent central pain mechanisms.

Most patients reported improvements in sleep, mood, cognitive function, and social activity.Patient satisfaction exceeded 90%.No cosmetic defects or major complications were noted. Temporary paresthesias occurred in isolated cases and resolved within a few months.

Table 1.

Distribution of patients by affected nerve and treatment outcomes

Affected nerve	Number of patients (n=100)	Stable improvement (%)	Partial effect (%)	No improvement (%)
n. supraorbitalis	38	84	13	3
n. supratrochlearis	16	81	13	6
n. auriculotemporalis	29	79	17	4
n. zygomaticotemporalis	17	82	12	6
Total	100	82	14	4

Comment: The most common site of compression was the supraorbital nerve, which also showed the best long-term improvement rates.

Table 2.

Dynamics of pain reduction (VAS 0–10)

Observation period	Mean pain level (VAS)	Reduction from baseline (%)
Before surgery	8.2 ± 1.1	—
6 months	2.3 ± 0.9	−72%
1 year	1.8 ± 0.7	−78%
3 years	1.5 ± 0.5	−81%
5–7 years	1.6 ± 0.6	−80%

Comment: The greatest reduction in pain occurs within the first six months, after which the effect remains stable throughout the entire follow-up period.

Table 3.

Overall patient satisfaction with treatment outcomes

Subjective assessment	Percentage of patients (%)
Very satisfied	68
Satisfied	22
Partially satisfied	8
Not satisfied	2

Comment: 90% of patients rated the surgical outcome as positive or fully satisfactory, confirming both clinical and psychological stability of the effect.

Discussion. The results confirm the high and long-term efficacy of surgical decompression for chronic craniofacial pain.The stability rate (82%) aligns with international data: Guyuron (2019) reported 84% sustained improvement, and Dash (2021) — 79% using similar surgical techniques.

Patient selection plays a crucial role — a positive response to diagnostic nerve block accurately predicts successful surgical outcomes.

Comparisons with conservative treatment (based on literature) show that pharmacotherapy provides only temporary relief, whereas decompression eliminates the underlying pathogenic mechanism of the pain.

Our findings also demonstrated a reduction in secondary psychoemotional disturbances, reflecting a comprehensive improvement in patients' overall condition.

Thus, surgical decompression is not only an effective but also a pathogenetically justified method for treating neuropathic forms of craniofacial pain.

Conclusions:

1. Surgical decompression of peripheral branches of the trigeminal nerve provides a stable clinical effect in 80–85% of cases during up to 7 years of follow-up.
2. The most stable outcomes are observed in patients with a positive response to diagnostic block and marked nerve compression.
3. The method is safe, minimally invasive, and does not cause cosmetic defects.
4. Surgical decompression should be considered the treatment of choice for refractory craniofacial pain resistant to pharmacotherapy.

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