

Glossalgia Etiology Clinical Manifestations Diagnosis and Comprehensive Treatment Methods

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Abstract Glossalgia is a chronic neuropathic disorder of the oral mucosa characterized by persistent pain, sensory disturbances, and autonomic dysfunctions. The condition is associated with systemic factors, including gastrointestinal, cardiovascular, endocrine, and neurological diseases, as well as local irritants such as dental prostheses, galvanic currents, and chronic mucosal trauma. Pathogenesis involves central and peripheral nervous system dysregulation, leading to persistent pathological afferentation and altered pain processing. Clinical presentation varies, complicating differential diagnosis. Effective diagnostics require a combination of laboratory tests, electromyography, capillaroscopy, and laser Doppler flowmetry. Treatment strategies include targeted pharmacotherapy (anxiolytics, neurotropic agents, analgesics, vitamins), physiotherapeutic modalities (ozone therapy, laser therapy, transcranial stimulation), and psychotherapeutic correction. Despite existing treatment protocols, therapeutic success remains limited, necessitating further research into pathogenetically substantiated approaches.

Keywords Glossalgia, Neuropathic pain, Oral mucosa, Sensory dysfunction, Galvanic reactions, Electromyography, Capillaroscopy, Autonomic dysregulation, Anxiolytics, Neurotropic therapy, Physiotherapy, Laser therapy, Transcranial stimulation, Interdisciplinary diagnostics, Treatment resistance

1. Introduction

Glossalgia is a chronic disorder of the oral mucosa characterized by persistent pain and sensory disturbances without visible pathological changes. The condition is associated with central and peripheral nervous system dysfunctions, resulting in altered afferent signaling and autonomic dysregulation. Its etiology involves systemic and local factors, including gastrointestinal and cardiovascular diseases, endocrine imbalances, neurological disorders, chronic mucosal trauma, prosthetic incompatibility, and galvanic effects from dental materials.

The clinical presentation is variable, with symptoms ranging from localized burning sensations to widespread dysesthesia and autonomic dysfunctions. The absence of specific morphological changes complicates differential diagnosis, requiring an interdisciplinary approach. Diagnostic methods include electromyography, capillaroscopy, laser Doppler flowmetry, and biochemical analysis of oral fluid, aimed at assessing neuromuscular and microcirculatory alterations.

Treatment remains challenging due to the complex pathogenesis of glossalgia. Current therapeutic strategies incorporate pharmacological interventions (anxiolytics, neurotropic agents, analgesics, vitamins), physiotherapy

(ozone therapy, laser therapy, transcranial electrical stimulation), and psychotherapeutic correction. However, the efficacy of these methods remains limited, indicating the need for further research to establish pathogenetically substantiated treatment protocols.

Glossalgia is a chronic disorder characterized by pain, burning sensations, and sensory disturbances in the tongue without visible morphological changes. It is associated with dysfunctions of the central and peripheral nervous systems, leading to altered pain perception and autonomic dysregulation. The etiology of glossalgia is multifactorial, including systemic diseases, local irritants, and psychological factors [1].

Glossalgia is linked to gastrointestinal disorders, endocrine dysfunctions such as diabetes and hypothyroidism, and neurological conditions affecting pain modulation [2]. Psychological stress, anxiety, and depressive states contribute to disease progression, exacerbating symptoms through altered neurotransmitter activity [3]. Local factors include chronic mucosal trauma from sharp tooth edges, dental restorations, prosthetic appliances, and galvanic currents from dissimilar metals in the oral cavity [4].

Patients with glossalgia report persistent pain, tingling, burning, or numbness predominantly affecting the tongue's tip and lateral surfaces. Symptoms may extend to the lips, palate, and oral mucosa. A characteristic feature is the reduction of discomfort during eating and an increase in intensity during rest or emotional stress [5]. Some patients

experience taste disturbances, dry mouth, and the sensation of tongue enlargement [6].

Diagnostic evaluation includes detailed history-taking, clinical examination, and exclusion of other conditions such as glossitis, candidiasis, trigeminal neuralgia, and iron deficiency anemia [7]. Laboratory assessments involve complete blood counts, biochemical markers, vitamin levels, and endocrine function tests [8]. Instrumental diagnostic methods include electromyography to assess neuromuscular activity, capillaroscopy for microvascular changes, laser Doppler flowmetry to evaluate blood flow, and biochemical analysis of saliva [9].

2. Materials and Methods

The study was conducted on patients with a confirmed diagnosis of glossalgia, excluding individuals with structural lesions of the oral mucosa and acute inflammatory diseases. Diagnosis was based on clinical examination, instrumental assessments, and laboratory investigations.

Clinical evaluation included detailed history-taking, assessment of sensory disturbances, and standardized pain intensity scales. Neurological examination focused on detecting afferent and efferent dysfunctions of the cranial nerves. The condition of the oral mucosa was assessed using direct and indirect visualization techniques under standard lighting conditions.

Electromyography was performed to evaluate neuromuscular function in the tongue and perioral region. Capillaroscopy and laser Doppler flowmetry were used to assess microvascular changes. Biochemical analysis of oral fluid included pH measurement, total protein concentration, and enzymatic activity evaluation. Laboratory diagnostics encompassed complete blood count, biochemical markers, and hormonal profiling, with emphasis on thyroid and adrenal function. Gastrointestinal examination was performed when clinically indicated.

Treatment included pharmacological and non-pharmacological methods. Pharmacotherapy consisted of anxiolytics, neurotropic agents, analgesics, and vitamin supplementation. Physiotherapy protocols incorporated ozone therapy, low-level laser therapy, and transcranial electrical stimulation. Psychotherapeutic interventions were applied when indicated by neuropsychiatric assessment.

The efficacy of treatment was evaluated through comparative clinical assessments, electrophysiological studies, and microcirculatory analysis before and after therapy. Statistical processing of results included correlation analysis and group comparisons based on primary outcome measures.

3. Results and Discussion

The study involved 72 patients diagnosed with glossalgia, aged 45 to 72 years, with an average age of 58 years. Among them, 48 were women and 24 were men. The duration of symptoms varied from several months to over 10 years, with

most patients experiencing discomfort for at least 3 to 4 years before seeking specialized treatment.

Clinical Symptoms and Microcirculatory Changes

The majority of patients reported a burning pain in the tongue, which was often described as persistent and worsening in the evening. Some experienced tingling sensations, numbness, or taste disturbances. Dry mouth was a common complaint, especially among older patients or those with concurrent systemic conditions such as diabetes or thyroid disorders.

During the clinical examination, some patients exhibited mild redness or swelling of the tongue, while others had no visible mucosal changes. A microcirculatory assessment showed that patients with more severe symptoms tended to have poorer blood flow in the tongue tissues, often associated with chronic irritation from dentures, dental fillings, or bruxism.

Electromyographic Findings

Patients with more pronounced neuromuscular symptoms, including difficulty in tongue movement or persistent discomfort when speaking or eating, underwent electromyographic testing (EMG). These assessments showed that some patients had weak tongue muscle contractions, suggesting nerve dysfunction, particularly in cases where symptoms had persisted for several years.

Treatment Outcomes

Patients were divided into three groups based on the treatment approach:

- Group 1: Received anxiolytics, vitamin B complex, and transcranial electrical stimulation (applied to the head and neck region).
- Group 2: Underwent laser therapy and ozone therapy, combined with vitamin supplementation to support nerve function.
- Group 3 (Control group): Received only symptomatic treatment, including topical anesthetics and standard vitamins.

After six weeks of treatment, patients in Group 2 (laser and ozone therapy) showed the most improvement. Many reported that their burning pain had almost disappeared, and their ability to eat and speak comfortably had significantly improved. Group 1, which received anxiolytics and electrical stimulation, also showed positive results, but some patients still experienced mild symptoms, particularly in stressful situations.

In contrast, the control group, which received only symptomatic care, reported less significant improvements. While some patients noted a temporary reduction in discomfort, their symptoms often returned after a few weeks.

Microcirculatory and Neuromuscular Improvements

Patients who underwent laser and ozone therapy demonstrated clear improvements in tongue circulation, with less dryness and discomfort. They also reported better taste perception, which had previously been dulled by the condition. Those who received electrical stimulation experienced reduced muscle tension and fewer episodes of spontaneous tongue pain.

Table 1. Comparative analysis of treatment approaches and patient responses to different therapeutic methods

Treatment Approach	Patients Who Reported Full Symptom Relief	Patients With Partial Improvement	Patients With No Improvement
Laser + Ozone Therapy	Majority of patients felt no pain after 6 weeks	Some still experienced mild tingling	None reported worsening symptoms
Electrical Stimulation + Anxiolytics	Most reported reduced burning sensations	Some still had mild symptoms in stressful situations	A few patients had persistent discomfort
Symptomatic Treatment (Control Group)	Few patients saw significant improvement	Most only had temporary relief	Symptoms often returned

The results indicate that glossalgia is closely linked to poor blood circulation and nerve function in the tongue, which can be effectively managed using laser and ozone therapy. Patients who received this combination treatment experienced faster recovery and greater long-term relief compared to those who only received symptomatic treatment.

Transcranial electrical stimulation, combined with anxiolytics, was also beneficial, particularly for patients whose symptoms were exacerbated by stress. However, its effect on circulation and taste recovery was less pronounced than that of laser therapy.

The control group, which received only symptomatic care, showed the least improvement, reinforcing the need for active therapeutic interventions rather than just pain relief measures.

Given these findings, physiotherapy-based treatments (laser, ozone, and electrical stimulation) should be considered primary treatment methods for glossalgia, especially for patients with persistent symptoms that do not improve with conventional medications. Further studies should focus on long-term outcomes and optimizing treatment combinations for different patient profiles.

4. Conclusions

The study confirms that glossalgia is a complex disorder with neuromuscular and microcirculatory impairments, requiring an integrated treatment approach rather than symptomatic relief alone. The results demonstrate that laser and ozone therapy provided the most significant symptom relief, with the majority of patients experiencing a complete resolution of burning pain and improved taste perception. Transcranial electrical stimulation combined with anxiolytics was also effective, particularly in patients whose symptoms were stress-induced, although its impact on circulation was less pronounced.

The control group, which received only symptomatic treatment, showed minimal long-term improvement, emphasizing the necessity of active intervention rather than passive pain management.

These findings suggest that laser and ozone therapy should be considered a first-line treatment for glossalgia, especially in patients with persistent symptoms and microcirculatory

disturbances. Future research should focus on long-term treatment effects, potential biomarkers for prognosis, and personalized therapy protocols to optimize outcomes for different patient groups.

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