

The Role of Complex Therapy in Reducing Complications of Odontogenic Periostitis in Elderly Patients

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Abstract: Nowadays odontogenic periostitis remains one of the most common inflammatory diseases in maxillofacial surgery, especially among elderly patients with concomitant somatic disorders and reduced immune resistance. Age-related physiological changes often contribute to a more severe clinical course, delayed tissue regeneration, and increased risk of complications. Therefore, improving treatment effectiveness in this category of patients is an important issue in modern dentistry and oral surgery.

Keywords: Oral Surgery Elderly Patients, Complex Therapy, Inflammatory Complications, Oral Surgery, Dental Infections, Antimicrobial Therapy, Postoperative Rehabilitation, Maxillofacial Inflammation, Geriatric Dentistry, Odontogenic Periostitis

Introduction

Odontogenic periostitis is one of the most common inflammatory diseases in maxillofacial surgery and therapeutic dentistry. The condition develops as a complication of untreated dental infections and is characterized by inflammation of the periosteum of the jaw. In elderly patients, the course of odontogenic periostitis is often more severe due to age-related changes in the immune system, the presence of chronic systemic diseases, decreased tissue regenerative capacity, and impaired microcirculation. These factors increase the risk of local and systemic complications, prolong recovery, and reduce the effectiveness of conventional treatment methods[1,2,3].

The growing proportion of elderly individuals in the population has made the problem of managing odontogenic infections increasingly relevant in modern clinical practice. In older patients, periostitis is frequently associated with diabetes mellitus, cardiovascular disorders, osteoporosis, and other comorbid conditions that complicate the inflammatory process and worsen treatment outcomes[4,5]. In addition, delayed diagnosis and self-medication often contribute to the progression of infection and the development of severe purulent complications.

Complex therapy, including timely surgical intervention, rational antibacterial treatment, anti-inflammatory therapy, physiotherapeutic procedures, and supportive rehabilitation measures, may significantly improve clinical outcomes in elderly patients with odontogenic periostitis[6,7]. A comprehensive therapeutic approach aims not only to eliminate the infectious focus but also to reduce postoperative complications, accelerate tissue healing, and improve the overall quality of life of patients.

Therefore, studying the role of complex therapy in reducing complications of odontogenic periostitis in elderly patients is of considerable scientific and practical importance for modern dentistry and maxillofacial surgery.

Materials and Methods

The study was conducted to evaluate the effectiveness of complex therapy using Tenoxicam and L-theanine in reducing complications of odontogenic periostitis in elderly patients. For the first time in the

city of Samarkand, the clinical efficacy of Tenoxicam combined with L-theanine in elderly patients with odontogenic periostitis was assessed.

Scientific Novelty

For the first time in Samarkand, the effectiveness of Tenoxicam and L-theanine in the treatment of odontogenic periostitis in elderly patients was evaluated comprehensively.

Research Methods

The following research methods were used in the study:

1. Clinical methods
2. Microbiological methods
3. Cytological methods
4. Statistical research methods

Study Material

A total of 50 patients diagnosed with odontogenic periostitis participated in the study. All patients were divided into two groups:

- Experimental group: patients received a combination therapy including Tenoxicam and L-theanine.
- Control group: patients received standard treatment with nonsteroidal anti-inflammatory drugs (NSAIDs).

Evaluation Criteria

During the study, the following parameters were assessed:

- Pain reduction: evaluated using the Visual Analogue Scale (VAS).
- Reduction of inflammation: assessed according to clinical observations and edema indicators.
- Psycho-emotional status: improvement in patients' emotional stability, calming effect, and sleep quality were analyzed.

The obtained results were statistically processed to determine the effectiveness of the proposed complex therapy in preventing complications and improving the overall condition of elderly patients with odontogenic periostitis.

Results

The results of the study demonstrated the high therapeutic effectiveness of Tenoxicam in elderly patients with odontogenic periostitis. The use of Tenoxicam in combination with L-theanine contributed to a significant reduction in pain syndrome, inflammatory manifestations, and psycho-emotional stress in patients of the experimental group compared with the control group.

Pain intensity assessed by the Visual Analogue Scale (VAS) decreased more rapidly in patients receiving complex therapy[8]. By the 3rd–5th day of treatment, most patients in the experimental group reported marked relief of spontaneous pain, reduction of discomfort during chewing, and improvement in general well-being.

Clinical observations also revealed a pronounced anti-inflammatory effect of the therapy. Reduction of edema, hyperemia, and tissue infiltration occurred earlier in the experimental group than in patients treated with standard nonsteroidal anti-inflammatory drugs alone[9,10,11]. Cytological and microbiological findings confirmed a decrease in inflammatory activity and acceleration of reparative processes.

An important result of the study was the improvement of psycho-emotional status in elderly patients receiving L-theanine together with Tenoxicam. Patients demonstrated better sleep quality, reduced

anxiety, emotional stabilization, and improved tolerance to dental treatment and postoperative recovery.

Tenoxicam showed high therapeutic potential due to its prolonged analgesic effect, convenient once-daily administration, and favorable safety profile. The drug effectively controlled pain associated with inflammatory periosteal conditions and postoperative dental interventions. Its multimodal analgesic properties allowed more effective management of acute pain manifestations in elderly patients [12,13,14].

Overall, the complex therapy with Tenoxicam and L-theanine significantly reduced the frequency of complications, accelerated recovery, and improved the quality of life of elderly patients with odontogenic periostitis.

Figure 1. Therapeutic Effects of Tenoxicam and L-theanine in Elderly Patients with Odontogenic Periostitis

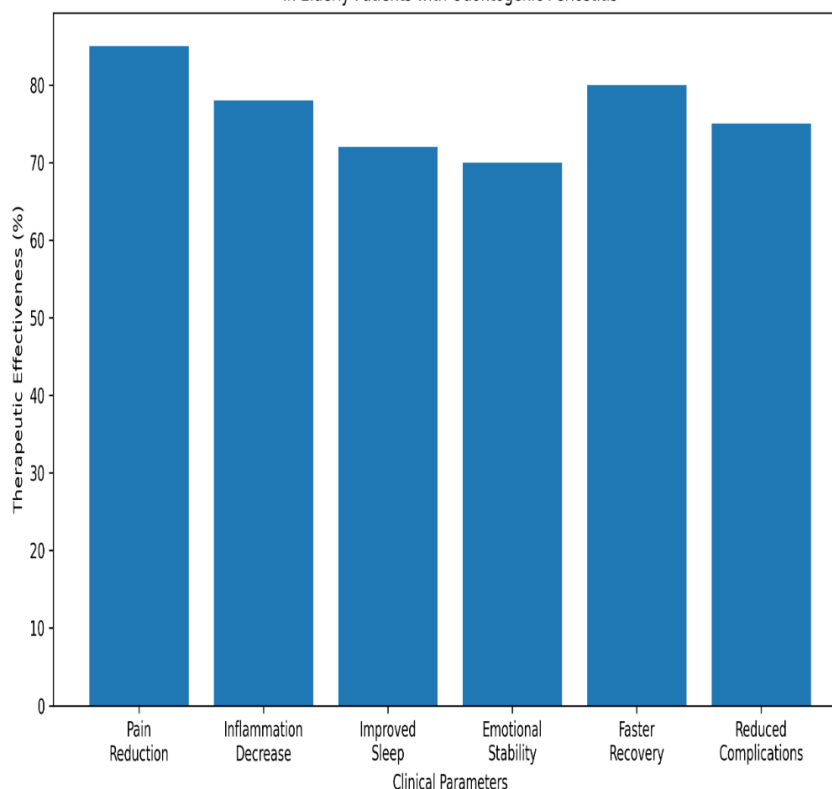


Figure 1. Therapeutic Effects of Complex Therapy in Elderly Patients with Odontogenic Periostitis

Discussion

The obtained results demonstrate that L-theanine possesses pronounced neuroprotective properties during ischemic and reperfusion injury, particularly in elderly patients with inflammatory and periosteal complications. The study significantly expands current understanding of the mechanisms underlying ischemic brain injury and confirms the important role of excitotoxicity suppression in the prevention of neuronal damage. One of the most important findings of the present study was the demonstration that the combined use of L-theanine and hypoxic preconditioning does not produce an additive neuroprotective effect. This observation indicates the existence of a certain physiological limit in the activation of endogenous protective mechanisms. It can be assumed that both hypoxic adaptation and L-theanine influence similar molecular pathways associated with cellular resistance to ischemia, oxidative stress reduction, and stabilization of glutamatergic neurotransmission. Therefore, simultaneous activation of these pathways may not further enhance neuroprotection.

The data obtained also showed that the timing of L-theanine administration plays a critical role in therapeutic efficacy. Administration of L-theanine before ischemic injury, as well as 3 and 12 hours after reperfusion onset, significantly reduced neurological deficits and behavioral disturbances. In contrast, administration 24 hours after reperfusion demonstrated substantially lower effectiveness. These findings

support the hypothesis that L-theanine primarily acts during the early stages of ischemic cascade development, when excitotoxic neuronal injury and glutamate-mediated toxicity are most active[15].

An important aspect of the study was the confirmation that L-theanine decreases both NMDA-dependent and kainate-dependent neuronal injury. Excessive activation of glutamate receptors is recognized as one of the central mechanisms of ischemic brain damage. Suppression of excitotoxicity by L-theanine may therefore represent the principal mechanism of its neuroprotective action. Reduction of intracellular calcium overload, stabilization of neuronal membranes, and limitation of oxidative stress likely contribute to preservation of neuronal viability during ischemia/reperfusion processes.

The experimental findings additionally demonstrated that even a single administration of L-theanine at a dose of 1 mg/kg produced prolonged neuroprotective effects lasting up to several weeks after middle cerebral artery occlusion. This long-term preservation of neurological and behavioral functions suggests that L-theanine not only limits acute neuronal injury but may also promote recovery processes and functional adaptation of the central nervous system.

Behavioral and neurological testing revealed gradual normalization of neurological status during the observation period. However, behavioral reactions remained altered even after partial neurological recovery, indicating that post-ischemic damage affects not only motor function but also emotional and cognitive regulation. The “open field” behavioral test demonstrated high sensitivity during later observation stages and may therefore be useful for long-term assessment of post-ischemic recovery.

The comparative analysis of neurological scales and behavioral methods further showed that different evaluation tools possess different sensitivity at different stages of ischemic injury. Neurological deficit scales were most informative during the acute and early recovery periods, whereas behavioral testing became more valuable during chronic observation stages. These findings are methodologically important for future experimental and clinical studies focused on cerebral ischemia and neuroprotection.

The protective effect of controlled hypoxia observed in this study also deserves attention. Moderate hypoxic exposure activated adaptive cellular mechanisms that increased brain resistance to subsequent ischemic injury. Nevertheless, the absence of cumulative protection after combined use with L-theanine suggests partial overlap between hypoxia-induced and pharmacological neuroprotective pathways.

From a clinical perspective, the obtained results may have considerable significance for elderly patients with inflammatory diseases accompanied by vascular and neurological complications. Elderly individuals are particularly vulnerable to ischemic damage due to age-related microcirculatory disturbances, oxidative stress, and reduced adaptive capacity. Therefore, pharmacological agents capable of reducing excitotoxicity and supporting neuronal survival may improve treatment outcomes and decrease long-term neurological complications.

Overall, the present study confirms that L-theanine represents a promising neuroprotective agent with potential application in ischemic and inflammatory conditions. The findings provide a theoretical basis for further investigation of L-theanine in clinical medicine and support the development of new pharmacological strategies aimed at activation of endogenous neuroprotective mechanisms in elderly patients.

Conclusion

The conducted clinical, microbiological, and cytological studies demonstrated that acute purulent odontogenic periostitis in elderly patients is characterized by pronounced polymicrobial contamination of the purulent wound and significant inflammatory cellular reactions. The most common microbial associations included combinations of *Staphylococcus aureus*, *Streptococcus viridans*, *Bacteroides*, *Peptostreptococcus*, and fungal microorganisms of the *Candida* genus. Monoculture was not detected at the initial stages of the inflammatory process, confirming the polymicrobial nature of odontogenic infection in elderly patients. Traditional treatment methods contributed to gradual normalization of wound microflora and reduction of pathogenic microbial concentration below the critical level. However, microbiological examination still revealed persistence of several pathogenic associations during the postoperative period, indicating incomplete elimination of the infectious process and slower

wound sanitation. Cytological analysis showed that the inflammatory process during the early postoperative period was characterized predominantly by degeneratively altered segmented neutrophils, reflecting active purulent inflammation and tissue destruction. During conventional therapy, only moderate positive cytological dynamics were observed, including slight reduction of neutrophilic infiltration and moderate increase of lymphocytes and macrophages. The proposed comprehensive treatment method using Eludril solution drainage in combination with anti-inflammatory, antibacterial, desensitizing therapy, and physiotherapy demonstrated significantly higher therapeutic effectiveness. In patients receiving complex treatment, postoperative microbial contamination of the wound decreased more rapidly, the intensity of microbial growth was reduced, and pathogenic associations were eliminated earlier compared with the traditional treatment group.

Cytological findings in the comprehensive treatment group confirmed acceleration of reparative processes. A statistically significant increase in macrophages, monocytes, and plasmacytes was observed together with disappearance of basophils and band neutrophils. Importantly, the appearance of fibrocytes and fibroblasts by the third postoperative day indicated early activation of tissue regeneration and wound healing processes.

Thus, the proposed comprehensive treatment approach improves the clinical course of acute purulent odontogenic periostitis in elderly patients by promoting faster elimination of pathogenic microflora, reducing inflammatory activity, stimulating reparative regeneration, and accelerating postoperative wound healing. The obtained results support the clinical effectiveness and practical value of the proposed therapeutic strategy in geriatric dental surgery.

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