

SYSTEMATIC REVIEW OF SCIENTIFIC LITERATURE: THE EFFECT OF HYALURONIC ACID COMPOUNDS IN THE COMPLEX TREATMENT OF GENERALIZED PERIODONTITIS

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Relevance. Gingivitis and periodontitis, often grouped under the common term periodontal diseases, are persistent infections of the periodontal tissues associated with biofilms (1,3). Between 20 and 50 percent of people worldwide suffer from periodontal diseases, with severe periodontitis being one of the main causes of tooth loss (4). Surgical and conservative approaches are used to treat gingivitis and periodontitis (5,6).

A significant number of adjuvant medications have been proposed to improve the clinical course after primary treatment, used in combination with primary therapeutic approaches (7). These adjuvants include various anti-inflammatory, antibacterial, and antiseptic compounds, such as chlorhexidine and essential oils. Other substances that can contribute to tissue regeneration and repair include hyaluronic acid (HA) and enamel matrix proteins.

Hyaluronic acid is a disaccharide polymer belonging to the glycosaminoglycan family. Native hyaluronic acid, which constitutes a significant portion of the extracellular matrix, is found in human connective and epithelial tissues in a high molecular weight form ($10^4 - 10^6$) (8). It is a structural component of both unmineralized (gingival tissue, periodontal ligament) and mineralized (cementum, alveolar bone) tissues of the oral cavity (9).

Hyaluronic acid has anti-inflammatory and antibacterial properties, and also plays a key role in wound healing. It is also involved in various biological processes, including cell migration, adhesion, and phagocytosis (10). Commercial products containing high molecular weight non-toxic hyaluronic acid (1.5×10^5) have been used as adjuncts to both non-surgical and surgical periodontal therapy (11). Since GK has an adhesive structure, it is assumed that it remains in the tissues where it performs its biological functions (11). By 2024, 5 systematic reviews had been published on the potential safety and efficacy of local GC application in the periodontium (12–14). However, the literature search for these reviews was limited to six electronic databases, and a number of new original research articles have recently appeared in the literature. Therefore, we decided to conduct a study on gingivitis and periodontitis to better analyze the relevant data and include the latest experiments.

The uniformity of the studies in terms of treatment methods and GC formulation was also investigated by examining the secondary characteristics of the studies and conducting a fresh systematic review with searches in a larger number of electronic databases. This study aimed to determine whether local use of GC as an adjunct to treatment... (the sentence is cut off in the original text).

In modern dentistry, the problem of the high prevalence of periodontal diseases persists, reaching 90% among the adult population [16]. Modern treatment of complications of periodontal diseases involves the use of combined and combined approaches utilizing surgical, medicinal, and physiotherapeutic methods. However, the importance of periodontal tissue regeneration during the maintenance phase is increasingly being discussed each year. One treatment option is the use of medications in combination with other methods [19]. These drugs include hyaluronate compounds, the results of whose use many specialists reflect in their works. The main criteria for evaluating the results in these studies were bleeding on probing (BOP), probing depth (PD), and gingival recession (GR).

The aim of the study is to determine the dose-dependent effect of hyaluronic acid preparations in patients with generalized periodontitis based on the results of a systematic review of scientific literature.

Materials and Methods. The search for articles was conducted using the keywords: "hyaluronic acid," "periodontitis," "periodontal treatment," in four databases, including PubMed (n=85), Scopus (n=5), disserCat (n=7), the Virtual Health Library (n=15), and supplemented by a manual search in the journal Parodontologiya (n=5). A total of 106 articles were found, of which 7 met all the design criteria of the current study.

Research findings. The total number of subjects studied in the included studies was 727, of whom 405 were in the case group – subjects with mild (n=105), moderate (n=187), and severe (n=113) chronic generalized periodontitis – and 322 were in the control group (patients who underwent periodontal treatment without the use of hyaluronic acid). The volume of the drug administered for treating diseases ranged from 0.04 ml per injection to 0.5 ml for both jaws. When evaluating the results after using the hyaluronic acid preparation in patients with chronic generalized periodontitis, the indicators statistically improved compared to the control group. A number of studies note an improvement in functional diagnostic results by 32–39%.

Conclusions. Based on the results of a systematic review of scientific literature, the use of hyaluronic acid preparations in patients with generalized periodontitis is advisable to improve the outcomes of comprehensive treatment. In the studies described above, hyaluronates were used in combination with other treatments to achieve better outcomes.

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