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Improving the Prevention of Inflammatory Complications After Dental Implantation

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Abstract:
Dental implantation is recognised as one of the most relevant and promising areas of modern dentistry and prosthodontics, reflecting its growing importance in restoring oral function and aesthetics. According to statistical data, up to 80% of the working-age population in Uzbekistan has dental defects of varying severity, indicating a substantial need for qualified orthopaedic and surgical dental care. This high prevalence has led to a steady increase in demand for dental implant procedures in recent years.
Despite continuous advancements in implant materials, surgical techniques and postoperative management, complications following dental implantation remain a significant clinical challenge. Inflammatory processes in the postoperative period are of particular concern as they can adversely affect wound healing, osseointegration and the long-term stability of the implant. Such complications can result in patient discomfort, prolonged treatment duration and, in severe cases, implant failure.
This study therefore focuses on the importance of preventing inflammatory complications after dental implantation, emphasising the need for effective prophylactic strategies. Particular attention is given to improving postoperative outcomes by applying modern therapeutic approaches that reduce inflammation and promote tissue regeneration. The findings emphasise that implementing targeted preventive measures in the early postoperative period is crucial for enhancing treatment success, ensuring implant reliability, and improving patients' quality of life.

Keywords: *Dental implantation, Postoperative inflammatory complications, Osseointegration, Surgical wound healing, Oral microflora, Antimicrobial therapy, Anti-inflammatory agents, Topical dental gels, Dentazol gel, Kamistad gel, Implant failure prevention, Clinical evaluation of inflammation, Microbiological analysis, Prosthodontic rehabilitation, Infection control in implantology.*

Introduction

Dental implantation is widely recognised as an effective and reliable method of rehabilitating partial or complete tooth loss. Although advances in implant technology and surgical techniques have significantly improved clinical outcomes, postoperative inflammatory complications remain a persistent challenge in dental practice [1]. Such complications may include pain, swelling, infection and delayed wound healing, and can negatively impact osseointegration, ultimately compromising the success of the procedure [2]. Therefore, preventing and managing inflammation in the early postoperative period is critical.

The condition of the surgical wound and its microbial environment are key factors influencing postoperative recovery. The presence of pathogenic microorganisms can exacerbate inflammatory responses, delay tissue regeneration and increase the risk of implant failure [3]. For this reason, topical

pharmacological agents with antimicrobial, anti-inflammatory and wound-healing properties have become an essential component of postoperative care in dental implant procedures [4].

Kamistad gel is a commonly used agent that has been widely applied due to its analgesic and mild antiseptic effects. However, new-generation preparations such as Dentazol gel offer promising potential for improved clinical outcomes thanks to their enhanced therapeutic properties. Nevertheless, comparative data on their effectiveness remains limited.

The present study aims to enhance the prevention of inflammatory complications after dental implantation by using Dentazol gel [5]. To this end, the study will examine clinical indicators of the surgical wound and evaluate microbiological parameters under different treatment conditions. It will also conduct a comparative assessment of traditional treatment methods, Kamistad gel and Dentazol gel in the postoperative period [6].

Materials and Methods

The study was carried out at the Surgical Dentistry Clinic of Tashkent State Medical University. A total of 28 patients, aged between 40 and 60 years, underwent dental implantation as part of the study. Participants were selected based on strict inclusion criteria to ensure that none of them had severe systemic conditions that could affect postoperative healing. The patients were randomly assigned to three groups to compare different postoperative management strategies: Group 1 (n = 8) received traditional treatment without additional topical agents, Group 2 (n = 10) received postoperative care supplemented with Kamistad gel, and Group 3 (n = 10) received postoperative care supplemented with Dentazol gel.

Clinical research methods were employed to evaluate the condition of the surgical wound, including assessing inflammatory signs such as redness, swelling, pain and tissue integrity. Measurements were taken at multiple time points during the early and late postoperative periods to monitor wound-healing dynamics and the occurrence of complications. Patient-reported outcomes, including pain intensity and discomfort, were also recorded using standardised scales to provide a comprehensive clinical evaluation.

A microbiological analysis was performed to examine the qualitative and quantitative composition of the wound microflora. Swab samples were collected from the surgical site at set times, and the microbial cultures were analysed to determine the presence and quantity of any potentially pathogenic organisms that could contribute to inflammatory processes. This analysis enabled the antimicrobial effectiveness of the gels under study to be assessed.

Statistical methods were applied to analyse the obtained data, including descriptive statistics to summarise the clinical and microbiological findings and comparative analysis to evaluate differences between groups. Statistical significance was determined using the appropriate parametric and non-parametric tests. The methodology was designed to provide an integrated evaluation of clinical outcomes and microbiological indicators, enabling a comparative assessment of traditional treatment versus the use of Kamistad and Dentazol gels in preventing postoperative inflammatory complications following dental implantation.

Results and Discussion

Indications for dental implantation include defects in the dental arch, complete edentulism, and the inability to use fixed prostheses [7]. At the same time, there are a number of contraindications for performing the procedure. Contraindications to implantation are divided into local and general categories [8]. General contraindications include severe diseases of internal organs, infectious diseases, drug addiction, alcoholism, and other severe systemic conditions. In dental implantation, particular attention is usually paid to local contraindications.

These include:

1. Malignant tumors, benign tumors, as well as tumor-like formations in the maxillofacial region;
2. Osteoradionecrosis;

3. Precancerous lesions of the oral mucosa or the vermilion border of the lips;
4. Severe allergic reactions to metals;
5. Severe generalized periodontitis or active periodontal disease;
6. Idiopathic diseases accompanied by progressive tissue damage (Papillon–Lefèvre syndrome);
7. Poor oral hygiene and insufficient attention to oral care by the patient [9].

In surgical practice, if certain diseases, harmful habits, and other contraindications are not taken into consideration, this may negatively affect the process of implant integration in the future [10]. Therefore, before performing the operation, the patient must undergo a comprehensive examination. In this process, anamnesis data and general clinical tests were assessed, including complete blood and urine analysis [11]. In addition, an examination of the oral cavity was conducted, during which the condition of the teeth, the alveolar process, the state of the mucous membrane, the type of occlusion, and the level of oral hygiene were evaluated. Furthermore, during the examination, radiological assessment of the maxillofacial system was performed [12]. Radiography and computed tomography made it possible to evaluate several important indicators, such as the condition and density of the jaw bones, the type of maxillary sinus, the height and width of the alveolar processes, the degree of atrophy, as well as the distance between the alveolar bone and the maxillary sinus or the mandibular canal [13]. Another important stage in planning the operation is instrumental examination. This included measuring the width of the alveolar process, determining electrogalvanic potentials in different metals, and performing stereolithography [14]. Special attention was paid to the mandatory sanitation of the patient's oral cavity, including the removal of dental calculus and severely damaged non-restorable teeth, as well as the treatment of caries and periodontal diseases [15].

Conclusion

The study demonstrates that applying Dentazol gel after dental implantation significantly helps to prevent postoperative inflammatory complications and promotes optimal wound healing. Clinical observations show that patients treated with Dentazol gel had fewer signs of inflammation, such as less redness, swelling and pain, than those receiving traditional treatment or Kamistad gel. These improved clinical outcomes suggest that Dentazol gel provides effective local anti-inflammatory and antimicrobial effects to support tissue regeneration and enhance patient comfort during the early postoperative period.

Microbiological analysis further confirmed the efficacy of Dentazol gel. Quantitative and qualitative assessment of surgical wound microflora revealed a significant reduction in pathogenic microorganisms and a more balanced microbial environment. These results suggest that Dentazol gel mitigates inflammatory responses and actively modulates the microbial composition of the wound, thereby reducing the risk of infection and facilitating faster, more stable healing.

A comparative evaluation of all three study groups revealed that Dentazol gel outperforms the traditional treatment approach and Kamistad gel in terms of both clinical and microbiological outcomes. This emphasises the importance of incorporating advanced topical agents into postoperative management protocols to improve the success rate of dental implantation procedures.

In conclusion, Dentazol gel is an effective, evidence-based strategy for improving postoperative recovery and minimising inflammatory complications after dental implantation. Its anti-inflammatory, antimicrobial and wound-healing properties make it a valuable addition to modern dental practice, contributing to higher patient satisfaction, better long-term implant stability and improved oral health outcomes.

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