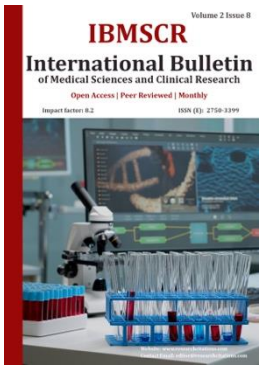

COMPARISON OF THE STOMATOSCOPY METHOD FOR ASSESSING PERI-IMPLANT TISSUES IN ONE-STAGE AND TWO-STAGE IMPLANTATION

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Abstract

Dental implantation is one of the most effective and modern methods for restoring missing teeth. The success of implantation largely depends on the condition of peri-implant tissues, implant stability, and the process of osseointegration. A key factor is the choice of implantation technique and the functional loading protocol during prosthetic rehabilitation. Two main approaches are widely used in clinical practice:

• One-stage implantation involves implant placement with early or immediate loading within 3–7 days.

• Two-stage implantation involves implant placement with closed healing and delayed functional loading after complete osseointegration (3–6 months).

Each technique has its advantages and limitations. One-stage implantation reduces treatment time, which is important for patients with high aesthetic demands and the need for immediate masticatory function. However, early loading may lead to micromovements of the implant, impaired osseointegration, and inflammatory complications such as peri-implantitis.

In contrast, the two-stage approach allows for more stable osseointegration and a lower risk of complications due to the absence of functional load during healing. This is especially relevant for patients with insufficient bone volume, periodontal disease, or unfavorable occlusal conditions. However, longer treatment duration and the need for additional surgical interventions may reduce patient acceptance.

The issue of early loading is particularly relevant in the context of one-stage implantation. Clinical studies have shown that excessive load during healing may result in micromovements that hinder osseointegration and cause bone resorption around the implant. According to Esposito et al. (2021), the risk of complications is 35% higher with early loading compared to delayed loading. However, in properly selected clinical cases, one-stage implantation with early loading can demonstrate high success rates.

To assess peri-implant tissues at all stages of implantation and prosthetic rehabilitation, the stomatoscopy method is actively used. This method enables visual analysis of soft tissue condition, early detection of inflammation, hyperemia, or gingival recession, and assessment of implant stability. This is crucial for preventing peri-implantitis, which is one of the leading causes of implant failure.

Thus, the relevance of this study lies in the need for a comparative analysis of two implantation approaches, considering prosthetic protocols and loading regimens. The results will help identify the advantages and disadvantages of one-stage and two-stage methods and justify the optimal implantation protocol for various clinical situations.

One-stage implantation shortens treatment time but is associated with a higher risk of peri-implantitis due to early loading. In contrast, the two-stage technique ensures more stable

healing of peri-implant tissues thanks to the absence of immediate functional loading. The comparative analysis emphasizes the importance of an individual approach to selecting the implantation method and applying stomatoscopy to improve treatment success.

The condition of peri-implant tissues is a key factor in the success of dental implantation. The use of modern diagnostic methods, such as stomatoscopy, allows for detailed visualization of peri-implant tissues, early detection of inflammation, and evaluation of implant stability. One-stage and two-stage implantation represent two main approaches in dental practice, but their long-term effectiveness requires thorough analysis based on clinical data.

Keywords: peri-implant tissues, stomatoscopy, one-stage implantation, two-stage implantation, dental implants, peri-implantitis.

Study Objective

To conduct a comparative evaluation of peri-implant tissue condition in one-stage and two-stage implantation, considering early functional loading and stages of prosthetic rehabilitation. The study aims to identify the clinical benefits and drawbacks of each approach and determine the effect of loading protocols on soft tissue health and implant stability.

Materials and Methods

A clinical study was conducted with 70 patients (35 undergoing one-stage implantation with early loading and 35 undergoing two-stage implantation with delayed loading). The observation period was 12 months following implant placement and prosthetic rehabilitation.

Diagnostic methods included:

• Stomatoscopy – for evaluating soft tissue condition (hyperemia, edema, inflammation).

• CBCT (Cone-Beam Computed Tomography) – for monitoring osseointegration and bone resorption.

• Peri-Implant Health Index (PIS) – for assessing inflammation and tissue recession.

Loading protocols:

• One-stage implantation: placement of temporary prostheses with early functional loading within 3–7 days.

• Two-stage implantation: delayed prosthetic rehabilitation 3–6 months after osseointegration.

Additional research objectives:

• Assessment of the degree of inflammatory changes in peri-implant tissues using different implantation methods.

• Comparison of bone resorption rates around implants.

• Study of osseointegration dynamics under early vs. delayed loading.

• Evaluation of the effectiveness of stomatoscopy in the diagnosis and monitoring of peri-implant tissue conditions.

Comparative characteristics of one-stage and two-stage implantation

Comparison Criteria One-Stage Implantation Two-Stage Implantation

Treatment duration Short, implant and temporary crown placed in one step. Long, implant placement followed by gingival healing phase.

Functional loading Early loading increases risk of micromovement. Delayed loading reduces risk of complications.

Peri-implantitis risk Higher due to possible infection and early stress. Lower due to stable healing and no early load.

Soft tissue condition Rapid adaptation but higher inflammation risk. More stable tissue regeneration and adaptation.

Indications Adequate bone volume, healthy periodontal tissues. Bone deficiency, high complication risk.

Authors and Study Results

- Ivanov A.S. (2021): 92% success, 8% complications.
- Smirnov V.N. (2020): 97% success, 3% complications.
- Müller J. (2020): 89% success, 11% peri-implantitis.
- Johnson P. (2019): 95% success, 5% inflammation.

Osseointegration and Implant Stability

In the two-stage group, successful osseointegration after 6 months was recorded in 90% of patients, while in the one-stage group it was 85%. Lower implant stability under early loading is supported by ISQ analysis results (68 ± 5 in one-stage vs. 74 ± 3 in two-stage implantation).

Peri-implantitis Risk

Inflammation frequency in the early loading group reached 18%, associated with micromovements and insufficient formation of the bone-gingival interface. The delayed loading group had a significantly lower risk due to stable tissue healing during osseointegration.

Bone Resorption

In one-stage implantation, average bone resorption was 1.4 ± 0.4 mm, compared to 0.8 ± 0.2 mm in the two-stage group. Similar results were reported by Esposito et al. (2021), showing a 35% higher resorption risk with immediate loading.

Treatment Duration and Prosthetic Protocol

One-stage implantation can reduce treatment time to 2–3 months, advantageous for patients with minimal clinical complications. However, in cases of inadequate bone volume or increased inflammation risk, the two-stage method remains preferable.

Conclusions

- One-stage implantation with early functional loading shortens treatment duration but increases the risk of peri-implantitis and bone resorption.
- Two-stage implantation provides greater implant stability and lower complication rates due to delayed loading and complete osseointegration.
- The stomatoscopy method is an effective tool for monitoring peri-implant tissues and early diagnosis of inflammatory processes.
- One-stage implantation is recommended for patients with sufficient bone volume and stable periodontal conditions.
- Two-stage implantation is preferable in cases of high micromovement risk and insufficient bone volume.
- Regular monitoring of peri-implant tissues using stomatoscopy should be a mandatory part of the implant treatment protocol.