NAVIGATIONAL SURGICAL GUIDES IN DENTAL IMPLANTOLOGY: A COMPARATIVE CHARACTERIZATION OF FULLY AND PARTIALLY GUIDED METHODS

Umurzakova D.A.
Musaev U.Yu.
Khaidarova M.A.
Tashkent State Medical University,
Tashkent, Republic of Uzbekistan.

Annotation*: The abstract discusses the advantages, limitations, and clinical indications of both types of systems, as well as their impact on accuracy, procedural safety, and the effectiveness of preoperative planning. The comparative analysis emphasizes the need for an individualized choice of navigational technique, taking into account anatomical conditions, the clinician's experience, and the required accuracy of implant positioning.*

Introduction.

Over recent decades, dental implantology has undergone significant technological progress, largely driven by the development of digital diagnostic and planning protocols. One of the key tools ensuring high accuracy and predictability of implant treatment is the use of surgical guides, which allow the transfer of a virtual implant placement plan into the clinical setting with minimal deviations. Their use is particularly important in the rehabilitation of patients with complex anatomy, limited bone volume, and in aesthetically critical areas.

Among the existing navigational solutions, fully guided and partially guided (pilot-guided) systems are the most widely used, differing in the degree of control over the surgical stage. Fully guided templates provide strict regulation of the direction, angulation, and depth of drilling, and in some cases

even implant placement itself, which significantly reduces dependence on the clinician's manual skills. At the same time, partially guided systems direct only the initial drilling step, leaving subsequent stages of osteotomy preparation to the surgeon's discretion. This provides greater flexibility and adaptation to intraoperative conditions but potentially increases the risk of implant deviation from the planned position.

Despite the active implementation of both technologies in clinical practice, questions regarding the comparative effectiveness, accuracy, and clinical indications of fully guided and pilot-guided systems remain a subject of scientific discussion. The relevance of this study lies in the need for an objective analysis of the advantages and limitations of each method, which will help optimize the choice of surgical navigation and improve the quality of implant treatment. Their primary task is to ensure the most accurate transfer of the virtual implant plan into the patient's oral cavity. The use of surgical guides reduces the risk of extraoral and intraoperative errors, increases the accuracy of implant positioning, and decreases invasiveness and operative time. They are of particular importance in cases of limited bone volume, prosthetically driven implant placement, and in aesthetically significant anterior regions.

Conclusion.

A comparative analysis of fully guided and partially guided surgical templates demonstrates that both types of navigational systems occupy an important place in modern dental implantology; however, their effectiveness and fields of application vary depending on clinical conditions. Fully guided templates provide the highest level of accuracy, minimize the influence of the human factor, and allow safe performance in complex anatomical areas. They are especially in demand for prosthetically driven implant placement and in situations where any deviation from the plan must be minimized.

Partially guided (pilot-guided) systems, despite lower accuracy, retain important advantages such as flexibility of the surgical process, ease of use,

and accessibility. They allow real-time adaptation of the surgical procedure and are often the optimal choice for multiple implant placements or in conditions that do not require extremely precise positioning.

Thus, the choice of the type of surgical guide should be based on careful consideration of anatomical features, the complexity of the clinical situation, the surgeon's experience, and the expected prosthetic outcomes. When applied correctly, both approaches ensure high treatment predictability; however, it is the individualized selection of the navigational system that allows achieving maximum efficiency and safety of implant intervention.