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Traditional surgery and guided surgery: A comparative approach

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ABSTRACT

Dental implant surgery can be conducted through two main approaches: Traditional Surgery and Guided Surgery. This article offers a detailed comparison between these techniques, exploring their advantages, disadvantages, and clinical applications. Traditional Surgery, widely practiced, stands out for its intraoperative flexibility, allowing real-time adjustments, but it can be less precise and more invasive. In contrast, Guided Surgery, based on digital technology, offers greater precision and less invasiveness, although it involves higher costs and greater dependence on technological resources. The choice between the two techniques must consider factors such as the complexity of the case, the surgeon's experience, and the patient's expectations. The article concludes that both approaches have their role in clinical practice, and the decision on which one to use should be carefully tailored to the individual needs of each patient.

Keywords: Dental Implants, Traditional Surgery, Guided Surgery, Surgical Precision, Digital Planning, Dental Surgical Techniques, Implantology.

INTRODUCTION

Dental implant installation is a dental practice that has evolved significantly over the past few decades, driven by technological advancements and increased expectations for both professionals and patients. The success of this procedure depends on multiple factors, including the surgical technique used, the accuracy of execution, and the predictability of the results. Within this context, two main approaches emerge: Traditional Surgery and Guided Surgery. Both techniques have their merits and limitations, and an in-depth understanding of these approaches is essential for dental professionals looking to provide the best treatment to their patients.

EMERGENCE OF DENTAL IMPLANTS

The modern concept of dental implants was significantly developed in the 1950s by Per-Ingvar Brånemark, who discovered the phenomenon of osseointegration by observing the integration of titanium with living bone. This discovery led to the development of titanium dental implants, which are widely used today [1]. Since then, implants have gone through several phases of evolution, including improvements in materials and surgical techniques, culminating in the emergence of advanced techniques such as Guided Surgery [2].

TRADITIONAL SURGERY

Traditional dental implant surgery is a widely used technique that relies on the surgeon's skill and experience to perform incisions in the gum and prepare the bone bed for implant placement. This approach offers intraoperative flexibility, allowing the surgeon to adjust the procedure according to the anatomical conditions encountered during surgery. Recent studies highlight the effectiveness of this technique in terms of long-term success of implants, despite its limitations in accuracy [3].

Despite technological advancements that make Guided Surgery an attractive option, Traditional Surgery remains an excellent alternative. Its flexibility allows the surgeon to make adjustments in real-time, which can be crucial in situations where anatomical conditions are unpredictable or variable. In addition, Traditional Surgery is widely disseminated and well understood by many professionals, ensuring its applicability in a wide range of clinical scenarios. This approach remains highly effective and feasible, especially in experienced hands, delivering high-quality results with a proven track record of success [4].

The success of Traditional Surgery depends, to a large extent, on the technical skills and decision-making capacity of the professional. The surgeon needs to have a deep understanding of the patient's anatomy and a refined ability to adapt the surgical technique to the conditions encountered at the time of surgery. The confidence and dexterity gained through years of clinical practice are critical factors that contribute to the excellent results often achieved with Traditional Surgery. The surgeon acts as a craftsman, shaping and adjusting the technique according to the specific needs of each patient, which highlights the importance of professional experience in obtaining consistent and high-quality results.

Advantages of Traditional Surgery:

- Intraoperative flexibility: Traditional surgery allows for real-time adjustments during the procedure, which is particularly useful in cases with unpredictable anatomical variables [5].
- Lower upfront cost: Traditional surgery typically requires less investment in advanced technology, making it more affordable for many practitioners [6].

Disadvantages of Traditional Surgery:

- Increased invasiveness: This approach often requires larger incisions and elevation of the gum flap, resulting in a longer recovery time and greater postoperative discomfort [7].

- Lower accuracy: The lack of accurate guides can lead to variations in implant positioning, which can negatively impact aesthetic and functional outcomes [8].

GUIDED SURGERY

Guided surgery, a newer technique, uses digital technology to plan and execute implant installation with high precision. This approach begins with a computed tomography (CT) scan of the patient, which is used to create a three-dimensional model of the dental arch. Virtual planning allows the surgeon to determine the exact location of implant placement, and customized surgical guides are used during the procedure to ensure positioning accuracy [9].

The main advantage of Guided Surgery lies in its ability to maximize the precision of the procedure. Through digital planning, the surgeon can visualize and simulate different scenarios before the intervention, minimizing the risks of error during surgery. This is particularly advantageous in complex cases or in aesthetic areas, where precision is essential to achieve a satisfactory end result both functionally and aesthetically.

However, the success of Guided Surgery also depends heavily on the expertise of the professional. Even with the support of advanced technologies, the surgeon must be able to correctly interpret digital data and apply it in the clinical context. Continuous training and familiarity with digital tools are essential for the professional to make the most of the advantages of Guided Surgery. In addition, the surgeon must be prepared to deal with any unforeseen events during surgery, demonstrating that, despite technological support, skill and clinical judgment remain fundamental pillars for the success of the procedure.

Advantages of Guided Surgery:

- High precision: The use of customized guides allows for extremely accurate implant positioning, which improves the predictability of results [10].
- Less invasiveness: In many cases, guided surgery can be performed with smaller incisions and without the need for gingival flap elevation, which reduces recovery time and postoperative discomfort [11].

Disadvantages of Guided Surgery:

- High cost: The advanced technology required for guided surgery, including planning software and personalized guides, increases the cost of the procedure [12].

- Technological dependence: The accuracy of guided surgery depends on the quality of the images and the software used, in addition to requiring a learning curve for the effective use of these tools [13].

THE IMPORTANCE OF THE PROFESSIONAL IN CHOOSING THE TECHNIQUE

Regardless of the technique chosen, the role of the professional is critical to the success of dental implant surgery. The surgeon's experience and clinical judgment are crucial in tailoring techniques to the patient's individual needs, ensuring that aesthetic and functional goals are successfully achieved. In traditional surgery, manual skill and the ability to make decisions in real-time are essential, while in guided surgery, technological knowledge and accuracy in digital planning are equally important. The professional must be able to evaluate the advantages and limitations of each technique and integrate them in a way that maximizes the results for the patient [14].

Additionally, the surgeon's ability to clearly communicate the options available to the patient and explain the potential benefits and risks associated with each approach is crucial to the decision-making process. The involvement of the patient in the choice of technique, based on a clear understanding of the options, contributes to a greater degree of satisfaction with the final result and strengthens trust in the patient-professional relationship.

COMPARISON AND CHOICE OF TECHNIQUE

The choice between traditional and guided surgery depends on several factors, including the complexity of the case, the surgeon's experience, the available budget, and the patient's expectations. While traditional surgery offers flexibility and a well-established approach, guided surgery stands out for its precision and predictability, especially in aesthetic or complex cases [15].

In terms of clinical outcomes, recent studies indicate that both techniques can achieve similar success in terms of osseointegration and implant longevity. However, guided surgery tends to have advantages in final aesthetics and patient satisfaction, particularly in cases that require high precision in implant positioning [16].

CONCLUSION

The evolution of implant dentistry reflects the continuous need to balance technology and surgical skill. Both traditional and guided surgery have their place in clinical practice, and the

decision on which technique to use should be based on a careful assessment of the patient's individual needs and clinical circumstances. With the continued advancement of digital technologies, guided surgery is likely to become increasingly prevalent, although traditional surgery remains a viable and reliable option for many cases. The skill and experience of the professional are decisive for the success of the treatment, regardless of the technique chosen.

Ultimately, the choice of surgical technique should be personalized for each patient, taking into account not only the clinical aspects but also the patient's preferences and expectations. The integration of the two approaches into a flexible and well-informed practice allows dental professionals to offer high-quality treatment, tailored to the needs of each case, thus ensuring the best possible outcome for the patient.

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