

Optimally invasive surgery: Evolving paradigms for ideal treatment outcomes



Introduction

The concept of “minimally invasive therapy” describes medical procedures that restrict the number and size of incisions and reduce postoperative complications.¹ It was introduced in 1986 by urologist John Wickham and adopted in general dentistry in the 1990s, emphasising the preservation of tooth structure to maintain natural tooth integrity.² Concurrently, the concept gained traction in dental surgery,³ facilitated by the advent of microsurgical techniques, enhanced magnification and the use of microscopes. These advancements led to the emergence of less invasive procedures in various surgical disciplines, including periodontal surgery, extractions, implant placement, bone and soft tissue grafting and osteotomies. In 2017, Buser et al⁴ highlighted that optimal treatment outcomes prioritise stable bone and soft tissue health, with the secondary goals being to minimise surgical interventions, reduce open flap procedures, lessen patient discomfort and morbidity, shorten overall treatment and healing times, and ensure cost-effectiveness. These principles encapsulate the essence of minimally invasive surgery. This term may not fully represent the goals of surgical practice, however, which should ideally balance procedural invasiveness with clinical effectiveness. This editorial advocates for the adoption of “optimally invasive” as a more fitting descriptor for contemporary surgical interventions in oral implantology.

Rethinking surgical terminology

The prevailing notion that less invasive surgery inherently yields superior outcomes does not consistently apply across oral implantology.^{5,6} Although minimally invasive techniques can reduce surgical trauma and accelerate recovery, they do

not always offer the best long-term functionality and aesthetic results. For instance, while particulate graft techniques using collagen membranes may be effective in specific cases, they do not universally deliver optimal outcomes.^{7,8} Conversely, non-resorbable polytetrafluoroethylene or titanium mesh membranes, though seemingly less invasive, pose higher risks of complications such as membrane exposure or infection. Furthermore, many of these methods necessitate a secondary surgical site to harvest autogenous bone, enhancing the graft quality.⁹ On the other hand, the gold-standard autogenous block¹⁰ or split bone block technique, as described by Khoury and Hanser¹¹ and Khoury and Khoury,¹² is often deemed overly invasive due to secondary site morbidity. Despite this, autogenous bone remains superior due to its osteogenic, osteoinductive and osteoconductive properties, along with the fact that it contains growth factors¹³ that enhance regeneration, leading to expedited healing and increased bone volumes,¹⁴ minimising complications and ensuring successful lateral and vertical augmentation.¹¹

Soft tissue management: A case for optimal invasiveness

In soft tissue management within implantology, the minimally invasive approach often falls short or its success is equivocal.¹⁵ Techniques such as the punch technique, despite being minimally invasive, typically do not improve the quantity of attached gingiva or tissue thickness, which are crucial for long-term implant success and aesthetic harmony.¹⁶ In contrast, the apically repositioned flap, though more invasive, significantly enhances the quality and quantity of attached gingiva, ensuring better colour matching and integration with the surrounding tissues.¹⁷

Conclusion: Embracing optimal invasiveness

The allure of “minimally invasive” surgery is undeniable, suggesting simpler, less painful and quicker procedures. Despite its popularity, however, this approach does not adequately capture the complexity of achieving optimal clinical outcomes in oral implantology. It is imperative for the field to consider a new paradigm that calls for “optimally invasive” protocols, emphasising the necessity of balancing procedural invasiveness with clinical effectiveness. This refined approach encourages clinicians to evaluate and select surgical options based on a comprehensive assessment of each case, aiming not merely to minimise invasiveness but also to optimise outcomes. By redefining our surgical strategies, we can enhance both the art and science of oral implantology, leading to improved patient satisfaction and sustained success.



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