



## **Supracrestal Fiberotomy in Relapse an Overview**

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### **ABSTRACT**

Orthodontic relapse remains a significant concern following the completion of orthodontic treatment. Supracrestal fiberotomy (SCF) has emerged as a promising adjunctive technique to address relapse by targeting the periodontal fibers surrounding the teeth. This review article aims to provide an in-depth overview of the concept, mechanism, clinical application, effectiveness, and potential benefits of Supracrestal fiberotomy in preventing orthodontic relapse. By understanding the principles and evidence surrounding SCF, orthodontists can make informed decisions regarding its integration into post-treatment management strategies.

Keywords: Supracrestal fiberotomy, orthodontic relapse, periodontal fibers, retention, stability, orthodontic treatment.

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### **INTRODUCTION**

Orthodontic treatment has evolved significantly over the years, aiming not only to achieve optimal dental alignment and occlusion but also to ensure lasting stability of treatment outcomes. However, despite the advancements in orthodontic techniques and materials, orthodontic relapse remains a persistent challenge that can compromise the hard-earned results of treatment. The phenomenon of orthodontic relapse, characterized by the gradual return of teeth to their pre-treatment positions, underscores the complex interplay between dental, skeletal, and soft tissue factors that influence the stability of orthodontic corrections. In recent years, supracrestal fiberotomy (SCF) has emerged as a potential adjunctive procedure in the orthodontist's arsenal to counteract relapse tendencies. Supracrestal fiberotomy is a surgical technique that divides the free gingival and transseptal fibers around rotated teeth that have been corrected orthodontically. Supracrestal fiberotomy is a technique for reducing rotational relapse of orthodontically aligned teeth.<sup>1</sup> But the procedure is only one aspect in the total care of the orthodontic patient, which should include proper root paralleling, complete correction of rotations, and correction of overbite. SCF operates on the premise of modifying the attachment and tension of the periodontal fibers surrounding the teeth, aiming to enhance treatment stability by addressing one of the fundamental factors contributing to relapse.<sup>2</sup> This review article aims to delve into the realm of SCF, offering a comprehensive overview of its theoretical underpinnings, clinical application, evidence-based effectiveness, and potential implications in the realm of orthodontic relapse management.

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### **MECHANISM OF SUPRACRESTAL FIBEROTOMY**

The mechanism of Supracrestal Fiberotomy (SCF) involves the deliberate disruption and modification of the periodontal fibers' attachment around teeth that have undergone orthodontic treatment. This procedure aims to influence the tension, arrangement, and orientation of these fibers, thereby potentially reducing the likelihood of orthodontic relapse. The periodontal ligament (PDL) consists of a complex network of collagen fibers that attach the tooth root to the surrounding alveolar bone. These fibers are categorized into different groups based on their orientation and function, including alveolar crest fibers, horizontal fibers, oblique fibers, and apical fibers. These fibers play a crucial role in maintaining tooth stability and responding to orthodontic forces.<sup>3</sup> During orthodontic treatment, forces are applied to teeth to induce controlled tooth movement. These forces create stress within the periodontal ligament, leading to a dynamic remodelling response of the surrounding tissues. As teeth are repositioned, the periodontal fibers adapt to the new alignment, contributing to the success of orthodontic treatment. After orthodontic treatment is completed and the appliances are removed, the periodontal fibers may tend to return to their original orientation. This potential for relapse is influenced by factors such as genetic predisposition, growth patterns, and the inherent elasticity of the periodontal tissues.<sup>4</sup> Without proper retention strategies, the teeth may gradually shift back toward their pre-treatment positions, compromising the treatment outcomes. Supracrestal Fiberotomy aims to disrupt this tendency for relapse by selectively severing and modifying the periodontal fibres' attachment to the alveolar bone. By carefully performing incisions in specific regions of the gingiva, the orthodontist releases the tension exerted by these fibers. This release of tension allows for a controlled reorganization of the fibers, potentially minimizing the forces that could lead to relapse. Following SCF, the periodontal tissues undergo a remodelling process. As the periodontal fibers adjust to the new equilibrium established through SCF, they may assume a more favourable orientation for maintaining the corrected tooth positions. This remodelled fibre arrangement, in conjunction with appropriate retention protocols, contributes to enhanced stability and a decreased propensity for relapse.<sup>5</sup>

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## PROCEDURE

The Supracrestal Fiberotomy (SCF) procedure involves a series of precise steps to selectively release the periodontal fibers surrounding mandibular teeth that have undergone orthodontic treatment and are now stabilized with a fixed retainer.<sup>2</sup>

- a) Following orthodontic treatment, the mandibular teeth are properly aligned, and a fixed retainer is in place to maintain their corrected positions.
- b) To ensure patient comfort, local anesthesia is administered to the soft tissue surrounding the teeth. This anesthesia is achieved by infiltrating the labial and lingual sides of the affected area.
- c) Using a No. 12 blade, a crevicular (sulcular) incision is carefully made along both the labial and lingual sides of the teeth. This incision effectively releases the supra-crestal fibers. The procedure is performed with meticulous precision and the blade is well-supported.
- d) Additionally, a proximal incision is made to release the trans-septal fibers that connect adjacent teeth. This step contributes to the comprehensive release of the periodontal fibers.
- e) After completing the incisions, the supra-crestal fibers are fully released from the labial, lingual, and proximal aspects of the teeth. The result is a modified attachment of the periodontal fibers.

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## BENEFITS AND POTENTIAL DRAWBACKS

SCF has shown potential in reducing orthodontic relapse by modifying the attachment of periodontal fibers, which may help maintain the achieved tooth positions over time. SCF is a minimally invasive procedure that involves small incisions, making it relatively comfortable for patients and promoting faster healing compared to more invasive surgical techniques.<sup>6</sup> By addressing the tension in periodontal fibers, SCF may contribute to improved stability of orthodontic corrections, especially in cases with a higher risk of relapse. While individual responses can vary, SCF offers a controlled way to influence tooth movement and fiber reorganization, potentially leading to more predictable treatment outcomes. SCF can be used in conjunction with traditional retention methods, enhancing the overall retention strategy and potentially reducing the need for prolonged retainer wear. Drawbacks of Supracrestal Fiberotomy include despite promising short- to medium-term results, there is a relative scarcity of long-term data to firmly establish the extended effectiveness of SCF in preventing relapse over many years.<sup>7</sup> Inaccurate incisions or inadequate tension release can impact the effectiveness of SCF. The effectiveness of SCF can be influenced by the patient's specific periodontal anatomy and tooth characteristics. Anatomical variations may necessitate modifications to the procedure. SCF is typically used as an adjunctive procedure and may not completely replace the need for traditional retention methods. Its role and impact may vary based on individual cases. Some patients may be hesitant about undergoing additional surgical procedures after orthodontic treatment, and their willingness to undergo SCF should be considered.<sup>8,9</sup>

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## REVIEW OF PREVIOUS STUDIES

In a prospective study conducted over a span of almost 15 years, an initial cohort of 320 consecutive cases was chosen for examination. The primary objective of this investigation was to statistically analyze the effectiveness of the supracrestal fiberotomy procedure in mitigating post-orthodontic dental relapse. To quantitatively assess relapse, the "Irregularity Index" method developed by Little, which measures tooth malposition, was employed. The relapse of both the control group and the SCF-treated cases was recorded approximately 4 to 6 years after active orthodontic treatment and again at 12 to 14 years post-treatment. Significantly, there were highly noteworthy differences in mean relapse between the control and SCF-treated cases at both these time intervals. The SCF surgical technique demonstrated a relatively greater efficacy in countering pure rotational relapse compared to labiolingual relapse.<sup>10</sup> Over the long term, the SCF procedure exhibited greater success in curbing relapse within the anterior segment of the upper jaw compared to the anterior segment of the lower jaw. Nonetheless, it is important to acknowledge that both the control and SCF groups exhibited considerable and unpredictable variability in individual tooth movement following orthodontic treatment. Incorporating Supracrestal Fiberotomy (SCF) into clinical practice requires careful consideration, thorough planning, and a patient-centered approach. While SCF holds promise as a strategy to enhance post-orthodontic stability, its successful integration hinges on the practitioner's expertise, patient factors, and ongoing commitment to evidence-based practice. As the field of orthodontics evolves, continued research and clinical experience will further refine the understanding and application of SCF in preventing orthodontic relapse.

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## CONCLUSION

As the field of orthodontics continues to evolve, research efforts should be directed toward addressing the gaps in our understanding of Supracrestal Fiberotomy (SCF). By pursuing these future directions, we can refine SCF's clinical applications, optimize its outcomes, and contribute to a more comprehensive and evidence-based approach to preventing orthodontic relapse. This review underscores the importance of a comprehensive understanding of SCF's mechanism, clinical application, and evidence-based effectiveness to guide orthodontic practitioners in making informed decisions for post-treatment management.

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