



Short Communication

Modified tucker: Simplifying your orthodontic practice

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ABSTRACT

Orthodontic treatment often involves the use of nickel-titanium (NiTi) wires for initial leveling and alignment of teeth due to their unique properties. However, engaging these wires into bracket slots, especially in crowded or rotated teeth can be challenging. This article presents the development of a custom-made wire tucker aimed at simplifying the engagement process, reducing operator effort, and maintaining sterility in orthodontic procedures. The design, advantages, and practical applications of this modified instrument are discussed, highlighting its potential to enhance clinical efficiency and patient outcomes.

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1. Introduction

Orthodontic treatment is a specialized field of dentistry that focuses on correcting malocclusions and improving dental aesthetics and function. One of the fundamental components of orthodontic treatment is the use of archwires, which apply controlled forces to the teeth to achieve desired tooth movements. Nickel-titanium (NiTi) wires are commonly used in orthodontics due to their unique properties, including super elasticity and shape memory effect, which allow for efficient tooth movement. However, engaging these wires into bracket slots, particularly in cases of crowded or rotated teeth, can be challenging and time-consuming.

Traditional methods of engaging archwires into bracket slots involve the use of ligature wires or commercially available wire tuckers. While these methods can be effective in many cases, they may not always provide optimal results, especially in challenging clinical situations. Furthermore, the use of multiple instruments can increase the complexity of procedures and prolong treatment times. Additionally,

ensuring sterility in the operatory is of utmost importance to prevent cross-contamination and ensure patient safety.¹

To address these challenges, there is a need for innovative solutions that simplify procedures, reduce operator effort, and maintain sterility in orthodontic practice. This article presents the development of a custom-made wire tucker designed to address these challenges and enhance clinical efficiency in orthodontic procedures.

2. Aim and Objectives

The aim of this study is to develop a customized wire tucker that facilitates the efficient engagement of orthodontic archwires, particularly NiTi wires, into bracket slots. The objectives include designing a modified wire tucker that overcomes the challenges associated with traditional methods, assessing its effectiveness and ease of use in clinical practice, evaluating its cost-effectiveness and practicality compared to existing techniques, investigating its impact on clinical outcomes and patient satisfaction, and exploring its potential applications in various clinical scenarios.²

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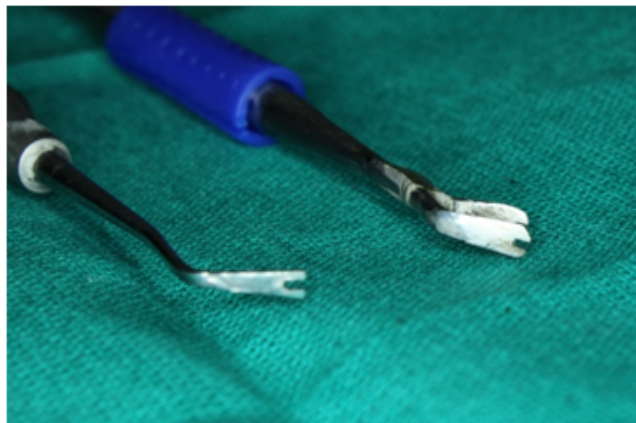


Figure 1: Indentations of 2mm depth for efficient seating of wire and ease of use

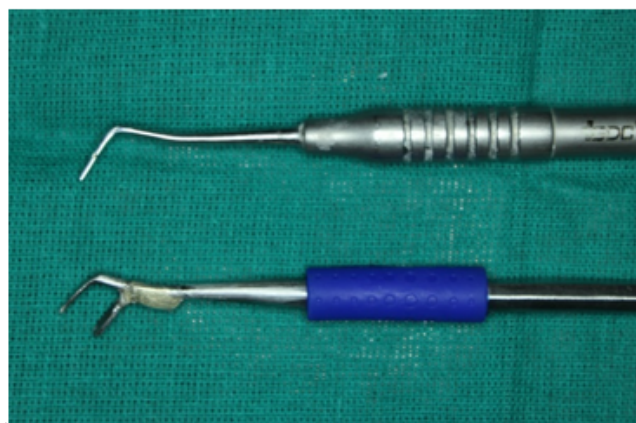


Figure 2: Lateral view of the instrument. 2 composite filling instruments soldered together to form one single instrument.



Figure 3: Modified tucker design

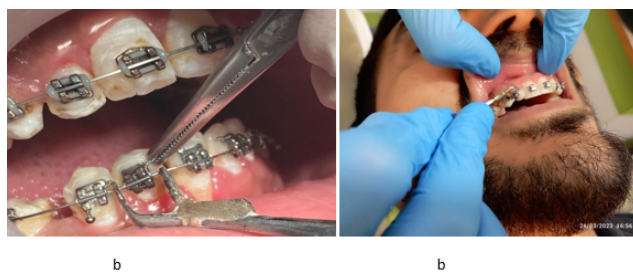


Figure 4: a: & b: use of modified tucker in patient for ligation eliminated the use of 4hands

3. Materials and Methods

The development of the custom-made wire tucker involved following steps to design and fabricate the modified instrument:

1. Selection of Materials: The custom-made wire tucker was designed using composite filling plastic instruments and stainless-steel ligature ties. These materials were chosen for their biocompatibility, durability, and ease of sterilization.
2. Instrument Design: Two composite filling plastic instruments were selected and tied together at the neck with stainless steel ligature ties. This ensured that the beaks of the instruments were at the same level and aligned properly. One of the instruments was then sliced at the neck to create a single two-faced instrument, allowing for simultaneous engagement of archwires on both sides of the bracket.
3. Measurement and Adjustment: The distance between the two heads of the modified tucker was determined based on the size of the central incisor bracket, with an additional 1mm clearance on both sides to facilitate easy tying of the ligature wire. Using a disc bur, an equal cut of 2mm was made on both faces of the instrument to create a suitable opening for engaging the archwire.
4. Assembly and Soldering: The composite filling plastic instruments were securely tied together at the neck using stainless steel ligature ties and soldered to ensure stability and durability during clinical use.
5. Testing and Evaluation: The prototype of the custom-made wire tucker was tested in simulated clinical scenarios to evaluate its effectiveness, ease of use, and practicality. Feedback from orthodontic practitioners was also obtained to assess the instrument's performance and identify areas for improvement.³

4. Results

The custom-made wire tucker has several advantages in clinical practice, as following:

1. **Simplified Procedures:** The modified tucker eliminates the need for multiple instruments, reducing the complexity of procedures and streamlining workflow in the operatory. Orthodontic practitioners reported that the single instrument design improved efficiency and saved time during archwire engagement.
2. **Enhanced Clinical Efficiency:** The custom-made wire tucker was easy to use and could be effectively applied in both anterior and posterior regions of the oral cavity. Orthodontic practitioners noted that the instrument provided consistent and reliable results, even in challenging clinical situations such as crowded or rotated teeth.
3. **Cost-Effectiveness:** The modified tucker is cost-effective compared to commercially available wire tuckers, as it could be easily assembled using readily available materials. This makes the instrument accessible to a wider range of orthodontic practitioners, regardless of their practice setting or budget constraints.
4. **Improved Patient Care:** The simplified procedures facilitated by the custom-made wire tucker contributes to improved patient care by reducing treatment times and enhancing overall treatment outcomes. Patients benefited from shorter chairside appointments and more efficient orthodontic treatment, leading to greater satisfaction with their orthodontic experience.
5. **Maintained Sterility:** The design of the modified tucker allows for easy disinfection and maintenance of sterility in the operatory, minimizing the risk of cross-contamination and ensuring patient safety.

5. Discussion

The development of the custom-made wire tucker represents a significant advancement in orthodontic instrumentation, offering a practical solution to the challenges associated with engaging orthodontic archwires. By combining innovative design principles with practical considerations for clinical use, the modified tucker addresses the specific needs of orthodontic practitioners and enhances clinical efficiency in orthodontic procedures.

The custom-made wire tucker contributes to improved patient care by reducing treatment times and enhancing treatment outcomes. Patients benefit from shorter chair side appointments and more efficient orthodontic treatment, leading to greater satisfaction with their orthodontic experience. Additionally, the cost-effectiveness of the modified tucker makes it accessible to a wider range of orthodontic practitioners, regardless of their practice setting or budget constraints.

Furthermore, the design of the modified tucker allows for easy disinfection and maintenance of sterility in the operatory, minimizing the risk of cross-contamination and ensuring patient safety. This is particularly important in orthodontic practice, where maintaining a clean and

sterile environment is essential to prevent infections and complications.

Overall, the custom-made wire tucker represents a significant advancement in orthodontic instrumentation, with the potential to improve the quality of care provided to orthodontic patients.

6. Conclusion

The development of a custom-made wire tucker offers a practical solution to the challenges associated with engaging orthodontic archwires, particularly in cases of crowded or rotated teeth. By simplifying procedures, reducing operator effort, and maintaining sterility in the operatory, the modified tucker enhances clinical efficiency and improves patient care in orthodontic practice. Its cost-effectiveness and ease of use make it a valuable tool for orthodontic practitioners, contributing to more efficient orthodontic treatment and greater patient satisfaction. Further research and clinical studies are warranted to validate its effectiveness and assess its long-term impact on treatment outcomes and patient satisfaction. Overall, the custom-made wire tucker represents a significant advancement in orthodontic instrumentation, with the potential to enhance the quality of care provided to orthodontic patients.

7. Source of Funding

None.

8. Conflict of Interest

None.


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