Scalable Tool for Holding and Placement of Orthodontic Brackets

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Abstract

An essential component of orthodontic therapy that affects the effectiveness of care and patient results is the positioning of orthodontic brackets precisely. This abstract introduces the idea of a "Scalable Tool for Holding and Placement of Orthodontic Brackets," which is intended to overcome the difficulties of manually placing orthodontic brackets. This ground-breaking device combines bracket holding, positioning aids, pressure control, and measuring features, making it flexible for use with different bracket types and tooth kinds. It attempts to increase bracket placement accuracy, efficiency, and consistency while decreasing bond failures and treatment adjustments. The tool's user-frien dliness and hygienic standards are enhanced by its ergonomic design and sterilizable components. This tool has the potential to streamline orthodontic treatments, reduce patient chair time, and enhance overall treatment by expediting the bracket insertion procedure. To enable successful integration into orthodontic practice, future research and development will concentrate on safety, legal compliance, and ethical factors.

Keywords: Brackets, Orthodontic, Orthodontic Brackets, Tool

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Introduction

Orthodontics is a subspecialty of dentistry that focuses on repositioning the jaws and teeth to improve both oral health and appearance[1]. The exact positioning of orthodontic brackets, which are small, personalized structures adhered to teeth to support orthodontic wires and promote tooth movement, is one of the main components of orthodontic treatment[2]. Placing brackets correctly is essential for successful orthodontic treatment, making it a key step that necessitates accuracy and consistency[3].

Traditional bracket placement techniques are labor-intensive, prone to human error, and frequently uncomfortable for the patient since they depend on the dexterity and competence of orthodontists and dental assistants. To increase bracket installation efficiency and accuracy, new instruments and methods have been developed in the orthodontic sector thanks to advancements in technology and materials[4].

Traditional orthodontic bracket implantation entails a number of complex steps. It requires extreme precision, close attention to detail, and rigorous adherence to predetermined rules. In order to ensure that the forces exerted during orthodontic

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treatment are distributed properly and that teeth move as intended, factors such as bracket alignment, angulation, and placement height are essential. Consistencies in bracket placement can be caused by the limitations of human dexterity and differences in practitioner expertise, which may compromise treatment effects[3].

In addition to these problems, the traditional bracket insertion procedure might cause the patient discomfort because of the prolonged chair time and the requirement for numerous adjustments. The orthodontic community has also been working toward reducing patient discomfort and the length of the entire treatment process[4]. The insertion of orthodontic brackets is a crucial stage of orthodontic therapy and calls for dexterity and accuracy. It is possible to create and use a scaled tool to place ort-hodontic brackets more quickly and accurately.

The proper insertion of brackets on teeth during orthodontic treatment can be a laborious and sensitive process. A scalable tool is suggested to increase the effectiveness and accuracy of this process. By presenting a revolutionary method for bracket placement, the scalable tool for holding and placement of orthodontic brackets overcomes these difficulties. This equipment offers orthodontists a user-friendly, incredibly accurate, and repeatable system for bracket installation by utilizing cutting-edge materials and technical processes. The device helps to maintain constant bracket location and angulation, which lowers the possibility of human mistake and eventually raises the standard of care given to orthodontic patients. With this instrument, orthodontists should have an easier time handling and placing brackets, which could shorten the amount of time patients spend in the chair. By streamlining and enhancing the bracket placement procedure, a scalable tool for holding and positioning orthodontic brackets has the potential to revolutionize the field of orthodontics[5]. This device can imp-rove accuracy, shorten treatment times, and ultimately lead to better patient experiences and orthodontic treatment results.

Methodology

This invention was patent by Saudi Authority for intellectual Property on 28th September 2021. The patent number is SA 8723 B1. The invention relates to a device for holding and positioning orthodontic brackets on teeth while simultaneously altering their vertical levels. The device consists of a base (25), to which a vertical bar (15) is affixed. For measuring the vertical level of the bracket on the tooth, the vertical bar has measuring indications (18). The vertical bar extends the bracket holder, which then glides vertically on the bar. (15). A third arm (17) that projects from the base (25) in a straight line toward the bracket holder and has a step at the end (20) serves as a standard for determining the bracket's vertical position. Figure 3-8 provides detailed diagrammatic representation of the invention.

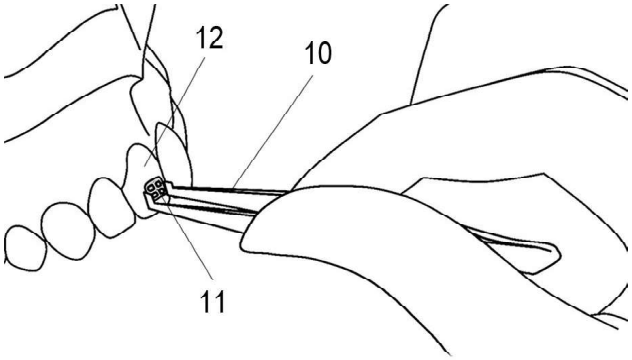

Fig 1. The conventional bracket holder

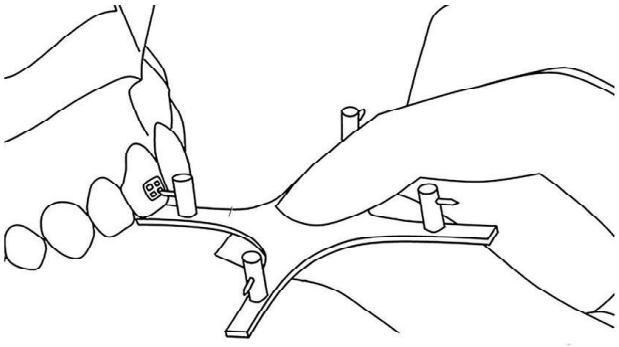

Fig 2. Use of bracket gauge after placement of orthodontic bracket

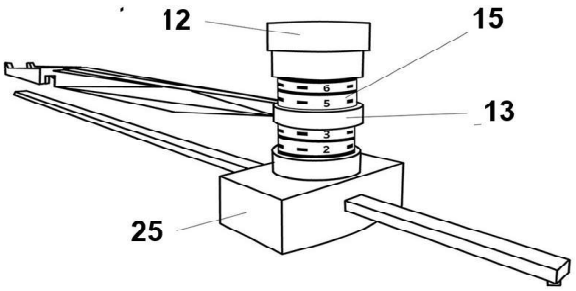

Fig 3. Scalable tool of modern bracket holder

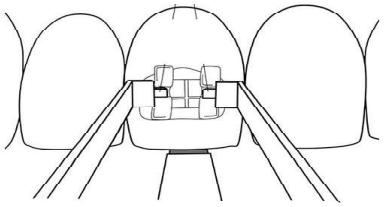

Fig 6. Method of gripping bracket and placement of spurs inside the bracket slots

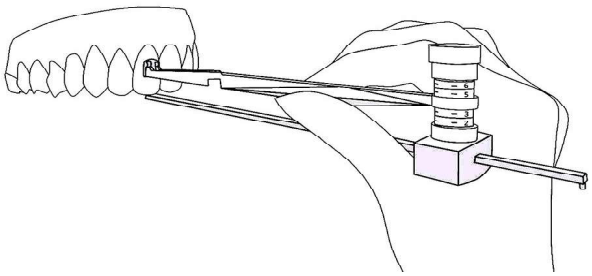

Fig 4. Use of innovated bracket holder

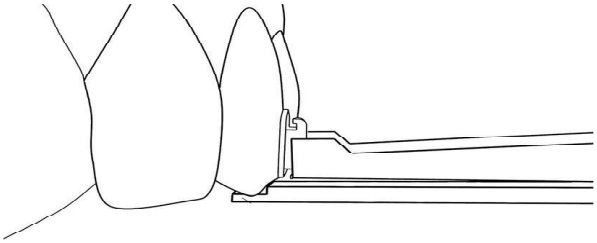

Fig 7. Placement of lower arm on the incisal edges during adjustment of bracket position

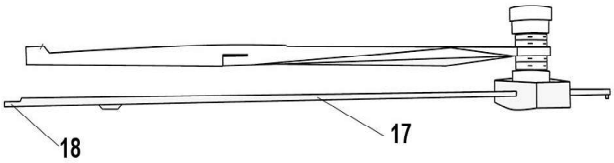

Fig 5a. Side view of innovation

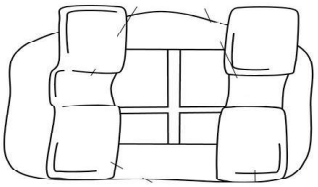

Fig 8. Orthodontic bracket

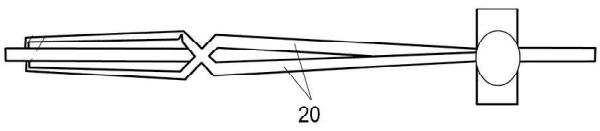

Fig 5b. Upper view of innovation

Discussion

An important development in orthodontic practice is the "Scalable Tool for Holding and Placement of Orthodontic Brackets". This device uses cutting-edge engineering and material science to streamline and improve bracket positioning. With the use of this technology, orthodontists and their teams will have access to a scalable, consistent, and reliable bracket installation solution, resulting in better treatment outcomes and increased patient comfort.

A device for holding and positioning orthodontic brackets is the current innovation. An orthodontist uses a holder designed specifically to hold orthodontic brackets exclusively (10) when attaching orthodontic brackets (11) to the surfaces of the teeth (12). He employs a different instrument (13), which results in more clinic time being lost, to modify the heights of the orthodontic brackets on the surfaces of the teeth after he has already placed them there. Because of this, many practitioners just place orthodontic brackets on the teeth's surfaces rather than correctly altering their heights[6]. This operation results in the loss of misaligned teeth and undesirable outcomes for the patient, or it lengthens the time required for orthodontic therapy. Figure 1-2.

The closest example of technology existing before the present invention is that which was described in the US patent application number 5868787, which showed a stand with a scale to regulate the heights of the orthodontic brackets[9]. The device offers the advantages of efficient Bracket Placement, time saving consistent result, ease of use and customization. The tool is designed to facilitate the efficient and accurate placement of orthodontic brackets on teeth. It ensures precise positioning, contributing to the overall effectiveness of orthodontic treatment. The scalable nature of the tool allows for simultaneous placement of multiple brackets, reducing the overall time required for the bracketing procedure. This is particularly beneficial for both orthodontists and patients. The tool helps achieve consistency in bracket placement, minimizing variations and enhancing the predictability of treatment outcomes. This is essential for achieving optimal tooth alignment and bite correction. The design of the tool prioritizes user-friendliness, making it accessible for orthodontic professionals. It streamlines the bracketing process, making it more straight forward and less prone to errors. The tool allows for scalability, accommodating various tooth sizes and shapes. This adaptability ensures that orthodontic brackets can be placed on a diverse range of patient cases, promoting versatility in orthodontic practice[7].

The potential disadvantages can be initial learning curve, cost considerations, dependency on technology, limited compatibility and maintenance requirements. Orthodontists and dental professionals may require some time to familiarize themselves with the tool and its proper usage. This initial learning curve could potentially slow down the bracketing process initially. Implementing scalable tools in orthodontic practices may involve an initial investment. The cost of acquiring and maintaining these tools could be a disadvantage for smaller practices or those with budget constraints. The tool relies on technology for its scalability and any technical malfunctions could disrupt the bracketing process. This dependency may introduce an element of vulnerability in the overall orthodontic workflow. Depending on the design and specifications of the tool, it may not be universally compatible with all types and brands of orthodontic brackets. This limitation could restrict its use in certain practices or with specific bracket systems. Like any dental instrument, the scalable tool would require regular maintenance to ensure its proper functioning. Failure to adhere to maintenance schedules could lead to equipment issues and potential disruptions in the treatment process.

The current invention only provides one holder suitable for all front and back orthodontic brackets, which would help to reduce the time spent adjusting the height of the orthodontic brackets. The dentist carries the orthodontic bracket through the holder and adjusts its height inside the mouth in accordance with the patient's needs[8]. While the US patent document claims that the doctor chooses the height of the orthodontic bracket for

each tooth individually outside the mouth before adhering it, this method ignores the patients' teeth's natural variations in size and shape[10].

Additionally, this tool is a useful addition to the orthodontist's toolkit due to its versatility to handle various bracket sizes and types, as well as its ergonomic design and sterilizable materials. Since it can save chair time and improve the standard of treatment given, the potential advantages go beyond the orthodontic community and can enhance the whole patient experience.

To ensure the secure and efficient incorporation of this scalable tool into orthodontic practice, it is crucial to prioritize rigorous testing, regulatory compliance, and ethical considerations as future research and development advances.

For effective utilization of the scalable orthodontic bracket tool, comprehensive training programs for practitioners are crucial to mitigate the initial learning curve. Prior to acquisition, practices should assess their financial capabilities to ensure a seamless integration of the tool. Regular maintenance schedules should be established and strictly adhered to in order to prevent disruptions. Collaboration with bracket manufacturers can enhance compatibility, widening the range of applications. Additionally, fostering a supportive environment for practitioners to share insights and experiences can expedite the tool's acceptance and utilization in diverse orthodontic settings.

Conclusion

In conclusion, the creation of a scalable tool for the holding and positioning of orthodontic brackets is an encouraging development for the field of orthodontics. This cutting-edge gadget has the potential to greatly improve accuracy, effectiveness, and consistency in the crucial bracket placing process. This instrument can minimize bond failures and lessen the need for corrections by resolving the difficulties with hand bracket installation, such as fluctuations in pressure and orientation, ultimately leading to more predictable treatment outcomes.

Conflict of Interest

Authors have no conflict of interest and no grant funding from any organization.

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