

# An Orthodontic Plier with Protractor for Orthodontic Wire bending

Ibrahim Alshahrani<sup>1</sup>, Ali Alhaizaey<sup>2</sup>

## Abstract

An inventive orthodontic instrument intended to improve accuracy during orthodontic wire bending operations. With the use of a unique tool called the Orthodontic Plier with Protractor, orthodontists can now manipulate wire at precise angles due to its integrated protractor. This development offers a simplified approach to orthodontic treatment while addressing the drawbacks of conventional techniques. By providing real-time angle measurement, the integrated protractor promotes uniformity in wire adjustments and improves treatment results. The plier's ergonomic comfort is prioritized in its design, making it simple for orthodontic practitioners to use. The Orthodontic Plier with Protractor is a useful addition to orthodontic instruments that advances accuracy and efficiency in orthodontic wire bending procedures by fusing functionality with user-friendly characteristics. By using this cutting-edge tool, practitioners support the ideas of technology integration and evidence-based practice while also furthering the continual evolution of orthodontics.

**Keywords:** Orthodontic, Orthodontic Wires, Orthodontic Appliances

**Citation:** Alshahrani I, Alhaizaey A. An Orthodontic Plier with Protractor for Orthodontic Wire bending . Annals of ASH & KMDC, 2024; 29(2): 198-202

## Introduction

The area of medicine that focuses on the mouth, teeth, and gums is called dentistry. It includes the investigation, diagnosis, prevention, treatment, and management of illnesses, ailments, and disorders pertaining to the mouth, with a common emphasis on the dentition (the growth and placement of teeth) and the oral mucosa. Other areas of the craniofacial complex that dentistry may treat include the temporomandibular joint and patients with syndromic conditions<sup>1</sup>.

As a sub-specialty of dentistry, orthodontics continuously searches for novel tools and techniques to improve outcomes for patients and treatment accuracy. The development of tools that improve the precision of orthodontic interventions while also streamlining processes has become more of a focus in recent years. The Orthodontic Plier with Protractor is one such innovative gadget that has surfaced and is completely changing the way orthodontists handle wire bending.

An essential component of orthodontic therapy that affects tooth alignment and location is orthodontic wire bending. In the past, wire modifications have been accomplished by practitioners using traditional pliers and manual approaches to reach the desired angles. However, these approaches' inherent drawbacks frequently lead to variances and irregularities in treatment outcomes. The orthodontic community has embraced technology improvements

---

<sup>1</sup>Department of Pediatric Dentistry and Orthodontic Science, college of Dentistry, King Khalid University, Abha, Saudi Arabia  
<sup>2</sup>King Faisal Medical City, Abha, Saudi Arabia

**Correspondence:** Dr. Ibrahim Alshahrani  
<sup>1</sup>Department of Pediatric Dentistry and Orthodontic Science, college of Dentistry, King Khalid University, Abha, Saudi Arabia  
**Email:** alshahrani@kku.edu.sa  
**Date of Submission:** 29<sup>th</sup> March 2024  
**Date of Acceptance:** 14<sup>th</sup> May 2024

to create instruments that enable efficiency and precision in recognition of this problem<sup>2</sup>.

At the vanguard of these developments is the Orthodontic Plier with Protractor, which combines functionality and technology. By integrating a protractor into the plier design, this tool gives orthodontists a real-time measuring tool for precise angle corrections while bending wire. The long-standing demand for an approach to orthodontic procedures that is more accurate and standardized is addressed by this breakthrough.

The orthodontic plier's design's incorporation of a protractor is evidence of how dental technology is developing. This multipurpose instrument not only makes wire bending easier, but it also adds a degree of objectivity and quantifiability that wasn't possible with conventional techniques. Today's orthodontists can reliably measure and duplicate particular angles, guaranteeing a greater level of precision in the alignment of dental arches.

The ergonomic design of the Orthodontic Plier with Protractor, which prioritizes user comfort and ease of use, is a crucial feature. Orthodontic professionals frequently perform complex and precise operations, therefore they require instruments that lessen fatigue and improve accuracy. Recent research has emphasized the significance of ergonomic design in dental equipment, connecting it to decreased incidence of musculoskeletal illnesses in practitioners and enhanced clinical performance (Padmavathi et al., 2021). These results are consistent with the Orthodontic Plier with Protractor, which puts orthodontists' well-being first while maintaining maximum functioning<sup>3</sup>.

This novel technology has an impact that goes beyond specific patient situations. A more methodical and repeatable approach to orthodontic treatments is made possible by the standardization of wire bending processes made possible by the Orthodontic Plier with Protractor. This is especially important in the age of evidence-based dentistry, as dentists aim to match the most up-to-date scientific research to support their clinical judgments. This tool's increased precision is in line with evidence-

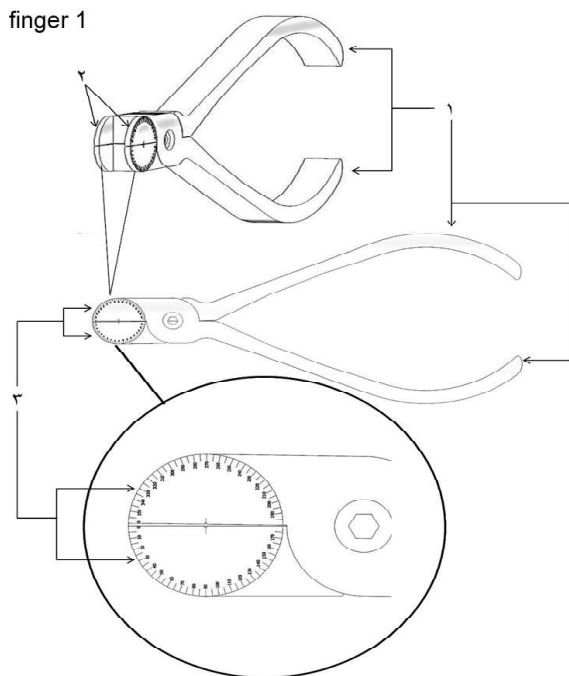
based practice, which promotes an orthodontic treatment approach that is more dependable and predictable<sup>4</sup>.

The Orthodontic Plier with Protractor is a major advancement in the design of orthodontic instruments. The incorporation of a protractor not only simplifies wire bending processes but also adds a degree of accuracy and uniformity that was not possible with conventional instruments. It has the ability to affect not just specific instances but also the larger orthodontic practice landscape. This tool demonstrates orthodontics' dedication to improving patient care through increased procedural accuracy as the industry embraces new technological advancements.

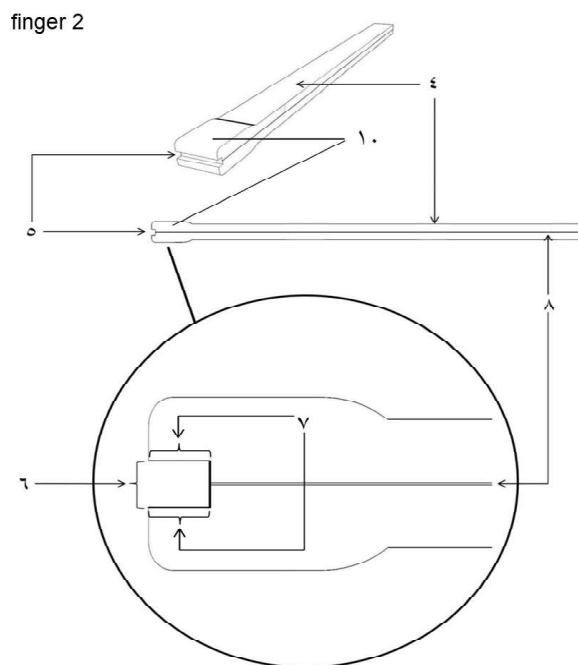
### Methodology

This invention was patent by 12 / 12 / 2022. The patent number is SA 11661. Figure 1-8 provides detailed diagrammatic representation of the invention. The invention relates to a tool consisted of 2 pieces. (A) a plier for bending the orthodontic wires in the third order bend with precisely measured angles when the root of the tooth will be moved labiobuccally (root torque). The plier has 2 crossed handles (1) with pivot point (2) closed to their head (3). The third part of this plier is plier head which is consisted of 2 parallel upper jaws and 2 parallel lower jaws (4). When 2 handles compressed, the upper jaws meet the lower jaws to constitute a circle with 360°. At the outer side of each jaw, a protractor of 180° is carved and work as reference for measuring the degree of bending. (B) a metal rod (5) with a tip (6) suitable to fit in between the plier jaws (4). The tip has a slot (7) to accommodate the orthodontic wire during wire bending. The groove (8) At the side of metal rod (5) extended from the middle of the slot (7) along the metal rod and work as indicator for reading the bending angle. The slot is consisted of 2 dimensions: (9) the vertical dimension and (10) the horizontal dimension. The 2 dimensions are designed to accommodate the rectangular working orthodontic arch wires. The 2 pieces of the innovated tool is work together as following: the 2 crossed handle are compressed together manually to grip the arch

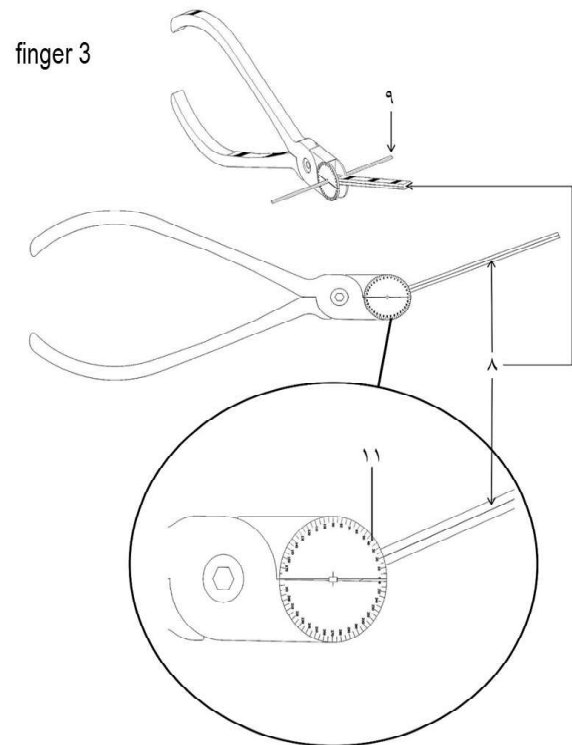
wire (11) in between their jaws. Then the metal rod is placed in a certain way so the slot in the metal rod accommodates the wire. When the metal rod moved up & down, the slot will bend the wire at an angle which will be read by using the indicator groove.



**Fig 1.** The 1st piece of the innovated tool (A) 1. Crossed handles, 2. Pivot Joint, 3. Parallel heads)



**Fig 2.** The 2nd piece of the innovated tool (B). (4. Upper & lower jaws, 5. Metal rod, 6. The tip at the end of metal rod, 7. Wire slot, 8. Groove (indicator), 10. The horizontal dimension of the slot)



**Fig 3.** Illustrates the general figure of the present invention. (8. Groove (indicator), 9. The vertical dimension of the slot, 11. The method of gripping the orthodontic wire by the plier)

### Discussion

By addressing long-standing issues with wire bending techniques, the incorporation of a protractor into the design of the Orthodontic Plier signifies a substantial advancement in the area of orthodontics<sup>5</sup>. Whenever it comes to orthodontic procedures, accuracy is crucial because even the smallest alterations can have a significant impact on treatment results<sup>6</sup>.

An unprecedented degree of precision made possible by the Orthodontic Plier with Protractor is now possible when using conventional instruments. The design of the pliers now includes a protractor, allowing orthodontists to measure and recreate particular angles with immediate feedback. This characteristic is especially important when effective tooth movement requires accurate torque and angulation.

The significance of accuracy in orthodontic procedures has been underscored by recent research, which highlights its effect on treatment efficacy and sustained stability<sup>7</sup>. These results are consistent with the Orthodontic Plier with Protractor, which provides practitioners with an instrument to attain precise control over wire bending angles. This increased accuracy may lessen the need for frequent modifications and help to ensure more consistent results from treatment.

The foundation of evidence-based dentistry is standardization, which encourages repeatability and consistency in clinical procedures. This paradigm is enhanced by the Orthodontic Plier with Protractor, which provides a standardized method of wire bending. Now that exact angles can be quantified and documented, orthodontists may lay the groundwork for a more methodical and repeatable treatment plan.

Despite particular circumstances, standardization has an effect on the larger orthodontic community. Practitioners can help develop best practices and guidelines by providing a tool that makes wire bending uniform. Standardized processes improve the reliability and comparability of data, and this is especially significant in the context of collaborative research initiatives and multi-center investigations<sup>8</sup>. By encouraging uniformity, the Orthodontic Plier with Protractor fits in with the changing field of evidence-based orthodontics.

The Orthodontic Plier with Protractor's ergonomic design provides care of the practitioner's well-being, which is an important part of orthodontic practice. Orthodontists frequently perform complex, focused operations that need for accuracy and concentration. The ergonomic characteristics of the instrument help to lessen strain and improve comfort during extended periods of use, which may help to lower the risk of musculoskeletal illnesses.

Recent research highlights the significance of ergonomic factors in dentistry practice and connects them to enhanced clinical performance and practitioner satisfaction<sup>9</sup>. These ideas are supported by the Orthodontic Plier with Protractor, which rec-

ognizes the mutually beneficial relationship between tool design and practitioner health. The orthodontic community is starting to realize how important ergonomics are, and this tool is becoming more and more useful in encouraging a more sustainable and healthy work environment.

One example of how technology has been used into conventional orthodontic operations is the Orthodontic Plier with Protractor. In addition to expediting wire bending, the use of a protractor illustrates a larger trend of technological developments in the industry. Orthodontics is going through a transformative era with the introduction of digital orthodontics, which includes 3D imaging, virtual treatment planning, and computer-aided design (CAD) technology<sup>10</sup>.

The advancement of technology is in line with the increasing demand for accurate, efficient, and patient-focused healthcare. As a physical manifestation of this movement, the Orthodontic Plier with Protractor enhances the digital environment by offering a practical instrument that closes the gap between conventional and contemporary orthodontic techniques.

### **Conclusion**

In conclusion, offering a unique combination of accuracy, uniformity, and ergonomic considerations, the Orthodontic Plier with Protractor is a noteworthy innovation in orthodontic equipment design. The Orthodontic Plier with Protractor is a symbol of advancement in the discipline as it seeks new solutions, pointing to a time when efficiency and accuracy will work together to improve patient care.

**Conflict of Interest: None**

**Disclaimer: None**

**Source of Funding: None**

### **References**

1. Kashif M, Kamran MA, Rizwan S, Iqbal S, Aslam A, Shifa S. Awareness of dental students about forensic odontology in Karachi, Pakistan. *Journal of Oral Health and Oral Epidemiology*. 2020 Jul 1;9(3):149-55. DOI: 10.22122/johoe.2020.91030.
2. Alshahrani I, Alhaizaey A. Scalable Tool for Holding and Placement of Orthodontic Brackets. *ANNALS OF ABBASI SHAHEED HOSPITAL AND KAR-*

- ACHI MEDICAL & DENTAL COLLEGE. 2023 Dec 2;28(04):224-9. Available From: <https://www.annals-ashkmdc.org/index.php/ashkmdc/article/view/752>. Accessed On, 11<sup>th</sup> may 2024.
3. Das H, Motghare V, Singh M. Ergonomics in dentistry: Narrative review. *Int J Appl Dent Sci*. 2018;4(4):104-. Available From: <https://www.oraljournal.com/pdf/2018/vol4issue4/PartB/4-4-14-114.pdf>. Accessed On, 11<sup>th</sup> may 2024.
  4. Kamran AK, Shahbaz S, Kashif M. Assessment of periapical root resorption after six months of fixed orthodontic treatment. *ASH & KMDC*. 2016 Mar 1;21(1):42-7. Available from: <https://annals-ashkmdc.org/oldsite/pdfs/2016/1/8.pdf>. Accessed On, 11<sup>th</sup> may 2024.
  5. Alnazeh A, Kamran MA, Alshahrani I, Ali AH, Saad OM, Fahad A. Effect of fixed orthodontic appliance therapy on periodontal health status of patients evaluated through community periodontal index. *Journal of biological regulators and homeostatic agents*. 2020;34(3):1067-70. [doi: 10.23812/20-154-l-27.].
  6. Kashif M, Aslam A, Iqbal S. *A-Z of Oral and Maxillofacial Syndromes*. Pak: Paramount books: 2023.
  7. Fleming PS, Johal A. Self-ligating brackets in orthodontics: a systematic review. *Angle Orthodontist*. 2010 May 1;80(3):575-84. [doi: 10.1177/1465312520977213.].
  8. Higgins, J., Green, S., & Cochrane Collaboration. (2020). *Cochrane Handbook for Systematic Reviews of Interventions*. John Wiley & Sons.
  9. Al-Mohrej OA, AlShaalán NS, Al-Bani WM, Masuadi EM, Almodaimegh HS. Prevalence of musculoskeletal pain of the neck, upper extremities and lower back among dental practitioners working in Riyadh, Saudi Arabia: a cross-sectional study. *BMJ open*. 2016 Jun 1;6(6):e011100. [DOI: 10.1136/bmjopen-2016-011100.].
  10. Meade MJ, Sooriakumaran P, Dreyer CW. Orthodontic retention and retainers: Quality of information provided by dental professionals on YouTube. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2020 Aug 1;158(2):229-36. [doi: 10.1016/j.ajodo.2019.08.013.].



This open-access article distributed under the terms of the Creative Commons Attribution NonCommercial 4.0 License (CC BY-NC 4.0). To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc/4.0/>