

## Clinical Innovation

# D-Arch: An Interdisciplinary Approach to Absolute Anchorage

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ABSTRACT

Anchorage is the most important consideration in any orthodontic treatment planning. The main aim of the D-Arch is to produce absolute anchorage in all three dimensions which cannot be obtained in the conventional transpalatal arch. D-Arch is a rigid, noninvasive appliance to avoid unwanted tooth movement.

**KEYWORDS:** Absolute anchorage, D-Arch, transpalatal arch

## INTRODUCTION

Various methods to reinforce anchorage are available such as transpalatal arch (TPA), Nance button, double transpalatal arch, intraoral maxillary elastics, and headgears.<sup>[1]</sup> The TPA helps control movement of the maxillary molars in all three dimensions, including producing molar rotation, uprighting, maintaining transverse dimensions posteriorly during treatment, and maintaining leeway spaces during the transition of the dentition.<sup>[2,3]</sup>

There is no systematic review that has evaluated the effectiveness of TPA as an absolute anchorage plan. It was observed that transpalatal bar provided insufficient anchorage during the extraction treatment; however, skeletal anchorage is more effective than the conventional TPA anchorage.<sup>[4]</sup>

D-Arch is fabricated on the maxillary second premolar, first molar, and second molar and is a successful appliance to control the posterior sections, to improve the torsion of the molars, and to provide an absolute anchorage in all three dimensions.

The resistance to movement is primarily dependent on the root surface area called as anchorage value. D-Arch uses the root surface area of the second premolar, first molar, and second molar bilaterally with an anchorage value of 1938/mm<sup>2</sup>, which is greater than that of the total root surface of the six anterior teeth which is 1420/mm<sup>2</sup>.<sup>[5]</sup>

## APPLIANCE DESIGN

This appliance is fabricated using cast cobalt-chromium alloy. It has dental and palatal component.

- Dental component: It includes wings on the palatal surface of the second premolar, first molar, and second molar bilaterally with 0.5–1 mm thickness and 1.5 mm short of cervical margin and occlusal surfaces as one unit [Figure 1]
- Palatal component:
  - Palatal bar of 2–4 mm width and thickness of 2 mm is connected to on either side of the metal wings of the upper first molar bilaterally 2 mm away from the palate [Figure 2]
  - Midpalatal D-shaped plate with a dimension of 10 mm length and 10 mm width is connected in the midpalatal area to the palatal bar on either side [Figure 3].


The fabricated D-Arch is then transferred to the patient mouth and cemented using glass ionomer cement [Figure 4].

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**Figure 1:** Wings on the palatal surface of the second premolar, first molar, and second molar



**Figure 2:** Lingual view showing the D-Arch kept 2 mm away from the palate



**Figure 3:** Occlusal view of the D-Arch



**Figure 4:** Intraoral image of the D-Arch

### ADVANTAGES

1. It is rigid, customized, and relatively hygienic
2. It provides absolute anchorage in all three dimensions
  - a. Anteroposterior dimension: It helps resist mesial migration during retraction of anteriors in the first premolar extraction cases
  - b. Transverse dimension: It preserves intermolar and interpremolar distance
  - c. Vertical dimension: In vertical growers and open-bite cases, this appliance brings about molar intrusion and promotes autorotation of the mandible
3. In cases where the second molar is not completely erupted, the anchorage will be obtained from first molars and second premolars
4. Less chairside time and more accurate as it is fabricated in the laboratory.

### DRAWBACKS

1. It needs to be prefabricated in the laboratory
2. It cannot be used on rotated teeth and cross-bite cases

3. It cannot be used in cases of multiple missing posterior teeth
4. It cannot be used in severe periodontally compromised cases
5. Unlike TPA, D-Arch cannot derotate or upright molars.

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### Conflicts of interest

There are no conflicts of interest.

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