

## An Overview of the Andrews Preadjusted Edgewise Appliance

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### Abstract

Edgewise appliance were non-programmed appliance. There were two basic short comings. First was bracket design problem and the second was heavy force requirement for the bodily tooth movement of the teeth. To overcome bracket design shortcomings one has to do extensive wire bending. For that an orthodontist should be skilled enough to do required wire bending for getting good results. The second problem of heavy forces for moving the tooth bodily, require greater anchorage preparation. Heavy force also compromises the health of the surrounding tissues. In 1970 Dr. Lawrence F. Andrews introduced straight wire appliance also known as preadjusted appliance, in which he tried to overcome the short comings of edgewise appliance.

**Key words:** Andrews prescription, Edgewise appliance, Straight wire appliance.

### Introduction

Bracket design shortcomings in the edgewise appliance are bracket base perpendicular to bracket stem, bracket bases not contoured, slots not angulated, bracket stem were of equal faciolingual thickness, and maxillary molar offset is not built in. Andrew's concept was to develop a bracket in which tip, torque, and in/out was in built therefore the wire bending was not required to produce desired tooth movement.<sup>1</sup> saving treatment time and chairtime, and improving consistency in end results. He also introduced features to resolve the gingival hygiene, patient comfort and bracket interference. Gingival tie wings of the posterior brackets are placed farther laterally.

### Generation Preadjusted edgewise appliance (PEA) of Andrews

**Bracket features:** Built-in guidance (tip, torque and in/out) minimizes arch wire manipulation.

**In-out:** First order bends were eliminated by variable bracket/tube thickness

**Tip:** Second order bends were eliminated by built in angulation of the bracket slot.

**Torque:** Third order bends were eliminated by placing the control mesio-distal crown angulation. Labio lingually traditional heavy edgewise forces continued to be used. Dots on the distogingival wing of the maxillary brackets.

**Torque in base:** The center of the slot and the center of the base are always on the same plane for consistent and easy bracket placement. The bases of the brackets are inclined for each tooth type, to achieve proper tooth "torque"-the center of each slot at the same height as the middle of the clinical crown.

**Inclination of the base:** Base has the same inclination as that of facial surface of crown.

(+) sign refers to *palatal root torque* (labial crown torque) values.

(-) sign refers to *labial root torque* (palatal crown torque) values.

**Rotation:** Present only in maxillary molars not in any other maxillary or mandibular teeth. 10° molar off set relative to embrasure line. Middle and mesiobuccal cusp are equally prominent in mandibular molars.

**Identification features:** Dash on the distogingival wing of the mandibular brackets for identification.

**Table 1: Andrews's prescription for maxillary arch**

Andrews	1	2	3	4	5	6	7
<b>TIP</b>	5°	9°	11°	2°	2°	5°	5°
<b>TORQUE</b>	7°	3°	-7°	-7°	-7°	-9°	-9°
<b>Crown prominence</b>	2.1mm	1.65mm	2.5mm	2.4mm	2.5mm	2.9mm	2.9mm

**Table 2: For mandibular arch**

Andrews	1	2	3	4	5	6	7
<b>TIP</b>	2 <sup>0</sup>	2 <sup>0</sup>	5 <sup>0</sup>	2 <sup>0</sup>	2 <sup>0</sup>	2 <sup>0</sup>	2 <sup>0</sup>
<b>TORQUE</b>	-1 <sup>0</sup>	-1 <sup>0</sup>	-11 <sup>0</sup>	-17 <sup>0</sup>	-22 <sup>0</sup>	-30 <sup>0</sup>	-35 <sup>0</sup>
<b>Crown prominence</b>	1.2mm	1.2mm	1.9mm	2.35mm	2.35mm	2.5mm	2.5mm

**Compound contour base:** SWA bases are contoured vertically as well as horizontally, resulting in a good bracket-to-tooth fit and a dependable, reproducible location of the bracket slot in relation to the crown for good torque expression.

**Bracket placement:** Bracket is placed on the FA point on the clinical crown. FA point is present on the FACC (facial axis of clinical crown) and separate the clinical crown into gingival half and incisal half.

**Level Slot Line up:** It is the end result of compound contours, torque-in-base and accurate bracket placement. The Straight - Wire Appliance is the only appliance that assures you that the slot of the bracket will always be parallel to the occlusal plane of the arch.

**Wagon wheel effect:** Andrews also emphasized the 'wagon wheel effect' where tip was lost as torque was added. Hence, he chose to add additional tip to the anterior brackets. Anterior arch wire torque negates arch wire tip in a ratio of four to one. Addition of 20<sup>0</sup> torque will negate the tip 5<sup>0</sup>. Bracket positioning was based on the center of the clinical crown.

**Roller coaster effect:** Difficulties were encountered with treatment mechanics in the early years, due to the heavy forces and possibly due to the increased tip in the anterior brackets. Consequently, deepening of the anterior bite, with creation of a lateral open bite, was seen in many cases, and this became known as the 'roller coaster' effect.<sup>3</sup> this effect is also caused by highly placed canine, distally tipped canine, rapid space closure on resilient wires.

**Arch form:** Andrews continued to use the basal bone of the mandible as an arch form reference.<sup>3</sup>

These early clinical experiences led Andrews to introduce a series of modifications, and after using the original 'standard' Straight-Wire Appliance for a period of time, he recommended a wide range of brackets.

**Auxiliary features:** Power arms, hooks, face bow tubes  
**Extraction series brackets:** Andrews determined that for extraction cases, canine, premolar and molar brackets should have anti-tip, anti-rotation and power arms. Translation series involve 3 categories for 2mm translation, between 2-4mm translation, and more than 4mm translation.

**Translation series** counter rotation – minimum 2<sup>0</sup>, medium 4<sup>0</sup>, maximum 6<sup>0</sup> slot rotation.

**Incisor brackets:** He also recommended the use of three different sets of incisor brackets, with varying

degrees of torque for different clinical situations.<sup>3</sup> for class – I, class – II, and Class – III.

For class – I base inclination for central incisor bracket is 7<sup>0</sup>, lateral incisor = 3

For class – II base inclination for central incisor 2<sup>0</sup>, lateral incisor = - 2

For class – III base inclination for central incisor 12<sup>0</sup>, lateral incisor =8

**Mandibular brackets**

For class – I base inclination for central incisor bracket is 1<sup>0</sup>, lateral incisor = 3

For class – II base inclination for central incisor 4<sup>0</sup>, lateral incisor = - 2

For class – III base inclination for central incisor - 6<sup>0</sup>, lateral incisor = 8

**Conclusion**

Andrew stressed on translation of the teeth utilizing sliding mechanics with different series of brackets for extraction and nonextraction cases. But the problem of extensive inventory of brackets was a setback to Andrews’s prescription.

**Conflict of Interest: None**

**Source of Support: Nil**

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