



## Recommendations for Fixed Orthodontic Appliance Design (OAD)

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### Abstract

We always need to calculate the wire play degrees (inclination, angulation and rotation) to know what reduction we have & what clearance in the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> order we will get and compared by what we need.

**Keywords:** Wire Play; Inclination; Angulation; Rotation; Clearance; Reduction; LACC; MBT; SAP; Extraction

### Abbreviations

OAD: Orthodontic Appliance Design; MIM: Metal Injection Molding; CNC: Computer Numerical Controlled; I/F: Angle between Upper Incisor axe and Frankfort plane; Inclination (I): Angle between Tangent on center of the vestibular face of the Upper Incisor clinical crown and the perpendicular on the Occlusal plane; MBT: McLaughlin, Bennett, Trevisi; SAP: Smile Arc Protection; OB: Over Bite; OJ: Over Jet; LACC: Long Axis of the Clinical Crown.

### Introduction

Determine the exact type of Braces with all information related to it and all information related to the ideal placement of it on the surfaces of the teeth for any orthodontic case.

### Materials and Methods

Comparison for this research of Bonding & placement to 300 cases.

### Results and Discussion

Noting the added reduction of the manufacturing method (MIM/CNC) with the deformation caused by frequent wires changes and the reduction due to friction during traction\movements plus forces\moments undesirables additionally the bone density with the depth of bracket and presence of clip in self-ligating system (noting that the wire is sealed within the bracket).

Ideal I/F=65, Inclination (I): Andrews (6-keys to occlusion) = 7 Roth (slot bracket pre-adjusted) = 12 MBT (over correction biomechanics) = 17 Ricketts (bioprogressive therapy) = 22.

We can put the bracket (mesial or laterally) from the middle of the vestibular surface of premolar crown or canine crown by an additional 5 degrees toward the tooth twisting to correct the rotation and place the canine bracket oblique by 10 degrees toward the mesial for the extraction cases to give advance tilt of the canine root towards the distal as a precursor to the canine retraction equivalent to the gable-band, and the rest is done by wire with accessories (O-ring, ligature wire, ..etc.).

It should be noted that the placement MBT (McLaughlin, Bennett, Trevisi)/SAP (smile arc protection) affects OB/OJ where the placement MBT is recommended to the cases of deep bite and cases of extraction in general while the placement SAP is recommended to the cases of open bite and cases of extraction of 15\25\35\45 only, and we can benefit from placement SAP also in cases of contrast between the crowns lengths of the anterior and posteriors teeth where the posteriors teeth is short compared to the anterior teeth and it fits with the nature of the occlusion.

It is advisable to keep the bracket placement away from the incisal edge to avoid the wide movement teeth and unwanted

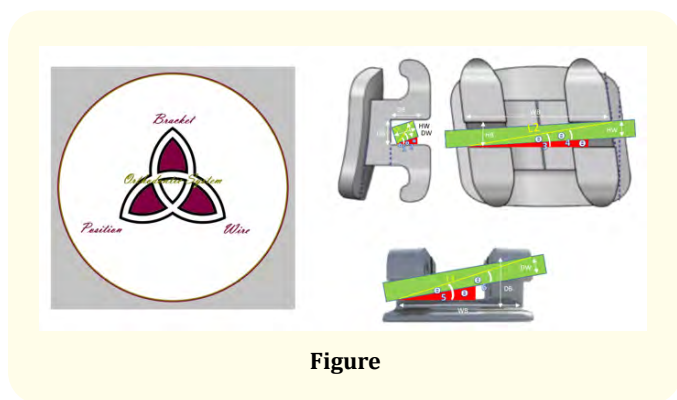
movements, and if the case is appropriate and the crowns teeth lengths are long, it is preferable to positioning the bracket towards the gingival margin, but if the crowns teeth lengths are short, it is best to maintain positioning the bracket in the middle of LACC (long axis of the clinical crown) of the tooth.

With mention of the advantage to use slot 0.022 for an extraction case to have more sliding and less friction in the active treatment stage by giving more possibility to use a diversity sizes of wires sections and slot 0.018 for a non-extraction case.

Noting to increase the last upper wire section in the class II cases and to increase the last lower wire section in the class III cases by changing wires to the next higher section [1,2].

### Conclusion

It is very important that you take care of every detail about choosing the right braces and designing the right placement because the correct installation is the first and most important step towards the correct finishing case.



Figure

### Bibliography

1. "Contemporary Orthodontics" Elsevier; 6<sup>th</sup> edition (2019).
2. "Fundamentals of Orthodontic Treatment Mechanics". Le Grande Publishing; (2014).

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