

Self Ligation - A Cutting Edge Technology

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Self-Ligating brackets have made a major impact in orthodontics in last seven or so years, although the idea of self ligating brackets has intrigued and fascinated the orthodontist since the time of Edward Angle , and some of his patented innovations of the edgewise bracket show this preoccupation with simple ligation of the archwire.

Self- ligating brackets transcends the limitations imposed on design by providing treatment efficiency and precise tooth movement

Definition

A self ligating bracket is defined as “a bracket, which utilizes a permanently installed,moveable component to entrap the arch wire.”-**Graber and Vanarsdall**



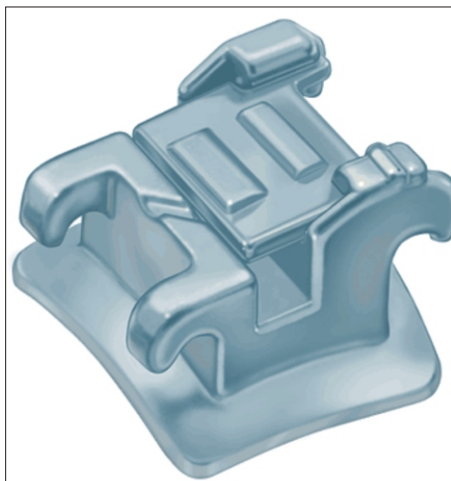
Classification

According to Woodside DG, Berger JL, and Hanson GH

Two types of self ligating brackets have been developed , active and passive . These terms refers to the mode in which they interact with the archwire .

Passive Self Ligating Brackets

Passive self ligating brackets use a rigid, movable component to entrap the arch wire. Tooth control with passive brackets was solely determined by the fit between the bracket slot and the arch wire.



The passive self ligating brackets had two designs

a) Ones with rigid slide that passively held the wire.

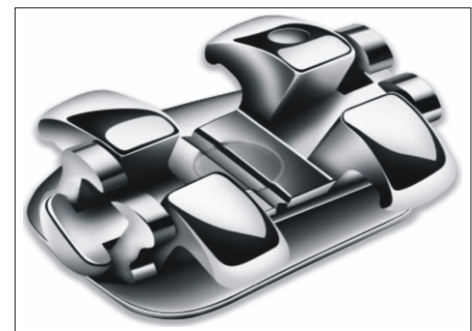
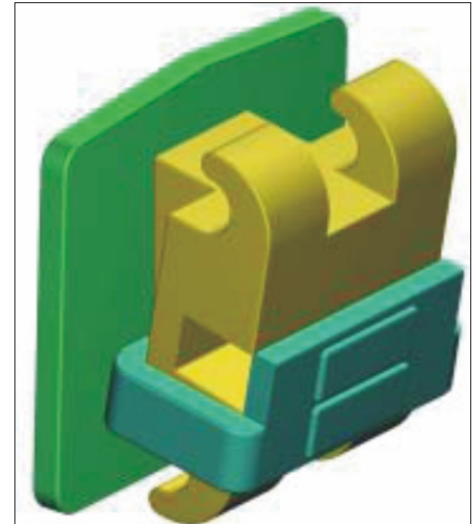
Ex: Edgelok , Mobil lock, Activa, Damon brackets.

b) Ones with integral “C” clips

Ex: Kesling , Smartclip.

Active Self Ligating Brackets

Active self ligating brackets have a



flexible component to entrap the arch wire. This flexible component constrains the arch wire slot and has the ability to store and subsequently release energy through the elastic deflection. This gentle action imparts a light but continuous level of force on the tooth and its supporting structures, resulting in precise and controlled movement.



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Ex: Speed , Time , In-ovation

Properties of an Ideal Ligation System

Ligation should be :-

- Be secure and robust,
- Ensure full bracket engagement of the archwire,
- Exhibit low friction between bracket and archwire,
- Quick and easy to use,
- Permit high friction when desired,
- Permit easy attachment of elastic chain,
- Assist good oral hygiene,
- Comfortable for the patient.

Frequently Proposed Limitations of Conventional Ligation

- Failure to provide and to maintain full archwire engagement resulting in poor control of tooth movement.
- Friction values are increased.
- For elastomeric modules owing to force decay tooth control was not optimal.
- Oral hygiene was potentially impeded.
- Wire ligation is time consuming clinical procedure.

Comparison of Self-Ligation and Conventional Ligation Brackets

| | Self-Ligation | Conventional Ligation |
|--------------------|---|---|
| Ligation Stability | Original form retained throughout treatment | Loss of initial shape and tightness |
| Ligation | Movable integral component that creates outer fourth wall | Elastomeric or steel ligature ties |
| Force Level | Use of lighter force permitted | Heavier force levels required |
| Friction | Predictable and very low | Steel tie: moderate to high Elastic: very high |
| Sliding Mechanics | Ideally suited for efficient tooth translation | Slow because of binding of the archwire |
| Office Visits | Shorter with longer intervals between the visits | Longer and more frequent visits |
| Treatment Time | Overall treatment reduced by upto 4 months | Longer, especially in extraction cases |
| Esthetics | Significant miniaturization possible with some designs | Limited size reduction |
| Patient Confort | Only slight discomfort with wire changes | Teeth usually sore after ligation |
| Oral Hygiene | Wingless designs easy to clean | Difficult to clean: food traps |
| Infection Control | Significantly reduced risk of percutaneous injury | Increased risk of percutaneous injury |
| Instrumentation | Fewer instruments required during archwire changes | Many instruments required during archwire changes |
| Staff | Less chairside assistance required | More chairside assistance required |

Advantages of Self Ligating Brackets

- A secure passive or active ligation mechanism that ensures consistent full bracket engagement. More certain full archwire engagement.
- Reduced friction between bracket and archwire that allows more rapid tooth movement.
- Less chairside assistance.
- Faster archwire removal and ligation.

Conclusion

Self ligating brackets offer the very valuable combination of extremely low friction, secure full bracket engagement and extended time between adjustment visits which allows the tooth movement to occur easily. It offer the possibility of a significant reduction in average treatment times and also in anchorage requirements, particularly in cases requiring large tooth movements .

Considering the advantages of self-ligating brackets for the clinician, staff , and patient they may become the “conventional” appliance system in future.

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