

# 3M Self-Ligating Bracket Overview



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# 3M Self Ligating Bracket Overview

- History of Self-Ligation
- Benefits of Self-Ligation
  - *Hygiene*
  - *Chair Time Savings*
  - *Frictional Resistance*
  - *Biological Resistance*
  - *Lighter Forces*
- What is Self-Ligation?
- Self-Ligating Designs
  - *Past Challenges with Self-Ligation*
  - *Bracket Designs*
  - *3M Self-Ligation*

# History of Self-Ligation



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# History of Self-Ligation

- The self-ligation concept is not new
  - *The first self-ligating concepts were developed in 1935 and the brackets have continued to evolve over time*
- Today, self-ligating brackets represent the fastest growing orthodontic bracket segment

# History of Self-Ligation

1935	Russell Lock
1971	Wildman (Edgelok); Button capped bracket opened vertically first passive slot
1975	Hanson: Speed™ (Strite); Narrow single design, difficult to control rotations and finish, technique sensitive
1980	Forestadent Mobil-Lock; Common mechanism failure
1986	Pletcher (Activa) A' Co; Difficult mechanism to manage
1995	Time™ (Adenta/American Ortho); Single wing design, non-mesh base, large bracket
1995	TwinLock (Wildman) Ormco; Precursor to the eventual Damon™ III design
1996,1999	Damon™ (A Co.); Single wing design, large external sliding door, multiple malfunctions
2000	Damon™ II (Ormco); Single wing design, reduced size from original same issues
2000	In-Ovation® (GAC); Single bracket, large size frequent clip failure
2003/2004	In-Ovation-R™ (GAC) 2003/2004; Single more functional clip closed better, reduced size
2004	SmartClip™ Brackets (3M Unitek); First true twin-wing design, novel ligating mechanism, high clip forces
2004	Damon III™ (Ormco); 2004 Single bracket door shut better, rhomboid angulation, improved mechanism
2004	Time 2 (Adenta/American); Single bracket, clip moves easier
2006	Damon™ Mx (Ormco); Combination metal/polycarbonate material for aesthetics
2006	SmartClip™ Brackets (3M Unitek); Improved clip forces
2007	Clarity™ SL Brackets (3M Unitek); Ceramic version of SmartClip Bracket, further improved clip forces
2009	SmartClip™ SL3 Brackets (3M Unitek); Further clip force reduction

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# Benefits of Self-Ligation



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# Improved Hygiene

- Ligatures can retain food particles around the bracket
  - *This makes it more difficult for patients to keep teeth clean and maintain effective oral hygiene*
- Ligatures are made of an elastomeric material that stains over time from food products
- Self-ligating brackets reduce the need to use ligatures, thus providing improved oral hygiene



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# Chair-Time Savings

## Doctors save time with self-ligation

1. *Archwire changes are shorter because they do not have to remove and re-tie ligatures (See wire comparison videos from Dr. Sondhi on 3MUnitek.com)*
2. *Chair-time may be reduced as patients no longer debate about what color of Alastik™ Ligature to choose*





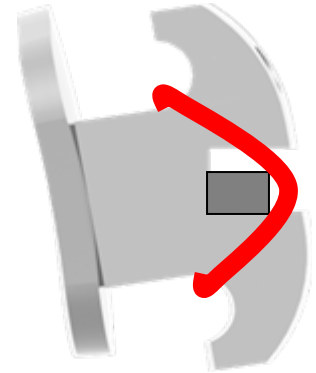
# What is Friction?

## ■ Friction

- *The resistance to motion when one object moves against another*
- *Examples include the archwire sliding in the bracket slot, and, brackets sliding on the archwire*

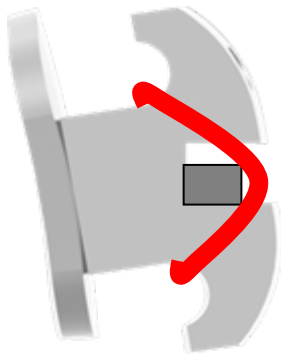
# Frictional Resistance

- **Ligated Appliances**
  - *Must secure/ligate the archwire*
  - *This imparts a frictional resistance with Alastik™ and/or SS Ligatures*
- **Self-Ligating Appliances**
  - *Alternative for archwire ligation*
  - *Reduces or eliminates frictional resistance*
    - *Active Mechanism*
    - *Passive Mechanism*



# Frictional Resistance

- Ligated brackets have more frictional resistance than self-ligating brackets due to the addition of ligatures
- Imagine driving your car with the emergency brake on ...
  - *The ligatures act as the brake*
  - *Driving with the emergency brake engaged requires more force to move the car*
- With ligated systems, doctors need to use higher forces to overcome the frictional resistance generated by the ligature

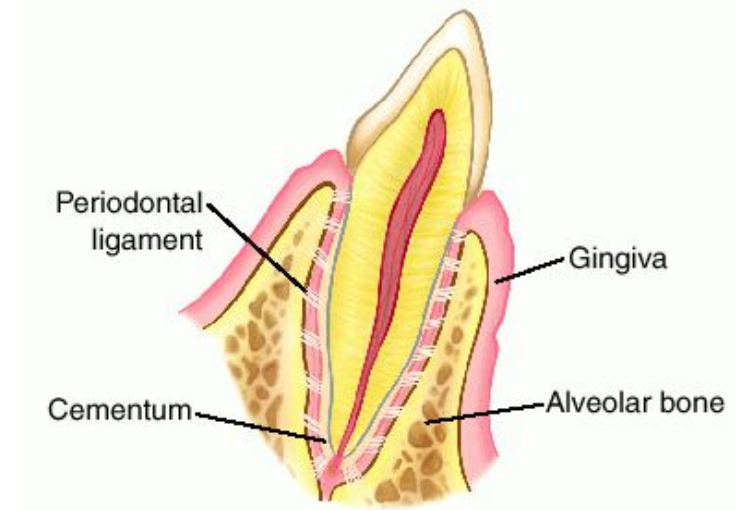


Ligature generates  
frictional resistance

# Biological Resistance

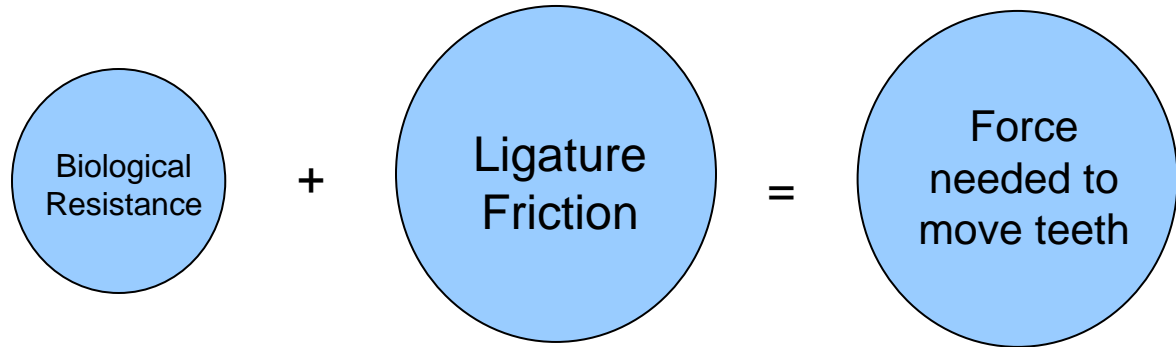
Self-Ligating appliances move teeth with light forces

- Teeth move within the bone more efficiently when lighter forces are employed
- Heavier forces can cause the periodontal ligament (cells) to react in such a way that it restricts tooth movement



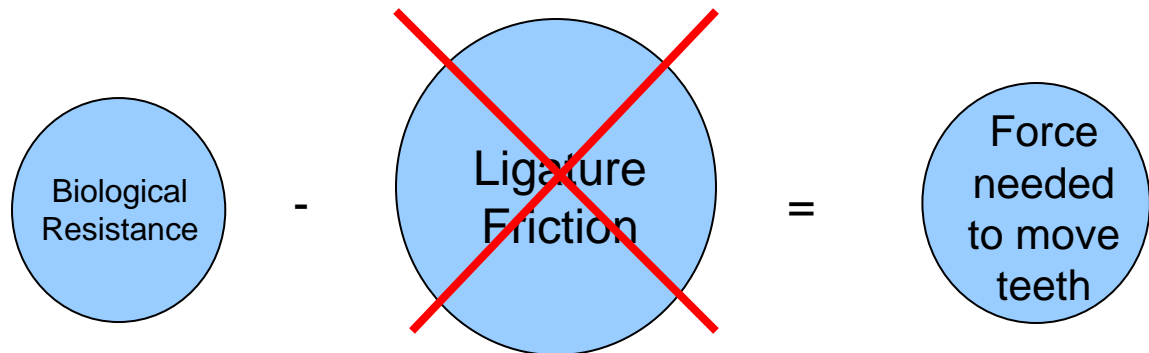
# Lighter Forces

Ligated  
Brackets



Greater force needed to account for ligature friction

Self-Ligating  
Brackets



Less force needed

Ligature Friction is Eliminated

Self-ligating brackets reduce the friction,  
thus, less force is needed to move the teeth.



## Benefits of Light Forces

- Light forces optimize cell stimulation which improves tooth movement (biomechanics)
- Light forces are achieved through the interaction of the brackets' Rx, design (twin bracket with clips) and the archwire
- The lighter forces and reduced friction offered by self-ligation may allow teeth to level and align faster
  - *This may result in faster overall treatment times*

# SmartClip™ SL3 Self-Ligating Appliances Friction in Treatment

- Light force initial archwires ensure patient comfort and assist in improved physiological response to accelerate leveling and aligning
- “Active on Demand” feature gives the ability to apply friction where needed with the use of ligature ties
  - *Aids in effective anchorage, detailing and finishing*



# Biomechanics and Light Forces in relation to the MBT™ Versatile+ Appliance System

- The MBT™ Appliance System's reduced angulations result in lighter forces to achieve the same mechanics
- The clips provide lower friction which supports the light force mechanics of the MBT Appliance System
- Lighter forces improve cell stimulation which creates more efficient tooth movement and sliding mechanics



# Biomechanics and Light Forces

- Compatible with multiple treatment disciplines without major treatment changes
  - *Roth\**
  - *Ricketts\**
- Integration of Variable Prescription Orthodontics
  - *Patient Centered Treatment Solution*

\* No endorsement by the Doctor is implied

Clarity™ SL and SmartClip™ SL3 Self-Ligating Brackets

# Self-Ligating Bracket Designs



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# Self-Ligating Bracket Designs

- Two types of self-ligating brackets
  - *Passive*
  - *Active*
- Passive
  - *No frictional force on the archwire, regardless of archwire size or material*
  - *Archwire remains passive within the bracket slot regardless of its size*
- Active
  - *With a large archwire, ligating mechanism imparts a frictional force on the archwire*

# Self-Ligating Bracket Designs



Damon™ Mx Bracket



Clarity™ SL Bracket



In-Ovation® C Bracket



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# SmartClip™ SL3 Bracket -- Key Features

- No moving parts
- "Active on demand"
- Pre-programmed release for excessive force
- Most like Edgewise bracket in appearance
- Tooth-specific bracket bases
- Easy AlastiK™ Ligature placement
- APC™ PLUS and APC™ II Adhesive Coated System
- Treatment Philosophy of the MBT™ Versatile+ Appliance System



# Combining the Best of Clarity™ & SmartClip™ Brackets



## Clarity™ Ceramic Bracket

- Leadership brand
- Ceramic technologies

## SmartClip™ SL3 Bracket

- Unique self-ligating technology
- Fast growing self-ligating bracket

**Aesthetics and Self-ligation, without Compromise.**

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