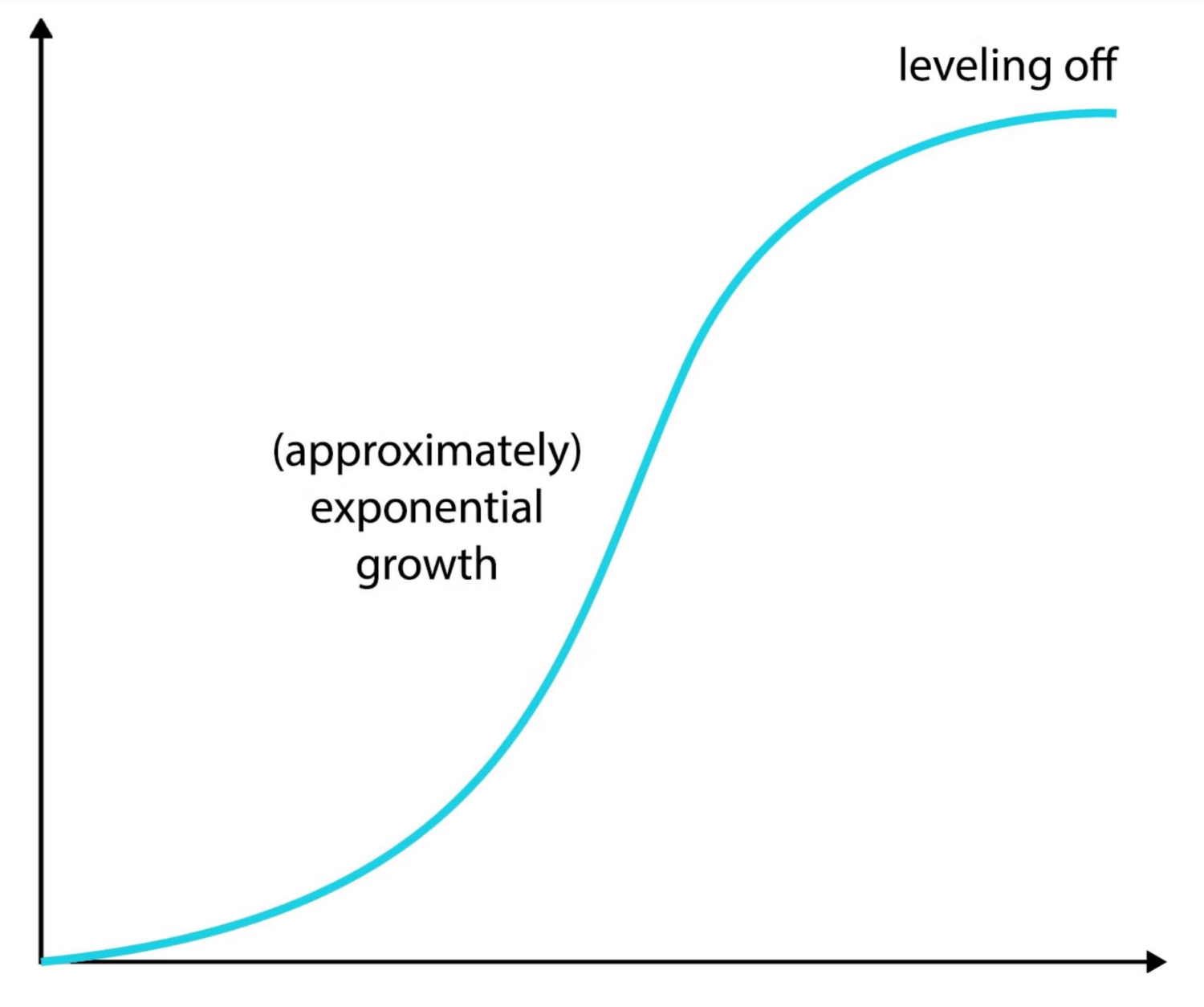


Limitation of Clear Aligner

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BDS PhD (London)

The Clear Aligner Boom: A \$8.5 Billion Market in 2025



Limitations in Tooth movement

Movement Type	Predictability	Status
Tipping	✓ High	Reliable
Intrusion	⚠ Moderate	Needs Attachments
Rotation (Conical)	⚠ Moderate	Difficult/Slippage
Bodily Movement	⚠ Moderate	Slow/Attachments
Extrusion	✗ Low	High Failure Rate
Root Torque	✗ Low	Mechanically Inefficient

Poor Extrusion Control

- **The Challenge of Vertical Pull**
- **Why it happens:**
 - **Aligner plastic applies compressive force (push), not true vertical pull.**
 - **Limited grip on smooth enamel.**
 - **Attachments improve retention but do not fully solve slippage.**



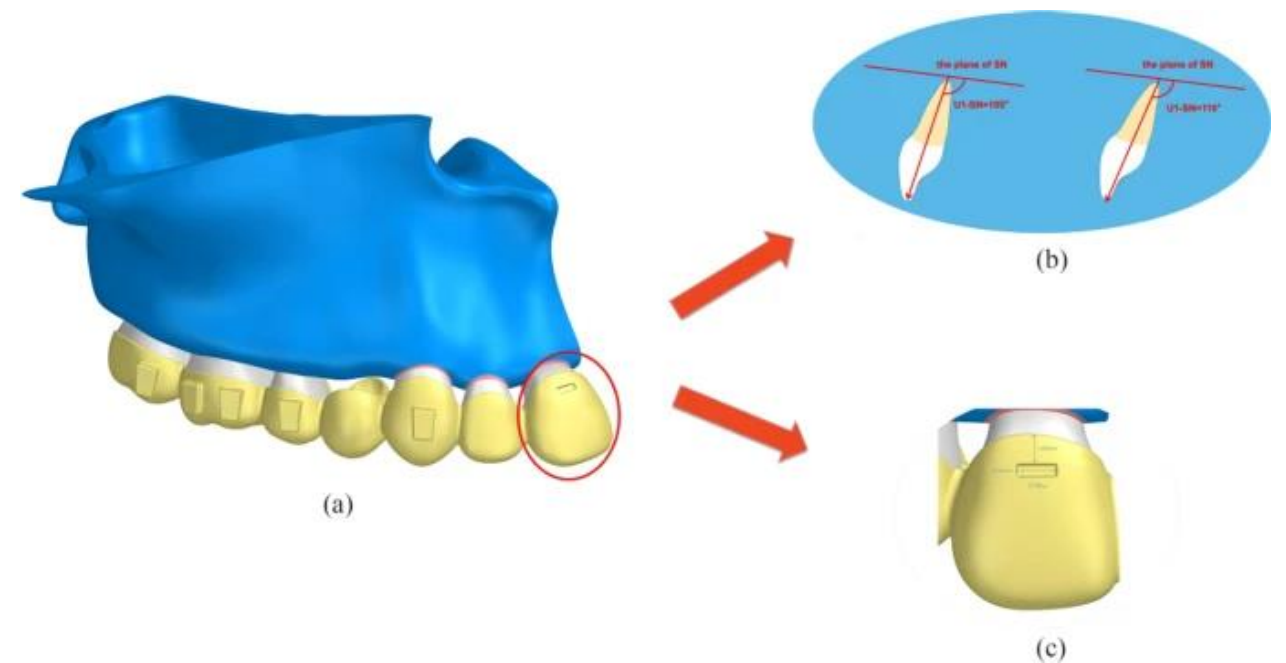
Difficulty Rotating Conical Teeth

- **Canines & Premolars**
- **Why it happens:**
 - Small contact surface area on round teeth.
 - Slippage of aligner material upon force application.
 - Loss of rotational moment (force couple failure).



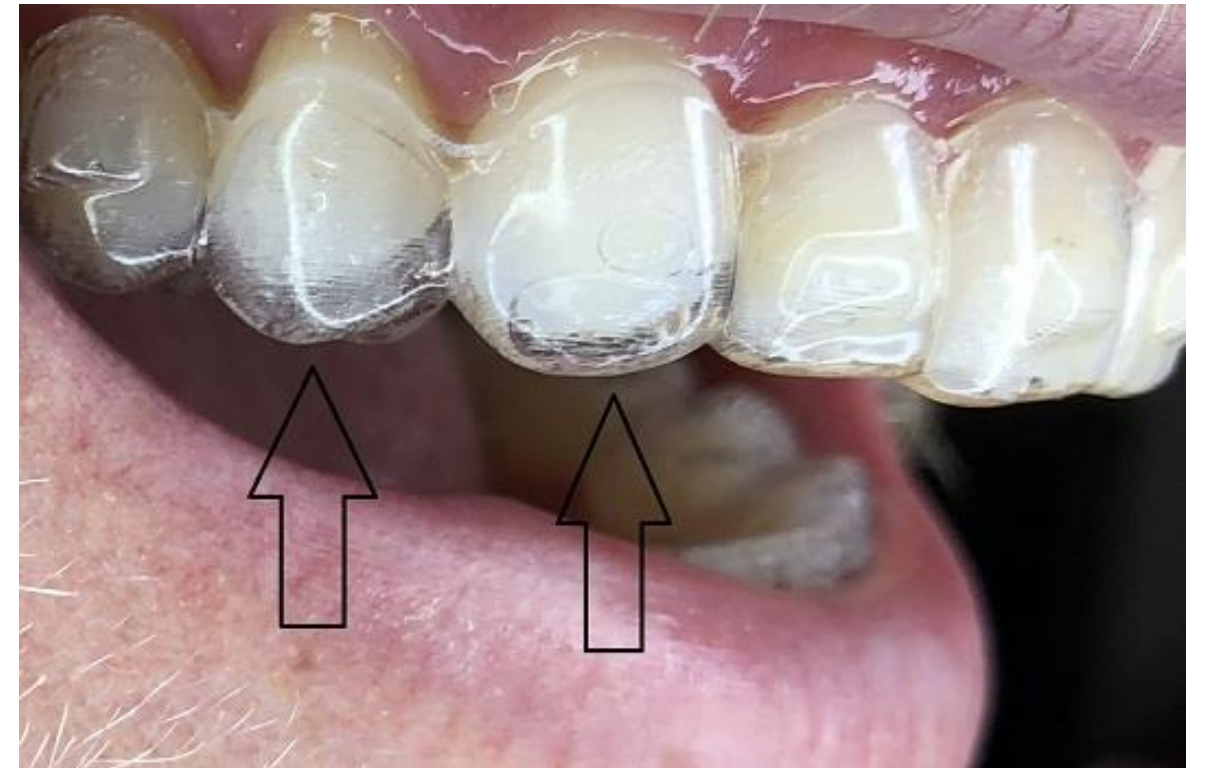
Limited Torque & Root Control

- **Crown Tipping vs. Root Movement**
- **Why it happens:**
 - - Thin plastic cannot deliver sustained rigid couple.
 - - Force acts mainly at crown level (far from Center of Resistance).
 - - 'Roller Coaster' effect in extraction spaces.



Dependence on Patient Compliance

- **The 22-Hour Rule**
- **Reality:**
 - - Must be worn 20–22 hours/day.
 - - Even 2–3 hours less leads to force decay.
 - - Intermittent force causes cell hyalinization.



Aligner Tracking



- ✓ Every visit check the tracking of the current aligner
- ✓ Ideally appointment should be scheduled at the end of an aligner wear period
- ✓ If aligner not tracking investigate why not tracking

Teeth are not tracking?

- ✓ **Back-track to previous aligner and check for better fit**
- ✓ **Perform any needed IPR and encourage chewies**
- ✓ **If no IPR planned and contacts tight, lighten contacts with IPR**
- ✓ **Remove attachment if preventing aligner from seating**
- ✓ **Take new scan for refinement**

Aligner "Popping Off" Teeth

Causes

Solution



Teeth Not Extruding / Intruding

Cause

Solution



Non-Rotating Teeth / Crowding Issues

Cause



Solution



Posterior Open Bite

Cause



Solution



Key Limitations of Clear Aligner Therapy

- **Limited control of vertical movements (extrusion & intrusion).**
- **Reduced efficiency for large rotations and root torque.**
- **Dependence on patient compliance.**
- **Difficulty in complex skeletal malocclusions.**
- **Posterior open bite and occlusal discrepancies.**

Thank You