Clinical methods for evaluating implant framework fitness & Occlusion

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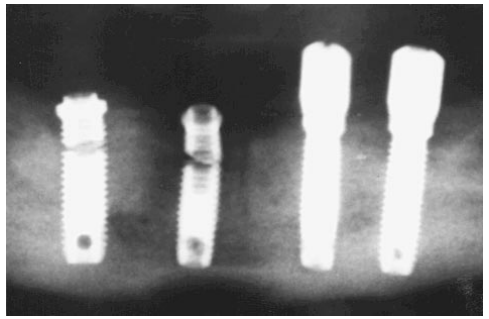
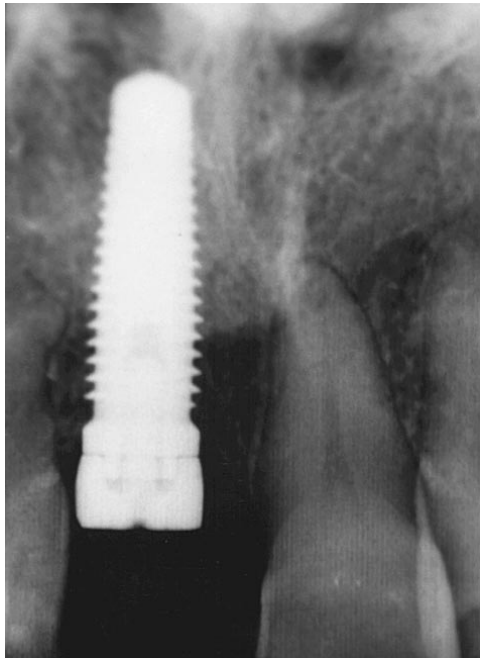
Passive fit between implant frameworks and underlying structures

Ill-fitting implant frameworks may cause:

- mechanical failures of the prostheses
- mechanical failures implant systems
- biologic complications of the surrounding tissue.



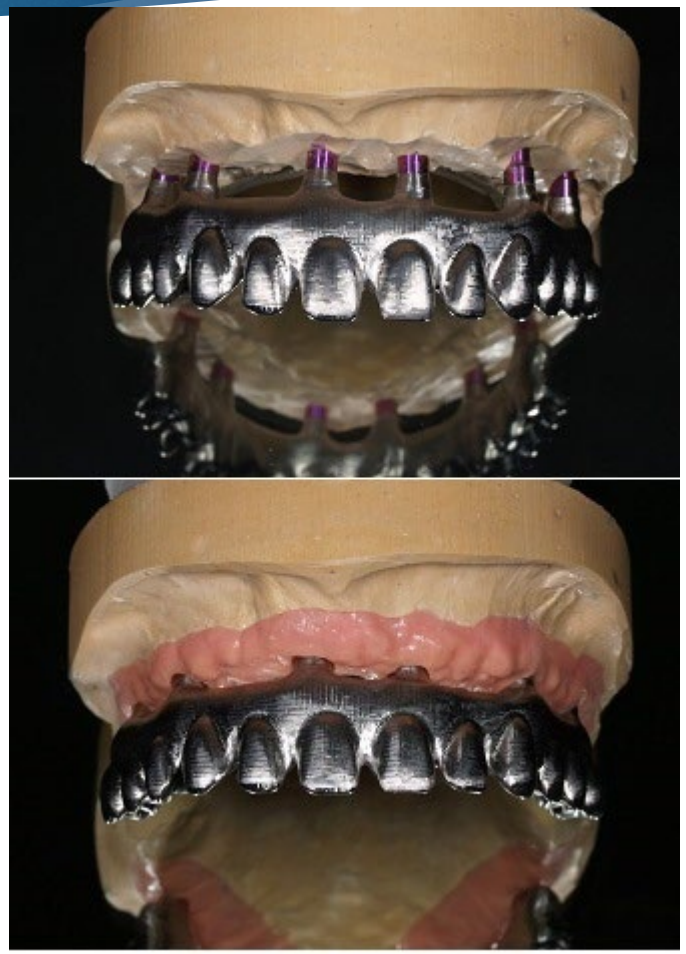


Achieving to implant fitness

- implant alignments,
- impression techniques and materials used,
- process of framework fabrication,
- framework design and configuration
- clinician/technician experience.

Methods of minimizing

- The use of different impression techniques,
- verification jigs,
- casting frameworks in sections,
- Sectioning and soldering the framework
- Cement medium to compensate for any misfits.



METHODS FOR EVALUATING FRAMEWORK FIT

Alternative finger pressure

- manually seating the prosthesis with finger pressure applied alternately over 1 terminal abutment and then the other.
- Any detected rocking and/or saliva movements between the framework abutment interface is considered a misfit.
- Difficult to interpret short span multi-implant–supported prostheses or where subgingival margins are present.

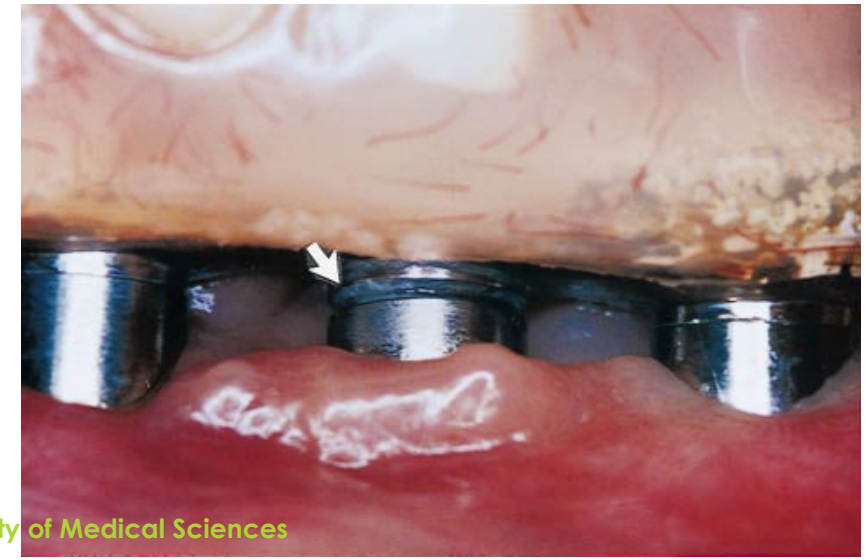
Direct vision with tactile sensation

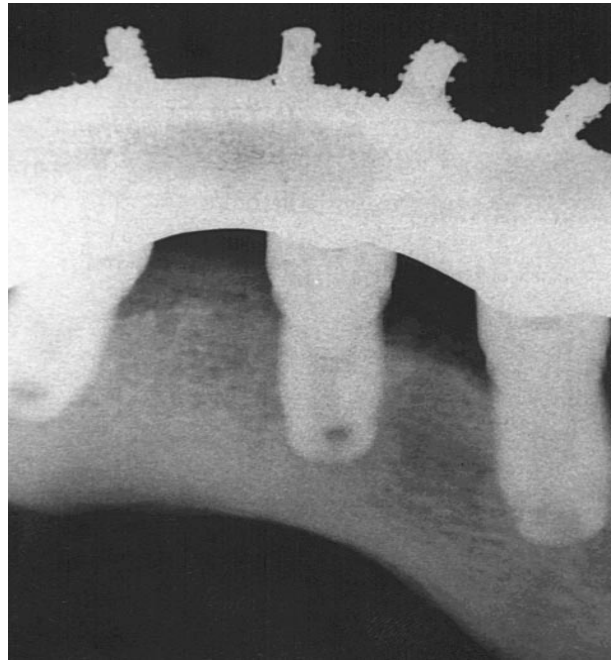
- ample lighting and magnification
- the size of the explorer tip
- The location of the margin
- the clinician's discriminatory ability.

- The problem is in subgingival margins
- less than 95 µm.

Radiographs

- perpendicular to the long axis of the implant-abutment junction to optimize accuracy.
- anatomic limitations: resulting in overlapping of components that mask misfits and mislead clinicians into believing that a passive fit has been achieved.



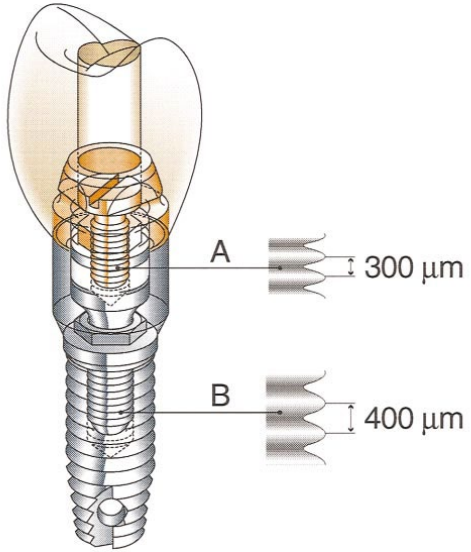


One-screw test

- where 1 screw was tightened at 1 terminal abutment and discrepancies observed at the other abutments.
- long span frameworks, in which vertical discrepancies tend to be magnified at the opposite terminal abutment.
- in conjunction with direct vision and explorer with periapical radiographs

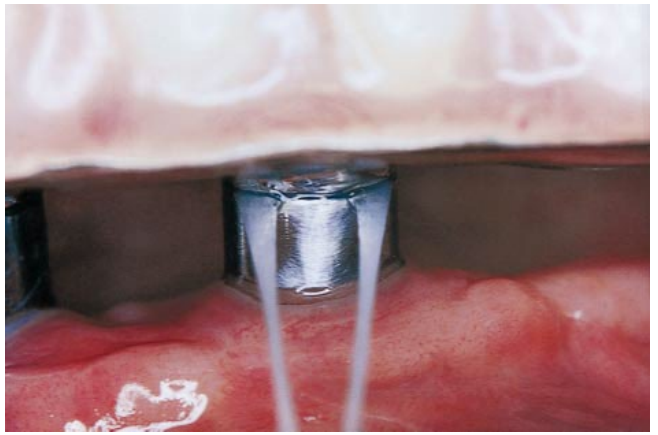
Screw resistance test

- The presence of persistent pain, pressure, and discomfort during the tightening of the screws may also indicate an unacceptable level of framework misfit.



Disclosing media

- The presence of disclosing media at the mating surface of the framework indicates misfit
- supragingivally and subgingivally placed margins.



CONCLUSIONS

- improving clinical techniques such as the use of rigid impression materials, custom trays, cementable superstructure, and a combination of the available evaluation methods described in this review may be relied on to optimize fit or compensate for misfit.

Occlusion

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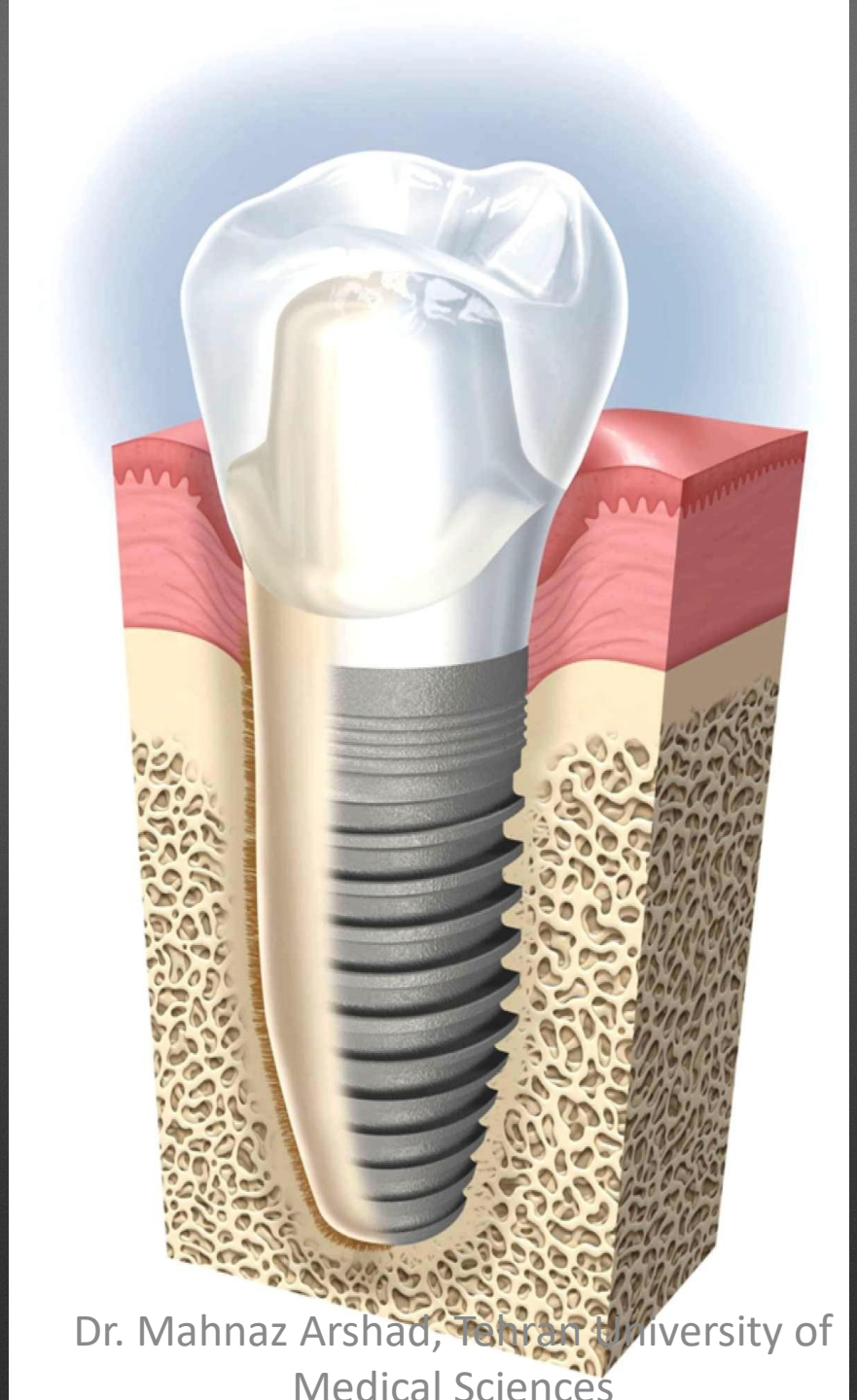
- Periodontal Ligament act as Shock Absorber
- Axial Mobility 25 to 100 µm
- Lateral Loading - Forces dissipated apically
- Occlusal Overload - widening of the PDL, Fremitus, and mobility of the tooth



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- No Periodontal Ligament
- Axial Displacement 3 to 5µm
- Lateral Loading - Forces concentrated at the crestal
- Occlusal Overload - Inflammation, Crater-like Bone Defect, Screw Loosening, Fracture of the Screw/Abutment/Prosthesis/Implant

Implant Occlusal Scheme

- Flat Fossa and Grooves for wide freedom in centric
- Shallow Occlusal Anatomy
- Narrow Occlusal Table - 30% to 40% smaller for molars (Widths > Implant Diameter - Cantilever Effect - Bending Effect)
  - Narrow Table - More Axial, Less non-Axial
- Reduced Cuspal Inclination - Less Bending forces, more axial
- Occlusal Material - Material with high modulus of elasticity
- Night Guard - Parafunction

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Single Unit

- Avoid excursive guidance
- Increased proximal contact

Multiple Unit - Anterior

- Light contact in maximum intercuspation (30 µm)
- Flatten vertical and horizontal overlap and protrusive guidance to reduce lateral forces

Multiple Unit - Posterior

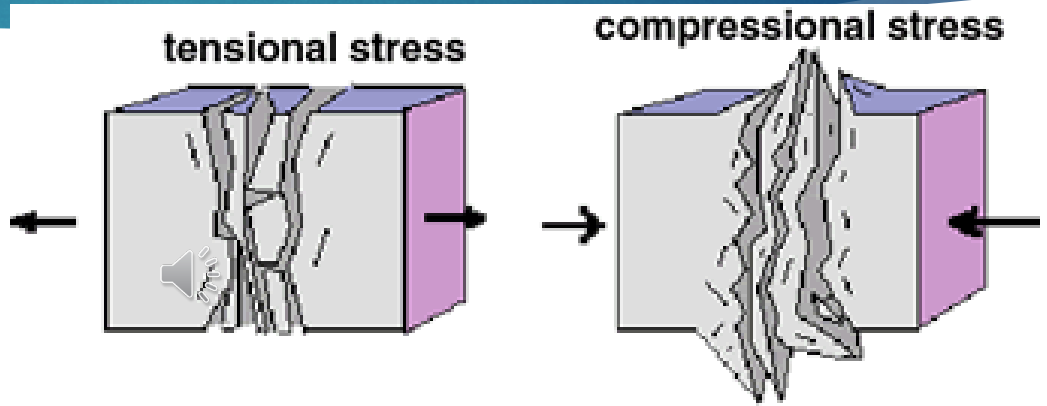
- Excursive guidance on well-supported anterior natural teeth with posterior teeth disclusion in eccentric movements
- Canine protected or mutually protected occlusion if canine present
- Group function occlusal scheme if canine absent/prosthesis replacing bilateral distal extension
- Optimum abutment support for working guidance

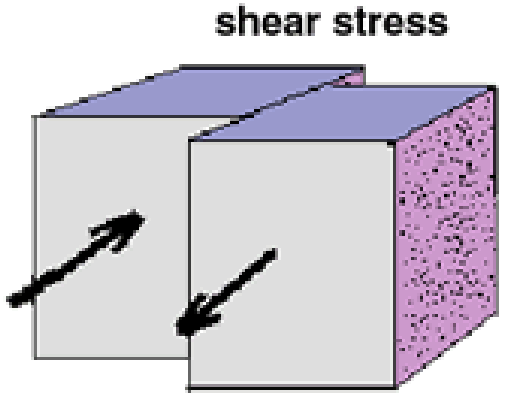
Occlusion Check

- Maximum Intercuspation - Contact in the Centre, Light contact (30 µm)
- Firm occlusion with shim stock (8–30 µm) passing through
- Anterior guidance with natural dentition, if possible
- No contact on lateral movements - working, non-working
- Group Function - if no natural tooth for lateral guidance

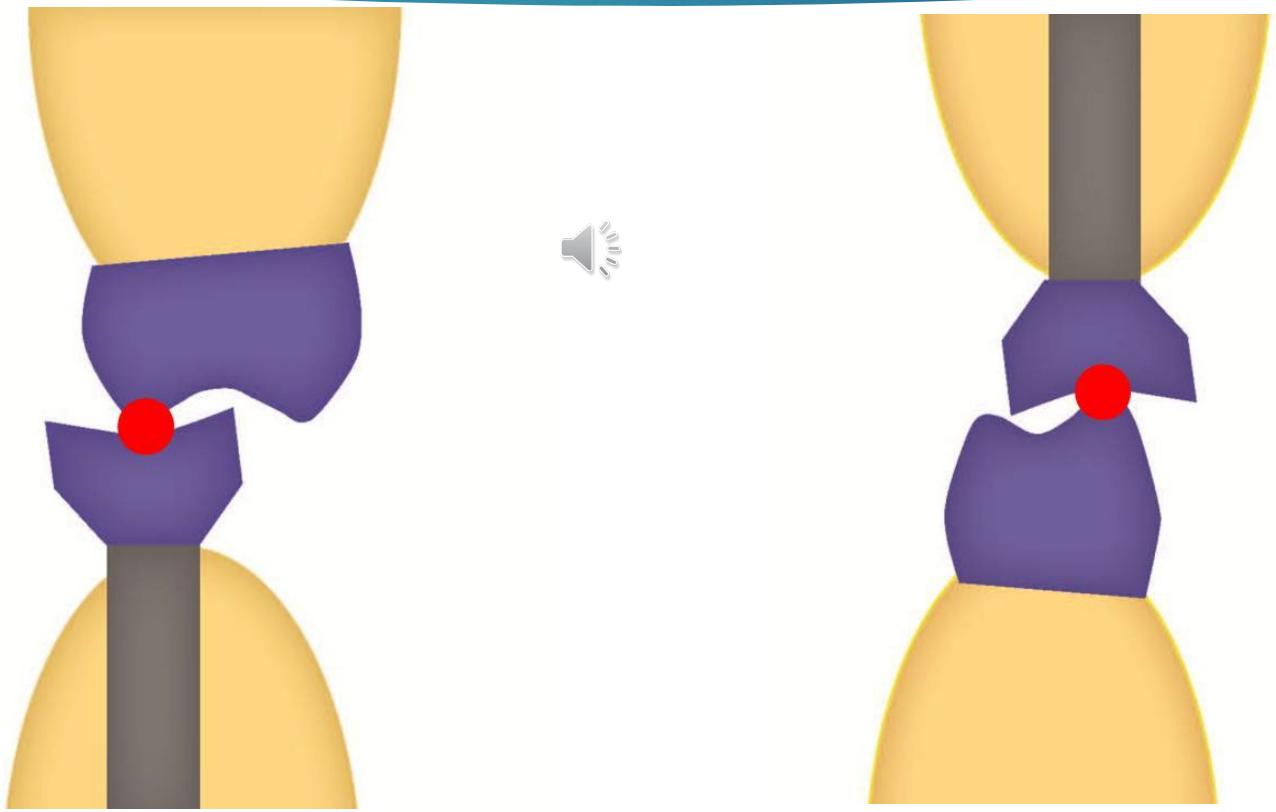
Three Types of Forces

- **Compressive**
- Tensile
- Shear





Occlusion



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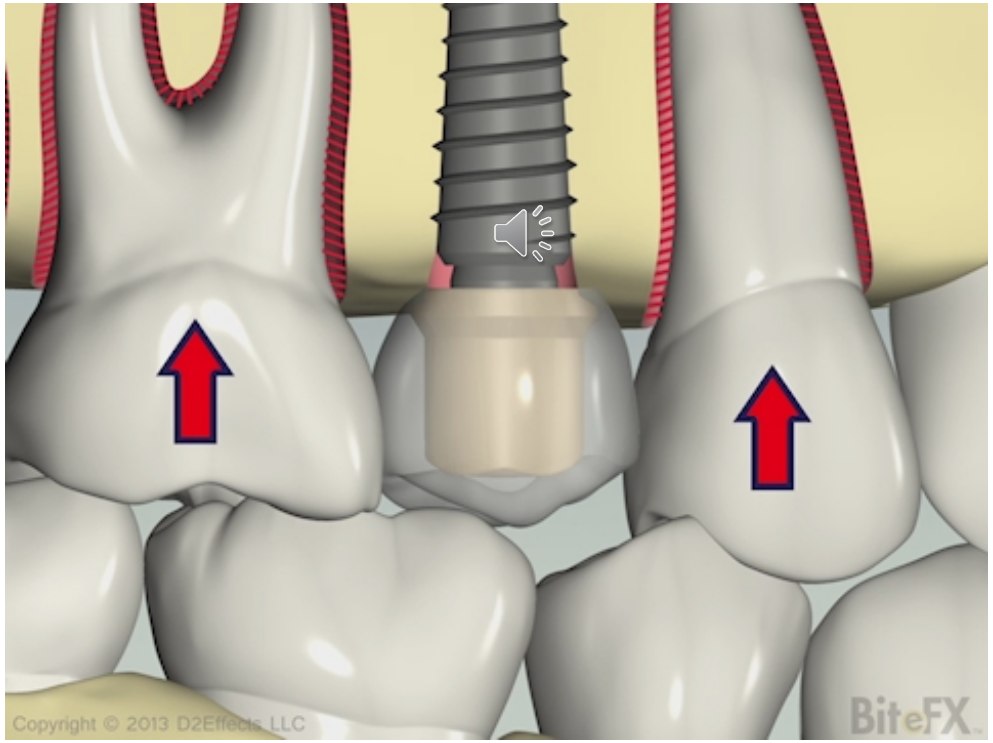
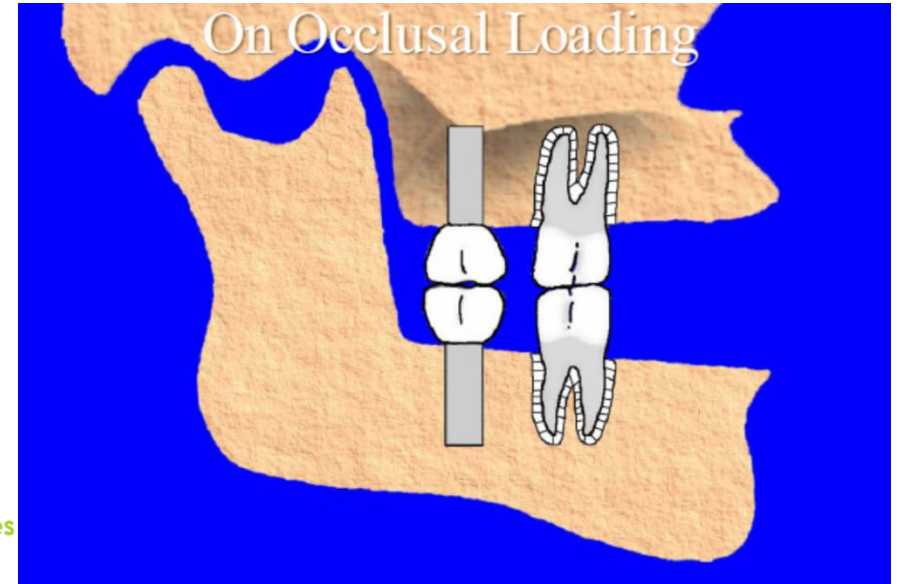
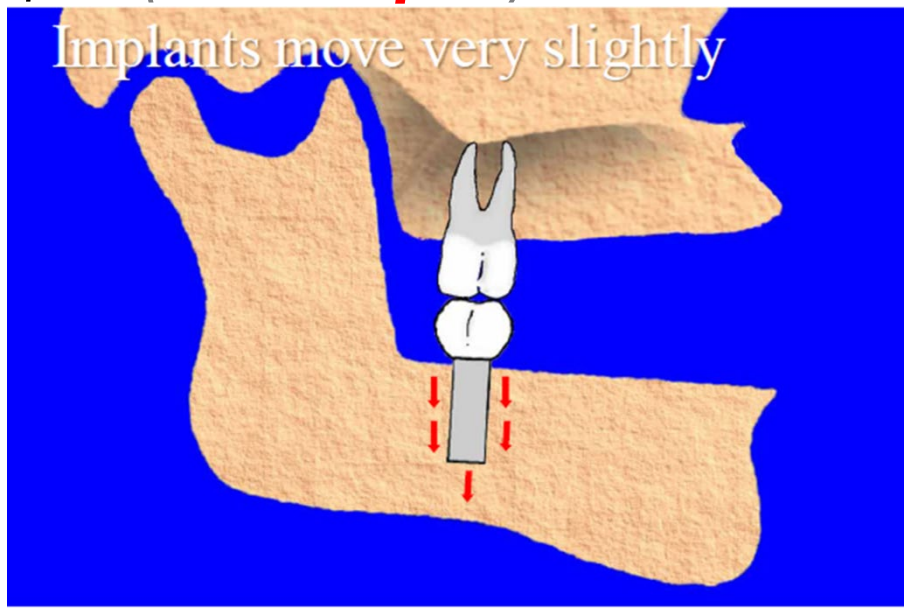


When teeth oppose each other, the combined intrusive movements of the contacting elements may be ***56 µm*** *(28 +28µm).*

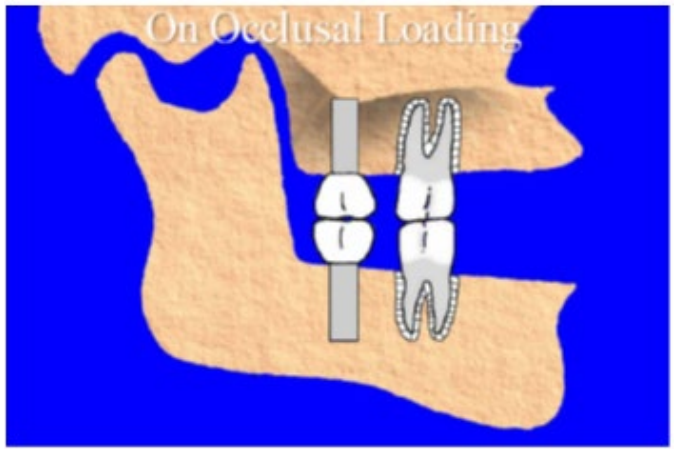


*When a tooth opposes an implant, the initial combined intrusive movement is only 28 µm (**28 + 0 µm**).*



The total combined implant movement may remain at ***0 µm*** *compared with* ***56 µm*** *in the rest of the mouth, and contrary to the teeth that move immediately, even with light loads, the implants only move under a heavy occlusal load*

When implant prostheses oppose each other, the biomechanical mismatch between teeth in the rest of the mouth and implants further increases.



Timing of occlusion

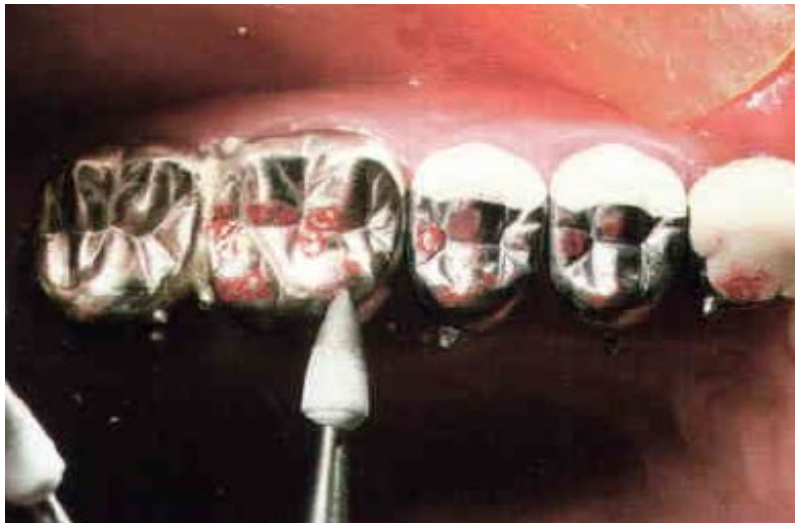
Because the initial difference in vertical movement of teeth and implants in the same arch may be as much as 28 μm, the initial occlusal contacts should account for this difference, or the implant will sustain greater loads than the adjacent teeth.

the dentist uses thin articulating paper (less than 25μm thickness) for the initial implant occlusal adjustment in centric occlusion under a light tapping force.

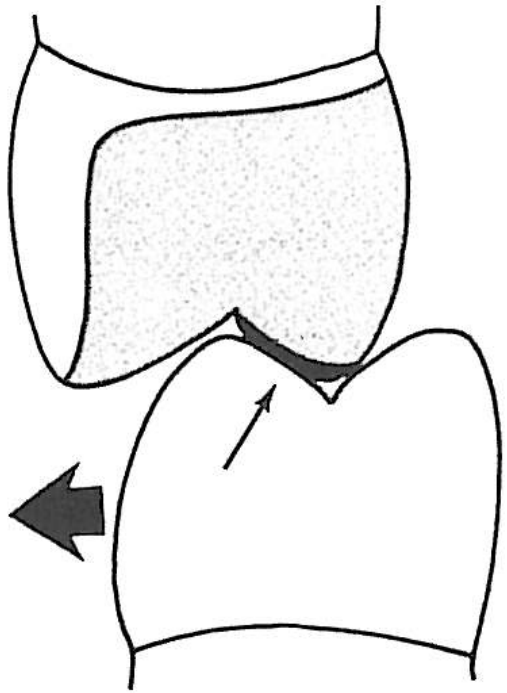
under a light tapping force The implant prosthesis should barely contact, and the surrounding teeth in the arch should exhibit greater initial contacts.

Only light axial occlusal contacts should be present on the implant crown.

Occlusion
"Marking Ribbon"



Premature Contact



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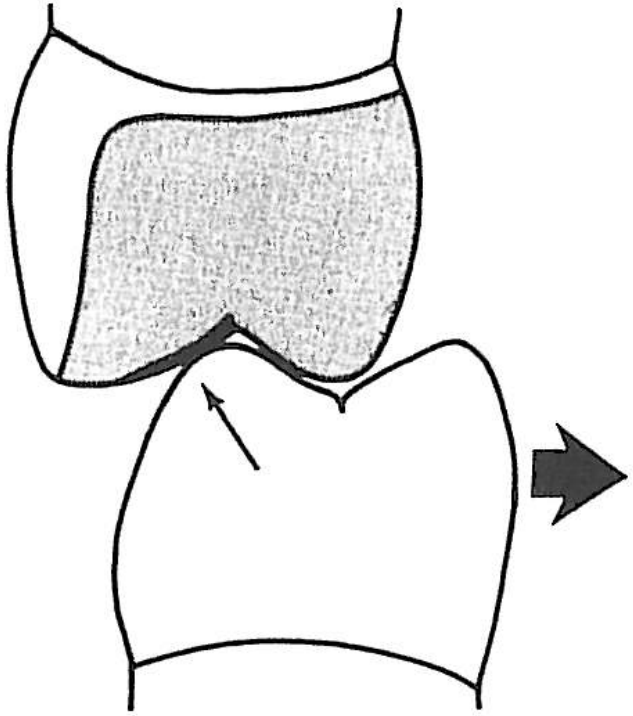
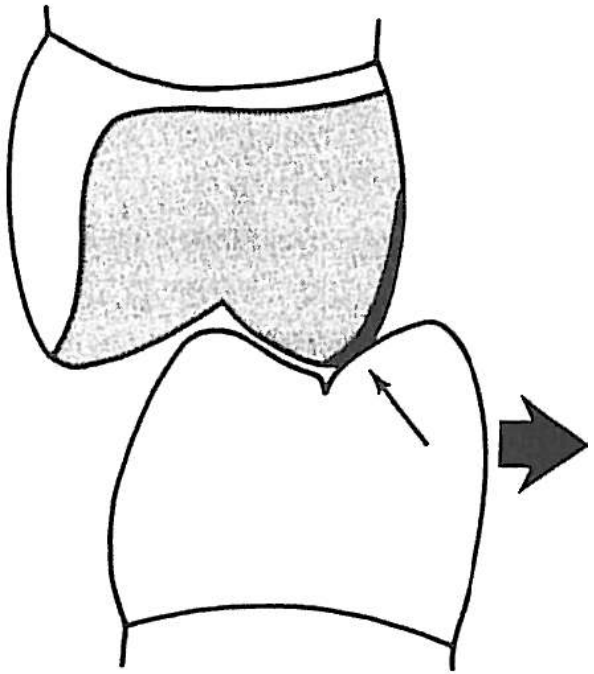
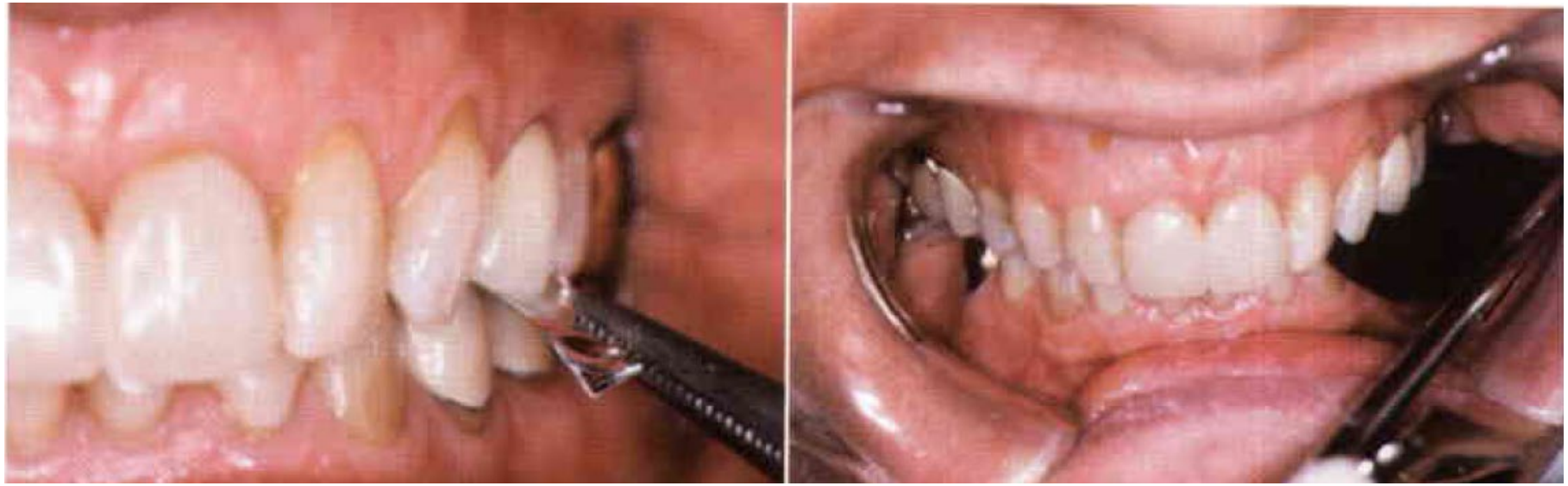


Premature Contact



Occlusion
"Mylar Shim Stock"



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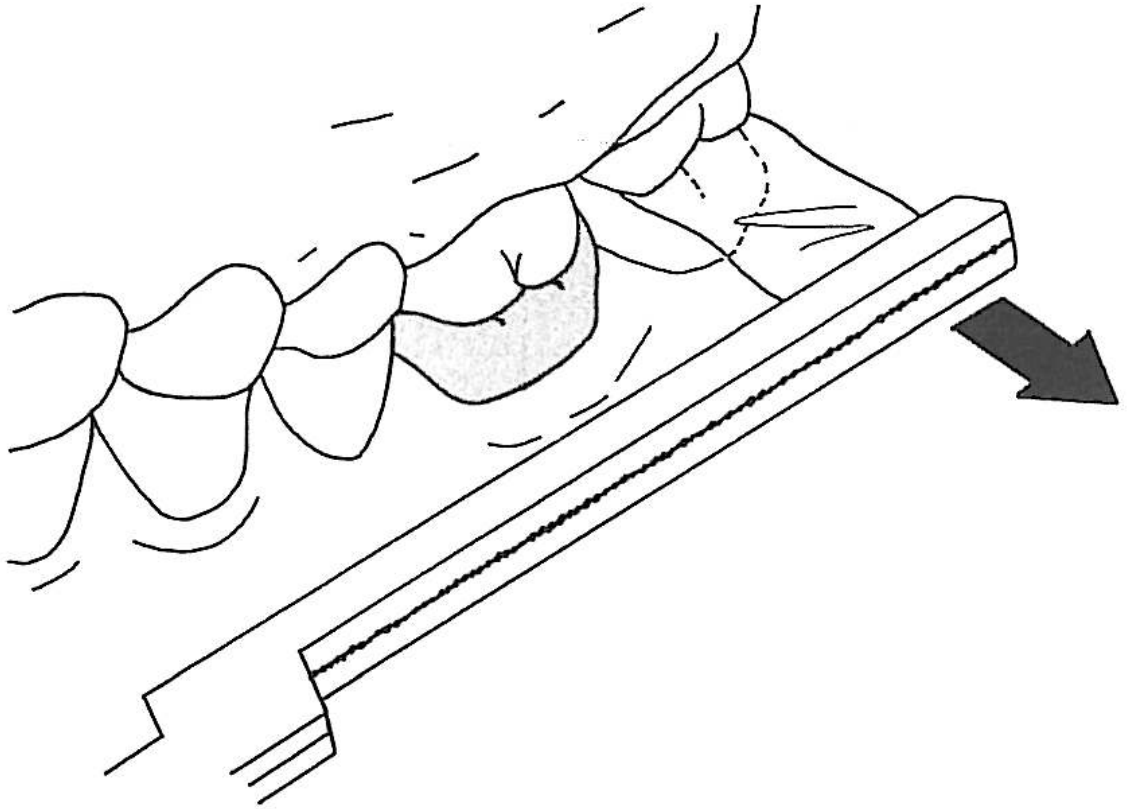
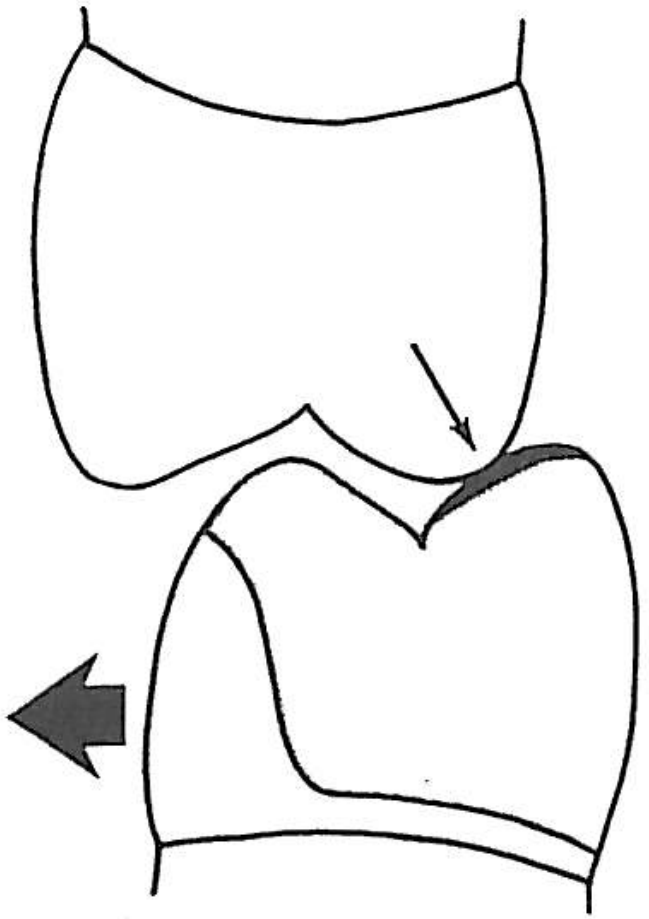
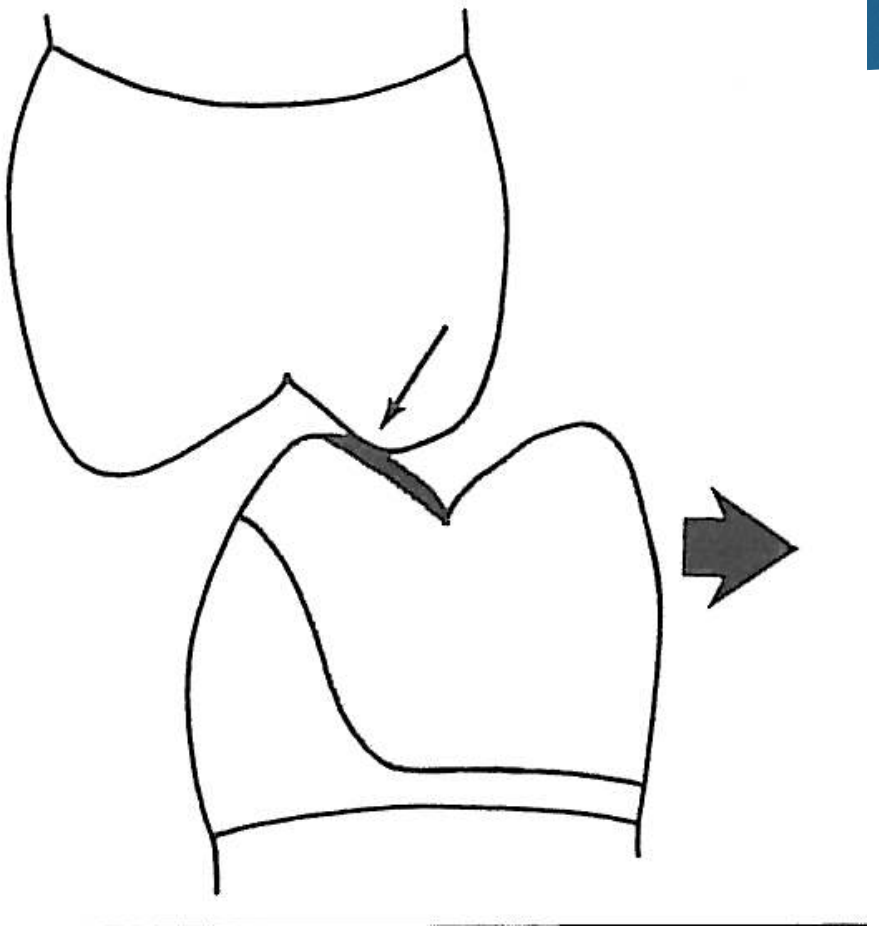


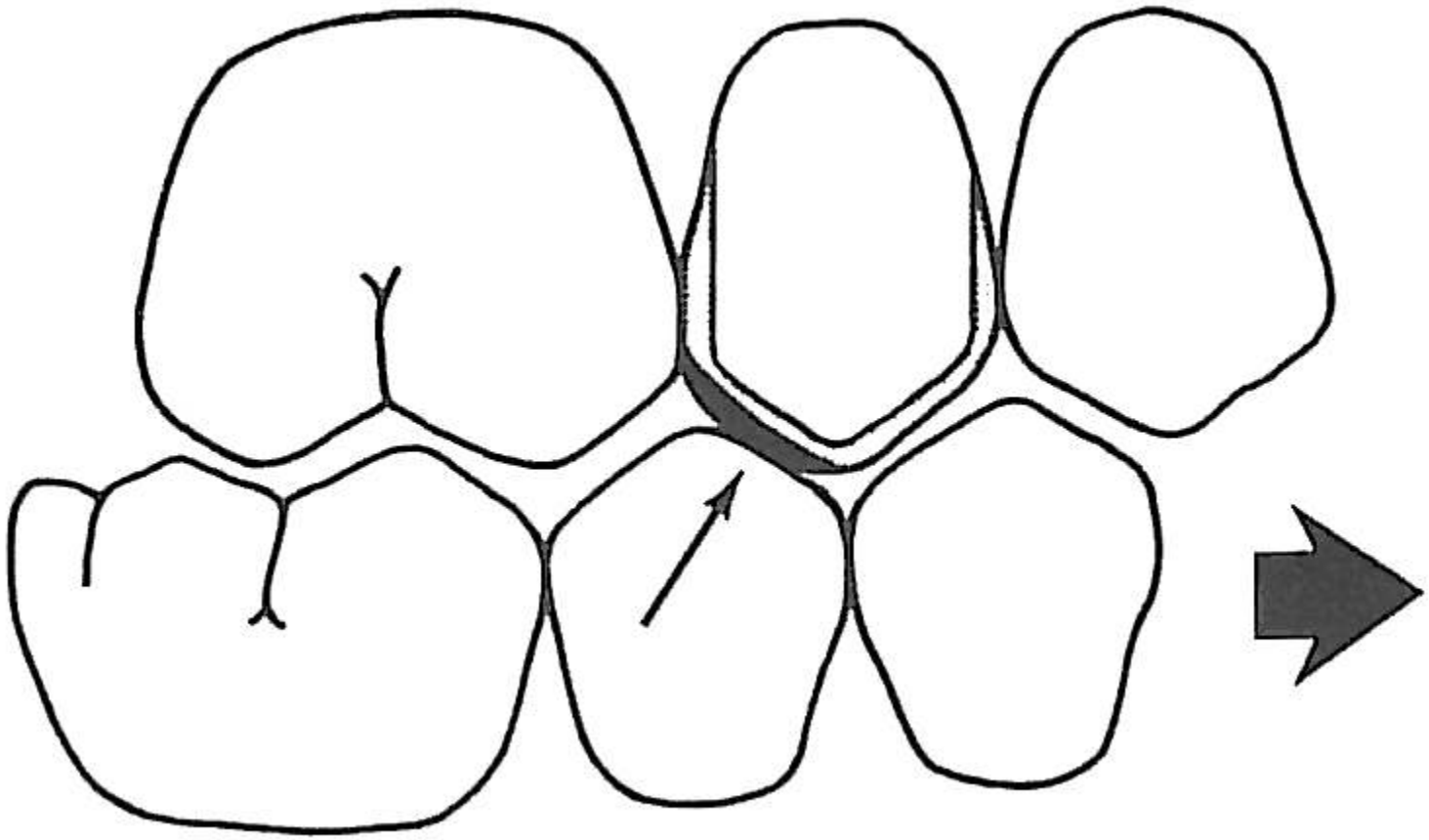
Working Interference



Non-Working Interference



Protrusive Interference



Thanks for Your Attention

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