

The Biomechanics of Root Resorption – Naphtali Brezniak, Atalia Wasserstein

Main Objectives:

1. To present a worldwide study results related to the standard of care (SOC) associated with orthodontic root resorption (ORR)
2. To present Orthodontitis, using biomechanics
3. To discuss: why the apex?
4. To present a recommended clinical protocol related to Orthodontitis

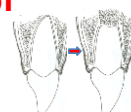


The Biomechanics of Root Resorption



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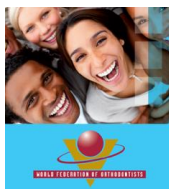
ISRAEL



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An anonymous questionnaire was sent by e-mails to WFO members worldwide



791 orthodontists from 93 countries responded

Worldwide ORR Standard of Care



Several questions that will be discussed:

The orthodontists are divided by their seniority and the level of development of the country of practice

- What are the radiographs that you usually require/take prior to the orthodontic treatment?
- What are the type of radiographs by the percentage of orthodontists that use them during treatment?
- Are radiographs taken during treatment?
- What is the timing of radiographic monitoring during treatment?
- What is the response to detection of minor resorption or significance resorption?
- Are radiographs taken following treatment and what type?
- Are radiographs taken during retention and what type?
- Are radiographs taken before correction of a relapse?

- Dear WFO member.
- My name is Atalia Wasserstein and I am an orthodontist and a WFO member.
- As part of my interest in root resorption concurrent with orthodontic treatment, I would like to conduct a survey of the attitudes of us, as orthodontists throughout the world, to know how we monitor this side effect of our treatment.
- Enclosed is an anonymous questionnaire consisting of 15 questions. It may take about 5 minutes of your time to answer it.
- You'll be able to choose more than one answer to most of the questions.
- Thank you for your cooperation.

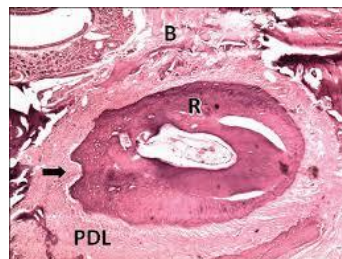
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Orthodontitis, is it
a sign, a symptom or a disease?

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What is Orthodontitis?



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The importance of naming a disease or a process

1. Gives existence
2. Points out on the uniqueness
3. Brings out validity and legitimacy
4. Explains reality
5. Naturalizes deviances (frame the disease)
6. Imposes status



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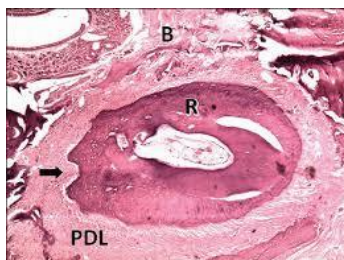


How could it be that this inflammation was
never named?



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Orthodontitis=Ortho+itis



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The importance of naming the inflammation
behind tooth movement and ORR:

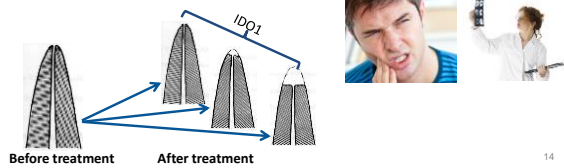
1. Iatrogenic
2. There is no Orthodontics without this inflammation
3. Its uniqueness:
 - 2 sides different processes (bone versus cementum)
 - 2 different expressions (stress versus strain)
4. Professional gain

JUST DO IT.

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2. Instrumental Detrimental Orthodontitis (IDO1)

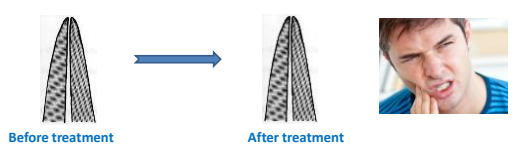
- minor to severe root-surfaces changes
- ~84% of the patients
- Signs: toothache & mobility during treatment
- Symptoms: toothache & mobility during treatment
- Treatment: Painkillers, TLC



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1. Instrumental Orthodontitis (IO)

- No root shortening or other root surfaces' changes can be detected clinically using external imaging technique
- 10%-15% of orthodontic patients
- Signs: toothache & mobility during treatment
- Symptoms: toothache & mobility during treatment
- Treatment: Painkillers, TLC



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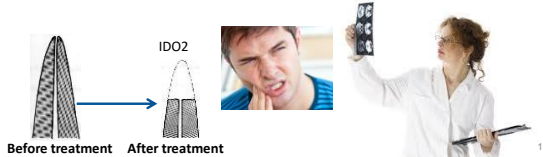
Inherent Defense Mechanisms (DM)

- Most of the body tissues have DM
- This DM reacts when the tissue (organ) are under threat (pressure, hypoxia, pathogens...)
- The quality and the quantity of the DM is individually determined
- Initially, the DM uses non specific, reversible tools
- Finally, the DM uses specific tools that might sacrifices tissues, organs, to save function and life

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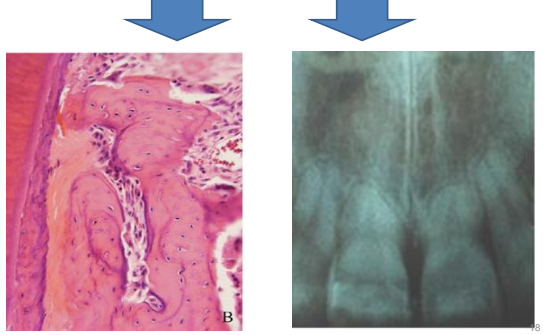
2. Instrumental Detrimental Orthodontitis (IDO2)

- Extreme apical resorption (over 3rd of the root length)
- ~ 1% of the patients)
- Signs: toothache & mobility during treatment.
- Symptoms: toothache & mobility during treatment.
- Treatment: Painkillers, TLC and Fixation
- Extraction is almost always – forbidden (malpractice!)



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Does this lead to this?



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Inherent Defense Mechanisms (DM)

- The blinking reflex (the corneal and menace reflexes)
- Upper airway DM protects the body from invasion of non-pathogens and pathogens invasion (mucous, cilia, non-specific and specific defense layers etc.)

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Biomechanics of orthodontitis and root resorption



1928-2015

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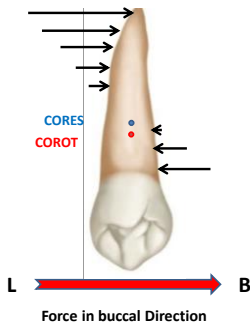
Short term in-vivo human experiments' design

- Helsinki Declaration approval
- Volunteer patients needed extractions
- Activation (4-12 weeks)
- Extraction
- Preparation
- Analysis
- Results
- Conclusions



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The pressure on the root



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Theoretical stress distribution in the periodontal membrane:
 A – Translation. B – Center of rotation at the apex. C- Center of rotation at the incisal edge. D – Center of rotation between the centroid and the apex

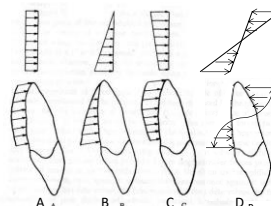
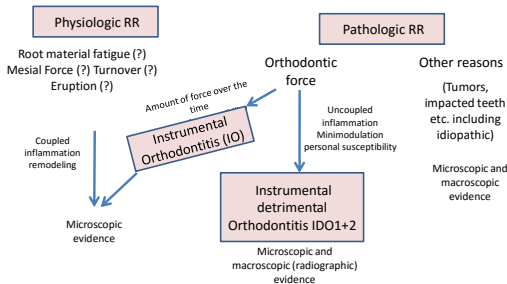


FIG. 2 – Theoretical stress distributions in the periodontal membrane. A, Translation. B, Center of rotation at the apex. C, Center of rotation at the incisal edge. D, Center of rotation between the centroid and the apex.

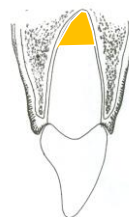
Burstone spoke about the stress distribution but not about their effect in the remodeling activity

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Types of root resorption (RR)



Why the apex is the one that is eliminating?



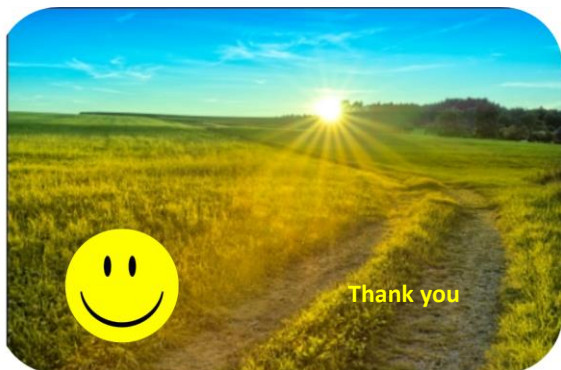
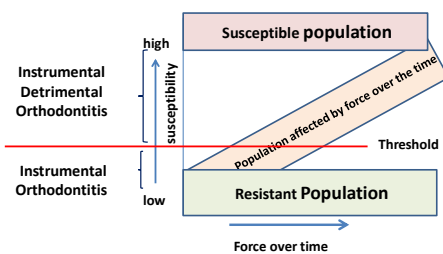
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Summary

- ✓ The worldwide SOC related to Orthodontitis was presented
- ✓ Orthodontitis (IO and IDO) were discussed
- ✓ The biomechanics of the short-term in-vivo studies was argued
- ✓ The vulnerability of the apex was addressed
- ✓ A protocol to reduce IDO2 was proposed

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Force level, time and Orthodontitis



ORTHODONTICS
IS MY *P*ASSION...

"That's why I support the AAOE."

AAOF
CASE PARTNER

Contribution to the AAOE is a contribution to our future.

AAC
American Association of Orthodontists

AAOF
Advancing the Specialty™