


IRRIGATION: the clinical aspect

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I do not have any commercial or financial affiliations with any of the products / methods or companies that will be mentioned in this lecture.



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To share the findings and recommendations of the ESE S3-level guidelines from two distinct perspectives: clinical practice and research



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Agenda-setting for research in oral health care - Connecting perspectives




Puck van der Wouden Geert van der Heijden



Wouden, Shemesh, Heijden (2021) : Acta Odontol Scand.



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CONNECTING PERSPECTIVES

Research priorities for oral healthcare: agenda setting from the practitioners' perspective.



P. v/d Wouden, May 2022

Wouden, Shemesh, Heijden (2021) : Acta Odontol Scand.



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KENNISAGENDA MONDGEZONDHEID

Website and questionnaires

ACHTERGROND METRODE RESULTATEN SAMENVATTINGEN INSLAGWIJZEN WELZIJNWIJZ CONTACT

ACHTERGROND

KLOOF TUSSEN PRAKTIJK EN WETENSCHAP

In zijn conclusieve de gezondheidsraad in zijn rapport De monding van morgen dat het onderzoek in de monding voor fundamenteel en multidisciplinair van aard is. Onderzoek naar gezondheidsproblemen en kwaliteit van zorg op gebied van schaal, plaats en het is onduidelijk of dit onderzoek van zijn bestaande die er leven onder de gebreken van onderzoek, mondingprofessionals en patiënten. Er gaat een kloof te bestaan tussen praktijk en wetenschap.

Als toekomstig onderzoek een aansluit bij de vraag van mondingprofessionals, dan:

- draagt dat onderzoek bij aan de kwaliteit van de monding.
- bevordert opgeboude wetenschappelijke kennis het veld verder.
- bevordert dat de koppeling van de kennis.
- meet de maatschappelijk waarde van dit onderzoek toe.

Een manier om erachter te komen welke kennisbehoefte er is, is door een kennisgids op te stellen. Het doel daarvan is dit onderzoek beter aansluit op de kennisbehoefte van mondingprofessionals en patiënten. Daarvoor is het belangrijk dat zijzelf onderzoeksvragen stellen. Denk daarbij aan onderwerpen over doelmogelijkheid, effectiviteit en mondinggezondheidskosten. Zo wordt de kloof tussen wetenschap en praktijk kleiner.

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Topics suggested in survey 1, grouped by research area

Research areas	Number of topics (%)
Prevention	68 7
Diagnostics	19 2
Patient factors	21 2
Special needs	49 5
Groups	49 5
Anaesthesia*	12 1
Oral medicine/surgery	100 11
TMD	50 5
Carology	103 11
Periodontology	68 7
Orthodontics	73 8
Pain	69 7
Tooth replacement	18 2
Tooth restoration	93 10
Implantology	20 2
Removable prosthodontics	40 4
Endodontology	131 14
Total	937 100

Which topics are important for dentists in their daily clinical work ?

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Which topics are important for patients?

Table 6.6: Top-10 research topics of patients

Research topic	Research theme	Ranking
1. The possibility to include oral health care in a patient's insurance system	Prevention and design of oral health care	1,000
2. Effective products for oral healthcare	Impact of oral health (oral) problems on daily life	709
3. Problems with my gums, related to my disease or medication	Oral symptoms	638
4. My mouth bothers my disease or medication	Oral symptoms	611
5. Oral health care that is tailored to my condition	Impact of oral health (oral) problems on daily life	588
6. Expanding the knowledge of oral health care professionals beyond their own expertise	The role of oral health care professionals	512
7. How patients can participate in decisions on their oral health care treatment	Information on oral health supplied to patients	510
8. How access of oral health care practices can be improved for people with a physical disability	Organization and design of oral health care	507
9. How my oral health care professional can improve interaction with me	Organization and design of oral health care	509
10. Increasing the knowledge of oral health care professional about the effect of my condition on oral health	The role of oral health care professionals	382

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Research priorities for Oral Health care - Agenda setting from the practitioners' perspective
Puck van der Wouden, Hagay Shemesh, Geert van der Heijden Acta Odontologica Scandinavica 2021,0(0):1-7

- The highest prioritized research topics have an interdisciplinary nature, mainly concern oral disease prevention and are underrepresented in the current oral health research portfolio.

Wouden, Shemesh, Heijden (2021) : Acta Odontol Scand.

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Research agenda for life-threatening cancer

Conclusion: User involvement in identifying research agendas has the potential to improve quality of care for patients and caregivers across the cancer trajectory, while minimizing the gap in research between the healthcare user and healthcare provider.

Piil et al. (2019) Eur J Cancer Care

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Researchers choose their research topics (& methodology?) not necessarily on the needs of the profession or patients but rather on high impact-factor scores, reputation system, seniority, commercial opportunities & funding, historical interests and personnel situation.

"academic drift"

'Academic drift' is a term sometimes used to describe the process whereby knowledge which is intended to be useful gradually loses close ties to practice

Harwood (2010) Minerva

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Evidence and consequences of academic drift in the field of dental research: A bibliometric analysis 2000-2015

Our findings suggest that the dental research portfolio is influenced by academic drift. This academic drift has increased the disbalance towards basic science, and presents a challenge for the scientific progress in dental healthcare services.

Wouden, Heijden, Shemesh, den Bresselaar (2022) :BDJ open

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Technical innovations

- Operating microscope
- Irrigation instrumentation
- Root canal filling: M&M
- CBCT imaging
- Wireless...
- Digital...

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40-Year Outcome of Old-School, Non-Surgical Endodontic Treatment: Practice-Based Retrospective Evaluation

Survival

- manual Hedstrom files,
- irrigation with H₂O₂, or hypochlorite 3%
- gutta-percha and sealers using a lateral compaction technique
- intracanal medication (chlorophenol)

Conclusions: Even with materials and techniques from the 1970s and 1980s, successful root canal treatment was achievable.

Frankenberger et al. (2024) Dent J

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"Although we know so much more today in almost every aspect investigated here, and although we definitely have access to much more advanced materials, methods, and protocols, are we really more successful today in clinical endodontics?"

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Manual	Conventional syringe irrigation	Needle design	
	Manual dynamic agitation	Master cone, file	
Machine assisted	Pressure alternation	Apical negative pressure	Endo Vac/ Rinse Endo
	Ultrasonic	EndoActivator, Eddy	
	Sonic	SAF, Xp endo finisher	Photon-induced photoacoustic streaming (PIPS)
	Continuous	Laser activated irrigation	Photoactivated disinfection (PAD)
	Rotary file agitation		
	Laser		
	Multisonic	Gentle Wave	

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Materials

- Sodium Hypochlorite** 1%, 2%, 3%, 5%
- Chelators** EDTA Citric Acid Etidronate
- Chlorhexidine**
- Combinations**
 - CHX+EDTA +detergent
 - Doxy+CitricA +detergent
- Mild chelator** DualRinse
- Qmix**
- Biopure MTAD**

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Why is hypochlorite syringe irrigation insufficient?

- Biofilm
- Complex anatomy
- Debris blocking the way, penetration in tubuli
- Influence on dentine
- Undesired chemical effects of irrigants

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Quality guidelines for endodontic treatment: consensus report of the ESE 2006

Irrigation

- The irrigant solution should be delivered in copious amounts as far up the canal as possible without risking extrusion beyond the foramen. This can be performed with a syringe, ensuring that the solution is allowed to escape freely into the pulp chamber and is not delivered with excessive force. The solution may also be delivered by ultrasonic or sonic systems.

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CLINICAL PRACTICE GUIDELINE- Treatment of pulpal and apical disease: ESE S3-level clinical practice guideline 2023

S classification	Description
S3	Evidence- and consensus-based guidelines
S2e	Evidence-based guideline
S2c	Consensus-based guideline
S1	Recommendation by group of experts

Description

- Representative committee, systematic review and synthesis of evidence, structured consensus process
- Systematic review and synthesis of evidence
- Systematic committee and structured consensus process
- Consensus through informal expert opinion

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Effectiveness of root canal irrigation and dressing for the treatment of apical periodontitis (R3.4)

Effectiveness of adjunct therapy for treatment of apical periodontitis (R3.6)

PIICO addressed by a SR

R3.4 Evidence-based recommendation 1

Grade of recommendation Very low (S2c)

Quality of the evidence Very low (S2c)

Strength of consensus Consensus through informal expert opinion

PIICO addressed by a SR

R3.6 Evidence-based recommendation 1

Grade of recommendation Very low (S2c)

Quality of the evidence Very low (S2c)

Strength of consensus Consensus through informal expert opinion

1. No mention of Chlorhexidine or other irrigation materials

2. Activation?


3. Volume?

1. LAI, PIPS, Ultrasonic, Sonic...

2. Volume?

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Quality guidelines for endodontic treatment: consensus report of the ESE 2006



Irrigation

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Clinical studies

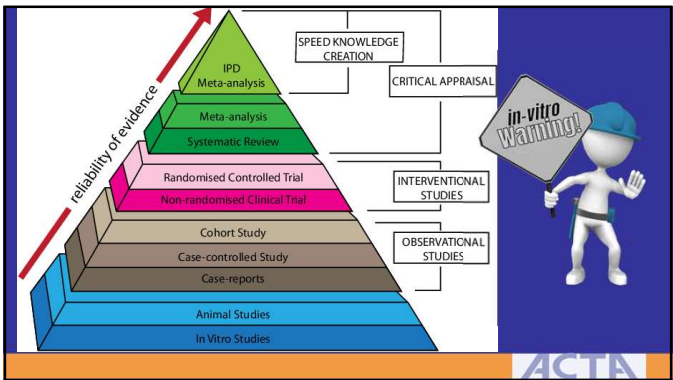
- Difficult to perform
- Often low numbers of patients
- “no difference”

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In vitro studies

- Leakage/ “sealability”
- Microbiology
- Cytotoxicity

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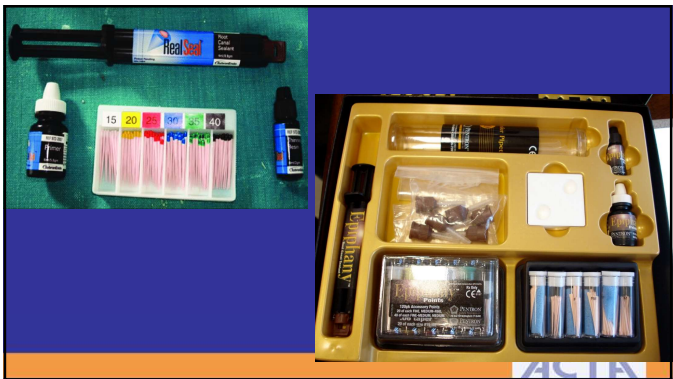
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Resilon-Epiphany

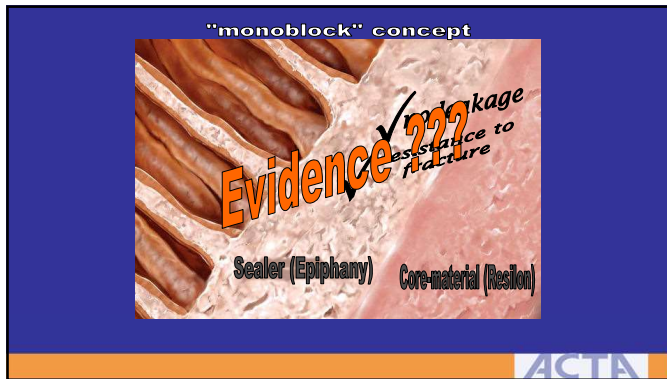
- New composite root canal filling material
- Introduced in 2004 (Shipper *et al.* JOE)

Root-canal wall (Dentin)

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Leakage studies

Resilon is better than GP	GP is better than Resilon	GP=Resilon
Shipper <i>et al.</i> 2004	Shemesh <i>et al.</i> 2006	Shemesh <i>et al.</i> 2007
Budrumglu & Tunga 2006	Paque & Sirtes 2007	De Deus <i>et al.</i> 2007
Different conditions & models	Pasqualini <i>et al.</i> 2007	Baumgartner <i>et al.</i> 2007

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Long-term Outcomes of Endodontic Treatment Performed with Resilon/Epiphany

Strange *et al.* JOE 2019

Resilon-treated teeth were 5.3 times more likely to have a periapical index of 3 to 5 at follow-up compared with gutta-percha ($P = .009$).

Long-term Clinical Outcome of Teeth Obturated with Resilon.

Barborka *et al.* JOE 2017

Teeth obturated with Resilon had 5.7 times greater chance of failure compared with teeth obturated with GP.

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- The most extensively studied
- Surge of enthusiasm in the early '2000s

Example : ultrasonic irrigation

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Căpută PE *et al.* J Endod. 2019

...no strong clinical recommendations could be formulated.

Silva EJNL *et al.* Br Dent J. 2019

...there was no evidence of effective improvement on periapical healing ...that supports the use of ultrasonic irrigation...

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Health economics

"Although tooth loss may be financially preferable to the patient in the short-term, retaining teeth using root canal treatment is usually more cost-effective than the option of removing them and replacing them prosthodontically" (Pennington *et al.*, 2009; Schwendicke & Herbst, 2023).

ESE S3 guidelines 2023

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Cost-effectiveness

Conclusions: The high costs for secondary root canal treatment do not seem to be outweighed by the increased risks associated with certain radiographic findings in asymptomatic teeth.

Schwendicke & Stolpe (2015) JOE

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So what should we do ?

- **As clinicians:** follow the ESE guidelines till more relevant evidence is available
- **As researchers:** Try to choose research topics that are relevant to patients/ clinicians
(Christos will elaborate on methodology)

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Suggested irrigation protocol

NaOCl fine needle close to WL
EDTA after instrumentation
Final rinse with NaOCl

If activation necessary- Ultrasonic

Boutsioukis & Arias-Moliz (2022) IEJ

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