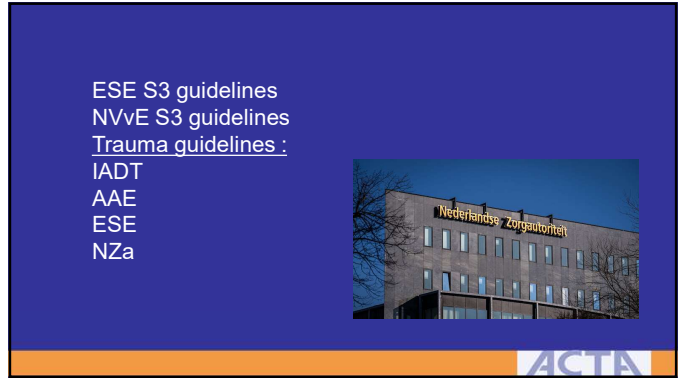


1



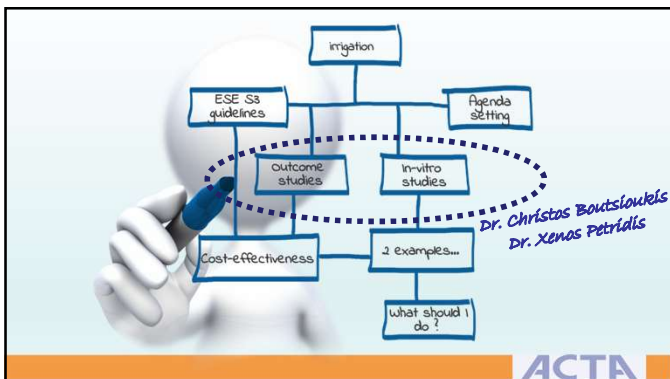
2



3



4



5



6



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

P. v/d Wouden, May 2022

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

7

KENNISAGENDA MONDGEZONDHEID

ACHTERGROND METHODE RESULTATEN SAMENVATTINGEN NASLAGWERK WELZIJN WUPT CONTACT

ACHTERGROND

KLOOF TUSSEN PRAKTIJK EN WETENSCHAP

In zijn conclusierapport de Gezondheidsraad in zijn rapport de monstergemengde onderzoek in de monstergemengde onderzoek en interdisciplinair van arts is. Onderzoek naar gezondheidsproblemen en behoeftes van de patiënt en het is belangrijk of dat onderzoek de vragen beantwoordt die er leven onder de gebruikers van onderzoek, monstergemengde en patiënten. Er ligt een kloof te bestaan tussen praktijk en wetenschap.

Als toekomstig onderzoek wat aansluit bij de vraag van monstergemengde, dan:

- draagt dat onderzoek bij aan de kwaliteit van de monstergemengde
- benut het beste wetenschappelijke kennis het best mogelijk
- bevestert dat de toepassing van de kennis
- neemt de maatschappelijke waarde van dat onderzoek mee

Een manier om ervoor te zorgen welke kennisbehoefte er is, is door een kennisagenda op te stellen. Het doel daarvan is dat onderzoek beter aansluit op de informatiebehoefte van monstergemengde en patiënten. Daarnaast is het belangrijk dat daarvoor onderzoeksvragen worden ontwikkeld met onderwerpen over doeltreffendheid, effectiviteit en inzicht in gezondheidsproblemen. Zo wordt de kloof tussen wetenschap en praktijk kleiner.

f t w i n

8

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 groups	49	5
Anaesthesia*	12	1
Oral medicine/surgery	100	11
TMD	50	5
Cariology	103	11
Periodontology	68	7
Orthodontics	23	2
Pain	59	7
Tooth replacement	18	2
Tooth restoration	93	10
Implantology	20	2
Removable prosthodontics	40	4
Endodontology	13	1
Total	937	100

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

ACTA

9

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 the basic insurance system	Organization and design of oral health care	1000
3. Effective Products for oral care	Impact of oral health care problems on daily life	700
3. Problems with my gum, related to my disease or medication	Oral symptoms	488
4. My health, related to my disease or medication	Oral symptoms	441
5. Oral health care that is adjusted to my condition	Impact of oral health care problems on daily life	388
6. Increasing the knowledge of dental health care professionals beyond their own expertise	The role of dental health care professionals	312
7. How patients can participate in decisions on their oral health care treatment	Information on oral health supplied to patients	219
8. How access of oral health care practices can be improved for people with a physical disability	Organization and design of oral health care	207
9. How oral and health care professionals can improve interaction with non-medical professionals	Organization and design of oral health care	200
10. Increasing the knowledge of oral health care professionals about the effect of my condition on oral health	The role of dental health care professionals	202

ACTA

10

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.

ACTA

11

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

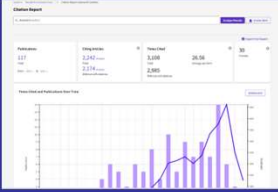
ACTA

12

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

13

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

14

Technical innovations

- Operating microscope
- Irrigation
- Instrumentation
- Root canal filling: M&M
- 3D imaging
- Wireless...
- Digital...



ACTA

15

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.

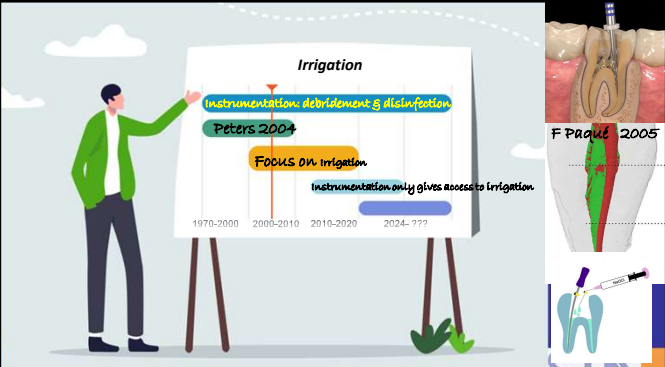
Frankenberger et al. (2024) Dent J

16

"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?"

Frankenberger et al. (2024) Dent J

17



18

Manual

- Conventional syringe irrigation
- Needle design
- Manual dynamic agitation
- Master cone, file

Machine assisted

- Pressure alternation
- Ultrasonic
- Sonic
- Continuous
- Rotary file agitation
- Laser
- Multisonic
- Apical negative pressure
- Endo Vac/ Rinse Endo
- EndoActivator, Eddy
- SAF, Xp endo finisher
- Laser activated irrigation
- Gentle Wave
- Photon-induced photoacoustic streaming (PIPS)
- Photoactivated disinfection (PAD)

19

Photon-induced photoacoustic streaming (PIPS)
Er:YAG laser (20 mJ) to aid in the removal of bacteria from the root canal system

DiVito et al. (2012) Lasers Med Sci

20

Materials

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

21

Why is hypochlorite syringe irrigation insufficient?

- Biofilm (activation to dislodge)
- Complex anatomy (activation to reach)
- Debris blocking the way, penetration in tubuli
- Influence on dentine (change of characteristics)
- Undesired chemical effects of irrigants

22

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.

23

24

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

Representative committee, systematic review and synthesis of evidence, structured consensus process

Systematic review and synthesis of evidence

Representative committee and structured consensus process

Consensus through informal expert opinion

25

S3 guidelines recommendations

Grade	Description	Syntax used for recommendation	Factors influencing recommendation
A	Strong recommendation	We recommend / not to	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Diagnosis of apical periodontitis</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 10px;">Single-visit approach without Ca(OH)₂</div>

26

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

PIICO addressed by a SR

Grade of recommendation	Evidence-based recommendation 1
Strong (A)	2 RCTs (n=212 patients) comparing irrigation with chlorhexidine or other irrigation materials

Quality of the evidence: Very low (⊕0.50)

Supporting literature: (Rosenblatt & Wang, 2022)

Strength of consensus: Consensus (95% of the group) agreed that this is a strong recommendation (A)

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

PIICO addressed by a SR

Grade of recommendation	Evidence-based recommendation 1
Strong (A)	2 RCTs (n=212 patients) comparing irrigation with chlorhexidine or other irrigation materials

Quality of the evidence: Very low (⊕0.50)

Supporting literature: (Rosenblatt & Wang, 2022)

Strength of consensus: Consensus (95% of the group) agreed that this is a strong recommendation (A)

1. No mention of Chlorhexidine or other irrigation materials

2. Activation?

3. Volume?

1. LAJ, PIPS, Ultrasonic, Sonic...

2. Volume?

27

Ned Richtlijn 2024

- "Het wordt aanbevolen om tijdens de chemo-mechanische reiniging gebruik te maken van handirrigatie met natriumhypochlorite, bij voorkeur na elk instrument"
- "Aan het eind van de chemo-mechanische reiniging kan worden overwogen om ultrason geactiveerd te irrigeren"
- "Ook kan worden overwogen om de smeerlaag met EDTA te verwijderen"
- "Overweeg geen toevoeging van lasertechnieken aan chemo-mechanische reiniging"

28

Clinical studies

- Difficult to preform
- Often low numbers of patients
- "no difference"

Outcome predictors/ Prognostic factors

- Instrumentation?
- Irrigation?
- Obturation?

29

Comparison of the effectiveness of conventional needle irrigation and photon-induced photoacoustic streaming with sodium hypochlorite in the treatment of teeth with apical periodontitis: a randomized clinical trial

quantitative ATP technique - assessing live bacteria

60 teeth with AP

Clinics- percussion, sinus tract

Root canal treatment

ATP assay

30 30

Final irrigation- syringe Final irrigation - PIPS

ATP assay

Root canal treatment finalized

7 days

Clinics- percussion, sinus tract

Jian Zhao et al. BMC Oral Health, 2024

30

Effect of QMix as final irrigation protocol on periapical healing after single-visit root canal treatment: A randomised controlled clinical trial

Outcome

CHX+EDTA +detergent

60 teeth with AP

Root canal treatment

30 30

Final irrigation - NaOCl Final irrigation - Qmix

Root canal treatment finalized

12 months

PAI score

Treatments with or without QMix contributed equally to periapical healing.

Ucan et al. Aus Endodon J . 2023

31

Outcome

Randomized Controlled Trial

Outcome of single-visit root canal treatment with or without MTAD: A randomized controlled clinical trial

Yildiz et al. IEJ 2024

Doxy+CitricA +detergent

No difference

Outcome

Radiographic outcome of endodontic treatment and retreatment of teeth with apical periodontitis using two different root canal irrigants (CHX/ NaOCl). A prospective cohort study

Katle et al. IEJ 2024

No difference

32

In vitro studies

- Leakage/ " sealability"
- Microbiology
- Cytotoxicity

Clinical relevance?

33

reliability of evidence

IPD Meta-analysis

Meta-analysis

Systematic Review

Randomised Controlled Trial

Non-randomised Clinical Trial

Cohort Study

Case-controlled Study

Case-reports

Animal Studies

In Vitro Studies

SPEED KNOWLEDGE CREATION

CRITICAL APPRAISAL

INTERVENTIONAL STUDIES

OBSERVATIONAL STUDIES

in-vitro warning!

34

Resilon-Epiphany

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

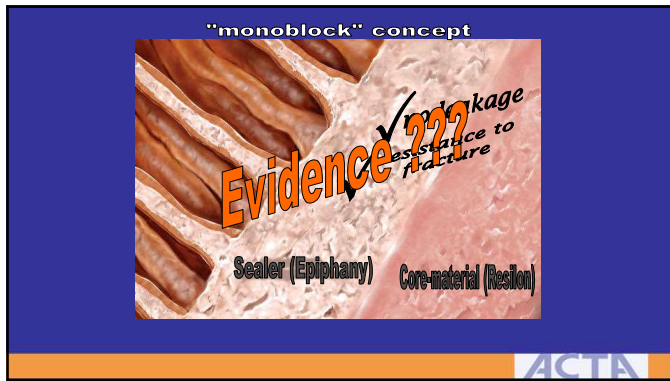
Root-canal wall (Dentin)

Resilon+Epiphany

Gutta-percha+sealer

35

36



37

Leakage studies

Resilon is better than GP	GP is better dan 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

38

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 .

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.

39

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

Example : ultrasonic irrigation

40

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...

41

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

42

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.

Clinically asymptomatic root-canal filled tooth with under- or over-extended root-filling or peri-apical lesion

Schwendicke & Stolpe (2015) JOE

43

Overtreatment

in-vitro Warning

Machine assisted

Ultrasonic

Sonic

Continuous

Rotary file agitation

Laser

Multisonic

Gentle Wave

Needle design

Master cone, file

Endo Vac/ Rinse Endo

Endo-activator

SAF, Xp endo f

Laser-activated irrigation

Carbon-induced photoacoustic streaming (PIPS)

Photoactivated disinfection (PAD)

Schwendicke & Stolpe (2015) JOE

44

So what should we do ?

- As **clinicians**: follow the ESE guidelines till more relevant evidence is available **

“you can consider” → Hopefully, more evidence will be available →

- As **researchers**: Try to choose research topics that are relevant to patients/ clinicians

Schwendicke & Stolpe (2015) JOE

45

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

46