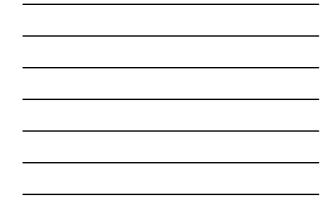


Use of luting cements in USA						
	Metal- Ceramic	Ceramic				
Hybrid ionomer	65%	46%				
Adhesive resin	46%	63%				
Glass ionomer	33%					
	ducts Report Survey, I elhi 10 September 2004	Nov 2000 n= 319 dentists. 2				











An evidence-based critical apraisal approach

1. How many reports related to the topic can be identified?



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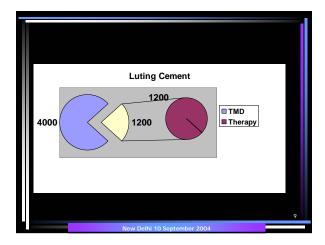


An evidence-based critical apraisal approach

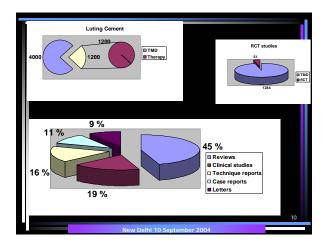
- 1. How many reports related to the topic can be identified?
- 2. How are these reports characterized on the basis of their study design?

How many reports are included within each category?

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Strength of evidence of treatment effects

1: at least 1 systematic review of multiple well designed randomised controlled trials (RCT)

2: at least 1 properly designed RCT of appropriate size and in an appropriate clinical setting

Richards & Lawrence, Br Dent J 1995;175:270

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Strength of evidence of treatment effects

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t: well-designed experimental studies from more than one centre or research group

5: opinions of respected authorities based on clinical evidence, descriptive studies or reports of expert consensus committees

Richards & Lawrence, Br Dent J 1995;175:270

An evidence-based critical apraisal approach

- 1. How many reports related to the topic can be identified?
- How can these reports be characterized on the basis of study design? How many reports are included within each category?
- What is the methodological scientific quality of these reports? How many reports can be excluded within each category due to questionable validity?

Strength of evidence of treatme	ent effects
1: Systematic reviews	0
2: RCTs	6
3: Clinical trials	5
4: Experimental studies	25
5: Opinions, descriptive studies, reports, etc.	135

An evidence-based critical apraisal approach

- 1. How many reports related to the topic can be identified
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- 3. What is the methodological scientific quality of these reports? How many reports can be excluded within each category due to questionable validity?
- 4. How can the reports be described in terms of participants- Interventions-Outcome measures

RCTs (6)						
Study	Methods	Participants	Interventions	Outcomes	Results	
White et al. 1994& 1995	Parallel RCT, function 6 mths, extraction, laboratory	Periodontally compromised teeth	2 cements, Zn-Ph, resin-modified glass- ionomer cement, b +dentin bonding agent	Extraction + embedded, sectioned microscopy	No differences	
Kern et al. 1996	Split-mouth RCT. Dental school setting. Obs. Per. av 17 mths	60 enrolled & completed	Metal-ceramic partial & full single crowns. 2 cements, Zn-Ph, Ketac-Cem©	Sensitivity	No differences	
Jokstad & Mjör (1996)	Parallel RCT. GP (3) setting. Observation period: 10 yrs	81 patient w/ 135 abutments enrolled. 88 abutm. remain at 10 yrs	Metal-ceramic FPDs & single crowns, 3 cements, Zn-Ph, Ketac-Cem©, Fuji lonomer©	USPHS (Retention, Caries, margins,	No differences	
Hilton et al. 2004	Parallel RCT. GP (10) setting. Observation period: 3 months	209 crowns	Metal/metal-ceramic single crowns, 2 cements: Fuji1©, Rely-X©	Temp. & Bite Sensitivity	No differences	
Jokstad (2004)	Split-mouth RCT. GP(3) setting. Observation period: 6.5-8.5 yrs	22 patients w/ 39 pairs enrolled 20% dropout/censor at 5 yrs	Metal-ceramic Single crowns, 2 cements: Zn-Ph& Vitremer©	Sensitivity, GI, x- ray, satisfaction CDA: Adaptation, Retention, Caries,	No differences (95% vs 97% survival)	



Clinical trials								
Study	Methods	Partici pants	Interventions	Outcome s	Results			
Dahl et al.,1986	Prospective cohort, School setting observation av 4.5 yrs	187 patients	2 cements, Zn- Ph, Durelon©	Clinical	No difference			
Black & Charlton b,1990	Cross-sectional. School setting observation between .5- 7 yrs	782 patients	FPDs.2 cements: Zn-Ph & GIC	Clinical				
Metz & Bracket, 1994	Prospective case- series, GP setting observation between 3-8 yrs	1230 patients	Cast restorations luted with GIC	Clinical	No sec. caries, 99% retention, 4% irrevers pulpitis, no thermal sensitivity			
Johnson et al., 1993	Prospective case- series, GP setting observation between 3 mths		FPDs.2 cements: Zn-Ph & GIC	Sensitivity Pulpal	2w: Zn>>GIC sensitivity 3m: No difference			
						20		



An evidence-based critical apraisal approach

- How nany reports related to the topic can be identified? How can these reports be characterized on the basis of study design? How many reports are included within each category? What is the methodological scientific quality of these reports? How many reports can be excluded within each category due to questionable validity? How can the reports be described?
- 5. Which conclusions and implications can be drawn from the present science foundation?

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Scientific evidence

Clinical trials demonstrate that most cements perform adequately

An evidence-based critical apraisal approach

- How many reports related to the topic can be identified? How can these reports be characterized on the basis of study design? How many reports are included within each category?
- 2
- What is the methodological scientific quality of these reports? How many reports can be excluded within each category due to questionable validity?
- Which conclusions and implications can be drawn from the present science foundation?
- 6. Which questions have not been answered by these studies?

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Extrapolations from laboratory studies?

Extrapolations from laboratory studies: Relevance?

- Adhesive strength to: dentin, alloy, ceramic, ...
- Working & polymerisation time
- Biocompatibility
- Film thickness
- · Fluoride content
- Chemistry: waterbased hybrid polymer
- Solubility
- pH
- Retentive ability Termic isolation



Obliterative properties: "fit", microleakage,

Laboratory study – a sample of variables

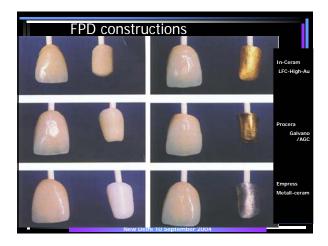
- Human or bovine tooth Time of testing after extraction Tooth storage environment Abutment form/geometry Surface area size Surface area size Surface area size Surface area size Location on tooth where dentin is exposed Dentin surface position relative to pulp

Cement thickness Cast fit & alloy/Ceramic & Surface treatment

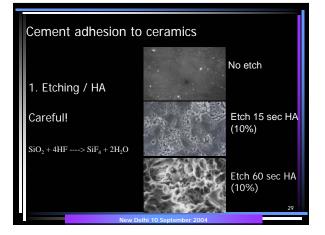
Test setup Geometry - cyclic loading, thermic stress, etc. Simulation of intrapulpal pressure/ humidity Test storage (time, temperature, etc.)

Measure of outcome?: Strength, leakage, SEM, degradation,

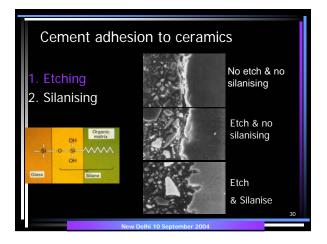
Other restorative materials













Cement adhesion to alloys & surface treatments

- 1. Chemical binding to oxides on the metal surface
- 2. Micromechanical retention
- Noble metals:
- Sandblasting
- Silanising
- Tin-plating
- "priming"
- Non-noble metals:
- etching w/ different acids or electrochemically
- etching w/ different acids and silanising
- Sandblasting and silanising under high pressure (Rocatec, ESPE),
- Sandblasting and silanising with heat (Kevloc AC, Silicoater Classic & MD, Siloc, Kulzer).

An evidence-based critical apraisal approach

- How can these reports be characterized on the basis of study design? How many reports are included within each category?
- What is the methodological scientific quality of these reports? How many reports can be excluded within each category due to questionable validity?
- Which conclusions and implications can be drawn from the present science foundation?
- Which questions have not been answered by these studies?
- Which problems remain unsolved?

Which luting cement should I use?

Clinical evidence: clinical experience

- Clinical trials and practical experience demonstrate that waterbased cements preform adequately when the tooth is prepared according to established guidelines, i.e.
 - preparations with adequate retentive surface
 - good precision of the restoration
 - -correct handling of the cement.

Other evidence: biocompatibility Waterbased cements

Polymer-based cements

Biological properties are known and acceptable.

Endodontic problems constitute a limited complication risk.

Systemic and/or local toxic problems not documented.

Substances that may leach adhesives. do not have an allergising potential.

Risk for local toxic reactions during the cementation process

Risk for allergic reactions related to some of the organic substances included in the cements and

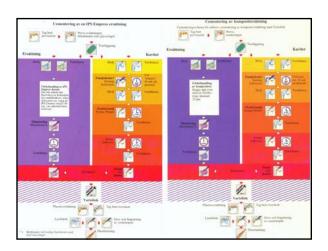
Other evidence: handling properties

The retentive ability and other mechanical properties are better for polymer-based than for waterbased cements measured in laboratory tests.

The use of waterbased cements is easy and allows room for variation of the worktime and polymerisation time with minor effects on the materials' properties.

Zinkphosphate cement

- **1.** Clean surface with H₂O₂, wash, dry
- 2. Mix powder and liquid
- 3. Apply cement in crown
- 4. Place crown on prepared tooth
- 5. Wait
- 6. Remove surplus with probe
- 7. Inspect crown margin



Conclusion

The use of waterbased cements to retain crowns and bridges has a long clinical history.

One should consider carefully before replacing 100 years experience with new materials with other compositions and little or no clinical documentation.

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