

Evidence Based Dentistry:

Luting agents:

Can we identify the best luting cement from clinical studies

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Use of luting cements in USA

	Metal- Ceramic	Ceramic
Hybrid ionomer	65%	46%
Adhesive resin	46%	63%
Glass ionomer	33%	

*Dental Products Report Survey, Nov 2000 n= 319 dentists.

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Resinmodified GIC & polyacrylate modified resin



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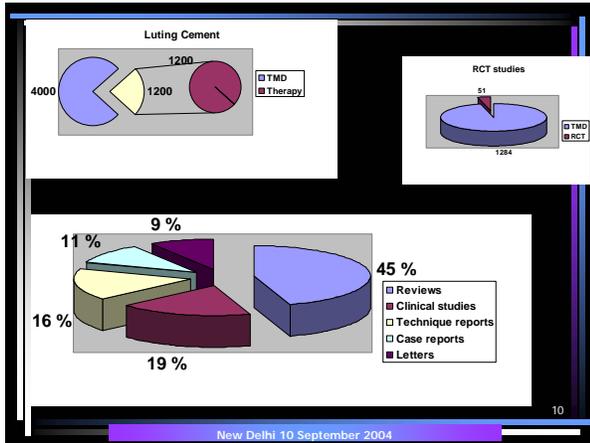
An evidence-based critical appraisal approach

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



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Strength of evidence of treatment effects

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

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

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

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- 3: well-designed trials without randomisation, single group pre-post, cohort, time series or matched case controlled studies
- 4: 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

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An evidence-based critical appraisal approach

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

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Strength of evidence of treatment effects

1: Systematic reviews	0
2: RCTs	6
3: Clinical trials	5
4: Experimental studies	25
5: Opinions, descriptive studies, reports, etc.	135

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4. How can the reports be described in terms of participants- Interventions- Outcome measures

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Scientific evidence

Clinical trials demonstrate that most cements perform adequately

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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?
5. 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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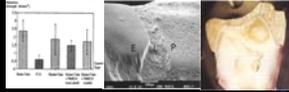
Extrapolations from laboratory studies?

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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,



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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 preparation techniques
- Enamel vs dentin surface area
 - 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,

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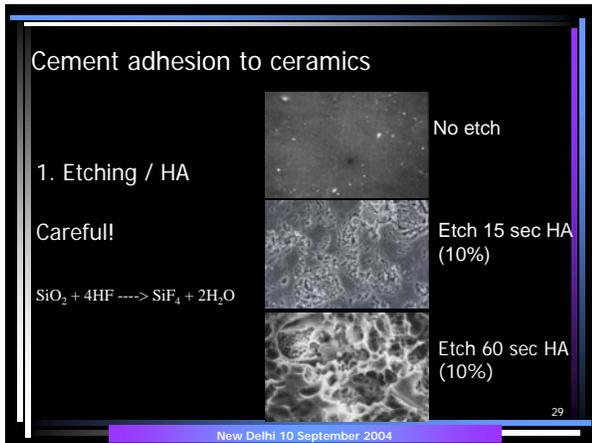
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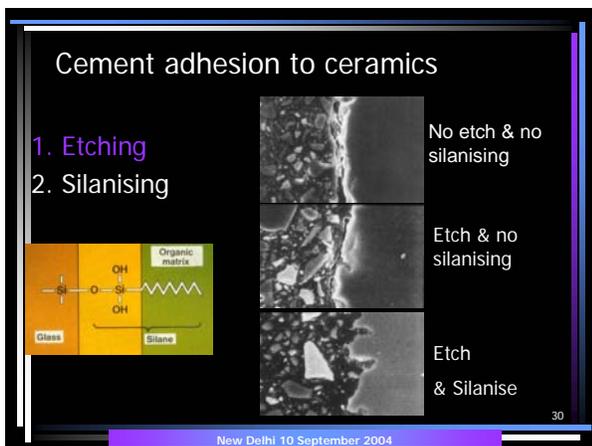
Other restorative materials

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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).

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6. Which questions have not been answered by these studies?

Which problems remain unsolved?

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Which luting cement should I use?

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Clinical evidence: clinical experience

Clinical trials and practical experience demonstrate that waterbased cements perform 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.

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Other evidence: biocompatibility

Waterbased 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 do not have an allergising potential.

Polymer-based cements

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 adhesives.

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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 work-time and polymerisation time with minor effects on the materials' properties.

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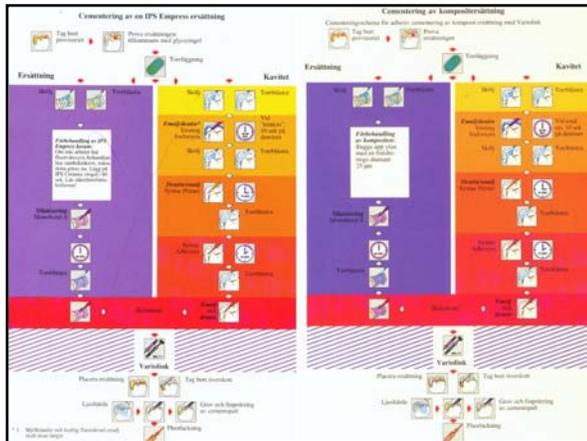
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Zinkphosphate cement

1. Clean surface with H_2O_2 , 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

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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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