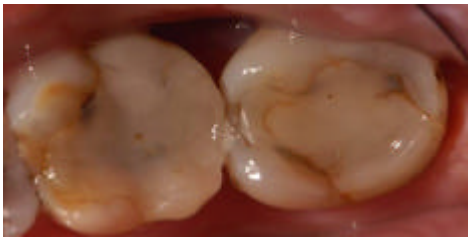
Repair or replacement of composite restorations? current teaching in North American dental schools



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History…

- Gordan *et al*, JADA 2003:

North American dental schools in 2001/ 2002:

- 71% (37 schools) taught repair techniques;
- 27 schools included clinical teaching of repair;
- Only 3 schools included formal teaching of repair

- Expectation longevity of a repair = 4 years

- Evidence for techniques was based on laboratory studies and desire for minimally invasive treatment

History…

- Blum *et al* Eur J Pros & Rest Dent 2002:

UK & Ireland schools in 2000/ 2001:

- 93% (14 schools) taught repair techniques;
- 14 schools included clinical teaching of repair;
- 14 schools included formal teaching of repair

- Expectation longevity of a repair = 5 years

Evidence…

- Some laboratory based studies (e.g. Puckett *et al*. 1991, Chiba *et al.* 1998, Shahdad & Kennedy 1998)
- Opinion from resin composite manufacturers (Blum *et al.* Prim Dent Care 2009)
- Some clinical data: longitudinal cohort studies within Dental Schools (e.g. Moncada *et al.* 2009, Gordan *et al.* 2009)

Current trends…

- Blum *et al* Eur J Dent Educ; in-press:

UK & Ireland schools in 2010:

- 88% (15 schools) taught repair techniques;
- defects considered appropriate for repair:
  - partial loss of restoration (13 schools)
  - marginal defects (12 schools);

- most popular surface treatment= mechanical roughening of existing composite with removal of surface layer (14 schools)
- Most popular repair material= hybrid resin composite (12 schools)

- Expectation longevity of a repair = 5 – 10 years

Aim of our study

… to investigate the contemporary teaching of composite restoration repair to dental students in North American dental schools

and

to compare these with the results of recent surveys of some European dental schools...

Method

With the assistance of CODE, an invitation to complete an internet-based questionnaire was distributed to 67 dental schools in US and Canada in late 2010.

Topics:

- Current levels of teaching of composite restoration repair
- Techniques taught for composite restoration repair
- Success of such techniques and evidence to support techniques used

Results

Responses received 48 North American schools (72%)

Region	Number of Responses	Percentage Response
Region I (Pacific)	10/12	83%
Region II (Midwest)	10/10	100%
Region III (South Midwest)	7/7	100%
Region IV (Great Lakes)	8/10	80%
Region V (North East)	6/17	35%
Region VI (South)	7/11	64%

Responses received from 17 UK & Irish schools (100%)

Responses received from 25 German schools (83%)

Responses received from 12 Scandinavian schools (100%)

Do you teach repair of composites?

	Yes	No
North America (48)	88% (42)	12% (6)
UK & Ireland (17)	88% (15)	12% (2)
Germany (25)	88% (22)	12% (3)
Scandinavia (12)	92% (11)	8% (1)

Of the 12 schools presently not teaching repair, 8 plan to introduce this teaching over the next 5 years.

If you teach repair, what evidence do you base this on?

	NA (42)	UK & Ire (15)	Ger (22)	Scan (11)
Clinical experience	42	12	11	22
Existing evidence	34	7	10	15
Case reports	11	2	3	8

Comments from schools who teach repair

"...Technique makes common sense – lack of evidence for replacing entire restoration..."

"...Minimise the increase in cavity size so slowing restorative spiral..."

"...Even though there is little concrete scientific evidence, teaching composite repair of an otherwise sound restoration makes eminent sense if one accepts and understands the current philosophy of minimal intervention dentistry or minimally invasive dentistry. The teaching must go hand in hand with optimal caries prevention and optimal repair techniques that provide appropriate retention and resistance form..."

Comments from schools not teaching repair

"...It is the policy of our institution NOT to teach students how to repair a failing composite restoration. It is recognized as perhaps a choice of treatment for seasoned practitioners that may understand when repair vs not is indicated. However, at this time, we concentrate on teaching our students how to place a complete, correct composite resin restoration..."

"...We promote the removal of all previous restorations to verify any and all infected dentin has been removed. This insures not only caries removal, but also provides experience in seeing strengths and limitations of different restorative materials. We prefer to teach to the "ideal", trusting this approach promotes excellence, rather than "repair" which is subjective and invites clinical risk to the patient and medicolegal obligation to the institution..."

Nature of teaching

	NA (42)	UK & Ire (15)	Ger (22)	Scan (11)
Didactic only (no clinical)	9	1	0	1
Didactic & clinical	33	7	4	9
Ad hoc clinical	29	9	19	6

Indications for repair: general factors

	NA (42)	UK & Ire (15)	Ger (22)	Scan (11)
Tooth substance preservation	42	15	21	11
Avoid damage to pulp	41	10	17	10
? treatment time	25	5	7	3
? treatment costs	26	2	10	6

Indications: restoration related factors

	NA (42)	UK & Ire (15)	Ger (22)	Scan (11)
Secondary caries	27	6	13	9
Marginal defects	42	12	20	10
Marginal discolouration	38	11	10	5
Superficial/ surface colour correction	28	11	11	3
Restoration discolouration labial/ buccal	27	10	8	6
Restoration discolouration occlusal	13	7	4	2
Restoration discolouration cervical	19	8	4	4
Restoration discolouration proximal	9	4	3	2
Discolouration involving more than one surface	9	5	0	1
Partial loss of restoration	37	13	19	8
Abrasion/ attrition/ erosion	22	8	6	9

Indications: restoration fracture

		NA (42)	UK & Ire (15)	Ger (22)	Scan (11)
Anterior Restoration	incisal	19	6	17	4
	proximal	7	6	4	3
	proximal - incisal	9	5	11	4
Posterior Restoration	occlusal	9	5	12	9
	isthmus	9	2	9	8
	box	12	7	14	7
	marginal ridge	14	5	15	9

Indications: tooth fracture adjacent to restoration

		NA (42)	UK & Ire (15)	Ger (22)	Scan (11)
Anterior Restoration	incisal	27	14	15	8
	proximal	14	11	6	5
	proximal - incisal	18	11	11	7
Posterior Restoration	cusp fracture	14	10	18	11
	cracked tooth	7	7	4	7

Have you found patients willing to accept composite repairs as an alternative to replacement?

	NA (42)	UK & Ire (15)	Ger (22)	Scan (11)
Yes	41	13	21	10
No	1	0	0	1
No response	0	2	1	0

What do you consider to be the acceptable longevity of a repair to an existing composite restoration ?

	NA (42)	UK & Ire (15)	Ger (22)	Scan (11)
<3 years	4	1	5	0
3 – 5 years	10	2	10	1
5 – 10 years	13	5	7	3
> 10 years	0	0	0	2
No response	15	7	0	5

Techniques: surface treatments

	NA (42)	UK & Ire (15)	Ger (22)	Scan (11)
Mechanical roughening of existing composite with removal of exposed surface	42	14	22	11
Etching with phosphoric acid	42	11	17	10
Cleaning with slurry of pumice	25	7	1	3
Aluminium oxide air abrasion	13	3	13	1
Etching with hydrofluoric acid	3	1	3	1
No mechanical surface treatment	0	0	0	0

Techniques: materials

	NA (42)	UK & Ire (15)	Ger (22)	Scan (11)
Dentine/enamel bonding agent	42	13	19	11
Silane coupling agent	12	5	10	3
Hybrid composite	42	12	16	9
Flowable composite	25	5	17	6
Nanohybrid composite	32	4	8	8
Glazing resin	11	2	0	0

Techniques: implements

	NA (42)	UK & Ire (15)	Ger (22)	Scan (11)
Diamond finishing instruments	39	13	19	11
Finishing discs	42	11	4	9
Composite polishing points	42	8	4	8
Composite polishing paste	29	7	2	2
Tungsten carbide finishing instruments	37	3	0	4

Other comments

“... Given the abuses we see in resin composite placement and that the replacement cycle is starting so much younger now, repair/refurbishment skills must be emphasized!...”

“... We do not specify and differentiate between different types of restoration/ tooth fractures in our teaching, it’s more like "when possible - repair!”...”

Other comments

"...Even though there is little concrete scientific evidence, teaching composite repair of an otherwise sound restoration makes eminent sense if one accepts and understands the current philosophy of minimal intervention dentistry or minimally invasive dentistry..."

"...Unfortunately we only do them as a provisional restoration, as there is no ADA code for resin repair one cannot offer it as a true alternative..."

In conclusion

- Teaching of repair, rather than replacement of composites, is increasing and has increased since time of last surveys.

- Motivated by a desire to avoid pulpal damage as well as reduced complexity of treatment

- However, there are still some recalcitrant views

In conclusion

- Should the ADA introduce a code for repair of direct composite restorations?

Acknowledgements

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Further information available from Dr Lynch:

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