Current trends in the teaching of direct posterior composites to dental students

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History…

- Mjör & Wilson, J Am Dent Assoc 1998:

…A survey of North American dental schools in the late 1990's concluded that at graduation, most dental students had '…minimal clinical experience with Class I and Class II composite restorations…'

- Similar pattern in Europe

History…

- Lynch, McConnell, Wilson, 2004/2005:

…ca. 30% of posterior restorations placed by dental students in US, UK and Irish dental schools were of composite…'

- Schools in US commented on the influence of the State/ Regional Board Exams, while schools in the UK commented on funding patterns (UK NHS) for dental care, as being challenges to teaching of posterior composites.

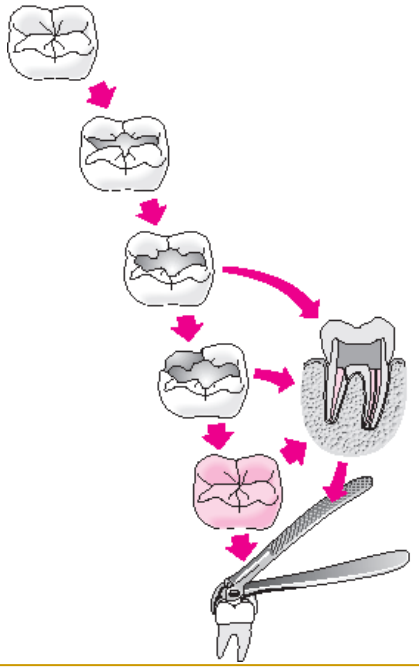
Evidence…

Increasing evidence to support the placement of composite in posterior cavities:

- Manhart J, Chen H, Hamm G, Hickel R. Review of the clinical survival of direct and indirect restorations in posterior teeth of the permanent dentition. Oper Dent 2004; 29: 481-508.

- Opdam NJ, Bronkhurst EM, Roeters JM, Loomans BA. A retrospective study clinical study on longevity of posterior composite and amalgam restorations. Dent Mat 2007; 23: 2-8.

The downward restorative spiral



Trends in dental practice

Increased placement of composite in load-bearing cavities of posterior teeth:

- Burke FJT, McHugh S, Hall AC, Randall RC, Widstrom E, Forss H. Amalgam and composite use in UK general dental practice in 2001. Br Dent J 2003; 194: 613-618.

- Gilmour ASM, Latif M, Addy LD, Lynch CD. Placement of posterior composite restorations in United Kingdom dental practices: techniques, problems, and attitudes. Int Dent J 2009; 59: 148 – 154.

Consensus statement UK teachers

Composite is the ‘material of choice’ for restoration of posterior teeth

Teaching posterior composite resin restorations in the United Kingdom and Ireland: consensus views of teachers

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Posterior composite resin restorations are an established feature of contemporary dental practice and all new dental graduates should be competent in providing such treatments for their patients. Surveys of educational curricula in this area in the United Kingdom and Ireland, as well as North America, have demonstrated variations both within and between dental schools. Such inconsistency does not help new dental school graduates, and may lead to confusion. At the British Association of Teachers of Conservative Dentistry Annual Conference held in Birmingham in September 2005, a session was devoted to the development of guidelines for dental schools on teaching posterior composite resin restorations to dental undergraduates. The theme of the conference concerned the teaching implications for changing from amalgam to composite. Two of the principal speakers at the meeting (Joost Roeters and Niek Opdam) were from the dental school at the University of Nijmegen in the Netherlands. This school was the first in Europe to discontinue the use of dental amalgam in its undergraduate curriculum over a decade ago. This paper reports the consensus views of those present on guidelines for teaching posterior composite resin restorations to dental undergraduate students.

British Dental Journal 2007; 25: 183 – 187.

Aim of our study

… to investigate the contemporary teaching of posterior composites to dental students in North American, UK and Irish 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 2009.

Simultaneously, the same invitation was sent to the 17 UK and Irish dental schools.

Topics:

- Current levels of teaching of posterior composites
- Techniques taught for posterior composite placement
- Anticipated teaching in five year's time

Results

Responses received 49 North American schools (73%)

Region	Number of Responses	Percentage Response
Region I (Pacific)	10/12	83%
Region II (Midwest)	7/10	70%
Region III (South Midwest)	7/7	100%
Region IV (Great Lakes)	7/10	70%
Region V (North East)	7/17	41%
Region VI (South)	11/11	100%

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

Types of posterior composites taught

Total number of respondents = 66

	Premolars	Molars
Occlusal cavities	66	66
2-surface occluso-proximal cavities	66	65
3-surface occluso-proximal cavities	60	56

Of the 10 schools not teaching 3-surface OP restorations – 8 are in North America and 2 are in the UK.

What material is taught first?

North America

36 schools (73%) teach amalgam first then composite;
13 schools (27%) teach composite first then amalgam

In 5 years… 27 schools (55%) will teach amalgam first

UK & Ireland

6 schools (35%) teach amalgam first then composite;
11 schools (65%) teach composite first then amalgam

In 5 years… 4 schools (24%) will teach amalgam first

Proportions of posterior restorations placed by dental students…

	North America	UK/ Ireland
Amalgam	48% (min=10%, max= 90%)	44% (min=10%, max=90%)
Composite	49% (min= 10%, max= 90%)	55% (min= 10%, max= 90%)

At the time of the last surveys (2004/2005), this ratio was 30% composite: 70% amalgam in US, UK and Irish schools.

Placement Techniques

Cavity design – to bevel or not to bevel?

North America

4 schools (8%) teach bevelled occlusal margins;

23 schools (47%) teach bevelled proximal margins

UK & Ireland

3 schools (18%) teach bevelled occlusal margins;

3 schools (18%) teach bevelled proximal margins

Contraindications to placement

North America		UK & Ireland	
History of adverse reaction to composite	46 (94%)	History of adverse reaction to composite	15 (88%)
Inability to place rubber dam	43 (88%)	Subgingival margins	12 (71%)
Subgingival margins	40 (82%)	Poor patient co-operation	9 (53%)
High caries risk	34 (69%)	Inability to place rubber dam	8 (47%)
Poor oral hygiene	29 (59%)	Poor oral hygiene	7 (41%)

Poor patient cooperation was 9th in North America (n=27)

High caries risk was 7th in UK & Ireland (n=4)

Protection of operatively exposed dentine

Shallow cavities (outer 1/3 dentine)

	No base – 'total etch'	**GIC only**	**Calcium hydroxide & GIC**
North America	44 (90%)	5 (10%)	0 (0%)
UK & Ireland	15 (88%)	1 (6%)	0 (0%)

Protection of operatively exposed dentine

Moderate cavities (middle 1/3 dentine)

	No base – 'total etch'	**GIC only**	**Calcium hydroxide & GIC**
North America	24 (49%)	24 (49%)	1 (2%)
UK & Ireland	13 (76%)	3 (18%)	0 (0%)

Protection of operatively exposed dentine

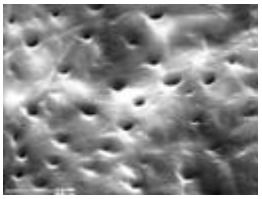
Deep cavities (inner 1/3 dentine)

	No base – 'total etch'	**GIC only**	**Calcium hydroxide & GIC**
North America	6 (12%)	30 (61%)	24 (49%)
UK & Ireland	7 (41%)	4 (29%)	7 (41%)

Trends in general practice (UK)

Table 5 Management of operatively exposed dentine

	No base/ liner ('dentine bonding' technique)	Glass ionomer cement (base) only	Calcium hydroxide (liner) & Glass ionomer cement (base)
Shallow cavities (outer third of dentine)	201(79%)	25(10%)	28(11%)
Moderate cavities (middle third of dentine)	53(21%)	135(53%)	66(26%)
Deep cavities (inner third of dentine)	23(9%)	71(28%)	160(63%)



Gilmour ASM, Latif M, Addy LD, Lynch CD. Placement of posterior composite restorations in United Kingdom dental practices: techniques, problems, and attitudes. Int Dent J 2009; 59: 148 – 154.

Light curing technologies

North America

43 schools (88%) teach LED LCUs (up from 15 schools in 2005);

25 schools (51%) teach QTH LCUs (down from 39 in 2005);

UK & Ireland

15 schools (88%) teach LED LCUs (up from 4 schools in 2005);

8 schools (47%) teach QTH LCUs (down from 11 in 2005);

Restoration of proximal contour

North America

46 schools (94%) teach circumferential metal bands and wooden wedges;

29 schools (59%) teach sectional metal bands and flexible plastic/ wooden wedges;

9 schools (18%) teach clear matrix bands and light-transmitting wedges

Restoration of proximal contour

UK & Ireland

15 schools (88%) teach circumferential metal bands and wooden wedges;

8 schools (47%) teach sectional metal bands and flexible plastic/ wooden wedges;

8 schools (47%) teach clear matrix bands and light-transmitting wedges

Popular composites

North America		UK & Ireland	
Filtek Supreme (3M Espe)	10 schools (20%)	Herculite XRV (Kerr)	7 schools (41%)
Premise (Kerr)	10 schools (20%)	Spectrum TPH (Dentsply)	6 schools (35%)
Esthet-X (Dentsply)	9 schools (18%)	Ceram X (Dentsply)	4 schools (9%)

Popular bonding systems

North America		UK & Ireland		
Optibond FL (Kerr)	11 schools (22%)	Prime & Bond (Dentsply)		8 schools (47%)
Optibond Solo (Kerr)	10 schools (20%)	Optibond (Kerr)		8 schools (47%)
Prime & Bond (Dentsply)	6 schools (12%)	Clearfil SE (Kuraray)	Bond 1 (Jeneric Pentron)	1 school (2%)

Fees for posterior composites

UK & Ireland

Ireland only= €21 = US$ 28

North America

Occlusal= US$ 61 (range= 25 -137)

OP= US$ 83 (range= 30 -160)

Finishing techniques taught (n=66)

	Occlusal restorations	Occlusoproximal restorations
Immediate finishing	65 (98%)	65 (98%)
Finishing diamonds	52 (79%)	50 (76%)
Finishing stones	16 (24%)	15 (23%)
Finishing/ polishing discs	48 (73%)	60 (91%)
Finishing/ polishing strips	34 (52%)	60 (91%)
Finishing/ polishing points	59 (89%)	59 (89%)
Finishing/ polishing pastes	31 (47%)	30 (45%)
Surface glaze/ sealant	29 (44%)	29 (44%)
Water cooling	38 (58%)	37 (58%)
Delayed (>24 hours) finishing	1 (2%)	1 (2%)

A note on indirect composites

Teaching of indirect composites?

North America

Yes: 39 schools No: 10 schools

Of these 39, 16 include clinical placement

UK & Ireland

Yes: 10 schools No: 7 schools

Of these 10, 3 include clinical placement

In conclusion

Teaching of posterior composites is increasing and has increased since time of last surveys.

Variation in techniques taught for placement of posterior composites

Time to think of a consensus document for North American schools?

Acknowledgements

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Further information available from Dr Lynch:

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