Expanded Structured Abstract

Fracture Risk Judgment and Crown Indication by Teachers in a Dental School: A Pilot Study

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Purpose: About 50% of crowns are made because of presumed fracture risk of the tooth or restoration itself in heavily filled teeth.^{1,2} Agreement among clinicians to prescribe crowns is generally low and influenced by various factors, including patient-, oral-, and dentist-related factors.¹⁻³ In dental education, agreement among teachers in different departments could promote consistent decision making.⁴ The hypothesis of the present study was that the risk to fracture of teeth restored with direct techniques is judged with a high level of agreement by dental teachers. The indication to make crowns to prevent fracture is, however, department dependent.

Materials and Methods: Eight natural posterior teeth with mesio-occlusodistal (MOD) restorations were arranged in an upper and lower phantom jaw (Table 1). Variables were tooth type, jaw, and restoration material. The (pre)molars on the right side were restored with amalgam alloys; those on the left were restored with resin composites. The first premolars had MOD resin composite restorations with cusp coverage of supporting or nonsupporting cusps. Afterward, two bitewing radiographs were made.

Jaws and bitewings were presented to 20 clinicians in the Operative Department and 20 in the Prosthodontic Department of the College of Dental Sciences, Radboud University of Nijmegen Medical Centre, Nijmegen, The Netherlands. They were asked to rank the teeth for risk of fracture with the consideration that other potential factors in fracture (eg, occlusal load) were equal for all

Table 1	Mean Ranks (Standard Deviations) for Fracture
Risk*	

Restoration type and tooth number [†]	Operative Department (n $=$ 20)	Prosthodontic Department (n = 20)		
MOD amalgam				
15	10.2 (1.9)	8.8 (3.4)		
45	9.3 (2.2)	8.6 (3.5)		
16	10.7 (1.0)	7.2 (2.6)		
46	10.8 (1.4)	8.7 (3.2)		
MOD resin composi	te			
25	4.2 (2.2)	3.8 (2.5)		
35	3.1 (2.0)	3.7 (2.6)		
26	4.1 (1.9)	5.2 (2.6)		
36	5.2 (2.0)	5.9 (2.8)		
MODS resin composition	site			
24	5.7 (2.2)	7.6 (2.9)		
34	5.1 (2.3)	6.1 (3.7)		
MODNS resin comp	osite			
14	6.5 (2.1)	7.3 (3.6)		
44	3.7 (1.7)	5.0 (3.2)		

*Lowest risk = rank 1; highest risk = rank 12.

[†]Fédération Dentaire Internationale tooth-numbering system. MOD = mesio-occlusodistal; MODS = MOD with supporting cusps cov-

ered; MODNS = MOD with nonsupporting cusps covered.

teeth. Observers could additionally indicate the type of restoration to be made assuming existing restorations were worn out, purely guided by fracture risk estimation. Options were re-restoration with amalgam; re-restoration with resin composite; re-restoration with covering (additional) cusp(s); and crowning. Intraobserver agreement on this indication was assessed by five clinicians in each department following a 2-month interval. Assessments were made in the context of each department's protocol.

Results: Teeth with amalgam restorations were assessed to have higher fracture risk than those with resin composite restorations (analysis of variance, P < .001; Table 1). This difference was more explicit for the Operative Department observers than for prosthodontic observers (P < .001). Additionally, operative observers assessed a higher fracture risk for the first molars (P=.001), and second premolars in the maxilla were assessed to have higher risk than mandibular ones (interaction between jaw and tooth type; P = .005). Prosthodontic observers considered the material effect

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	Re-restoration with resin composite		Re-restoration with resin composite while covering (additional) cusp(s)		Cr	Crowning	
	Operative	Prosthodontic	Operative	Prosthodontic	Operative	Prosthodontic	
Restoration type	Department	Department	Department	Department	Department	Department	
MOD amalgam (n = 160)*	69	42	11	15	20	39	
MOD resin composite $(n = 160)^{\dagger}$	60	41	19	15	21	41	
MODS resin composite ($n = 80$)	60	25	5	2	35	72	
MODNS resin composite ($n = 80$)	60	22	5	5	35	72	

 Table 2
 Distribution (%) of Indications for Restoration Assuming Existing Restorations Are Worn out

*4% of Prosthodontic Department advised re-restoration with amalgam with coverage of cusps (for molars).

[†]3% of Prosthodontic Department advised re-restoration with amalgam with coverage of cusps (for molars).

MOD = mesio-occlusodistal; MODS = MOD with supporting cusps covered; MODNS = MOD with nonsupporting cusps covered.

greatest for premolars (interaction between material and tooth type; P < .050). Operative observers indicated 70% re-restoration with resin composite and 30% crowns, whereas prosthodontic observers more often indicated crowns (50%). This difference was significant for the four restoration types (all P < .050; Table 2). Intraobserver agreement was moderate (kappa = .51).

Discussion: Results suggest that the operative teachers had more confidence in the clinical behavior of resin composite-restored teeth than did those in prosthodontics. This was reflected in the higher percentage of decisions to re-restore with resin composites instead of crowns. Noted differences between the departments, as well as moderate intraobserver agreement and relatively high standard deviations (Table 1), might interfere with consistent educational clinical decisions within a dental school.

Conclusion: Fracture risk for teeth with MOD restorations was judged with low agreement by dental teachers from two clinical departments. Moreover, the indication to make a crown appears to depend substantially on the teacher's department.

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Literature Abstract

The influence of some different factors on the accuracy of shade selection

The purpose of this study was to determine the effects of the light source, the experience of the observer, and the thickness of porcelain on the accuracy of shade selection. Vita shades of A1, A3, A4, B2, B4, C1, C3, D2, and D4 were fabricated from two different porcelains in 0.5-, 1.0-, and 1.5-mm samples. Ten experienced and 10 novice observers were solicited to select the shades in both adverse and ideal light conditions. An adverse light condition was represented by fluorescent ceiling light and natural light from the window. A Duro-test Vitalite lamp fixed above the samples was used to represent the ideal light source. The chi-square test for independence at a probability level of P < .05 was used to show significant difference. Results show that light quality was the most critical factor in shade selection, followed by the thickness of the samples. The thicker the samples, the better the shade selection. Observer experience was also an important factor, although it was not significant when the selection was performed in adverse light conditions.

Dagg H, O'Connell B, Claffey N, Byrne D, Gorman C. J Oral Rehabil 2004;31:900–904. References: 11. Reprints: Catherine Gorman, Department of Restorative Dentistry, Cork University Dental School and Hospital, Wilton, Cork, Ireland. e-mail: c.gorman@ucc.ie—Esquivel-Upshaw, San Antonio, TX

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