

Evaluation of dental explorer and visual inspection for the detection of residual caries among Greek dentists.

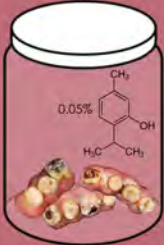
Ntovas P.*, Maniatakos P., Loubrinis N., Rahiotis C.

Department of Operative Dentistry, School of Dentistry, University of Athens, Greece



The main purpose of this study was to determine the efficiency of tactile sensation through dental explorer and visual inspection in the management of the diagnosis and removal of residual dental caries and the correlation of the results with the experience of the clinician.

MATERIALS & METHODS



Ten freshly extracted human carious teeth, were selected and carious tissue were removed to a level selected in random. Every tooth was examined by each person individually, initially only with the use of visual inspection and, consequently, with the use of a dental explorer for the need for further removal of dental tissues. In addition, a questionnaire inquiring about their dental experience, their familiarity with the Minimal Invasive (MI) philosophy and the technique which they use to detect and remove residual caries was completed. Mann-Whitney U-test and Kruskal Wallis tests were performed. (P<0.05)



RESULTS

Out of the 280 dentists in the original contact group, finally 220 accepted to take part in this study, 20 refused, 10 were unavailable, while contact was not facilitated with the remaining 30. Also, a total of 160 dental students - 80 for each of the two last years of Dental School - from a total of 220 were contracted. The experience of the examiners ranged from the undergraduate level to 41 years of clinical practice. Diagnodent analysis provided that 3 out of 10 teeth were underexcavated. Caries detector dye indicated the presence of residual caries in 6 out of 10 teeth. Histological analysis, revealed that 5 out of 10 teeth had residual caries, of which 5 with infected dentin, 3 with affected dentin, whereas 2 being free of residual caries.

	Usage %	Usage %	Diagnosis Mean/Median	Diagnosis Mean/Median	Familiarity with MI Dentistry %
	78.8	52.5	5.33 / 5	5.34 / 5	84.4
	<21 88.2	30.7	5.1 / 5	5.58 / 6	80.3
	>21 88.2	9.7	5.09 / 5	5.61 / 6	69.9
	Sensitivity %	Specificity %	Sensitivity %	Specificity %	Carious tissue removal technique % / Technique*
	51	55.6	56.6	50.1	65 / LSH 28 / HSH 5.7 / L 3.2 / DE
	<21 60.1	41.9	49.6	62	94 / LSH 82.3 / HSH 70 / DE 12.5 / OI 2.7 / L
	>21 59.1	42.6	45.4	66.5	88.6 Carbide 60 Diamond

* LSH: Low Speed rotary Handpiece, HSH: High Speed rotary Handpiece, L: Laser, DE: Dentline Excavator, OI: Oscillating instruments. Dentists were asked regarding the technique which they use, while students about the technique which they consider as optimal.

DISCUSSION

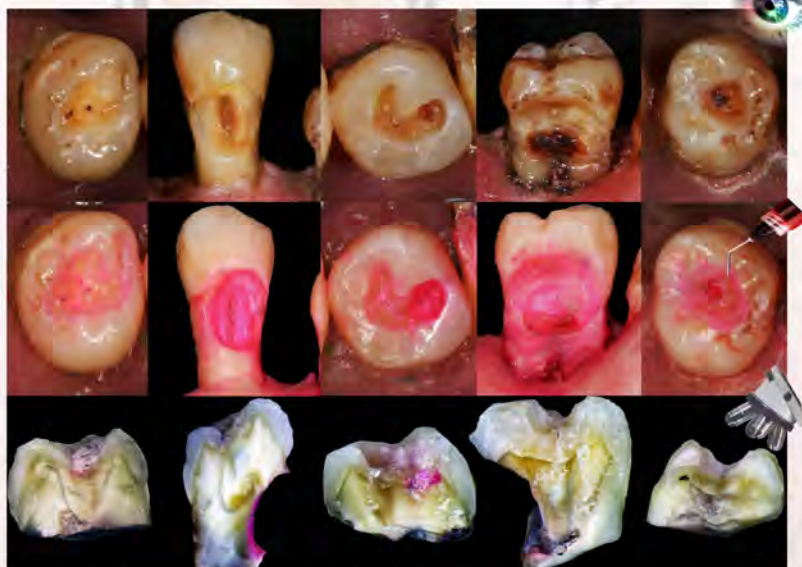
The operator's variability can influence different clinical procedures, including the diagnostic process. Our study results confirm that the use of dental explorer, one of the mostly widely utilized instrument for the identification of the caries endpoint, suffers from subjectivity, inherent between dentists, with a great potential either for over and under preparation. Despite the advances in residual caries diagnostic and removal methods, most Greek dentists still solely use traditional methods. More experienced professionals displayed better sensitivity, compared to young dentists and students with the use of dental probe. Contrary, dental students present superior sensitivity in the visual identification of residual caries, which can be explained by the fact that the Athens Dental School, in the past 5 years gave greater focus on the optical assessment of carries. Specificity Students, as well as the dentists with less than 20 years of clinical experience, exhibited more familiarity concerning MID. This can be explained by the fact that the Athens Dental School adopted Minimal Invasive philosophy into its curriculum in 2006. Most of the experienced professionals considered the minimal invasive philosophy to be associated with the avoidance of retention shaped cavities at the expense of the healthy dental tissues formation. The traditional visual tactile method, in combination with new caries diagnostic methods, has to be available, in order to reduce the objective effect of the former, to standardize the training procedure and to help students to be more confident during caries removal procedures.

CONCLUSIONS

The effect of the examiner's subjectivity on the diagnosis of residual caries has to be considered in future research, as it impairs the comparison between traditional and newer caries removal techniques and can result in significant differences in the quantity and quality of dental tissue removed by different operators. During the removal of carious lesions, with the goal of limiting the sacrifice of healthy structures and the leftover of residual caries, clinicians should combine a selective removal technique and the attentive visual inspection, with at least one further diagnostic method, aside from the dental explorer. Tactile examination of residual caries with the dental explorer must be used with attention and reduced trust.

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1st Row Teeth lesions after the random removal of carious tissue
2nd Row Stained lesions after the application of caries detector dye
3rd Row Histopathology after the longitudinal section of the teeth