Guest Editorial

Ignorance beats science and quality: Are not preparation techniques the origin of many problems in dental practice?

Karlheinz Kimmel*

Optimal selection and use of rotary dental instruments are keys to the quality and success of many procedures in dental practice and in the dental laboratory. Realization of the three major objectives of preparation techniques (atraumatic preparation, optimal results, and systematic performances) depends on the attention to research findings relating to the dangerous increase of dentinal and pulpal temperatures[1-3]; the congruency and optimalization of preparation and instrument configurations[4-7]; the consensus in dental education in this field[8-10]; and the complexity of relevant aspects.[11-13] However, too many members of the dental profession and dental industry neglect important perceptions regarding anatomic, physiologic, technologic, ergonomic, hygienic, and time/economic aspects. This results in an incredibly high incidence of pulpal irritation and damage. One of the most frequent errors by dentists is based on the ignorance of the necessary quantity of cooling water to be used during high-speed tooth preparation, milling, or grinding, because information and awareness of the problem are lacking in many countries.

In 1978 several investigations came to the conclusion that 50 mL/min of water is the minimal quantity of liquid necessary to prevent the increase of pulpal temperature to greater than 37°C.[2,3,7,10-12] This conclusion was published in the official guidelines for the selection and use of dental products issued by the German Dental Association[14] and the Federation of German Dentists Working Within the Federal Social Insurance System[14] since 1989.

This guest editorial has its origin in the comments of a *Quintessence International* reviewer in connection with a report by the International Institute of Dental Ergonomics and Technology (IIDET) relating to the selection and use of rotary instruments for cavity and crown preparations. "The author(s) are very dogmatic [in] what is right and what isn't. This reviewer tested our handpieces after seeing the authors' 50 mL/min decree. This reviewer found that I used about 3 to 4 mL/min. Opened up to the maximum, my handpiece could only put out 7 to 8 mL/min. [Use of] 50 mL/min would damn near drown the patient."

This "test result" and conclusion is one of the most dismaying scientific anecdotes I have experienced during my 40 years of research in this and other fields (ergonomics, infection control, standardization, and quality assurance). It is almost incredible that a dentist is so ignorant even after reading the mentioned report. Many thousands of dental educators and practitioners can certainly state that they never drowned a patient with the 50 mL/min and more of water coming out of their handpieces in the 25 years since high-speed preparation and evacuation techniques have been performed in clinical practice.

One of the reported IIDET surveys had the result that 56 departments of Austrian, German, and Swiss dental schools (of 63 answering the IIDET request) recommend the mentioned minimum of cooling water.[10,12] French and Italian experts also support actions to improve preparation techniques in this direction with their findings, publications, and participations at consensus conferences.[10]

Is all this enough evidence to change the mind of the quoted reviewer and other dentists who, until now, have neglected one of the most important safety measurements in clinical dentistry?

* Director, International Institute of Dental Ergonomics and Technology, Löhrstrasse 139, D-56068 Koblenz, Germany.

Editor's note: The purpose of the Guest Editorial is to allow authors to present their opinions on controversial issues. The views expressed by the author do not necessarily reflect the views of *Quintessence International* or its editors.

References

1. Langeland K. Pulp reactions to cavity preparation and burns in the dentin. Oral Surg 1960;12:1235.
2. Klötzer, WT. Die traumatische Schädigung der Pulpa als Folge der Kronenpräparation. In: Kimmel K, Büchs H, Eibofner E (eds). Zahnärztliche Präparationstechnik. Heidelberg: Hüthig, 1986:157–172.
3. Klaiber R, Gleinser HA, Martin HH. Temperaturentwicklung von Turbinen und Mikromotor mit Schnellauf-Winkelstück. In: Kimmel K, Büchs H, Eibofner E (eds). Zahnärztliche Präparationstechnik. Heidelberg: Hüthig, 1986:179–183.
4. Markly M-R. Saving teeth for lifetime service. Presented at the Academy of General Dentistry. July 1981.
5. Lustig PL, Przetak CH, Mucko K. Ein rationelles System für die Kronenpräparation. Komet-Fachberichte für die zahnärztliche Praxis. Lemgo 1983.
6. Ketterl W, Mayer A. Kritische Betrachtung zur rationellen Kavitätenpräparation. Zahnärztl Welt 1976;1:16–20.
7. Lutz F, Kreji I, Barbakow F. The importance of proximal curing in posterior composite resin restorations. Quintessence Int 1992;23:605–609.
8. Kress GC, Silversin JB, Colenback PR. An Evaluation of the Project ACORDE. Final Report. Boston: Harvard School of Dental Medicine, 1978.
9. O'Hara JW, Clark LL. The evolution of the contemporary cavity preparation. J Am Dent Assoc 1984;108:993–997.
10. International Institute of Dental Ergonomics and Practice Administration/International Institute of Dental Ergonomics and Technology: Annual Reports 1973–1992
11. Bleicher P. Considérations physiologiques, physiques et économiques d'entrainements et des instruments rotatifs en art dentaire [thesis]. Strasbourg, Univ Louis Pasteur Strasbourg I, 1987.
12. Kimmel K. Optimal selection and use of rotary instruments for cavity and crown preparations. Dent Echo 1993;63:63–69.
13. Shillingburg HT, Jacobi R, Brackett SE. Fundamentals of Tooth Preparations. Chicago: Quintessence, 1987
14. Bundeszahnärztekammer/Kassenzahnärztliche Bundesvereinigung: Das Dental Vademekum. Kap. 10 Präparationstechnik. Köln: Deutscher Ärzte-Verlag, 1989–1991 □