

The teaching of minimally invasive dentistry: an experience report

Marcella Satte Alam Gonçalves*; Maximiliano Sérgio Cenci**; Marcos Britto Corrêa**; Marcus Cristian Muniz Conde***; Luiz Alexandre Chisini****

- * Graduate student, Federal University of Pelotas
- ** Professor, Doctor, Post Graduate Program, Federal University of Pelotas
- *** Professor, Doctor, Biological and Health Center, University of Vale do Taquari
- **** Professor, Doctor, Biological and Health Center, University of Vale do Taquari

Received August 04, 2018. Approved December 22, 2019.

ABSTRACT

For many years, teaching dentistry has been based solely on the reproduction of restorative techniques, students being motivated merely to perform procedures without developing reflective skills, which are as important as the techniques themselves. This experience report discusses a clinical case and problematizes the teaching of minimally invasive dentistry. Discussions were held and the formulation of tables and charts was performed by the students, as well as the compilation of a practical guide to help with the choice of restorative treatment. The activities were considered productive and complementary in solving lingering doubts. It was concluded that the use of the active methodology reported in knowledge building was an important strategy for the creation of learning situations in the approach to minimally invasive dentistry. Meaningful learning from an ongoing clinical case proved to be an important teaching strategy.

Descriptors: Education, Dental. Decision Making. Clinical Case. Dental Caries.

1 INTRODUCTION

Dental caries is the most prevalent problem in the oral cavity¹⁻³, presenting multifactorial etiology⁴. Behavioral, social and economic factors are important components in the development of the disease, which can be

arrested at any time by removing the etiological factors, thus restoring health. In this way, the dentist must know and be able to identify the components of the activity of the disease in order to make the best treatment decision, which, in many circumstances, is not restorative^{5,6}.

Several studies have shown that clinical management varies among dentists in different countries⁷⁻¹³, demonstrating the highly curative and interventionist profile of professionals, who tend to intervene in initial caries lesions and in restorations with marginal staining, without there being, in fact, a need to do so⁹⁻¹¹. Therefore, teaching minimally invasive dentistry presents a very interesting context in the problematization of technical dentistry. Clinical cases can be a trigger for discussion and used as a strategy to work reflective skills and abilities such as critical thinking. In addition, the questioning of cases can be a pedagogical instrument to develop the clinical reasoning of future professionals, who must be able to act upon the etiological agents of the disease and not only on the reproduction of procedures^{14,15}. The focus should not only be on the traditional teaching of certain restorative techniques, but also provide an environment capable of generating discussion¹⁶ that ensures future professionals will avoid performing

unnecessary procedures¹⁷⁻¹⁹.

In view of the importance of discussing topics related to minimally invasive dentistry and considering that the studies published in this context are basically restricted to teaching and training in the detection of carious lesions²⁰ and simulation of the texture of carious lesions for preclinical training²¹, the present study aimed to present an experience report that used the discussion of a clinical case to problematize the teaching of minimally invasive dentistry.

2 EXPERIENCE REPORT

A 22-year-old female patient sought dental care at the Faculty of Dentistry of the Federal University of Pelotas (FO-UFPel), at the *Clínica Odontológica I* unit. At reception, the main complaint noted was the need to perform several restorations. Further information was provided at reception and then clinical and radiographic examinations were performed, the findings of which are shown in chart 1.

Chart 1. Clinical findings after diagnostic tests

Supragingival periodontal examinations	
Visible Plate Index:	8.3%
Gingival Bleeding Index:	13.5%
Plaque Retentive Factor:	16.7%
Subgingival periodontal examinations	
Probing attachment:	All < 4 mm
Bleeding on probing:	71.8%
Dental Fluorosis	
Dean index:	2
ICDAS (<i>International Caries Detection and Assessment System</i>)	
Score 2 - inactive caries lesions with visible opacity in the presence of humidity	Teeth numbers 15, 17, 25, 27, 33, 34, 36, 43, 44, 45 and 47
Score 3 – enamel cavity	Teeth numbers 25, 26, 36 and 46
Restorations	
Composite resin restorations	Occlusal faces of teeth numbers 16, 26 and 46

The diagnosis was mild, plaque-induced gingivitis and caries disease was absent. The

patient was instructed to perform oral hygiene, restorative treatment being contraindicated. The patient reported that she had made an appointment at a private dental clinic and that the professional concluded that the stains on her teeth were caries lesions and that restorative treatment was necessary. In addition, the professional insisted that the disease would progress and, if not treated with an operative intervention, could result in the need for endodontic treatment. In addition, it could eventually lead to the loss of teeth. The treatment plan and costing were presented by the professional.

Due to the high cost of performing all the restorations, she reported that only three teeth were operated on, the services of FO-UFPe being sought subsequently. After clarifying the patient's doubts, she was instructed and warned of the risks of dental overtreatment and that inactive caries lesions carry a low risk of reemerging and progressing. She was also instructed to attend regular consultations to monitor inactive lesions and control gingivitis.

In view of the complex range of nuances in the present clinical case, a group discussion was held with the other students, who initially presented several contrasting points of view on the possibilities of clinical management for the case in question. Several students tended to recommend restorative treatment. In this context, considering that the indication of restorative treatment does not present specific criteria and that it can vary (within certain limits), students were asked to devise, based on the literature, a table showing the treatment possibilities for dental caries, classifying them according to the intervention target. The construction of a schematic chart was also requested to guide the decision of restorative treatment based on a philosophy of minimal restorative intervention.

The students presented the two requested

tasks, which were discussed with the teachers.

At this point, the students continued to have difficulty in deciding whether restoration should or should not be indicated, mainly due to the impossibility of standardizing or objectively determining the extent of carious lesions based on radiographic images, coupled with the various possibilities of materials and techniques. In this way, an agreement was reached with the students to compose a text based on the current scientific literature, focusing on a discussion about the restorative treatment decision, all of them being based on the ICDAS (International Caries Detection and Assessment System). This was carried out with the objective of compiling a practical guide for the choice of restorative treatment method.

The feedback was reported by the students to be productive and complementary in solving lingering doubts regarding the composition of the tables. Thus, the present case was important for problematizing the discussion of minimally invasive dentistry during practical activities, boosting reflective thinking, which is essential in the training of professionals capable of looking beyond the restorative technique, in other words, in the determinants of the health / disease process.

3 FINAL CONSIDERATIONS

The formulation of the treatment plan is one of the most important aspects of the dentist's routine and the decision on restorative intervention must be based on scientific knowledge, as well as the determination of a correct, accurate diagnosis. However, establishing a correct diagnosis requires considerable knowledge regarding the determinants of disease, as well as a knowledge of the histopathology of caries and its manifestations in dental tissue^{4,22,23}, which might be considered complex for students who are

starting out on their clinical career. Thus, the use of clinical situations to problematize the subject and acquire a deeper understanding of the cognitive issues seems to be an interesting pedagogical strategy based on the philosophy of active learning.

For many years, the teaching of Dentistry was based solely on the reproduction of restorative techniques and the student was motivated merely to perform restorations with a high level of detail, but without reflecting on his actions²⁴. Currently, one of the fundamental characteristics of the profile of students is the ability for reflection. Thus, the teaching of Dentistry has moved towards less passivity for students, who should participate in moments of discussion¹⁶. These moments are fundamental for the development or improvement of reflective skills.

The development of material based on scientific literature to assist in determining and subsequently applying the content in clinical situations, was an important teaching strategy that provided learning environments and fostered discussion based on scientific evidence obtained by the students. These approaches have always been mediated by teachers who have come to perform the role of tutors. In addition to the initially proposed questions, the students raised other issues that had not been initially considered by the teachers, such as the large number of dentists in Brazil²⁵ and the possible reflection of this in the behavior of professionals and the commercialization of Dentistry. This discussion was based on a recent study investigating the job market for dentists²⁵. Thus, the students argued that professionals might be recommending unnecessary treatments for financial reasons, in addition to their lack of current information about minimally invasive dentistry.

It is concluded that the use of the active methodology reported in the construction of

knowledge was an important strategy for the creation of learning situations in the approach of minimally invasive Dentistry. Significant learning from an ongoing clinical case proved to be an important teaching strategy.

RESUMO

O ensino da Odontologia minimamente invasiva: relato de experiência

Por muitos anos o ensino de Odontologia foi baseado apenas na reprodução de técnicas restauradoras e o estudante era motivado a apenas realizar procedimentos, sem desenvolver habilidades reflexivas, as quais são tão importantes quanto as técnicas. O presente relato de experiência discute um caso clínico como problematizador no ensino da Odontologia minimamente invasiva. Discussões e formulação de tabelas e quadros foram realizadas pelos estudantes, assim como a elaboração de um guia prático para auxiliar a escolha do tratamento restaurador. As atividades foram tidas como produtivas e complementares na resolução das dúvidas que ainda estavam pendentes. Conclui-se que a utilização da metodologia ativa relatada na construção de conhecimento foi uma importante estratégia para criar situações de aprendizado na abordagem da Odontologia minimamente invasiva. O aprendizado significativo advindo de um caso clínico em andamento se mostrou uma importante estratégia de ensino.

Descritores: Cárie Dental. Tomada de Decisões. Caso Clínico. Ensino em Odontologia.

REFERENCES

1. Marcenes W, Kassebaum NJ, Bernabe E, Flaxman A, Naghavi M, Lopez A, et al. Global burden of oral conditions in 1990-2010: a systematic analysis. *J Dent Res.* 2013;92(7):592-7.
2. Robertson MD, Schwendicke F, de Araujo MP, Radford JR, Harris JC, McGregor S, et al. Dental caries experience, care index and restorative index in children with learning

- disabilities and children without learning disabilities; a systematic review and meta-analysis. *BMC Oral Health*. 2019;19(1):146.
3. Jordan RA, Krois J, Schiffner U, Micheelis W, Schwendicke F. Trends in caries experience in the permanent dentition in Germany 1997-2014, and projection to 2030: Morbidity shifts in an aging society. *Sci Rep*. 2019;9(1):5534.
 4. Kidd EA, Fejerskov O. What constitutes dental caries? Histopathology of carious enamel and dentin related to the action of cariogenic biofilms. *J Dent Res*. 2004;83 Spec No C:C35-8.
 5. Schwendicke F. Less Is More? The Long-Term Health and Cost Consequences Resulting from Minimal Invasive Caries Management. *Dent Clin North Am*. 2019;63(4):737-49.
 6. Schwendicke F, Splieth C, Breschi L, Banerjee A, Fontana M, Paris S, et al. When to intervene in the caries process? An expert Delphi consensus statement. *Clin Oral Investig*. 2019.
 7. Chisini LA, Conde MC, Correa MB, Dantas RV, Silva AF, Pappen FG, et al. Vital Pulp Therapies in Clinical Practice: Findings from a Survey with Dentist in Southern Brazil. *Braz Dent J*. 2015;26(6):566-71.
 8. Gomez J, Ellwood RP, Martignon S, Pretty IA. Dentists' perspectives on caries-related treatment decisions. *Community Dent Health*. 2014;31(2):91-8.
 9. Kakudate N, Sumida F, Matsumoto Y, Yokoyama Y, Gilbert GH, Gordan VV. Patient age and dentists' decisions about occlusal caries treatment thresholds. *Oper Dent*. 2014;39(5):473-80.
 10. Domejean S, Leger S, Maltrait M, Espelid I, Tveit AB, Tubert-Jeannin S. Changes in Occlusal Caries Lesion Management in France from 2002 to 2012: A Persistent Gap between Evidence and Clinical Practice. *Caries Res*. 2015;49(4):408-16.
 11. Innes NPT, Schwendicke F. Restorative Thresholds for Carious Lesions: Systematic Review and Meta-analysis. *J Dent Res*. 2017;96(5):501-8.
 12. Chisini LA, Noronha TG, Ramos EC, Dos Santos-Junior RB, Sampaio KH, Faria ESAL, et al. Does the skin color of patients influence the treatment decision-making of dentists? A randomized questionnaire-based study. *Clin Oral Investig*. 2018.
 13. Chisini LA, Collares K, Bastos JLD, Peres KG, Peres MA, Horta BL, et al. Skin color affect the replacement of amalgam for composite in posterior restorations: a birth-cohort study. *Braz Oral Res*. 2019;33:e54.
 14. Secco LG, Perreira MLT. The teaching of dentistry: professionalization of university teaching and the challenges of the political-structural dimension *Ciênc Saúde Coletiva*. 2004;9(1):113-20.
 15. Innes NPT, Chu CH, Fontana M, Lo ECM, Thomson WM, Uribe S, et al. A Century of Change towards Prevention and Minimal Intervention in Cariology. *J Dent Res*. 2019;98(6):611-7.
 16. Aquilante AG, Tomita NE. O estudante de Odontologia e a educação. *Revista da ABENO*. 2005;5(1):6-11.
 17. Chisini LA, Collares K, Cademartori MG, de Oliveira LJC, Conde MCM, Demarco FF, et al. Restorations in primary teeth: a systematic review on survival and reasons for failures. *Int J Paediatr Dent*. 2018;28(2):123-39.
 18. Bader JD, Shugars DA, Bonito AJ. Systematic reviews of selected dental caries diagnostic and management methods. *J Dent Educ*. 2001;65(10):960-8.
 19. Cury JA, Tenuta LM. Enamel remineralization: controlling the caries

- disease or treating early caries lesions? *Braz Oral Res.* 2009;23 Suppl 1:23-30.
20. Braga MM, Lenzi TL, Tibério BP, Ferreira FR, Mendes FM, Ekstrand KR. Nova proposta para ensino/treinamento na detecção de lesões de cárie: insights da implementação do método entre estudantes de graduação. *Rev ABENO.* 2018;18(2):2-12.
21. Monnerat AF, Cadette C, Monnerat ABL, Barquete CG. Simulação de textura de lesão cariiosa para treinamento pré-clínico. *Rev ABENO.* 2017;17(1):55-61.
22. Gonzalez-Cabezas C. The chemistry of caries: remineralization and demineralization events with direct clinical relevance. *Dent Clin North Am.* 2010;54(3):469-78.
23. Cury JA, de Oliveira BH, dos Santos AP, Tenuta LM. Are fluoride releasing dental materials clinically effective on caries control? *Dent Mater.* 2016;32(3):323-33.
24. Lazzarin HC, Nakama L, Júnior LC. Perceptions of dentistry teachers in the teaching and learning process. *Ciênc Saúde Coletiva.* 2010;15(1801-1810).
25. San Martin AS, Chisini LA, Martelli S, Sartori LRM, Ramos EC, Demarco FF. Distribution of Dental Schools and dentists in Brazil: an overview of the labor market. *Rev ABENO.* 2018;18(1):63-73.

Correspondence to:

Luiz Alexandre Chisini
e-mail: alexandrechisini@hotmail.com
Universidade do Vale do Taquari
Centro de Ciências Biológicas e da Saúde
Faculdade de Odontologia
Rua Avelino Talini, 171
95914-000 Lajeado/RS Brazil