Journal of Dentistry xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Journal of Dentistry

journal homepage: www.elsevier.com/locate/jdent

Decision-making of general practitioners on interventions at restorations based on bitewing radiographs

Cácia Signori[a,b,*], Mark Laske[b], Fausto M. Mendes[c], Marie-Charlotte D.N.J.M. Huysmans[b], Maximiliano S. Cenci[a], Niek J.M. Opdam[b]

[a] Federal University of Pelotas, Graduate Program in Dentistry, Gonçalves Chaves, 457, 5th floor, Pelotas, RS, 96015560, Brazil
[b] Radboud University Medical Centre, College of Dental Sciences, Preventive and Restorative Dentistry, Ph van Leydenlaan 25, PO Box 9101, 6500HB, Nijmegen, The Netherlands
[c] University of São Paulo, Department of Pediatric Dentistry, School of Dentistry, Lineu Prestes Avenue, 2227, Sao Paulo, SP, 05508000, Brazil

ARTICLE INFO

Keywords:
Restorations
Dental caries
Diagnosis
Decision-making

ABSTRACT

Objective: The aim of this study was to compare decision-making based on bitewing analysis of restored proximal surfaces by general dental practitioners (GDPs) with diagnossis and clinical decisions made by experts in cariology and restorative dentistry.
Methods: This practice-based study used a database of 7 general dental practices. Posterior bitewing radiographs were selected from the electronic patient files of patients, and 770 cases of proximal restored surfaces were selected. Fifty percent of the cases which lead to the restorative decision, and the other half were cases decided for monitoring by the GDPs. Three experts performed radiographic assessment. The outcome variables were agreement of diagnosis and decision of treatment. Cohen's kappa statistic was used.
Results: For the experts, moderate to substantial intraexaminer agreement was observed for the diagnostic criteria, and kappa values of 0.77, 0.79, and 0.88 were obtained for each expert regarding the treatment assignment. Agreement between GDPs and the majority of experts for secondary caries varied between 67 and 83%. One hundred seventy-three out of 385 cases that were treated by GDPs were decided for monitoring by the experts, while 8 cases that were decided for monitoring by the GDPs were decided for treatment. The agreement between experts and GDPs was moderate for secondary caries detection, and fair for treatment decision.
Conclusion: The GDPs tend to have a less conservative approach regarding the decision to intervene or not concerning the reassessment of restorations, showing moderate agreement with the experts for secondary caries detection and fair agreement regarding the treatment decision.
Clinical significance: This study highlights that GDPs tend to have a less conservative approach to the decision to intervene or not in posterior restorations, compared to experts in cariology and restorative dentistry. Efforts should be made to reduce these differences based on minimally invasive dentistry.

1. Introduction

The detection of proximal secondary caries is a challenge for general dental practitioners (GDPs) in their daily clinical routine [1]. Bitewing radiographs are traditionally used to examine interproximal restored surfaces [2] because the presence of adjacent teeth and gingival tissue in cervical areas do not allow an appropriate visual inspection of marginal defects, such as overhang, ditches, and gaps [3]. However, radiographic detection of marginal gaps may lead to false-positive and false-negative treatment decisions, including underestimation of caries lesion size [4]. Moreover, misinterpretations may occur due to difficulties in distinction between restorative materials and tooth tissue, depending on the radiopacity of materials [5].

Substantial variability in diagnosis and subsequent decision-making of restorations between dentists has been reported [6–8], which may be due to the lack of standardized diagnostic criteria and treatment guidelines for monitoring, restoring or replacing a defective restoration [9]. As a result, the decision on how and when to intervene continues to be a topic of discussion [9–11], and it is unclear whether dental practitioners and professionals from the academic field share a common understanding of restorative treatment decisions. Several studies have investigated the treatment decision related to radiographic diagnosis of primary caries in proximal surfaces in posterior teeth [12,13], while a limited number of studies have addressed the diagnosis and decision-

* Corresponding author.
E-mail address: cacia.signori@ufpel.edu.br (C. Signori).

https://doi.org/10.1016/j.jdent.2018.07.003
Received 5 June 2018; Received in revised form 2 July 2018; Accepted 4 July 2018
0300-5712/ © 2018 Elsevier Ltd. All rights reserved.

making in restored surfaces [4,14]. There is need to clarify the reasons for the decision to intervene restoratively on a defective restoration [15] and improve the treatment decision based on radiographic assessments [16], ensuring that the patient receives the best dental health care and avoids overtreatment [1,17].

Secondary caries are reported to be the most common reason to replace or repair a defective dental restoration in general practice [18,19], while in controlled studies performed in academia, secondary caries are seldom observed [20,21]. This raises the issue of whether GDPs correctly diagnose secondary caries or misjudge discolored margins and imperfect marginal fit as secondary caries [22]. Therefore, the investigation of clinical decision-making on defective restorations in a network of GDPs is interesting, as it allows access to the clinical information of actual treatments performed by GDPs [23]. The aim of this study was to compare the outcome of clinical decision-making by GDPs based on the analysis of bitewings with decisions made by experts in cariology and restorative dentistry analyzing the same bitewings. The hypothesis of the study was that experts and GDPs would have a reasonable agreement in the detection of secondary caries and treatment decisions, while a more conservative approach in decision-making would be adopted by the experts compared to GDPs.

2. Materials and methods

2.1. Study design

This was a practice-based study conducted from a database with clinical records from 7 general dental practices. Posterior bitewing radiographs of proximal surfaces with different statuses concerning secondary caries lesions and defective restorations were randomly selected from files. Three experts in the areas of cariology and restorative dentistry (FMM, MSC, NO) performed the radiographic assessment. The outcome variables were agreement of diagnosis and decision of treatment between experts and GDPs. Ethical approval was granted by the local Ethics Committee of METC (CMO file nr. 2015-1565).

2.2. Sample characterization and eligibility criteria

Data were collected from a dental practice-based research network in the Netherlands (Fig. 1). Clinical records from 7 general practices were used, including 2 solo practices, 3 small practices (2–3 dentists), and 2 larger (more than 4 dentists) group practices. Five practices were located in urban areas and 2 in rural areas. Data from the Electronic Patient Files (EPF) of the patients were digitally extracted into a Microsoft® Excel file (Microsoft, Redmond, WA, USA) from the EPF software (Exquise®, Kwadijk, NL; Complan®, Heerhugowaard, NL). Cases registered in the period between January 2015 to January 2017 from patients attending a regular checkup were included. For eligibility in the study, those patients that received at least one restoration in a posterior tooth due to the detection of ‘caries around restorations’, ‘marginal imperfection’ (lack of material or overhang), or inadequate proximal contact were selected. Only Class II restorations in 2 or more surfaces were included in the study sample, while third molars were excluded. Patient files with incomplete information were also excluded. Furthermore, each included dentist should have at least 100 restorations meeting the inclusion criteria. In total, this resulted in 13 dentists to be included in this phase.

2.3. Data collection and selection

Seven dental practices located in different cities in the Netherlands were visited. During the visits, data of the included patients were checked, and the bitewing radiographs were extracted from the EPF. Cases without appropriate radiographs either due to the date or quality of the image were excluded from the sample. Dates of dental visits and bitewing radiographs were used as a parameter to confirm the treatment decision made by dentists (intervention or non-intervention) at the time of the digital bitewing analysis. For instance, in those cases where the intervention was performed following the radiograph, the treatment decision attributed by the dentist was classified as ‘intervention’. On the other hand, in those cases in which the checkup including bitewings did not lead to a restorative intervention before another checkup had taken place, or in cases in which no intervention was performed within the period of 6 months after bitewing radiographs were taken, the dentist's treatment decision was classified as non-intervention (at the time of the radiograph interpretation). Also, cases of restored teeth present in the radiographs without intervention during the period of the study were considered as cases of non-intervention.

In total, 70 cases were selected per dentist. Thirty-five cases were cases of intervention and the same amount of cases with were randomly selected from the bitewings. Two dentists were excluded in this phase of the study due to an insufficient number of cases related to poor quality of images or absence of radiographs in patient files. Thus, 770 cases from 11 dentists were included for assessment by the experts. For calculation of intraexaminer agreement, 10% of cases were re-evaluated after 2 weeks, totaling 847 cases for evaluation.

2.4. Calibration of experts

Three experts (FMM, MSC and NO) in cariology and restorative dentistry from distinct university centers were invited to analyze a series of bitewing radiographs. Prior to the assessments, the 3 experts received a sequence of cases for analysis and discussion, after which a pilot test was conducted. Ten cases were individually evaluated for each expert. The agreement in most diagnostic criteria, described above, was substantial (kappa > 0.60) to excellent (kappa > 0.86) regarding aspects related to the diagnosis and moderate for intervention assignment (kappa 0.56). The experts were blind to the decisions made by the GDPs and to the other experts’ decisions.

2.5. Assessment of bitewings

Digital bitewing radiographs were inserted in a Microsoft® PowerPoint file (Microsoft, Redmond, WA, USA), coded, and projected on a black background. Tooth number and surface were identified in each bitewing radiograph. The cases were divided in 3 parts available with a 1-week interval between each part for optimizing the assessments. Information related to the patient was not provided. The assessments were performed individually by the 3 experts. The presence of secondary caries, lack of material, overhang, inadequate contact point, radiolucent bond, or cement layer, lack of adaptation, and residual caries were assessed as likely present (1) or not likely present (0). In those cases involving 1 or more of 3 aspects, overhang, lack of material, and lack of adaptation, were scored as present, the cases were scored as lack of adaptation in the analysis.

Finally, the need for intervention was scored as: (0) no intervention, (1) more information is necessary for treatment decision, and (2) intervention.

2.6. Statistical analysis

Statistical analysis was performed using Stata 11.0 software (StataCorp LP, College Station, TX, USA). Final diagnosis and treatment decision for each case was based on the opinion of the majority of experts. In cases in which the treatment decision ended in a tie, the case was defined as ‘treatment decision not possible’. Cohen’s kappa statistic was used to measure intra and interexaminer reliability of experts and interexaminer agreement between GDPs and experts. Weighted kappa was calculated only for the variable ‘need for intervention’ (treatment), as for this assessment, 3 categories of responses were available (0 - no intervention; 1 - more information is necessary for treatment decision; 2 - intervention). For the comparison between GDPs and the scores

Download English Version:

https://daneshyari.com/en/article/8699180

Download Persian Version:

https://daneshyari.com/article/8699180

Daneshyari.com