

CARIES DIAGNOSIS

Comparison of diagnostic methods



BACKGROUND

Precise detection and careful assessment are essential to the proper management of dental caries. Various methods can be used to help the dental practitioner make an accurate diagnosis. Among these are visual inspection (VI) and bitewing radiography (BWR). VI is considered limited in its ability to estimate the caries burden on occlusal surfaces, and BWR exposes patients to ionizing radiation, which can limit its applications to strictly defined indications. Near-infrared light transillumination (NIR-LT) offers the advantage of limited radiation exposure. It uses invisible, near-infrared light with longer wavelengths, which reduces light scattering and allows deeper light penetration to enamel and dentin. In addition, the light is applied directly through the alveolar process toward the teeth. These approaches have improved diagnostic imaging quality. A comparison of the 3 methods was done to determine the diagnostic outcomes that can be achieved with each.

METHODS

The 203 participants (mean age 23 years) underwent meticulous VI, BWR, and NIR-LT imaging to obtain a diagnosis. All had moderate caries in their permanent dentition, with a mean of 6.1 teeth and 7.6 surfaces having non-cavitated caries lesions. The images collected were evaluated for the presence of enamel caries lesions (ECLs) and dentin caries lesions (DCLs). Statistical analysis was done to determine the best approach for detecting caries and other problems in various sites.

RESULTS

Each method was associated with a different proportion of the caries diagnostic categories. The largest diagnostic proportion was free of either ECLs or DCLs. The proportions of occlusal surfaces found to be caries free were 34.8% for VI, 54.0% for BWR, and 40.9% for NIR-LT. Occlusal surfaces of premolars were less likely to be involved than those of molars.

The proportions of occlusal surfaces found to have ECLs were 23.0% for VI, 0.2% for BWR, and 9.4% for NIR-LT. All methods detected a small proportion of surfaces involved with DCL only, less than 1.1%. The highest proportion was found with

BWR. Molars had more ECLs, DCLs, sealants, and restorations than premolars. About one fifth of the fissures detected were filled or sealed.

When all the diagnostic categories (sound, ECL, DCL, sealants, and restorations) were considered, the highest percentage of similar decisions (61.5%) was found for the combination of VI and NIR-LT. The highest concordance of a diagnosis of caries was found for ECLs and DCLs (51.3%) using the combination of VI and NIR-LT. Adding NIR-LT did not provide a significant additional diagnostic benefit in any comparison.

DISCUSSION

Most ECLs/DCLs were detected by VI on occlusal surfaces. Limited caries detection and assessment were noted when VI was used for proximal sites. BWR had no significant benefit when used alone to analyze occlusal surfaces. BWR's strength was in precisely diagnosing and assessing DCLs in relation to the enamel-dentin junction or pulp, which is nearly impossible with NIR-LT images. The clinical strength of NIR-LT was found for the detection of ECLs. NIR-LT had a lower proportion of non-assessable surfaces compared to BWR.

Clinical Significance

Most of the diagnosed caries lesions on occlusal surfaces in these young patients were detected visually, making VI the diagnostic method of choice for these lesions. BWR and NIR-LT had limited benefit, which may be related to the study sample. NIR-LT may be preferred over x-ray-based methods in clinical practice, but BWR can detect insufficient fillings or multiple deep caries lesions. Following this diagnostic strategy may reduce the use of multiple methods, limit exposure to ionizing radiation, and avoid over- or under-diagnosis. Optimal preventive and operative dental care can then be delivered on the basis of well-balanced diagnostic evaluation.

DENTAL PROVIDER COMPLAINTS

Addressing concerns that may lead to complaints



BACKGROUND

In dentistry, practitioners perform multiple high-risk surgical procedures daily and work in a private practice setting. These characteristics have the potential to increase dental practitioners' risk for some forms of legal and regulatory action compared to other health care professionals. Some research has indicated that dental practitioners are at higher risk than other health care providers for complaints. The frequency, nature, and risk factors for complaints involving dental practitioners in Australia were evaluated.

METHODS

A national dataset of complaints about registered health care practitioners in Australia from January 2011 until December 2016 was compiled. All complaints were classified into 23 issues in the domains of health, performance, and conduct. Complaints against dental practitioners were compared to those against other health care practitioners. Factors associated with complaints were also identified.

RESULTS

Dental practitioners accounted for 3.5% of all health care practitioners. However, they had the highest rate of complaints at 42.7 per 1000 practitioners per year. The specific dental practitioners with the highest rate of complaints were dentists and dental prosthetists, with allied dental professionals receiving significantly fewer complaints.

About 16% of the dentists received at least 1 complaint to regulators, and 4% received more than 1 complaint to the Australian Health Practitioner Regulation Agency (AHPRA). This latter group of dentists accounted for almost 49% of all the complaints lodged against dentists.

Male dentists had a higher risk of receiving complaints than female dentists. In addition, older practitioners were at higher risk for complaints than younger colleagues.

The focus of the complaints was performance issues, usually related to procedures and treatment, in about 75% of the

cases. About a quarter of the complaints involving dentists related to concerns over conduct, which often referred to advertising, misuse of titles, fees, and interpersonal behavior. Just 2% of claims dealt with the health of the practitioner. Most of these were concerns about mental illness and substance misuse.

Patients filed 84% of the complaints. Ninety-three percent of the complaints received were closed, with no further action recommended in 59%. Restrictive actions were instituted in 13% of the cases.

DISCUSSION

Dental practitioners appear to be at increased risk for receiving complaints, mostly from patients and mostly concerning treatments and procedures. Complaints were most often filed against male practitioners, dentists, dental prosthetists, and older dentists. Just 13% of complaints resulted in restrictive actions, such as placing conditions on the individual's practice.

Clinical Significance

Dental professionals need to recognize that they can take actions to avoid receiving complaints about their work. It's important to achieve early resolution of any patient concerns whenever possible; make efforts to communicate clearly and completely, especially for male dentists; identify and remediate performance concerns in those dentists who receive the most complaints; address fee issues through improved financial informed consent and fair funding for dental services; ensure that any advertising is fair and accurate; and make certain that patients are enabled to make informed decisions about care. To achieve these goals will require collaboration between dental professionals and educators, professional dental associations, and health regulators.