Guest Editorial *Risk-Benefit Analysis of the Radiographic Standards of Care*

The widespread use of implants in dentistry has been accompanied by a great diversity in the planning and execution of their placement and restoration. There is probably no greater variation than in the radiographs selected in preparation for implant placement. As an oral and maxillofacial radiologist, I receive inquiries from clinicians, as well as attorneys, who want to know the radiographic standard of care for implant planning. There is no definitive literature on the radiographic standard of care in the United States and little in other countries. In an effort to fill this void, the American Academy of Oral and Maxillofacial Radiology (AAOMR) set forth selection criteria in 2000, stating that some form of cross-sectional imaging should be used for all implant cases.[1] AAOMR's publication gave rise to a heated response from some individuals, who questioned the authority of oral and maxillofacial radiologists to prescribe what information is required for planning purposes.[2] AAOMR's recommendations do not appear to have had much impact. Based on my professional experience, I know clinicians who perform a CT scan for every implant on every patient, with no exceptions, and others, at the other extreme, who perform a complete-mouth rehabilitation on completely edentulous patients with the aid of only a panoramic radiograph.

Since the standard of care is determined by what the "average qualified practitioner" does, the state of affairs can be interpreted to mean either that the standard of care spans the spectrum, or that no standard exists. Thus, the implant dentist might assume that whatever imaging he does would suffice. That assumption, however, may not be correct. As many a practicing attorney will attest, the standard of care is frequently determined by the practice in academic centers, as well as by what students and residents are taught. Unfortunately, no data exist on whether students and residents are taught to routinely use cross-sectional imaging for implant planning. Certainly, no educational or accreditation standard exists that requires residents to use such imaging, nor are there data on the use of cross-sectional imaging by academic faculty. On the other hand, it is the experience of US plaintiff attorneys who have taken on implant cases in which the clinician has injured the mandibular nerve—one of the most common types of implant-related lawsuits[3]—that insurance companies routinely settle these cases where no advanced imaging has been performed. Their experience is supported by data from other countries.[3] This may be an indication that malpractice insurers regard the lack of advanced imaging as being below the standard of care, at least for implants placed close to and distal to the mental foramen, and that they consider such cases to be indefensible. Although not definitive, the data from the Israeli study, as well as from a German study,[4] are quite compelling that the greatest reason for implant failure is lack of planning, with poor radiographic workup being a major factor. In the Israeli study, there were 61 implant-related lawsuits. In 53 of those cases, panoramic imaging was the sole imaging modality, despite the well-known risks of the panoramic image's many shortcomings.[5–7] Sixteen of the 61 cases involved loss of sensation, and in all of these cases the error was preoperative radiographic misinterpretation.

Another interpretation of the US experience to date, but less likely the correct one, is that insurers settle these cases not because the failure to secure cross-sectional imaging is below the standard of care, but because clinicians have failed to gain informed consent to proceed without such imaging. Whereas the standard of care generally is determined by what the average qualified practitioner does, in the majority of states the standard for informed consent is different, and is viewed from the patient's perspective. Clinicians owe to their patients the duty to disclose in a reasonable manner all significant medical/dental information that the clinician possesses or reasonably should possess that is material to an intelligent decision by the patient about whether to undergo a proposed procedure. Whatever a practitioner's habit, but especially if she does not routinely have a patient undergo advanced imaging, she should discuss in some detail the relevant facts concerning advanced imaging, including the radiographic procedures available, their availability in the patient's geographic region, their relative efficacy, as well as the cost (both absolute and relative to the cost of implants and crowns, and the cost, both financial and otherwise, of a mishap). It is the patient's decision whether to risk going forward without the additional information. When the risks, benefits, and costs of advanced imaging are considered in relation to the risks, benefits, and costs of not undertaking the procedure, as well as the cost of the implant and

crowns, in my opinion the balance favors performing advanced imaging. This is especially true in an area where the use of cross-sectional imaging can avoid a nerve injury.

Finally, courts may on rare occasions decide to hold an entire profession or trade negligent, even though everyone in the profession adheres to the same standard of care. Two such cases, considered seminal law cases, are *TJ Hooper*[8] and *Helling v. Carey.*[9] The latter involved a plaintiff who had serious vision loss because of glaucoma. She had regularly had her eyes checked by an ophthalmologist. She sued the ophthalmologist for not giving her a pressure test in time to discover and treat her glaucoma. Everyone concurred that it was the standard of the ophthalmology profession to not give routine pressure tests to patients who are under the age of 40 because the chance of this disease appearing in patients under 40 is extremely remote. Nevertheless, the court agreed with the plaintiff that the whole profession of ophthalmology was negligent. The court stated that a physician may be guilty of negligence even though he adhered to the standard of care and skill expected of the average qualified practitioner in the class to which he belongs, if reasonable prudence requires a higher degree of care. In reaching its decision that reasonable prudence did require a higher degree of care, the *Helling* court balanced the complexity and cost of the additional care, its risks, its reliability, and the consequences of failure to exercise the care. As was stated in *TJ Hooper* in words well-known to every attorney, "Courts must in the end say what is required; there are precautions so imperative that even their universal disregard will not excuse their omission."

Where does all of this leave the practicing implant dentist? As is so often the case, in the absence of a definitive decision to guide one, it is not possible to give any conclusive advice. Based on the available data, however, a *Helling* analysis leads me to conclude that failure to employ cross-sectional imaging for implants to be placed close to and distal to the mental foramen is highly likely to be considered inexcusable, notwithstanding what the average qualified practitioner does or what the standard in the academic setting is. Beyond that, in deciding on advanced imaging, clinicians should consider their experience, the complexity of the case, the number of implants to be placed, the cost of the implants and restorations, versus the cost and risks of cross-sectional imaging and the potential cost to the patient (in non-dollar terms) of not having information that could avert a problem. The decision should be based on the specific case and not be made in a general sense. The decision to undergo or forgo cross-sectional images is the patient's to make; hence, informed consent is crucial. The clinician's approach should be individualized to each patient. For example, perforation into the maxillary sinus is not as big a complication as is penetrating the mandibular canal. In a patient with a particular sinus problem, however, it may be sensible and necessary to take every reasonable precaution to avoid such an outcome.

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