In Pursuit of a Quality Journal

There are some who would question the decision to publish certain articles, but, in the end, the integrity of our publication must prevail.

A member contacted me concerning articles published in The Journal that were written by authors from New York State who are not NYSDA members. He objected to accepting articles from nonmembers, arguing that their presence in The Journal gave them exposure and credibility they didn’t deserve since they did not belong to the Association.

This is not the first time I have heard this complaint. I told this particular member we couldn’t discriminate against an author on the basis of that person’s membership status, a point he willingly acknowledged, especially when I reminded him that we publish papers from around the world and that these authors aren’t even eligible to be NYSDA members. Bottom line: To require membership in our organization as a prerequisite to publication is short-sighted in the immediate and impossible in the long run.

If we were to restrict publication in The Journal to member-authored papers, we wouldn’t have a worthwhile publication. Also, such a requirement would put us into a position of coercing residents and postgraduate students into joining the Association as a condition of publication. I hardly think this would be sound policy if we want these people to become full members once they have finished their training. Coercing membership would definitely leave a sour taste.

I have also heard complaints about the number of foreign authors we publish. Again, if we want a viable Journal with international prestige, we must accept the best papers submitted without regard to the author’s country of origin. Currently, The NYSDJ is well-respected—and deservedly so. It was highly regarded long before I became editor; I am merely trying to continue the tradition. As such, my goal is to make The Journal one our members can be proud of, as well as one that educates about all things dental.

All of the articles that appear in The Journal are peer-reviewed before being accepted for publication. We have a diverse Editorial Review Board, one that helps me determine the quality of the papers submitted. I rely heavily upon the opinions of its members in determining which papers are worthy of publication. These reviewers do a tremendous job, and they do it gladly. Each is a volunteer whose only reward is knowing he is helping us publish a Journal that is respected around the world. I thank them all for their contributions.

Mary Stoll, our managing editor, sends me manuscripts as they are received. We average about four submissions a week. I read each manuscript to see if it merits further consideration. If it does, then I send it our reviewers, who read it and send back their comments as to its relevance to the practice of dentistry in New York State and what our members could learn from its publication. If the comments...
are positive, the paper is usually accepted. If they are negative, the paper is rejected. If a reviewer is on the fence as to the merits of the article, I will send the article to another reviewer. Once that reviewer is finished, I make my decision about acceptance and publication.

Some of the foreign articles we receive are quite good. Others, not so much. However, we don’t discourage submissions from foreign authors, as their viewpoints also contribute to production of a well-rounded Journal.

We try to publish the best Journal we can. I believe we succeed. But we can only continue to succeed if we are open to all submissions. This way, we attract high-quality papers. It doesn’t matter the state the author lives in or his or her country of origin. It only matters that the paper is good, that our members can learn from it and, we hope, become better dentists. That is our ultimate goal—to provide you, our readers, with the latest and the best in dental research and clinical topics. We want you to know you can trust that what you are reading has been thoroughly vetted by some of the best minds in New York State, all of whom are themselves NYSDA members.

I understand the concern of the member who contacted me. I hope this member understands why it is impossible to insist that all authors hold NYSDA membership. I hope, too, that all our readers understand we operate as we do because we have their best interests at heart and that, because we operate this way, we are able to publish such an excellent Journal, one in which you can have pride of ownership. Because, when all is said and done, you are the owners of this Journal. We are only its caretakers.
On Aug. 27, 2013, an amendment to the Public Health Law known as I-STOP (Internet System for Tracking Over-Prescribing) went into effect. The I-STOP law requires all dentists (and other prescribers, except veterinarians) to consult the Prescription Monitoring Program (PMP) Registry prior to prescribing or dispensing a controlled substance listed on Schedule II, III or IV. The PMP provides prescribers with a six-month history of controlled substances dispensed to their patients to help them determine whether there is abuse of non-medical use.1

In passing this law, legislators had the best interests of society in mind as they sought to reduce the non-medical use of controlled substances. Specifically, their intention was to lessen “…the misuse, diversion and overdose of prescription controlled substances…”2 and, thus, reduce the concomitant increase in violence that has occurred due to the non-medical use of controlled substances. In order to achieve this noble goal, the law obligated doctors to function in a new role—that of gatekeeper. But, as currently written, the I-STOP law raises questions where it intersects with four of the dental profession’s principles of ethics: non-maleficence; beneficence; autonomy; and veracity.3

Non-maleficence and beneficence are Hippocratic principles. Non-maleficence obligates a doctor to keep his or her patients from harm. Beneficence obligates a doctor to provide care that benefits the patient.

Autonomy is a non-Hippocratic principle that holds that rules and laws are morally right insofar as they involve respecting the self-determined choices of individuals. It is derived from Western political philosophy, which prioritizes the liberty and freedom of an individual, that is, a person has rights. A person has the right to be left alone and be free from the interference of others.

The principle of informed consent is derived from the principle of autonomy. A series of legal cases from 1969–1972 shifted the emphasis from the paternalistic (the doctor is the sole decision maker) Hippocratic basis for consent to consent based on respect for a person’s autonomy and right to make his or her own medical decisions. One case in particular, Canterbury v. Spence,4 introduced the standard by which doctors practice today. This standard is called the Reasonable Person Standard. It requires a doctor to disclose to a patient what a reasonable patient would want to be told regarding any medical procedure. For example, a person needing extraction of a mandibular third molar would want to be told that there is a risk of paresthesia resulting from such a procedure.

In evaluating the ethical correctness of the I-STOP law, it is first necessary to examine the intent of the law. The intent of the law is to keep people from using controlled substances in a non-medical way, consistent with the principle of non-maleficence—to keep people from harm. However, in the “Frequently Asked Questions” section of the online PMP Registry, the first question is, “What is the purpose of the PMP Registry?” The answer that is given is that the doctor, by viewing the patient’s recent controlled substance prescription history, can “… better evaluate patient’s treatment as it pertains
to controlled substance prescribing and dispensing.” Thus, the law implies that it is now the doctor’s obligation to withhold a controlled substance from a patient with a prescription history of controlled substance. Therefore, the law is asking doctors to render a paternalistic value judgment.

In prescribing a controlled substance, like a palliative narcotic, the doctor is seeking to benefit his or her patient by mitigating potential discomfort from pain. However, the doctor must now make a determination if prescribing that controlled substance is creating the potential for abuse of the drug by the patient (maleficence). The doctor becomes a gatekeeper in determining if the benefit of prescribing the controlled substance outweighs the potential risk of causing harm by creating a potential for abuse of the medication by the patient. The I-STOP law provides no guidance to the doctor in making such a determination.

Responding to Pain
There is also the ethical problem of the dentist who withholds a controlled substance from a patient who is, or has the potential to be, suffering from severe pain. In a recent article published in JADA, Moore and Hersh concluded that if severe pain is anticipated, it is recommended that “400 to 600 g of ibuprofen plus an opioid-APAP combination equivalent of either 5 mg of hydrocodone with 325 mg of APAP or 10 mg of hydrocodone with 650 mg of APAP administered every six hours.” The value of nonnarcotic and narcotic analgesic drugs in dentistry is fully appreciated only when a comprehensive description of the symptoms and related pathology of the patient’s pain has been recognized. Management of the patient’s complaint with adequate and profound pain relief is just as important as an accurate diagnosis of the case and provides momentous and rewarding achievement by the dentist.

In dentistry, the decision to prescribe a narcotic versus a nonnarcotic analgesic depends on the quality and intensity of acute pain experienced by the patient. Generally it is accepted to prescribe or recommend NSAIDs alone (e.g., ibuprofen, naproxen, naproxen sodium) or in combination with acetaminophen for mild-to-moderate pain (e.g., nonsurgical extraction, surgical endodontics, periodontal surgery). If NSAIDs are contraindicated in patients with peptic ulcers or sensitivity to NSAIDs (with asthma and nasal polyps), then acetaminophen can be substituted. Caution should be used in patients with severe liver disease, and, in general, it is recommended that patients not take more than 3 g/day of acetaminophen.

Narcotic analgesics are prescribed in severe dental pain (e.g., surgical extractions, advanced periodontal or implant surgery); however, upon acute administration, many significant adverse effects can occur, especially in opioid naïve patients.

Failure to Inform
Significantly, the I-STOP law skirts the issue of privacy. The law ignores the principle of autonomy. Neither the law, nor the nine pages of frequently asked questions, addresses the principle of autonomy. The new law does not require the doctor to ask for the patient’s permission to search his or her controlled substance history. This is a breakdown in autonomy, as a reasonable person would want to know that his or her controlled substance history is being searched. On page 5 of the “Frequently Asked Questions” of the PMP Registry, the following question appears: “Can I share the report of my patient’s controlled substance history with my patient?” The answer is, “Yes. Release of the information is allowed to your patients but should be based on your professional medical judgment. All state and confidentiality rules must be adhered to.”

As confidentiality rules are based on the Reasonable Person Standard, the failure to share this information with the patient would violate this standard. Thus, the law should say that the release of the information is “required” as opposed to “allowed.” Such a situation has the potential for triggering a conflict between the doctor and the patient. How could the doctor release information about the patient without having first obtained the patient’s permission to search for such information? Accordingly, the new law places doctors in a conundrum: It may be OK to release information about a patient’s controlled substance history, but searching for that information occurred without the informed consent of the patient.

Finally, in skirting the issue of privacy, the I-STOP law also skirts the ethical principle of veracity. Though the Department of Health is supposed to be ensuring that all professionals not violate the privacy of patients when complying with the I-STOP law, the department has yet to issue regulations that specify how professionals avoid violating that privacy. At present, in order to comply with the law, doctors are required to secure information without being required to obtain the consent of the patient when accessing the registry. Such an action is a breakdown in the sacred doctor-patient relationship. This de facto contract between doctor and patient is based on trust. By not being upfront with the patient in securing permission to search his or her controlled substance history, the patient’s trust in the doctor has been violated. The principle of veracity has been compromised.

Though the new I-STOP law was passed with the noblest of intentions, it presents ethical quandaries for the profession with regard to beneficence, nonmaleficence, autonomy and veracity.

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REFERENCES
Professional Responsibility and Patient Retention
Alerts for the New Dentist

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ABSTRACT
Getting to know your patients, well beyond recognition of their specific chief dental complaint, is most important in operating a successful and satisfying practice. In addition to the clinical findings and pertinent history alerts, a good understanding of the person being treated can go a long way toward cementing lasting and rewarding doctor-patient relationships. Almost all new patients to the practice are welcome. However, an occasional “difficult” patient can be identified. This is the patient who you will not be able to satisfy, who cultivates misunderstandings, is unfairly over demanding, wastes office time in innumerable ways and eventually causes great frustration for the dentist. These patients may leave the practice in an unpleasant termination. Concerns of litigation arise, and one must also consider the waste of economic and emotional currency, as well as any other negative repercussions that may result. The dentist should become skilled at early identification of potentially risky, disruptive and problematic persons seeking treatment.

The dentist may encounter an incredibly diverse population seeking professional care. Most patients are totally acceptable, friendly and happily seek your dental care. They complete their treatment needs uneventfully and become good ambassadors for referral of friends and family. However, some patients appear with compromised dental IQ’s, less than ideal understanding of their needs and desires (realistic or not), and with an array of attitudes based on past dental experiences and personality-based issues. An immediately identified interpersonal challenge can exist or a more subtle, developing set of clues may begin to surface. Financial concerns, as well, can add to patient questioning and mistrust.

Each patient presents with a compelling need for the dentist to accurately assess his or her clinical and personal needs. The duty to properly understand and diagnose the appropriate treatment plan and to present realistic options for treatment, including appropriate referrals, is paramount. But barriers to this goal occasionally exist.

Communication skills are so important for understanding your patient and for getting your patient to trust you as a person and practitioner. The evolution of the clinical treatment plan, and the subsequent care, is dictated by mutual understanding. The demeanor and attitude of both dentist and patient, as well as any agendas that either may have, play into building a trusting relationship. It is important for the dentist to be sensitive to the patient’s degree of interest in the potential treatment. The dentist, as a good listener, will allow the patient to express, explain and
espose concerns and desires relating to the care being offered. An ethical practitioner presents the professional options unhurriedly and in language that is understood.

Competent treatment planning involves teaching and choice, with an explanation of the rationale for each choice. Awareness that barriers to good communication, such as culture and language differences, hearing loss and other disabilities, and educational impediments, can have a profound effect on mutual understanding is necessary. Past dental experiences may also color the attitude and degree of trust by the patient. Disappointment in former outcomes, personality friction, fear of pain, upset at the sound of the drill, germ phobia, affordability, availability of time and low self-esteem can influence the patient’s reaction to being “at the dentist.”

In the course of learning who the patient is, it is highly recommended that the dentist become sensitive to signals that potential problems may arise in the building of interpersonal and professional relationships. Such indicators may not portend an estranged compatibility, but they are worthy of caution, as much wasted time, many lost patients and legal difficulties could have been averted by paying attention to these kinds of clues.

Rationale

It is necessary to understand that every patient is important, not only for the compassionate and ethical aspects of professional responsibility, but, also, for the business of practice growth, reputation and success. Every patient is at the apex of a pyramid of potential referrals to foster further practice success. There is great resistance to making the occasional decision not to treat a patient, or to resist succumbing to uncomfortable, if not unacceptable patient demands or behavior. Pressure to lower one’s standards during an economic downturn and, perhaps, when faced with significant educational debt is a factor.

Extremes in patient personality and wide variances in their demands or expectations can result in unattainable and disappointing outcomes or, worse, pressure on the dentist to perform unsound, substandard or illegal practice. Additionally, there are patients who are disruptive, overly demanding and time wasters, with unending acts of mistrust. They may ask constant questions that go beyond what is fair and reasonable; some are not diligent about their appointments. A skilled and astute dentist communicator is often able to divert and “train” such detractors to become acceptable patients in the practice. One has to be willing to invest a significant amount of time in these situations.

However, there are situations, some less clear than others, that make it wise to not only recognize that some patients will not be an asset to the practice and, indeed, may very well be far more costly in time and emotional angst than is acceptable. They can require extraordinary extra effort, or may be potentially litigious, as well as damaging to your reputation. Non-acceptance or dismissal of such a patient must be carried out tactfully, legally and with great thought, but is an essential part of effective risk management.

In practices where many patients are served by third-party payment plans, insurance panels and such, referral of new patients to the practice is still germane and any time wasting is equally, if not more disruptive, to the economics of those practices. While it may be less agonizing to “dismiss” problem patients in high-volume practices, production is a key element of practice success and individual dentist income. The treating dentist has the duty to maintain treatment flow, which if interrupted by a disruptive or uncooperative patient, can be significant.

Treatment outcomes that are disappointing to the patient, whether justified or not, in those who may be litigious can create much upset and time wasted. Reading the clues early in the doctor/patient relationship is an important form of preventive risk management.

Medley of Experiences

A selection of misadventures and situations that can occur is presented with the intention of identifying “red flags.” Certainly not all scenarios or instances discussed would warrant a “denial to treat.” Rather, they warn of potential concerns, not just for patient acceptance but also for the likelihood of successful treatment. There can be many varied commentaries as to how individual practices might respond to any of the following presentations. Some dentists may react quite opposite to the commentary on these patients and might consider appropriate dialogue to “turn around” the difficult or troubling patient and thwart the issues of concern. The intent here is not to over dramatize or to recommend refusal to treat in most cases but, rather, to identify potential difficulty.

It is important to comment on the advice of many practice management experts, consultants and seasoned office staffs, including the doctor, who may be skilled in handling the difficult patient. Understanding past human experience, and how personality and behaviors are molded by fears, unpleasant experiences, defensive personality traits, financial concerns, etc., is a subject for much discussion. Many texts, articles and educational courses deal with these aspects of communication and patient psychology, teaching how to effectively turn challenging people into patients who can be managed in ways resulting in acceptable outcomes.

The scenarios and alerts are cautionary and are simply a commentary on some of the issues that confront dentists as they try to get to know and understand their new patient. New patients are valuable to the practice, including to the revenue treatment generates and as well as the referral potential for growth of the practice. But one must learn to be circumspect in analyzing the true value after considering the extra time spent, the emo-
tional torment, aborted treatment and/or arguments over post-treatment fees and possible legal recriminations. So, while some might advise how to make “a silk purse out of a sow’s ear,” this discussion advises careful scrutiny of the options.

Patient # 1
This patient appears with a zippered bag, which she opens and from which she removes nine sets of full upper and lower dentures. Her question to you is, “Doesn’t anybody know how to make a denture that fits or allows me to chew and makes me look like I used to? For all I’ve spent, I should sue those crooks. All I did was spend my life in their chair getting adjustments that never helped.”

Perhaps after clinical examination and scrutiny of the nine denture sets, of which at least two sets seemed closer to acceptability in terms of being well made, you might feel you could make this patient a set to please her.

Clues to ponder before acting: nine sets of dentures; continuous adjustments; loss of faith in dentists to satisfy; has a desire to regain past appearance, which may be unrealistic; accuses dentists of being crooks; and is possibly litigious.

You could be the first to make her happy but, more likely, you will fabricate another example in the bag.

Patient # 2
This 56-year-old female patient arrives with a large shopping bag filled with glamour magazines and a folio of professionally taken photographs spanning her life from high school to her wedding day 30 years ago. Her last three dentists did not recreate the smile she envisions for herself, failing to produce the color, shape, length and gum line she insists can be achieved. She is focusing on minu-tia. Her upper anterior teeth from bicuspid to bicuspid have been veneered. These restorations are well done and fit properly. She says she has had them redone three times. She is looking for a dentist with whom she has good karma and who is a specialist in cosmetic dentistry. She tells you she has been in touch with five nationally renowned cosmetic dentistry specialists and has sent them photos for their opinion. She has not heard back from any of them. From the conversation, you get the impression that she has withheld payment (all or part) from her previous dentists.

Clues to ponder before acting: What makes you think you can satisfy this very vain and driven person with her exacting esthetic desires? She has, so far, not been able to communicate what she wants to any number of dentists with whom she has consulted and/or has been to for treatment. Her oral conditions may not coincide with her desire to regain the glamour of her perceived lost youth. The withheld payment issues also warn of danger ahead.

Patient # 3
Scott Sanders phones you at home Tuesday evening relating that he is a previous patient who had come to you in an emergency a year ago. He asserts you had begun root canal therapy on his back tooth and prescribed an antibiotic. Because of his heavy travel schedule for business, he has not had time to come back to finish the treatment. He has just returned to town and he has a terrible ache in that tooth. With apologies, he is requesting that you phone in a prescription for Vicodin just to hold him over until tomorrow, when he intends to come into the office. You have no recollection of a patient named Scott Sanders.

Clues to ponder before acting: This is a scam. You have never treated a Scott Sanders, and he is using a common name so you may not recall whether or not he was a patient. No prescriptions, especially for controlled substances, are to be ordered without seeing the patient. He, of course, will not appear in your office. He is calling multiple dentists with the same story and if he finds a sympathetic ear, he will supply the name of a different pharmacy for each scammed prescription.

The new Internet for Tracking Over-Prescribing law, or i-STOP, which requires consulting a data bank before prescribing or dispensing controlled substances may prevent some of these scams, but the perpetrators will keep changing the names they use to circumvent this new system.

Patient # 4
Mary W. appears with a chief complaint of headaches, bite problems and facial pain, which day-to-day move from upper to lower, right to left. According to her, she has had a poor bite for over 20 years. She produces a bag full of stone models that she says were taken at her insistence after each of the seven or eight episodes of bite grindings and removable appliance therapy. All past attempts to make her comfortable have failed. She admits to being “high strung” and sleeps only a few hours a night due to insomnia. Mary takes over any discussion and asserts she will not consent to any more changes in her mouth or any more tranquilizers, which don’t work anyway. “[Previous dentists have already destroyed my teeth,” she says. At least six of her teeth have been restored with ceramo-metal crowns where the porcelain has been ground or worn through to the metal; on two crowns, the tooth structure is exposed occlusally. As you examine her, you see the masster and temporalis muscles rippling with spasm under the skin of this anorexic-looking 52-year-old woman.

Clues to ponder: While this patient needs and deserves complex treatment, this syndrome of myofacial pain is a psycho-neurotic problem, coupled with dental dysfunction. In most cases, this is someone to be referred to a specialist/team for treatment of her TMD. And she should be getting the emotional and psychological components of her chronic problem treated as well.

Patient # 5
Mr. O. hands you an 8-inch x 10-inch manila envelope filled with old X-rays, including seven full series, the last taken 22 months ago. His mouth is full of acrylic temporary bridges and crowns, obviously worn, overcontoured and showing evidence of patched
repairs. Some are still broken and have sharp edges. His periodontal tissues are swollen, red and bleed with the lightest touch, even just an application of air. Hygiene is virtually nonexistent. The last films show a similar array of provisional restorations. Mr. O. tells you his previous dentist kept finding decay under the temporaries each time he (the patient) gets around to making an appointment to continue. These acrylic crowns and two bridges are now three years old and keep loosening. One of the four-unit bridges is handed to you in a dried up tissue, having been out of the mouth for at least a few months. There is no cement inside the abutment crowns. The fetid odor of his breath is as expected.

Clues to ponder before acting: Do you really want to be mired down with this kind of neglect, non-compliance and lack of self-esteem? Maybe you can educate the patient, but the history warns of a lot of time wasted redoing, redoing and redoing, with long periods of absence from treatment and never accomplishing anything substantive toward getting finished. Most likely you will not get paid for your time. This is a lot of dentistry to turn away, but will you ever get to do it? You may insist on payment up front as an incentive and for your protection, but chances are the patient will not agree to such an arrangement and will want concessions on the fee due to what he paid to the other dentist, if he paid anything at all.

**Patient # 6**

Horace B., referred by a friend of one of your golf buddies, has an emergency. He appears with a chipped molar, which he claims has kept him up all night with pain. The defect seems to have been present for a period of time, as there is evidence of calculus in the chipped area. The radiograph shows little likelihood of pulpal involvement, but several other incipient carious lesions are seen on the X-ray. You place a moderate-sized MOL composite restoration and write a prescription for Vicodin at the insistence of the patient.2,4,6 Horace calls you the next day saying he is still in pain and has lost the prescription. He asks for another one. You refuse. The local pharmacy calls you later to tell you the Vicodin prescription you wrote the other day can’t be filled yet, as Mr. B. still has doses left on a previous prescription written by a different doctor. You have not been paid for the visit the other day. The Controlled Substance Registry set up by the I-STOP legislation may prevent this, but there are ways to circumvent the law, such as filling the prescription in a neighboring state.

Clues to ponder before acting: This is another scam artist looking for drugs. Your golf friend, when asked, never heard of Horace B. The pain scenario seemed unrealistic; the chip was old and not a probable cause of any discomfort. The incipient caries on other teeth, at worst, would not call for Vicodin pain control. And the lost prescription story,4 coupled with the pharmacy phone call, all add up. You won’t get paid, as his address and phone number are usually phony. The lesson is to get as much corroboration of the biographical data in the beginning and to be vigilant about claims of pain that seem unrealistic.

**Patient # 7**

Jane C., 48 years of age, is seated for a consultation. She has a set of stone models depicting her mouth with an edentulous upper anterior segment missing teeth #7, #8, #9 and #10. She is wearing a crude acrylic removable “flipper” with no wire clasps, which is very loose. The esthetics are poor, with a misshapen arch form and very short, discolored teeth. A large discrepancy exists between the prosthesis and the underlying ridge tissue in the edentulous area. Jane has a spiral notebook containing seven pages of notes and questions relating to how the restoration of her mouth might look and be accomplished. She admits to having consulted four dentists prior to this visit. She is well-versed in dental terminology, dental materials, implants, bridges and removable prostheses. The rest of her mouth is not healthy, exhibiting periodontal issues, four missing lower posterior teeth and two missing upper second molars. The third molars are fully impacted.

Jane is knowledgeable, to the point of seeming as if she went to dental school. Her questions are focused, very confrontational, and aimed at pitting your remarks against the presentations of previous consultations elsewhere. She has questions about the complete assay of any metals that might be used, various properties and comparisons of the different ceramic materials and even the physical properties of everything that might be used. She says she has no allergies but is afraid of reacting poorly to materials that may be carcinogenic. The questions never end. Flipping the pages in her notebook, she continues her barrage, including exactly what will be done each visit, how long will she be in the office, what lab will be used, whether the technicians are illegal aliens, and have the lab technicians been health screened and certified safe? Then she continues with the cost of treatment and how you will charge her. Can you document your overhead as a percent of her fee? How much metal will be used and what cost is incurred as a figure calculated from its weight? On and on the inquisition goes until she tells you she is interested in the lowest price and is shopping.

Clues to ponder before acting: Do you need another second with this woman? Without filling in additional blanks, this is more than a disaster waiting to happen. One way to handle this patient is to quickly, without further devotion of time and effort, tell the patient that you do not wish to treat this case and that she would be better served seeking another dentist. You can extricate yourself from this type of patient by explaining that her treatment needs are not a good clinical fit with your practice and that you must respectfully decline treating her case.3 Since you have not
begun any treatment and emergency care is not germane, you are not abandoning, nor can you be cited for any illegal prejudice short of the patient being able to claim nationality, ethnicity or disability-generated disinterest in her treatment. The patient would not be a good clinical fit with your practice and you must decline the case.

**Patient #8**

Tiffany is a schoolteacher, referred to your practice by one of her co-workers. As she is a very attractive young woman, you are surprised at the dental neglect you discover. Treatment begins and after the third visit, she asks if you are interested in meeting her for a drink after work. She must have inquired about your eligibility, and you are flattered and interested. A torrid relationship ensues, and the rest of her dental care is continued without charge. Several weeks later she moves in with you; you are totally and helplessly hooked. Tiffany, however, enjoys the use of recreational drugs, for which she has totally and helplessly hooked. Tiffany threatens to sever her relationship with you. When you try to explain to her the seriousness of the trouble you can get into, she tells you she will be the one to turn you in if you don’t continue to write prescriptions.

Again, New York’s I-STOP law curtails multiple prescriptions, but users are aware and demand prescriptions written for different names.

Clues to ponder before acting: Tax evasion is a crime and can lead to very serious consequences, as attractive as it may seem at first. Once you have taken the steps to be dishonest, you are hostage to potential reporting of this deceit by the patient, who during and after treatment “has a gun to your head.” But even if the patient doesn’t betray you, the real danger from such a misadventure surfaces when you eventually have staff issues, perhaps the need to terminate someone’s employment or a disgruntled employee over a disappointing pay increase. The blackmail opportunity lurks ever present, pressing for severance favors.

**Patient #10**

Vincent is a walk-in. He claims to be in great pain and says he was referred by the pharmacy around the corner. The preliminary encounter with the front desk is difficult as the new patient is slurring his words and using the countertop as a crutch to keep himself from falling. Obviously intoxicated, his breath corroborates his physical status. The patient is seated in an operatory especially to remove his presence from the reception area, and you attempt to take a medical history and listen to his chief complaint. His answers are not responsive, and his medical status is questionable at best. There is an obvious severely decayed upper molar visible with moderate swelling above tooth # 3.

Clues to ponder before acting: You are not able to gather sufficient information at this time as to how much alcohol he has consumed, or how chronic his drinking habit is, including whether he has taken other medication or uses drugs regularly. He cannot credibly report on any health issues or allergies. This patient cannot be treated until a further medical profile can be established. However, and most important, legally you cannot treat this patient without having competent and informed consent, which under the present condition of this patient, you are not able to obtain. This patient should be referred to the emergency department of a nearby hospital. If you fear for his safety in getting to the ER, you may want to call for an ambulance.

**Patient #11**

Virginia M. should be living in a bubble. She reviles at touching anything, breathing near another individual or being in physical contact with objects and materials that might be unclean and unsterile. She is a true germaphobe. Her hands are bathed constantly in hand sanitizer, and she will not touch common objects—even a borrowed pen or pencil—without an intervening paper tissue. She says her handbag can only be fashioned out of materials that she can “sanitize,” such as plastic. Entry into the dental operatory is a circus, as she has to actually witness new infection control barriers being placed on equipment, the chair, countertops, etc. Needless to say she is forcefully inquisitive about dental instruments.
and their care, as well as materials being used. Everything has to be ecologically safe or natural in origin. The required explanations, demands to read labels and apparent mistrust is time consuming and daunting. Even the rinse cup, which she brings sealed in plastic, has to be filled with her own bottle of water. Open sources of dental materials in drawers are problematic for her, as is the explanation of how laboratory work has been handled, as is the dental handpiece and burs. As expected, her teeth exhibit marked toothbrush abrasion.

Clues to ponder before acting: One has to educate, show extreme patience and be ready to spend time, time, time. These obsessive patients, when taken to their extreme disruption, may not be able to be comfortably treated. You must take into consideration that this patient may have become obsessed as a result of a disability, and dismissal could be problematic in light of legal constraints.

Patient # 12
Harry P. grew up in a family where discounts and bargains were a way of life. Nobody with any sense paid full price for anything, goods or services. In his world, if you didn’t haggle and negotiate, you were a loser. This certainly included dental care. Always an emergency patient, he appeared as a walk-in and demanded immediate attention. Needless to say his neglectful and “me first” personality were disrupting. Still, he was a pleasant enough person—until the issue of money surfaced. You had the feeling that you were in a Turkish bazaar as Harry went to work on you. Finally, just to get him out of the office, you agree to an amount far less than is fair. Harry then goes to the desk and leaves half of the amount and promises the rest “next week.”

Clues to ponder before acting: You are a loser from the beginning. Once burned, maybe, but this kind of charity is only voluntary if you allow it.

Patient # 13
Mr. C., a CEO of a moderately large advertising firm, is so busy he has difficulty making appointments and, worse, keeping them. When he does show up, he is considerably late. Then he is on his cell phone while in the chair, on and off throughout the visit. It is a miracle you are able to get anything done, let alone fit him into the already upset schedule. Very demanding and in a hurry to leave, he wonders why it takes so long to get his work done. He’s out the door before your staff can collect any payment. It’s always, “Bill me at the office.” The business manager at his company “cuts the checks.” The disconnect, either purposely or through inefficiency, ends up in payment delays for months and months, sometimes close to a year. There is always an unpaid balance. Insurance claims figure into his calculation to hold back clearing his balances. Attempts to set up a payment policy with him end in empty promises.

Clues to ponder before acting: Your practice has to have a strict business and payment collection procedure; and it must be enforced. Continuing to pander to his manipulation is only regulated by the doctor and a trained staff at the front desk. Do this patient’s fees generate enough profitable revenue considering the lack of efficiency and time wasted, coupled with playing banker while waiting for your payment? Raising your fees to him only delays payment further and creates his bigger banking account at your expense.

Patient # 14
Mrs. B.—and she insists that she be addressed as “Mrs.”—not by her first name, Emily—is pleasant enough, but very formal and critically demanding of protocol, staff and office routine. At her last visit, when X-rays were taken, her complaints ran the gamut from lack of available hangers in the clothes closet to the difficulty the dental assistant had taking the X-rays in her small mouth. Then, it was the odor of food she detected in the office from one of the staff’s delivered breakfast. All of these concerns had some legitimacy, but Mrs. B. took them “over the top” and made a scene publicly in the reception area, going on and on, especially about the difficulty hanging up her coat.

The treatment plan presentation part of the visit took an extraordinary amount of time, with question after question, interruptions, doubts and veiled indications of mistrust punctuating the discourse. After an unbelievable number of repetitions and explanations, she requested time to think about the plan and asked for it to be sent to her in writing, which was done. During the ensuing several weeks, Mrs. B. called the office seven times to speak to the doctor for clarification and with new questions, which were a repeat of her earlier conversations while in the office. To say that she could not make up her mind or agree with or understand the details of her proposed treatment was a gross understatement. Could her teeth be fixed without implants? Could she be treated with fewer implants? Could there be no implants? If she elected to have bridges, how would they feel, how would they work, what are the drawbacks, how long will they last? Does she have to have root canal treatment and why? Can her dentistry be done without using metals? “My son-in-law who is going to dental school says...........” More questions and then when a decision is made to go ahead with an agreed-upon plan, she calls the next day requesting changes again and again. The fee is also banded about, over and over again. This case is going nowhere.

Clues to ponder before acting: Complex treatment plans have to be presented in an orderly fashion with clear discussion of the alternatives, advantages and disadvantages. Reasonable questions should be answered, with an explanation that during treatment there may be a need to alter some of the planned treatment, such as an additional need for endodontic therapy or extraction of a tooth that becomes unrestorable. After receiving ample explanation, the patient must be able to make a decision without undue pressure. Continued doubt, delay, mistrust and lack of confidence only point to serious problems later in this demanding, and somewhat intolerant, potential patient. Red flags are abundant.
Patient # 15
Jack W. lives across the street from you. You know him socially, and your children play with his children. Jack is a very friendly and affable neighbor, who last year chipped a front tooth, having been hit in the mouth with the handle of his rake while doing yard work. He came to your office on that Saturday and you restored his incisor. He is a patient of record now even though you didn’t charge him for the service. Friendships often encourage discussions that center on health issues that go beyond the practice of dentistry. Patients, some of whom are friends or family, occasionally will ask the dentist to either assist in making a diagnosis of a medical condition or offer advice that is not dentally related. Many times, it is an offer from the dentist or a request from the friend to have the dentist write a prescription for a medicine that is intended to ameliorate or treat something out of the scope of dental practice. Jack is a typical example. He asks you to give him a prescription for a Z-Pak (azithromycin) for a nagging chest cold, and last year you offered to prescribe Lomotil prior to his trip to Mexico.

Clues to ponder before acting: Although seemingly innocuous, practicing outside the scope of your license is not only illegal, it can result in dire consequences. Many instances of these violations of scope issues involve writing a prescription2,4,6 for an improper drug, a useless medication or a contraindicated medicine. These “favors” are doled out with little or no medical history of the patient/friend and are not only beyond the scope of practice but beyond competent medical knowledge. The FDA has identified massive overuse and the ineffective use of wrongfully prescribed antibiotics, resulting in considerable harm to patients and the biosphere, therefore stimulating more stringent scrutiny. There is as well the rampant abuse of controlled substances through illegal and improper prescriptions causing more governmental control. Involvement in such illegal scope of practice is detrimental and may have serious legal repercussions. When your favor does not have a desirable outcome, the physicians in the emergency room are often not tolerant of patient illness made worse by delay of appropriate and proper treatment.

Conclusion
New patients introduced to the dental practice may present a variety of interpersonal and dental treatment challenges, which a skilled dentist is called upon to identify and understand. The management of professional demands, as well as dealing with patient fears, understanding wide differences in expectations, and recognizing emotional and behavioral issues and economic constraints can be daunting. Handling the complexity of the actual dental treatment and arriving at a desired outcome are certainly the pillars of successful practice and patient satisfaction. However, the atmosphere in which the doctor and patient relate to each other, the cooperation and understanding of the “how to get there” and mutual trust are essential.

Adversarial and disruptive interference in this relationship adds a different dimension to the effective and efficient completion of treatment. An attempt has been made to identify issues that dentists experience from time to time that cause practitioners to ponder whether they and the patient they encounter are ready to embark on a journey together through a treatment regimen.

The examples offered are not exhaustive, as there are many stories that can be told. But one can get a flavor, a realization that impediments exist to cordial and effective professional relationships with some patients. It is certain, too, that personality types enter into the interpersonal comfort. The doctor must be circumspect about venturing into areas of potential legal repercussions. Skilled staff, as well as the doctor, have every opportunity to take the initiative to turn some of these “difficult” people into cooperative patients in the practice. In some cases, though, it may not be worth the time or the effort for an efficient and ethical working of a successful practice.

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Management of Rapidly Progressing Periapical Pathologies

A Case Report


ABSTRACT

Dentists often treat swellings from odontogenic periapical pathologies. One management option involves immediate treatment with antibiotics, followed by surgical intervention. We report a clinical case in which an 8-year-old patient sought care for such a lesion and received pharmacological therapy alone. The lesion expanded into multiple facial spaces approximating the ocular organ and other vital cranial structures. Eventual treatment of the lesion required a CT-scan, followed by an intubated general anesthetic, incision and drainage, extraction of the involved dentition and an overnight hospital admission. This case report is meant to highlight appropriate courses of action in management of rapidly progressing periapical pathologies.

Periapical abscesses and granulomas, types of apical periodontitis, are common pathologies treated by dentists. Such lesions can be defined as “acute or chronic inflammatory lesion(s) around the apex of a tooth caused by bacterial infection of the pulp canal system.” One retrospective study found that in patients 0-14 years of age, periapical cysts and granulomas accounted for 36.7% of all biopsied cystic lesions and 87.9% of granulomatous lesions, respectively. Such lesions are caused by bacterial infection subsequent to caries extending to the pulp, dental trauma or anatomical anomalies of the involved dentition. They may be acute or chronic, painful or asymptomatic. Histologically, they are a result of a periapical inflammatory response concurrent with the resorption of adjacent bone and localization of inflammatory cells in the affected area.

Potential complications of apical periodontitis include intracranial, retropharyngeal and pulmonary pleural infections, as well as rheumatic complications and endocarditis. Diagnosis of apical periodontitis is typically made through evaluation of patient symptoms, clinical signs and radiographic findings. Treatment options for such lesions include pulpal therapy, dental extractions and, in cases where the infection has spread into soft tissues, incision, drainage and antibiotic therapy.

Case Report

An 8-year-old Caucasian female presented to the emergency room in September 2010 with a one-day history of left-sided facial swelling preceded by four days of left-sided maxillary tooth pain. The pain began spontaneously in the presence of dental caries but with no history of oral or facial trauma. It was exacerbated upon chewing, but not upon swallowing. The patient had increasing difficulty with food intake due to pain upon opening her mouth.
Two days prior to hospital presentation, the patient was seen by her family dentist, who prescribed the patient PO amoxicillin 250 mg TID. A full dental exam and imaging were not done at that visit due to the patient’s inability to open her mouth sufficiently. As per the patient’s mother, on the day of hospital presentation, the patient had decreased facial swelling but increased left orbital swelling, as well as a tactile fever overnight. The patient denied any eye pain, changes in vision, headache, nausea or vomiting.

On physical examination, the patient had gross left-sided facial swelling involving the skin overlying the left mandible, maxilla, preauricular region and extending to the periorbital skin involving the upper and lower eyelids (Figures 1,2,3). The lower eyelid was noted to be more swollen than the upper eyelid, with the involved skin presenting as erythematous, warm to touch and tender upon palpation. There was no proptosis; extraocular muscles were intact; and there was no pain with ocular movements. Cranial nerves 2-12 were clinically evaluated and found to be grossly intact, though the patient was unable to open her mouth wide enough to have her oral cavity examined.

In the emergency room, the patient was given one dose of ceftriaxone 1 g IV and one dose of clindamycin 350 mg IV. Because of the emergent nature of the case, a CT without contrast medium of the maxillary complex was taken to evaluate the extent and origin of the inflammation. The imaging showed an alveolar bone defect centered on tooth J and an associated 0.4 cm x 1.5 cm x 1.3 cm abscess collection anterior and adjacent to the left maxilla, with minimal inflammation into the medial left orbit. The oral and maxillofacial surgeon was consulted and a diagnosis of maxillary buccal cellulitis secondary to apical periodontitis was made.

The patient received a general anesthetic for incision and drainage of the maxillary buccal abscess and extraction of teeth I and J, both of which had caries to the pulp. The patient was subsequently placed on unasyn, which is a combination of ampicillin (a broad spectrum penicillin) and sulbactam (an irreversible inhibitor of beta-lactamase given to aid beta-lactam antibiotics) 875 mg IV Q6H, Tylenol 500 mg PO Q4H prn pain, and Peridex 0.12% 15 mL Swish and Spit BID. Fluid from the abscess showed moderated white blood cells on gram stain but no organisms. Culture of the fluid grew pan-sensitive alpha-hemolytic Streptococcus viridans in the broth, along with a few Propionibacterium granulosum, a few coagulase-negative Staphylococcus, a few bacteroides fragilis, consistent with typical odontogenic infections. Blood culture was negative for five days.

The patient was discharged to home on day two on augmentin ES-600 PO Q8H after marked improvement of facial swelling and improvement in oral intake. Follow-up revealed complete resolution of the lesion thereafter.

Discussion
Periapical pathology is a common presentation among dental patients and requires correct diagnosis and sequence of treatments.
If these lesions are not treated adequately or in a timely manner, they can lead to problems as severe as infections of the deep spaces of the head and neck (such as Ludwig’s angina) or various systemic complications. Initial treatment options may include one or more of the following:

1. Extraction of the involved dentition, facilitating trans-alveolar drainage. Martis et al. suggest that while the majority of oral surgeons are not against the extraction of uncontrolled abscessed teeth, some oral surgery textbooks are more conservative, indicating pretreatment with antibiotics prior to extraction.4

2. Endodontic therapy of the involved dentition. Skucaite et al. state “the purpose of treatment of symptomatic apical periodontitis is to eliminate the infection in root canal system and...can be done by conventional root canal therapy....”5

3. Incision and drainage of the associated lesion. According to Matthews et al., “In the management of localized acute apical abscess in the permanent dentition, the abscess should be drained through a pulpectomy or incision and drainage.”6

4. Antibiotics for systemic considerations. “In the event of systemic complications (e.g., fever, lymphadenopathy or cellulitis), or for an immunocompromised patient, antibiotics may be prescribed in addition to drainage of the tooth.”5,6

Appropriate care may be rendered as determined by patient symptoms, radiographic extent and origin of the lesion, patient tolerance of treatment and general clinical evaluation. In many cases, a two-step treatment, consisting of antibiotics with surgical interventions, should be rendered. The effectiveness of such therapy is illustrated by Har-El et al., who suggested that the incidence of periapical pathologies spreading to the deep tissues of the neck has decreased over the last 40 years due to the wide use of such combined antibiotic and surgical therapies.7 Generally, with active pathologies of this nature, antibiotic therapy alone is ineffective.6

At times, as dictated by the severity of symptoms, the extent of the lesion radiographically and anticipated patient compliance, immediate surgical intervention is not indicated. In such cases, timely follow-up is crucial to determine when such surgical intervention may be attempted safely. If poor patient compliance and/or follow-up is likely, the dentist should weigh the risk and benefits of immediate intervention and/or referral against potential unpredictable patient follow-up and treat the patient accordingly.

For an 8-year-old otherwise healthy female with a correct diagnosis of an advanced odontogenic periapical lesion of bacterial origin, as was present in this case report, a course of
amoxicillin 250 mg TID in conjunction with surgical intervention may be considered a proper course of initial management. The eventual culture of the lesion (Streptococcus viridans, coagulase-negative Staphlococcus, etc.) was consistent with typical periapical lesion cultures and would commonly be within amoxicillin’s spectrum of coverage. As expected, the pathology did not resolve from treatment with antibiotic therapy alone; and surgical intervention under general anesthesia in the hospital setting was required.

A proper diagnosis is necessary for correct treatment. Essential components of proper diagnosis include radiographic evaluation, clinical examination and a review of previous dental work. In the instance where the dentist is unable to obtain intraoral radiographic images of the lesion due to pain, limited jaw opening or a lack of patient cooperation, panoramic imaging or even immediate referral for more advanced imaging techniques might be considered. A typical differential diagnosis for a facial swelling of this patient may include a variety of non-odontogenic infections; infected malignancies and tumors, including odontogenic cellulitis, keratocystic odontogenic tumor (formerly known as odontogenic keratocyst or OKC); dentigerous cyst; ameloblastoma; and parotiditis. Treatment for each of these pathologies varies widely; hence, proper workup and diagnosis are required for correct treatment.

Additionally, access to care can be a consideration. This otherwise healthy patient eventually required treatment under general anesthesia and an overnight hospital stay. Such treatment can be psychologically traumatic, costly and time-consuming. It is possible that with access to adequate care, the patient would have benefitted from immediate surgical intervention under sedation or general anesthesia in the dental setting.

Conclusion

Dentists must be acutely aware of the need for proper patient workup prior to diagnosis and treatment of periapical pathologies, which commonly present to the dental office. Furthermore, proper treatment of such lesions is important so as to avoid their progression to more severe and even life-threatening conditions. A dentist should be aware of the available adjuncts to care, such as advanced imaging modalities, proper antibiotic courses, surgical interventions, sedation/anesthesia, and consultation with other medical professionals in the management of such pathologies.

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REFERENCES

Peri-implantitis: Etiology, Diagnosis and Treatment
An Update


A B S T R A C T

Peri-implant mucositis is described as the presence of inflammation in the mucosa around implants without any bone loss. By contrast, in peri-implantitis, besides the inflammation in the peri-implant mucosa, loss of supporting bone is also seen. The probing depth, the presence of bleeding on probing, suppuration and radiographs should be assessed regularly for the diagnosis of peri-implant diseases. Poor oral hygiene, smoking and previous history of periodontitis are known risk factors for the disease. The occlusion and longevity of fixed partial dentures around implants, whether connected to the natural teeth or not, is still an area of investigation, but studies show that long-term results are acceptable for both. Various treatment modalities are discussed in relation to the management of peri-implantitis. The predictable outcome of peri-implantitis management is not yet known.

For the last few decades, dental implants have become the choice of treatment over conventional, removable partial dentures and fixed bridges. Despite the risk factors, such as poor oral hygiene, history of periodontal disease and cigarette smoking,1 high survival rates increased the use of osseointegrated implants among dental professionals.2 Thus, the soft tissue barrier around implants has become more important.

The titanium implant is attached directly to the alveolar bone; no intermediate layer of connective tissue exists between the bone and the implant, as it does between the bone and a natural tooth.3 The connective tissue immediately adjacent to the collar of the implant is rich in collagen and is relatively acellular and avascular, making it histologically similar to scar tissue. The vascular system of the peri-implant mucosa derives solely from the alveolar supraperiosteal blood vessels because there can be no contribution from a periodontal ligament. Unlike the gingiva around teeth, the connective tissue compartment between the junctional epithelium and the alveolar bone consists of bundles that originate from the alveolar crest and run parallel to the abutment surface.4

Definition and Prevalence of Peri-implant Diseases
Zitzman and Berglundh described the definition and prevalence of peri-implant diseases in their review, including cross-sectional and longitudinal studies with more than 50 implant-treated subjects exhibiting a function time of greater than five years. According to the researchers, peri-implant disease is a collective term for inflammatory reactions in the tissues surrounding an implant.
Peri-implant mucositis is used to describe the presence of inflammation in the mucosa at an implant with no signs of loss of supporting bone. Peri-implantitis, in addition to inflammation in the mucosa, is characterized by loss of supporting bone.5

Prevalence is defined as “the number of cases of a disease present in a population at one point in time.”6 Peri-implant mucositis occurred in 80% of the subjects and in 50% of the implant sites. Peri-implantitis was identified in between 28% and 56% of subjects and in 12% and 43% of implant sites, respectively. The authors recommended that subject-based data be provided regarding the prevalence of peri-implant disease. The subjects ideally should be recruited from private or public dental clinics, rather than from university clinics and, hence, provide information on the “effectiveness” rather than the “efficacy” in implant therapy. The extent of the disease needs to be described, that is, the proportion of affected implants for each subject. In the presence of peri-implantitis, the severity of the disease, that is, the amount of bone loss should be reported.

Koldsland et al. assessed the prevalence in relation to the severity of peri-implantitis with different degrees of bone loss. Out of 99 subjects with 351 dental implants, inserted with a mean functional loading time of 8.4 years, they assessed peri-implantitis at different levels of severity (Table 1). They concluded that assessing different levels of severity yielded a substantial variance in prevalence (11.3% to 47.1%) in the study population.7

**TABLE 1**

<table>
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<tr>
<th>Different Levels of Severity of Peri-implantitis7</th>
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<td>Radiographic Peri-implant Bone Loss</td>
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<td>1) &gt;2 mm</td>
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**Diagnosis of Peri-implant Tissue Breakdown**

For the diagnosis of a compromised implant site, measurement of soft tissue by manual or automated probes is suggested.8 It may be preferable to use bleeding on probing (BoP) for routine clinical documentation. Differences in the morphology of peri-implant mucosa and the lack of light transmission through the metal of the device, however, may mask visible signs of inflammation.

Mombelli et al. compared the tissue resistance to probing and the accuracy of depth determination at different force levels around implants and teeth. The mean distance between the probe tip and the peri-implant bone crest amounted to 0.75 +/- 0.60 mm at 0.25 N probing force. It was concluded that peri-implant probing depth measurements are more sensitive to force variation than periodontal pocket probing and that the size of the probe, as well as the application force, should be standardized.9

Heitz-Mayfield concluded that probing using a light force (0.25 N) does not damage the peri-implant tissues and that BoP indicates presence of inflammation in the peri-implant mucosa. It may be used as well as a predictor for loss of tissue support.10

Luterbacher et al. compared diagnostic characteristics at implant and tooth sites during supportive periodontal therapy. Twelve female and seven male patients received a complete periodontal examination at one and five years after implant placement. In their study, BoP appeared to have a more favorable diagnostic accuracy at implant sites than at tooth sites.11

In the European consensus report, it was concluded that the probing depth, the presence of BoP and suppuration should be assessed regularly for the diagnosis of peri-implant diseases. Radiographs are required to evaluate supporting bone levels around implants. In evaluating the bony structures adjacent to the implants over long periods of time, conventional radiography is a widely applied technique in clinical practice. Analysis of peri-implant crevicular fluid (PIcF) was not found to be a clinically useful diagnostic parameter.1

**Microbiology around Dental Implants**

The cause of peri-implant tissue breakdown is multifactorial, but bacterial infection and biomechanical overload are considered to be major factors. Because of a lack of connective fiber insertion and decreased vascular supply around the implant, there may be greater susceptibility to plaque-induced inflammation. It was recognized that the composition of the biofilms established on the implant surfaces corresponded closely to those identified from teeth surrounded by healthy tissues. Hence, it can be anticipated that the microbiota present in the oral cavity may have a substantial impact on biofilm formation on newly placed implants.12

The composition of the microbiota associated with healthy peri-implant tissues is generally characterized as being dominated by gram-positive facultative cocci and rods. Fürst et al. found that the colonization of bacteria occurred within 30 minutes after completion of trans-mucosal implant installation surgery. They also discovered the presence of early colonizing bacteria, including *Actinomyces species* and *Veillonella parvula* in gingival fluid samples from both teeth and implants.13

Mombelli et al. studied the microbiota around successful and failing implants in 12 patients using microscopic and cultural methods. It was demonstrated that one week after implant placement, a microbiota characterized predominantly by gram-positive, facultative organisms was established and maintained throughout the duration of the study (six months). They found that the sites in unsuccessful implants harbored a complex microbiota with a large proportion of gram-negative anaerobic rods. Black pigmented *Bacteroides* and *Fusobacterium* spp. were regularly found. On the other hand, in successful implants, the predominant morphotype were coccoid bacteria, which represented over 50% of the total count.14

Emrani et al. reported that periodontal pathogens can be retained for a prolonged period of time in nondental sites, from
where they can later colonize and compromise the health of dental implants. In a split-mouth study by Hickey et al., researchers placed 12 implants in the edentulous mandible of two microswine and created experimental peri-implantitis. They kept the control implants clean for 45 days by using plastic scalers. Microbiologic studies revealed there was a shift from gram-positive facultative organisms to gram-negative anaerobes in experimental implants. The microbiota of the control implants remained primarily gram-positive facultative organisms.

The transmission of putative periodontal pathogens from periodontal sites to implant sites has been investigated by Eke et al. They examined the microbiota associated with the progression of experimental peri-implantitis and periodontitis induced concurrently in partially edentulous adult monkeys. At the end of six months, they found that the microbiota associated with the progression of experimental peri-implantitis and periodontitis occurring in partially edentulous mouths were similar. Out of 17 partially edentulous patients, with a total of 98 implants, Hultin et al. found that patients with peri-implantitis harbored high levels of periodontal pathogens Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis, Prevotella intermedia, Bacteroides forsythus and Treponema denticola. All of these studies show the importance of proper periodontal infection control before placement of dental implants in partially edentulous patients. Besides, one can say that because of the presence of similar microbiota around implants placed in edentulous jaws, dental professionals should be aware of the potential peri-implant diseases in those patients as well.

Inflammation and Host Response
In an experimental peri-implantitis model in five beagle dogs, Ericsson et al. found that the apical extension of inflammatory cell infiltrate was more pronounced in the peri-implant mucosa than in the gingiva at the end of 90 days. The same group performed a similar experiment in the same year. The difference was that they allowed ligature-induced plaque to accumulate for six weeks, removed the ligatures and went on observing the dogs for one more month. The histological analysis revealed that tissue destruction was more pronounced at the implants than at the teeth and that the lesion at the implants extended directly to the bone marrow, suggesting the absence of an uninflamed connective tissue zone between the healthy and diseased sites. One can speculate, therefore, that peri-implantitis lesions can be expected to progress rapidly. If so, early treatment should be applied in patients with peri-implantitis.

Accumulation of microbial biofilm on clean tooth and peri-implant surfaces results in the development of an inflammatory process around the tissues. The presence of inflammatory cells negatively affects epithelial function as a protective barrier. The perivascular connective tissue matrix becomes altered and there is exudation and deposition of fibrin in the affected area. Also, lymphocytes soon begin to accumulate. Berglundh et al. found that the inflammatory infiltrate developing as a result of the bacterial challenge was equal in size regardless of whether it was adjacent to control teeth or to oral implants, indicating that the host response to bacterial colonization triggered in gingiva is equal to that of peri-implant mucosa. As the cellular infiltrate becomes enlarged, plasma cells dominate the lesion and collagen depletion becomes quite substantial. Gualini and Berglundh studied immunohistochemical features of peri-implant mucositis and peri-implantitis lesions. According to their findings, peri-implantitis lesions contained significantly greater proportions of B cells and elastase-positive cells than mucositis lesions, suggesting they exhibit properties different from mucositis but similar to periodontitis lesions.

The peri-implant crevicular fluid is an inflammatory exudate originating from the vessels of the gingival plexus. Although Lindhe et al. mentioned that analysis of PICF is not a clinically useful diagnostic parameter for peri-implant diseases, there is overwhelming evidence in the literature showing that the analysis of cytokine levels in the PICF may help detect inflammatory lesions around dental implants.

Petkovic et al. studied the concentrations of cytokines and chemokines (interleukin (IL)-1 beta, tumor necrosis factor (TNF) alpha, macrophage inhibitory protein (MIP)-1a and IL-8) in relation to the PICF volume. Patients with clinically healthy gingiva had significantly lower concentrations of IL-1b, TNF-alpha, MIP-1a and IL-8 in PICF compared to both groups with mucositis. Significantly elevated PICF levels of IL-1b have been detected in advanced mucositis infections when compared with healthy control implants. Javed et al. reviewed the current literature on the cytokine profile in the PICF of patients with peri-implantitis. They concluded that raised levels of proinflammatory cytokines, such as interleukin (IL)-1 beta, tumor necrosis factor (TNF) alpha, IL-6 and IL-8, were exhibited in the PICF of patients with peri-implantitis. Thus, monitoring cytokine levels in the PICF may help in the early detection of inflammatory conditions and could be prognostic markers of implant failure as well.

Risk Factors for Peri-implant Diseases
Heitz-Mayfield reviewed retrospective and cross-sectional studies and identified potential risk factors associated with peri-implant diseases. Poor oral hygiene was highly associated with peri-implantitis. Tobacco consumption has been propagated as the second most important risk factor for disease progression for both teeth and oral implants. Lindquist et al. analyzed the influence of smoking on bone loss around dental implants in 45 edentulous patients who were followed for 10 years after treatment with a fixed, implant-supported prosthesis. Smokers with poor oral hygiene showed greater marginal bone loss around the implants than those with good oral hygiene. Subjects with a history of periodontitis are at greater risk for peri-implant disease.
There is limited evidence of the association between diabetes, alcohol consumption, implant surface characteristics, genetics and peri-implant diseases. No association between the absence of keratinized peri-implant mucosa and peri-implant disease was found.\textsuperscript{1}

**Occlusion and Prosthetic Determinants for Marginal Bone Level and Osseointegration**

Implants and their bony housing need to be planned and placed to support the functional and parafunctional demands of occlusal loading. Implants lack the adaptive facility of teeth to develop reversible increased mobility when loaded.\textsuperscript{28} Implant loss has been attributed to overloading or excessive loading.

Berglundh et al. studied marginal bone level alterations following implant installation, abutment connection and functional loading, and they analyzed bone tissue reactions to functional load in six beagle dogs.\textsuperscript{29} Three months after abutment connection, fixed partial dentures (FPDs) made in gold were cemented to the maxillary canines and pre-molars. FPDs were also connected to the three posterior implants in each side of the mandible, while the mesial implant in each side was used as an unloaded control. The radiographic analysis revealed that the largest amount of bone loss occurred following implant installation and abutment connection. The bone level alterations observed at implants exposed to 10 months of functional load were small and did not differ from control sites. The histological analysis revealed that implants exposed to functional load exhibited a higher degree of bone-to-implant contact than control implants, suggesting that functional load at implants may enhance osseointegration and does not result in marginal bone loss.

In a study by Heitz-Mayfield et al., no difference in terms of bone-to-implant contact was found in loaded (74%) and unloaded (73%) implants in dogs at the end of eight months.\textsuperscript{30} In the same study, it was concluded that in the presence of peri-implant mucosal health, a period of eight months of excessive occlusal load on titanium implants did not result in loss of osseointegration or marginal bone loss when compared with non-loaded implants.

In contrast, Isidor evaluated the breakdown of bone around oral implants following excessive occlusal load or plaque accumulation in four monkeys.\textsuperscript{31} The study demonstrated that excessive occlusal load during a 4.5-month to 15.5-month period can result in loss of osseointegration. Marginal bone loss, an average of 1.8 mm in the radiographic bone level associated with peri-implantitis, was assessed after 18 months, but none of these implants with plaque accumulation lost osseointegration.

It has been claimed that natural teeth should not be connected to implants because of the potential problem of root intrusion. In a study by Fugazzotto et al., 843 patients treated with 1,206 natural tooth/implant-supported prostheses utilizing 3,096 screw-fixed attachments were studied.\textsuperscript{32} After 3 to 14 years in function, only 9 intrusion problems were noted. All problems were associated with fractured or lost screws. In a systematic review by Lang et al., intrusion, almost exclusively detected among non-rigid connections, was observed in 5.2% of the abutment teeth after a five-year observation period.\textsuperscript{2} These studies suggest that natural tooth/implant-supported fixed prosthesis can be used safely if the implant is rigidly connected to the tooth.

Lang et al. also assessed the 5- and 10-year survival of combined tooth/implant-supported fixed partial dentures (FPDs). They found the survival rate of FPDs was 94.1% after 5 years of function and 77.8% after 10 years of function. Taking into consideration the number of FPDs at the end of 10 years (n=60) when compared to 5 years of function (n=219), it can be concluded that combined tooth/implant-supported FPDs are acceptable.\textsuperscript{2}

In another systematic review study, by Zurdo et al., the potential effect of incorporation of cantilever extensions on the survival rate of implant-supported FPDs was analyzed. According to the researchers’ results, the five-year survival rate of cantilever FPDs varied between 89.9% and 92.7%. The corresponding survival rate for FPDs without cantilever extensions was 96.3-96.2%, suggesting that an implant-supported FPD with a short cantilever extension (one-tooth unit) is an acceptable restorative therapy and might be considered as an alternative to procedures that require more advanced surgery.\textsuperscript{33}

**Treatment of Peri-implant Diseases**

There are various treatment modalities available to treat peri-implant diseases (Figure 1), but there still is lack of evidence regarding their indications and predictable outcome.

**Surface Decontamination**

While periodontal treatment involves debridement of contaminated tooth surfaces, treatment of peri-implantitis focuses on decontamination of implant surfaces.\textsuperscript{12} Currently available clinical procedures do not allow surfaces to be isolated perfectly from all possible sources of re-contamination. Furthermore, it cannot be excluded that agents used to kill bacteria or detergents used to remove contaminants are themselves deposited on treated surfaces.\textsuperscript{34}

**Treatment Modalities for Peri-implantitis**

<table>
<thead>
<tr>
<th>1. Surface Decontamination</th>
</tr>
</thead>
<tbody>
<tr>
<td>− Citric acid</td>
</tr>
<tr>
<td>− Photosensitizing treatment</td>
</tr>
<tr>
<td>− Stannous fluoride</td>
</tr>
<tr>
<td>− Tetracycline – HCl</td>
</tr>
<tr>
<td>− Chlorhexidine gluconate</td>
</tr>
<tr>
<td>− Hydrogen peroxide</td>
</tr>
<tr>
<td>− Chloramine T</td>
</tr>
<tr>
<td>− Sterile water</td>
</tr>
<tr>
<td>− Plastic sonic scaler</td>
</tr>
<tr>
<td>− Air powder abrasive unit</td>
</tr>
</tbody>
</table>

| 2. Use of Antimicrobial Treatment |
| 3. Laser Therapy |
| 4. Surgical Treatment |

Figure 1.
There are several methods for implant surface decontamination, such as citric acid, photosensitizing treatment, stannous fluoride, tetracycline-HCl, chlorhexidine gluconate, hydrogen peroxide, chloramine T, sterile water, a plastic sonic scaler tip and an air powder abrasive unit. No single method of surface decontamination was found to be superior; however, Zablotsky et al. found that in treating the infected hydroxyapatite (HA)-coated implant surface, a 30-s to 60-s application of citric acid (pH 1) may be beneficial in detoxifying the HA coating prior to regenerative procedures. Citric acid was also found to be effective in removing lipopolysaccharide (LPS) from HA-coated surfaces, suggesting that detoxification of an infected implant surface may be beneficial when surgical repair of the ailing implant is indicated.

Antimicrobial Treatment

Treatment of peri-implant mucositis should include patient motivation and instruction in oral hygiene procedures, followed by mechanical/chemical plaque removal using a combination of professional and self-performed care. Renvert et al. evaluated the effect of the nonsurgical treatment of peri-implant mucositis and peri-implantitis. They observed that mechanical nonsurgical therapy could be effective in the treatment of peri-implant mucositis lesions. Furthermore, the adjunctive use of antimicrobial mouthrinses enhanced the outcome of mechanical therapy of such mucositis lesions.

In peri-implantitis lesions, nonsurgical therapy was not found to be effective. Adjunctive chlorhexidine (CHX) application had only limited effects on clinical and microbiological parameters. However, adjunctive local or systemic antibiotics were shown to reduce BoP and probing depths. Renvert et al. performed non-surgical treatment and local minocycline (17 subjects and 57 implants) or chlorhexidine gel (15 subjects and 38 implants) in patients with peri-implantitis over three months. At the end of one year, the use of minocycline resulted in significant improvements in probing depths compared to chlorhexidine when applied at different time periods. Thus, the adjunctive use of minocycline microspheres is beneficial in the treatment of peri-implant lesions, but the treatment may have to be repeated.

Laser Therapy in Peri-implantitis

Beneficial effects of laser therapy on peri-implantitis have been described in the literature. In their study, Renvert et al. assessed the clinical outcomes following treatment with nonsurgical debridement using either an air-abrasive device or an Er:YAG laser in subjects with implants and a diagnosis of peri-implantitis. Given the fact that nonsurgical mechanical debridement of peri-implantitis has been found to be ineffective, the researchers did not use this as a control treatment. No differences in the reduction of BoP six months after treatment were found between laser treatment and treatment with the air-abrasive device. In conclusion, the results of therapy of subjects with peri-implantitis after six months were similar between treatments using an Er:YAG laser and treatments using the air-abrasive for debridement of implants diagnosed with severe peri-implantitis. Both methods resulted in a reduction of pocket depth, the frequency of suppuration and bleeding at implants with a diagnosis of peri-implantitis. However, the overall clinical improvement was found to be limited. On the other hand, the use of the CO₂ laser in treatment of peri-implantitis deserves consideration as an efficacious treatment modality, as there appears to be little risk to the patient.

Surgical Treatment

The primary objective of surgical treatment in peri-implantitis lesions is to get access to the implant surface for debridement and decontamination in order to achieve resolution of the inflammatory lesion. Once peri-implantitis progression has been prevented and inflammation eliminated, bone fill within the defect and re-osseointegration along the previously contaminated implant surface are treatment goals. It is not known if the adjunctive use of systemic antibiotics in surgical therapy of peri-implantitis is required. Regenerative procedures such as bone graft techniques with or without the use of barrier membranes resulted in various degrees of success. Albouy et al. analyzed the effect of surgical treatment of peri-implantitis without systemic antibiotics at four different types of implants in six dogs. They concluded that resolution of peri-implantitis following treatment without systemic or local antimicrobial therapy is possible but that the outcome of treatment is influenced by implant surface characteristics, which are not yet proven to be risk factors for peri-implant diseases.

In terms of regenerative treatment, different methods with and without the use of barrier membranes have been used for peri-implant bone fill. Wiltfang et al. placed autologous bone mixed with a xenogenic bone graft in 36 peri-implant bone defects that were >4 mm. The radiologic evaluation of the bone defects after regenerative treatment revealed a mean reduction of 3.5 mm one year after the treatment. In another study, by Roos Jansaker et al., the bone defects in 36 patients were placed with a bone substitute with and without the use of resorbable membrane. Defect fill amounted to 1.5 mm and 1.4 mm, respectively, indicating no difference between the groups. Sahrmann et al. concluded that complete fill of the bony defect using guided bone regeneration is unpredictable. According to their study, 10.4% of the implants showed complete bone fill, whereas 85.5% revealed incomplete defect closure.

Maintenance

There is very little data available regarding maintenance procedures for peri-implant diseases. However, Schou recommended that implant treatment in periodontitis-susceptible patients has to include an individualized maintenance program. Thus, early detection and treatment of peri-implant mucositis and peri-implantitis can be achieved. In the consensus of the 7th European Workshop, it was agreed that clinical and radiographic
data should routinely be obtained after prosthesis installation on implants in order to establish a baseline for the diagnosis of peri-implantitis during the maintenance of implant patients.48

Conclusion

Peri-implantitis is an inflammatory disease of the peri-implant mucosa with the loss of supporting bone. Poor oral hygiene, smoking and previous history of periodontitis are known to be the main risk factors for the disease. Because of the absence of an uninflamed connective tissue zone between the healthy and diseased sites, peri-implant lesions are thought to progress more rapidly than periodontal lesions, suggesting the importance of early treatment. Today, the treatment modalities for peri-implantitis are similar to the ones used for periodontitis, mainly focusing on the idea of surface decontamination versus debridement on teeth. The occlusion and longevity of fixed partial dentures around implants, whether connected to natural teeth or not, are still areas of investigation. But studies show that the long-term results are acceptable for both. Further randomized control trial studies are needed to assess the efficacy of the above-mentioned treatment modalities.

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REFERENCES

A Technique to Salvage Endodontically Compromised Maxillary Anterior Tooth


A B S T R A C T

A complication of endodontic treatment is over-preparation of the tooth structure in an attempt to access calcified pulp chambers and root canals. This could result in thin root walls that might compromise the long-term prognosis of the tooth. There are various treatment options when such a complication occurs, among them, extraction of the compromised tooth and its replacement with a dental implant. This clinical report describes a nonsurgical, multidisciplinary treatment alternative where a maxillary anterior tooth with a thinned root wall was successfully saved by repairing the damaged root to its original thickness using a composite resin material and subsequently restoring with a cast post and core and a crown.

Endodontic treatment followed by fabrication of a post and core and a crown has been a routine dental treatment to restore structurally compromised teeth. The introduction of implant dentistry into practice has encouraged some dentists to extract such teeth and replace them with dental implants. One reason for this approach is the documented high success rate of dental implants. While implant therapy is a well-accepted treatment option for many cases, there are disadvantages associated with it. These include: the need for surgical procedures; high cost; extended treatment time; and possible mechanical and biologic failures. There are also esthetic concerns related to implant therapy. It may pose a challenge to the practitioner to achieve well-contoured gingival papillae. In addition, the possibility of bone resorption around the implant may result in gingival recession. The gray hue of the implant in patients with a thin gingival biotype is an added concern. Some literature reports progressive infraocclusion of the implant crown even in mature adults, progressive resorption of labial bone plate and darkening of overlying gingiva even when the implants had sufficient bone support at the time of placement.

The success of endodontic therapy is well documented. A recent systemic review revealed 86% to 93% tooth survival rate following endodontic treatment over a range of 2 to 10 years. Once the endodontic treatment is successfully completed, the tooth may need a post and core and a crown, depending on the structural integrity of the tooth post-treatment. The decision to place a prefabricated post and core or fabricate a cast post and core depends on the amount of remaining tooth structure. A prefabricated post and core would be the treatment of choice when there is at least 75% of circumferential tooth structure remaining after the tooth preparation and mostly on the posterior teeth, where occlusal forces are parallel to the root axis.
Fabricating cast post and cores is more time consuming but, because the post and the core is one unit, it provides more structural strength than the prefabricated post and core system, which consists of two separate materials. This is of critical importance, because lateral forces may separate the different materials in the prefabricated post and core system. A study that analyzed stress distribution in maxillary central incisors subjected to various post-and-core applications under simulated biting forces showed that gold-cast post and core yielded the best results compared to prefabricated post and core systems.13

A main complication of cast post and core has been root fracture. A study investigating fracture resistance and the incidence of root fracture of endodontically treated teeth restored with six post and core systems demonstrated that cast post and cores resulted in significantly higher failure thresholds than all other prefabricated post and core groups.14 In this study, all failures in the cast post and core group involved root fracture, whereas in prefabricated post and core groups, 70% of teeth failed as a result of root fracture. The remaining 30% of teeth failed due to core fractures. It has been documented in the literature that root fracture could be reduced by fabricating a passive and well-adapted cast post and core to the canal.15

Endodontic treatment may have complications, among them, perforation of the canal and inadequate debridement of the root canal system. When these complications occur, it is the responsibility of the practitioner to decide the long-term prognosis of the tooth.16,17 If extraction would better serve the patient, the tooth could be replaced by an implant or by fabricating either a fixed dental prosthesis or a removable partial denture.18 If the decision is to save the tooth, proper corrective procedures should be performed, depending on the location of the complication. If there is a perforation at the apex or persistent apical infection, an apicoectomy would be indicated.19 If there is a perforation close to the crestal bone, orthodontic forced extrusion would be the treatment of choice, to expose the perforated area.20 The tooth would then be ready for fabrication of a cast post and core and crown.

Another complication of endodontic therapy is overpreparation of the tooth in an attempt to find the pulp chamber and root canal in case of calcific metamorphosis. This will result in thin-walled roots. One study evaluated the fracture resistance of thin-walled roots (1.0 mm, 1.5 mm, 2.0 mm) restored with different post systems and showed that shear strength of the roots might be affected by the remaining dentin thickness.21 The results of this study revealed that fiber-reinforced composite posts with a dentin thickness of 2.0 mm were more fracture-resistant than the other two groups (1.0 mm and 1.5 mm); the cast post and core group had higher fracture strength than the resin groups. Some studies indicated that reinforcement of the intra-radicular defects might be achieved by composite resin22,23 and that the repair might increase the fracture resistance of thin-walled roots.24

This article describes a technique to salvage a tooth with a similar complication using a composite resin material to repair the damaged root of a maxillary anterior tooth and, subsequently, fabricate a cast post and core and a crown.
Clinical Report

A 79-year-old white male presented to New York University College of Dentistry for a regular checkup. His medical history included controlled high blood pressure, high cholesterol, emphysema and multiple myeloma. His dental history revealed multiple restorations on several teeth, consisting of endodontic treatments, amalgam and composite restorations, crowns, fixed dental prostheses and implant-supported prostheses. The patient had xerostomia; he reported daily brushing and flossing. Extraoral examination was within normal limits. Intraoral examination indicated fair oral hygiene, plaque accumulation and clinically acceptable restorations, except for a 25-year-old composite restoration on the mesial and palatal surfaces of the maxillary right lateral incisor that presented with marginal recurrent caries (Figure 1). The tooth had no mobility and had a negative response to both percussion and palpation. Radiographic examination showed good bone support, recessed pulpal chamber and narrowing of canal space (Figure 2). Sensitivity testing was negative. The tooth was diagnosed with a necrotic pulp and required endodontic treatment.

Following removal of the existing composite restoration and recurrent caries, the remaining tooth structure was evaluated for restorability. It was decided that a new composite restoration would be suboptimal due to remaining unsupported tooth structure; therefore, the treatment plan included fabrication of a cast post and core and a crown following the endodontic treatment. Due to recession of the pulp chamber and calcification of the canal, endodontic access was challenging and resulted in an over-preparation, leaving tooth structure that was only 1 mm thick at the root and about 2 mm apical to the crestal bone level. Clinical examination showed no perforation (Figure 3). A pulpectomy was performed and the tooth was temporized with a cotton pellet and Cavit G temporary filling material (3M Espe, St. Paul, MN). Periapical radiograph of the tooth confirmed the integrity of the root wall with no evidence of perforation (Figure 4).

After explaining the incident to the patient, his treatment plan was revisited. The treatment options listed below were offered to the patient; the risks, benefits and prognosis of each option were discussed in detail.

1. Extraction of the maxillary right lateral incisor and replacement with a dental implant.
2. Extraction of the maxillary right lateral incisor and fabrication of a three-unit fixed dental prosthesis using maxillary right central incisor and maxillary right canine as abutments.
3. Extraction of the maxillary right lateral incisor and fabrication of a removable partial denture to replace the maxillary right lateral incisor.
4. Endodontic treatment and orthodontic forced extrusion of the maxillary right lateral incisor to expose defected root area, followed by fabrication of a cast post and core and a crown.
5. Endodontic treatment of the maxillary right lateral incisor and repair of the defected root with a composite material, followed by fabrication of a cast post and core and a crown.

The patient was opposed to extraction and orthodontic extrusion; therefore the revised treatment plan included endodontic treatment of the maxillary right lateral incisor and repair of the root.
defect with a composite material, followed by fabrication of a cast post and core and a crown.

The endodontic treatment was done under dental dam isolation. Access to the canal space was made, and working length was measured using radiographs. The canal was instrumented with copious irrigation of 5.25% sodium hypochlorite and 0.04 Profile endodontic rotary system (Dentsply GAC Int. Inc., Bohemia, NY). Calcium hydroxide was placed in the canal as an inter-appointment medicament. The patient returned in two weeks for completion of endodontic therapy. The canal was irrigated with 5.25% sodium hypochlorite, dried with fine paper points and obturated using lateral condensation and zinc oxide eugenol sealer (Tubli-Seal, SybronEndo, Orange, CA). The tooth was temporized with cotton pellet and Cavit G (3M Espe, St. Paul, MN). A periapical radiograph of the tooth was taken to confirm adequate obturation (Figure 5).

The coronal tooth structure was prepared with a chamfer finish line. The axial walls were evaluated for thickness and reduced cervically until at least 1 mm thick (Figure 6). Root repair started with removal of gutta-percha from the root canal using Maillefer Gates Glidden drills, sizes #2 and #3 (Dentsply/GAC Int. Inc., Bohemia, NY). Silicon endo stops (Pearson Dental, Sybron Endo, Orange, CA) were used to adjust the length of the drill in order to leave 5 mm of gutta-percha at the apex to maintain the proper apical seal (Figure 7). Periapical radiograph was taken to verify removal of the gutta-percha to the correct length (Figure 8). A soft LumineX Post (Dentatus USA Ltd., New York, NY) was tried in the canal to verify the fit (Figure 9). Root structure at the defect site was etched with 35% phosphoric acid (Ultradent Products Inc., South Jordan, UT) for 15 seconds and irrigated with water. Peak LC bond resin (Ultradent Products Inc., South Jordan, UT) was applied and light cured for 20 seconds. The soft LumineX Post was coated with petroleum jelly (Vaseline; Pearson Dental, Sylmar, CA), and repositioned into the canal as a spacer. Ultra Seal XT-plus flowable composite (Ultradent Products Inc., South Jordan, UT) was applied to the defect and light cured for two seconds (Figure 10). The soft LumineX post was removed from the canal, and the composite was cured for an additional 40 seconds. The repaired root wall was examined clinically (Figure 11) and radiographically (Figure 12). The tooth was then provisionalized with autopolymerizing acrylic resin (Alike, GC America, Alsip, IL) using a temporary post in the canal (Figure 13) and cemented with temporary cement (Tempbond, Kerr Corp., Orange, CA) (Figure 14).

Fabrication of cast post and core pattern started with lubrication of the repaired canal with petroleum jelly (Vaseline; Pearson Dental, Sylmar, CA). A duralay plastic pin (Reliance Dental Mfg. Co., Worth, IL) was used to support the duralay inlay pattern resin (Reliance Dental Mfg. Co., Worth, IL) to create the post pattern. Once good and firm adaptation of the pattern was obtained in the canal, the core part was built with the duralay inlay pattern resin. A chamfer bur was used intraorally to shape the core to the ideal tooth preparation form (Figure 15). The post pattern was cast in metal. The adaptation of the cast post was improved using pressure spot indicator (Coltene/Whaledent Inc., Capahoga Falls, OH) and verified with periapical radiograph (Figure 16). The canal was irrigated and dried with absorbent points (Henry Schein Inc., Melville, NY). A radiopaque reinforced-class-ionomer luting
cement (Fuji Cem, GC America Inc., Alsip, IL) was used to cement the post (Figure 17). The provisional crown was relined to fit the cast post and core and cemented with temporary cement.

A definitive impression was made using polyether impression material (Impregum; 3M Espe, St. Paul, MN). A Captek metal-ceramic restoration was fabricated. After the fit was verified radiographically (Figure 18), the restoration was cemented using resin-reinforced glass-ionomer luting cement (Fujicem; GC America, Alsip, IL). The patient was very satisfied with the results and the treatment outcome (Figure 19).

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REFERENCES

A study was undertaken to determine the general level of knowledge, attitudes and practices in clinical dental care of pregnant women. This was a transversal descriptive study in the form of a structured and anonymous survey completed by dentists in Murcia (southeast Spain). The questionnaire was sent by e-mail and investigated dentists’ knowledge of and attitudes toward different dental procedures applying to pregnant women. The response rate to the questionnaire was 60%. The vast majority of dentists (81.3%) agreed that oral care should be part of general healthcare for pregnant women. However, discrepancies were found in knowledge and attitudes to practice.

Pregnant women are likely to experience dental decay, perhaps because of a tendency to neglect oral hygiene routines, arising from the fact that most pregnant women suffer vomiting, nausea and/or acid reflux during pregnancy. They might also find that the taste of some toothpastes and mouthwashes is not to their liking.

During pregnancy, hormonal and vascular changes can affect both mother and fetus, and it has been suggested that these changes predispose women to gingivitis, periodontal disease, dental decay, development of hyperplastic tissue, preterm delivery, low birth weight and preeclampsia, among other conditions. Some studies indicate that treatment for periodontal disease during pregnancy can improve birth outcomes. A survey of dentists in Oregon revealed misconceptions about the appropriateness of routine procedures, including dental X-rays and the administration of lidocaine. Wider et al., in a study carried out in North Carolina, found that 49% of obstetricians rarely or never recommend a dental examination during prenatal care visits.

In another national study, by obstetrician-gynecologists Morgan et al., most obstetricians (73%) did not ask pregnant women if they had seen a dentist recently; nor did they inquire about current oral health (54%) or provide information on dental care (69%). The main obstacles to women seeking dental care during pregnancy is a lack of awareness or a lack of information about the safety and/or importance of dental care for the health of both mother and fetus.
The providers of dental care can themselves create obstacles to adequate attention. A survey of dentists in Oregon, performed by Huebner et al., found that 71% of dentists reported that low economic returns were an obstacle to providing dental care during pregnancy, while 11% said they were too busy to add oral health assessment of pregnant women to their existing workload. Currently, there is no standard program of dental healthcare for pregnant women offered at community health clinics. In spite of the recommendations to provide care and guidance for the maintenance of oral health during pregnancy, there is little information available about the actual clinical practices of Spanish dentists in this area. The aim of this study was to determine Spanish dentists’ general knowledge of and attitudes toward pregnancy and to identify other factors influencing the provision of dental care to pregnant women.

Methods
This was a transversal descriptive study. The inclusion criteria were dentists registered in the Spanish College of Dentists and practicing in the Autonomous Community of the Region of Murcia in southeast Spain. In this way, the participants were all general dental practitioners (GDPs) in private practice. The study was approved by the Ethics Committee of the University of Murcia (Spain) and took place from May 2009 to May 2011.

A survey was sent to a random sample of 250 GDPs. The sample size was selected so that a 60% response would yield a margin of error of approximately 3%. Data collection was by email survey and was carried out over different time periods. Each email contained an introductory letter explaining the purposes of the study and the survey itself. Participation was voluntary, anonymous and confidential. Return of the questionnaire was considered consent. Members who did not complete the questionnaire after the first week were reminded to do so after two weeks and again after four weeks. When there was no positive response after the third follow-up mail, the recipient was considered non-responsive.

Survey
The survey questions were conceived in response to issues arising from a literature review, policy statements and guidelines, qualitative research and expert opinion about dental care for pregnant women and anticipatory guidance. The questionnaire’s basic structure and specific items were produced in reference to previously published studies/surveys. Socio-demographic data and years of professional experience were registered. The questionnaire was tried out on 30 dentists. The content, wording and length were modified on the basis of responses to this field test.

One section contained questions as to whether or not the dentist gave oral health information and guidance to pregnant women, with responses in the form of a Likert-scale format scoring 1 to 4: “strongly disagree”; “disagree”; “agree”; “strongly agree.”

Another section investigated the frequency with which different dental procedures were carried out (“never”; “sometimes”; “always”). Another assessed dentists’ knowledge about procedures and the administration of medication during pregnancy using the format: “when (first, second or third trimester) can you provide each of the following procedures on pregnant women?” The point-scoring system followed recommendations set forth in the Practice Guidelines (New York State Department of Health, 2006).

Statistical Analysis
Data were processed using SPSS version 12.0 statistical software (SPSS Inc., Chicago, IL, USA). A descriptive study was made of each variable. Associations between different qualitative variables were analyzed using Pearson’s chi-squared test. Statistical significance was accepted for p≤0.05.

<table>
<thead>
<tr>
<th>Services</th>
<th>Never n (%)</th>
<th>Sometimes n (%)</th>
<th>Always n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prophylaxis</td>
<td>32 (21.33)</td>
<td>42 (28)</td>
<td>76 (50.67)</td>
</tr>
<tr>
<td>Root planing and curettage</td>
<td>52 (34.67)</td>
<td>72 (48)</td>
<td>26 (17.33)</td>
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<tr>
<td>Orthopantomography</td>
<td>111 (74)</td>
<td>30 (20)</td>
<td>9 (6)</td>
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<td>Root canal therapy</td>
<td>55 (36.67)</td>
<td>79 (52.67)</td>
<td>16 (10.66)</td>
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<td>Restore untreated caries</td>
<td>34 (22.67)</td>
<td>69 (46)</td>
<td>47 (31.33)</td>
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<tr>
<td>Fixed bridge</td>
<td>83 (55.33)</td>
<td>44 (29.33)</td>
<td>23 (15.34)</td>
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<td>Dental implant</td>
<td>131 (87.34)</td>
<td>12 (8)</td>
<td>7 (4.66)</td>
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<td>Emergency dental care</td>
<td>26 (17.33)</td>
<td>32 (21.33)</td>
<td>92 (61.34)</td>
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<td>Tooth extraction</td>
<td>42 (28)</td>
<td>84 (56)</td>
<td>24 (16)</td>
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<td>Alveolitis treatment</td>
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<td>58 (38.67)</td>
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<td>61 (40.67)</td>
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<td>Temporal dental restoration</td>
<td>41 (27.34)</td>
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<td>Injection of local anesthetic</td>
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<td>Paracetamol prescription</td>
<td>51 (33.99)</td>
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<td>AINEs prescription</td>
<td>90 (60.01)</td>
<td>51 (33.99)</td>
<td>9 (6)</td>
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<td>Acetylsalicylic acid prescription</td>
<td>116 (77.33)</td>
<td>30 (20)</td>
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<tr>
<td>Antibiotics prescription</td>
<td>35 (23.33)</td>
<td>57 (38)</td>
<td>58 (38.67)</td>
</tr>
<tr>
<td>Antiseptics prescription</td>
<td>45 (30)</td>
<td>91 (60.97)</td>
<td>14 (9.03)</td>
</tr>
</tbody>
</table>
Results
A total of 250 dentists were approached; 150 completed the questionnaire correctly, producing a response rate of 60%. The average age of participants was 30.91 ± 8.97, ranging from 21 years to 58 years. Fifty-eight of the respondents (38.67%) were men; 92 (61.33%) were women. The average duration of professional life was 7.75 ± 7.50 (1 to 30) years. Most dentists strongly agreed (81.3%) that oral care should be a part of healthcare programs for pregnant women. However, not all dentists (113 [75%]) gave guidance or made arrangements to do this, and eight (5.3%) believed this to be a waste of time.

Table 1 shows the frequency of treatments carried out by dentists for this patient group, the most common being emergency dental treatment (61.34%), followed by preventive measures (50.67%) and surgery on dental abscesses (40.67%). When dentists’ knowledge was investigated through questions on procedural frequency (“never”; “sometimes”; “always”) and the time that these were applied (first, second or third trimester), a higher percentage of incorrect responses (i.e., dentists who never carried out these procedures) than correct (dentists who sometimes or always applied the procedures) with statistically significant differences between the following procedures: preventive measures, root planing, root canal therapy, restoration of untreated caries, alveolitis treatment, dental abscess surgery or administration of lidocaine (Table 2).

Discussion
During pregnancy, hormones alter immune-responsiveness and inflammatory response mediators. This has been reported to cause oral problems, primarily gingivitis and periodontal infection.7,16 Pregnancy gingivitis ranges from asymptomatic erythema to severe cases with pain and bleeding of the gingival tissue. It affects 30% to 80% of pregnant women in industrialized countries.19,20 Periodontal diseases produce a wide range of clinical signs and symptoms, such as tooth loss, altered appearance, pain, bleeding, bad breath and impaired quality of life.8

The most important objective of dental healthcare for pregnant women is to establish a healthy environment through adequate plaque control by brushing, flossing and professional prophylaxis, including scaling, root planing and polishing.1 The results of the present study agree with other research,2,3,19 which reports that most dentists do give guidance on oral care during pregnancy and believe in its necessity as a part of general health care for pregnant women. Nevertheless, the utilization of dental

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<td><strong>Comparison of Knowledge about Procedures during Pregnancy</strong></td>
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* By mean of the question: “When (first, second or third trimester) can you provide each of the following procedures on pregnant women?” Between dentists that never provide these services during pregnancy and dentists that sometimes or always provide these services during pregnancy (Pearson χ² test).
The most important objective of dental healthcare for pregnant women is to establish a healthy environment through adequate plaque control by brushing, flossing and professional prophylaxis, including scaling, root planing and polishing.¹

care during pregnancy by the women themselves is reported to be low. Lydon-Rochelle et al.¹⁹ examined data from a population-based survey of women in Washington state during 2000 and found that only 42% received dental care during pregnancy.

Data from an ongoing population-based survey conducted by the Centers for Disease Control and Prevention (CDC)—the “Pregnancy Risk Assessment Monitoring System”—reports that the proportion of women receiving dental services during pregnancy varies among the U.S. states, and ranges from 23% to 43%.¹⁷,¹⁹ In one study of women who reported oral health problems, only half said they sought dental care.²¹ Some women believed that poor oral health status during pregnancy was normal; and some believed dental treatment was harmful to their unborn child.³²¹ Persistent misconceptions about dental care in pregnancy among childbearing women need to be further identified and clarified to aid development of educational and policy strategies.

Dental treatment can be provided safely at any time during pregnancy,⁸ allowing women to maintain an optimal level of dental health throughout their pregnancy. At present, the basic dental services offered by the Spanish National Health System are regular examinations and dental extractions. Dental care is provided mainly by private practices, with patients paying considerable amounts of money to treat their dental problems.

Other research¹⁷,²⁰ has found that perceived barriers exist among dental practitioners to the provision of dental services and that these have a direct effect on practice. Lee et al.¹⁹ found that the most influential barriers are time required, low economic compensation, capability and resistance by dental personnel. Improved training in the importance of oral health, recognition of oral health problems and knowledge of the safety of procedures during pregnancy may make doctors more disposed to assess oral health and address dental care issues for these patients.

The present study does have limitations, namely, the 60% response rate and—in spite of the pilot test carried out to ensure the functioning and clarity of the questions—the possibility that some participants may have interpreted the questions incorrectly. No data was obtained that might allow a comparison of dentists who took part with those who did not. Nevertheless, the study has highlighted important gaps in dental care knowledge, especially among dentists who do not provide dental care to pregnant women. Better knowledge was identified among those who sometimes or always provided dental care adapted to the needs of pregnant women. These discrepancies in knowledge and attitudes revealed by our results point to a need for continuing dental education programs for pregnant women, further interdisciplinary academic training and education on integrated approaches to healthcare.

There is a glaring deficiency of policy in the fact that the Spanish National Health System does not have a specific preventive oral program for pregnant women. The only oral healthcare provided is through examinations, which women must seek for themselves, and extractions if necessary. Professional associations and governmental agencies should publish practical recommendations to increase public and professional awareness of the oral health needs of pregnant women and adopt policies to improve dental care for this patient group. 🆕

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REFERENCES

The Botryoid Cyst

Case Report

Caitlin B.L. Magraw, D.D.S.; Louis Mandel, D.D.S.

ABSTRACT

The clinical and radiographic features of the botryoid odontogenic cyst (BOC) are non-specific; and significant overlap exists with other lesions. Here we report a case of an asymptomatic BOC in the anterior mandible. The purpose of this report is to call attention to the manifestations of the BOC, to review the differential diagnosis and to outline the histologic criteria required to establish a definitive diagnosis. This report highlights the importance of careful histologic examination of unilocular or multilocular radiolucencies lying lateral to the roots of vital teeth. Following diagnosis of a BOC, long-term follow-up to monitor for recurrence is indicated.

The botryoid odontogenic cyst (BOC) was first identified by Weathers and Waldron in 1973 as a multilocular variant of the lateral periodontal cyst (LPC). The BOC is odontogenic in origin and histologically appears as “grape-like” clusters of individual locules. It has been postulated that the BOC may arise from the rests of Malassez or the rests of Serres. Similar to other developmental odontogenic cysts, BOCs are well-circumscribed unilocular or multilocular radiolucencies, and are located intraosseously lateral to the roots of vital teeth. The clinical and radiographic features of BOCs are not pathognomonic. Histopathologic analysis is required to establish a definitive diagnosis.

Most BOCs occur in older individuals, typically during the sixth and seventh decades of life, and show no significant sex predilection. These lesions tend to develop in the mandibular canine and first premolar region, as does the LPC. In a review of 65 BOCs only 14% were identified in the maxilla. Many patients with BOCs are asymptomatic, although clinical swellings can develop. Patients rarely complain of tenderness, paresthesia and drainage.

Here we report a case of an asymptomatic BOC in the anterior mandible. The purpose of this report is to call attention to the manifestations of the BOC, to review the differential diagnosis and to outline the histologic criteria required to establish a definitive diagnosis. An accurate diagnosis of the BOC is mandatory in light of its risk of recurrence, which is reported to be as high as 33%.

Case Report

A healthy 52-year-old Hispanic male was seen in the oral and maxillofacial surgery clinic at the Columbia University College of Dental Medicine with a buccal swelling in the left mandibular incisor region (Figure 1). The patient reported that the swelling had...
been present for approximately two months and had gradually increased in size. The patient’s medical history was unremarkable.

The intraoral examination revealed a 7 mm x 4 mm circumscribed buccal gingival swelling in the left anterior mandibular area (Figure 1). Palpation created moderate discomfort and indicated that the lesion was filled with fluid. The radiograph demonstrated a well-defined, unilocular radiolucent lesion between the mandibular left canine and lateral incisor teeth (Figure 2). Surgically, via local anesthesia, a circumscribed cyst-like lesion was readily enucleated from its bony crypt (Figure 3).

The histopathologic examination showed fibrous connective tissue with multiple cystic spaces lined by cuboidal and stratified squamous epithelium. The epithelium lining was thin, with occasional focal areas of plaque-like thickenings. Some inflammatory cells were seen. A diagnosis of a botryoid odontogenic cyst was made.

**Discussion**

BOCs present as non-specific multilocular or unilocular radiolucencies, but they are multilocular histologically. Multilocular radiolucencies can also reflect the presence of an odontogenic keratocyst (OKC), ameloblastoma or central giant cell granuloma. The OKC and ameloblastoma usually involve the posterior mandible, whereas the central giant cell granuloma frequently involves the anterior mandible. Less common multilocular entities include the odontogenic myxoma, glandular odontogenic cyst (GOC), ameloblastic fibroma, central odontogenic fibroma and low-grade mucoepidermoid carcinoma.

Alternatively, the differential diagnosis for a unilocular radiolucency in the mandibular cuspid area must include the LPC and even the gingival cyst of the adult (GCA). LPCs constitute less than 1% of all intraosseous jaw cysts, tend to occur in the mandibular canine area and may be associated with swelling. The LPC has a limited growth potential, while the BOC is inclined to be larger. At this time, the relationship between LPCs and BOCs is not well understood. Siponen et al. suggest that BOCs may arise from the fusion of multiple LPCs or from cystic expansion of one LPC. It is also possible that the LPC and the BOC do not lie on a continuum and represent different lesions with similar characteristics.

The GCA is the extra-osseous soft tissue variant of the LPC, and can occasionally cause erosion with a radiolucency of the underlying bone. Therefore, although unlikely, the GCA should also be considered in the differential diagnosis of unilocular radiolucencies lying lateral to the roots of vital teeth, particularly mandibular canines or premolars.

There is significant histologic overlap between the LPC, GCA and BOC. The LPC is lined by thin cell layers, cuboidal to stratified non-keratinizing squamous epithelium, which is described as resembling reduced enamel epithelium. Usually the cyst wall has few or no inflammatory cells. Additionally, the LPC has characteristic epithelial thickenings, which form plaques that bulge into
the central cystic cavity. Glycogen-rich PAS-positive clear cells in either the superficial layer of the lining epithelium or in the plaques are also evident.\textsuperscript{9,10,12} The GCA has the same histopathologic features as the LPC, but is located in the gingival soft tissue. Likewise, the BOC shares similar microscopic features with the LPC, but is characterized by the presence of multiple cystic locules.

Weathers and Waldron\textsuperscript{1} originally described BOCs as being multilocular. However, the BOC is more commonly seen radiographically as a unilocular lesion, but with multilocystic features microscopically, as in our case.\textsuperscript{4,7,12-14} Therefore, a multilocular radiographic appearance should not be used as a diagnostic criterion for a BOC. Instead, a BOC should be diagnosed only when the lesion demonstrates a multilocystic microscopic appearance, as suggested by Siponen et al.\textsuperscript{12} Furthermore, because significant histologic overlap exists between many of the developmental odontogenic epithelial cysts, careful analysis of multiple tissue sections is essential.

The likelihood of BOC recurrence is attributed to its larger size and multilocular configuration, both of which contribute to increased difficulty in surgical removal.\textsuperscript{5} Larger BOCs and those that present with multilocular radiographic appearances are more likely to recur than those that are radiographically unilocular.\textsuperscript{6} Long-term follow-up is essential, since many recurrences do not occur until 10 years after the initial surgery.\textsuperscript{13} Unfortunately, the reported recurrence rates may be underestimated, because many BOCs are followed for only short periods of time.\textsuperscript{6}

A more aggressive surgical approach, enucleation, curettage and the use of Carnoy solution may decrease the risk of recurrence of the BOC.\textsuperscript{6} Regrettably, the BOC represents an uncommon lesion, the majority of which are radiographically unilocular, that usually can only be diagnosed microscopically after surgery. Long-term follow-up to monitor recurrences must be the focus of practitioners.

**Conclusion**

The clinical and radiographic features of BOCs are non-specific; and significant overlap exists with other lesions. Careful histologic examination of unilocular or multilocular radiolucencies, lying lateral to the roots of vital teeth, is required. When a BOC is diagnosed, long-term follow-up, to monitor for recurrence, is indicated.

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**REFERENCES**

Dental Considerations in Hereditary Epidermolysis Bullosa

S. Mahesh Sharma, M.D.S.; Muralee Mohan, M.D.S.; Joanna Baptist, M.D.S.

ABSTRACT

Epidermolysis bullosa is an inherited mucocutaneous disorder characterized by blister formation due to a defect in collagen metabolism. Each of the three major subtypes of epidermolysis bullosa has distinct clinical and oral manifestations. A case report of the most classic form of epidermolysis bullosa, recessive dystrophic epidermolysis bullosa, is presented here, along with a review of the literature on the clinical features and management of the condition. An attempt has been made to highlight the anesthetic and oral surgical considerations when treating a patient with epidermolysis bullosa.

Hereditary epidermolysis bullosa (HEB) is a rare genodermatosis, mechanobullous disorder characterized by blistering of the skin and mucosa following mild mechanical trauma. However, the descriptive term “epidermolysis” is considered irrelevant, since epidermal disruption is not the primary feature in two of three main varieties of epidermolysis bullosa.1

Based on the level of skin cleavage, epidermolysis bullosa simplex, junctional epidermolysis bullosa and dystrophic epidermolysis bullosa are the three major recognized varieties of HEB. A subcommittee of the National Epidermolysis Bullosa Registry in 1991 described 25 subtypes of hereditary epidermolysis bullosa.2 These subtypes of HEB can be inherited as an autosomal dominant or recessive form.

Various other subtypes of epidermolysis bullosa have been described in the literature, such as pretibial epidermolysis bullosa,17 epidermolysis bullosa nevus18 and epidermolysis bullosa pruriginosa.19

Complications of Epidermolysis Bullosa

The recessive dystrophic form of epidermolysis bullosa is usually associated with various systemic complications. The Hallopeau-Siemens subtype may exhibit various renal complications, such as obstructive uropathies of the urethra and bladder during the first few years of life and glomerular complications in early adulthood. Chronic inflammation may finally lead to end stage renal failure.20

The common ocular findings in patients suffering from hereditary epidermolysis bullosa are corneal blistering and ulcerations. Other less common findings include corneal scarring, the presence of ectropions, impaired vision and symblepharons.21

Cardiomyopathy has also been suggested as a relatively less common complication of recessive dystrophic epidermolysis bullosa.2 It is believed that the leading cause of death in the recessive dystrophic form of epidermolysis bullosa is cutaneous squamous cell
carcinoma, which causes death through invasion and metastasis. Studies have shown that the alterations in both p53 and p16ink4a can contribute to the occurrence of carcinoma.²³,²⁴

**Management**

The management of HEB is multidisciplinary. All the treatment modalities are nonspecific and supportive, as it is a lifelong disease. Secondary infections of the raw wound surfaces can be managed with the use of topical antibiotics²⁵,²⁶ such as bacitracin, silver sulfadiazine and mupirocin. Sucralfate suspension is effective in managing pain and the number of blisters.²⁷

In recessive dystrophic epidermolysis bullosa, a good nutritional balance is necessary to obtain healing of the chronic wounds. However, involvement of the oral mucosa and esophageal stenosis may be responsible for severe nutritional deficiencies. Studies have shown that deficiencies of iron, vitamins D, C, B6, zinc and selenium were evident in 36% to 70% of patients.²⁸ Phenytoin, 5mg/kg/day has been shown to be effective in reducing blistering and improving the prognosis of dystrophic epidermolysis bullosa by inhibiting the synthesis or secretion of collagenase.²⁹

Dental surgeons should consider removing sharp and non-functioning teeth. Endosseous implants are preferred over removable partial denture prostheses. Large, non-healing ulcers may be managed with split-thickness skin grafts.

**Airway and Surgical Considerations**

Dental surgeons should be aware that due to the lack of adhesion between various layers of the skin, blisters are formed following minimal provocation. They should follow a “no-touch policy” when dealing with patients suffering from HEB. Patients should be allowed to position themselves into the dental chair or onto the surgery table. They should not be sedated and brought to the operatory, but, rather, they should be sedated after they position themselves on the surgery table. It is now known that direct pressure to the skin is not as damaging as shearing forces.

Sheets beneath the patient should not be moved once the patient is seated in the chair. During the preoperative procedures, under general anesthesia, eyes should not be taped with adhesives; face masks should be used after placing several layers of Vaseline gauze; laryngoscopes need to be lubricated copiously; and oropharyngeal suctioning during extubation is to be avoided, as it can lead to the formation of life-threatening bullae. Excessive salivation can be managed using antisylogogues, such as atropine and glycopyrrolate.³⁰,³¹

During dental surgical procedures, all surgical instruments should be adequately lubricated with triamcinolone or petroleum ointment. Ideally, instruments used for retracting tissues should be broad and have blunt, rounded edges. It is prudent to gently mop the surgical field rather than use intraoral suction devices. Intraligamentary injections are recommended wherever feasi-
Local anesthesia is best injected slowly and with utmost care to avoid tissue cleavage.

**Case Report**

A 25-year-old woman, previously diagnosed as suffering from HEB, reported to our department with a complaint of loose teeth. On further interviewing the patient, it was discovered that she reported blisters occurring all over her body since she was 4 days old. These blisters subsequently broke down to form ulcers, which healed gradually before new blisters appeared. The blisters were not associated with pain, fever, difficulty in swallowing or hoarseness of voice.

The patient reported a mild itching sensation and said the blisters occurred even with minimal trauma/provocation. She also reported hearing difficulty and had no history of burning micturition.

The patient was born out of a second-degree consanguineous marriage. Her younger sister, age 13, was reported to be suffering from the same condition. However, the parents were unaffected.

On examination, a large ulcer was seen in the occipital region (Figure 1). Other significant extraoral features included the characteristic absence of eye lashes, the presence of milia around the ala of the nose, clubbing of the digits and dystrophic nails (Figure 2). Multiple crusted lesions were seen on the palm, shoulder, back and waist (Figure 3).

Intraoral examination revealed hypoplastic, discolored and mobile teeth (Figure 4). Multiple teeth were missing. The tongue, labial and buccal mucosa exhibited ulcers and tissue tags (Figure 5). An intact bulla was seen on the lateral surface of the tongue.

As the teeth present were rudimentary, non-functional and only traumatizing the mucosa, aiding in the formation of new lesions, extraction was planned. Following the dental examination, the patient was referred to a team of consultants that included a cardiologist, otolaryngologist, gynecologist and ophthalmologist. Her medical examination revealed the presence of mild mitral regurgitation and pulmonary arterial hypertension, anemia, hearing deficit in both ears, genital ulcers and mild loss of vision.

The patient’s teeth were extracted under local anesthesia (intra-ligamentary) and with necessary precautions, keeping in mind the muco-cutaneous fragility and the systemic condition of the patient. Measures taken included antibiotic prophylaxis to prevent infective endocarditis and correction of anemia with whole blood transfusion. The patient was reviewed three weeks following extraction, at which time the oral lesions had subsided. Endosseous implants were planned for the edentulous sites.

**Conclusion**

The fragility of the skin and oral mucosa in patients with HEB pose a challenge to dental surgeons. It is imperative that the surgeon recognize the clinical signs and symptoms of the various forms of this condition and formulate an ideal treatment plan for these patients.

**References**


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