

The “Point of Care” section answers everyday clinical questions by providing practical information that aims to be useful at the point of patient care. The responses reflect the opinions of the contributors and do not purport to set forth standards of care or clinical practice guidelines. Readers are encouraged to do more reading on the topics covered. If you would like to submit or answer a question, contact editor-in-chief Dr. John O’Keefe at jokeefe@cda-adc.ca.

QUESTION 1

My patient recently fractured her mandibular first bicuspid, and as a result very little visible crown remains. What are my restorative options?

Background to the Problem

The success of endodontic treatment is significantly better with a permanent coronal restoration (a crown or an amalgam or composite restoration) than with a temporary restoration. However, given the availability and predictability of implants, should retention of compromised teeth be considered at all (Fig. 1)?

The use of a compromised tooth as the basis for a coronal restoration must be considered in terms of the benefits of retaining the tooth, the anticipated longevity of the definitive restoration, the cost of the procedures and the consequences of clinical complications or failure of any aspect of treatment. In determining whether to save and restore a tooth or extract the tooth and place an implant, I consider the following factors:

1. Can an implant be used in this case?
2. How much of the tooth structure remains?
3. Will the restoration last at least 5 years?
4. Does the patient understand the treatment options and the risks associated with treatment?

1. Is a dental implant an option?

When longevity of the restoration is factored in, an economic analysis usually favours use of an implant. When the tooth is eventually lost, a bridge or removable partial denture must be made, or the tooth must be replaced by an implant. It may be more cost-effective to extract the compromised tooth now and replace it with an implant than to replace it with a bridge, using an adjacent healthy tooth as the primary abutment.

For some patients, an implant may not be an option because of various relative contraindications:

- insufficient space, either the mesiodistal space (as in the case of a mandibular incisor) or the inter-arch space
- inadequate bone volume

- medical contraindications to surgery
- patient’s inability to afford the implant and lack of insurance coverage.

2. How much coronal tooth structure remains?

Endodontically treated teeth are at greater risk of clinical failure after restoration than vital teeth. Placement of a post provides retention for the core but does not strengthen the tooth or increase the resistance to fracture. Posts must be of sufficient length to provide resistance to loosening and must be of a diameter appropriate to prevent root fracture.¹ A ferrule, a band of cast metal 1.5 to 2 mm in width, should be designed to engage the coronal tooth structure apical to the core to improve resistance to fracture.^{2,3} Placement of a ferrule may necessitate root extrusion or surgical crown lengthening, at the expense of the remaining tooth structure, which will weaken the tooth.⁴ Complications associated with placement of a post, core and crown can be anticipated to occur in approximately 20% of cases.⁵ The most common clinical complications for teeth with posts and cores are loosening of the post (5%), root fracture (3%) and caries (2%). For crowned single teeth the common complications are porcelain veneer fracture (3%) and



Figure 1: Full-coverage restoration that failed 3 months after initial cementation.

loss of retention (2%).⁵ If there is no clinical crown the incidence of clinical complications increases significantly. The survival of crowned teeth with 2 natural proximal tooth contacts is also better than for teeth with an adjacent edentulous area.^{6,7}

3. Will the restoration last for a reasonable length of time (at least 5 years)?

In many cases the loss of the tooth will have a negative impact on function and esthetics. Provided the tooth does not have to serve as an abutment for a bridge or removable partial denture and if lateral loading can be minimized, the restored tooth can be expected to function adequately for a reasonable length of time.

4. Does the patient understand the treatment options and any associated risks?

If an implant is not an appropriate option, basic treatment principles can be used to restore a compromised tooth, provided patients are fully informed of their treatment options, the risks and benefits, and the consequences of treatment failure.

Conclusions

The important thing is to maintain a healthy dialogue with patients and ensure that their expectations concord with yours. If the restoration won't last 5 years, than perhaps it is best to choose an implant. It is always a good idea to discuss with your patients how long they expect the treatment will last. ✦

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QUESTION 2

A patient new to my practice has atrial fibrillation. How should I modify the patient's regular dental care in light of this condition?

Background to the Problem

Atrial fibrillation (AF) is the most common cardiac dysrhythmia, and as such many patients with medically managed AF will present to general dentists for routine care. AF is characterized by rapid uncoordinated contraction of the atria, usually between 350 and 600 beats per minute (normal range 60 to 100). This abnormality adversely affects cardiac output, and "atrial kick" accounts for 30% of ventricular filling. The reduction in stroke volume places an additional burden on the ventricles to maintain cardiac output. Electrocardiography shows no discrete P waves in patients with AF (Fig. 1); instead, there may be fine undulations between QRS complexes.

Cardiac conditions linked to the development of AF include rheumatic mitral valve disease, coronary artery disease, congestive heart failure and hypertension. Noncardiac conditions that can predispose patients to AF include hyperthyroidism, hypoxia, alcohol intoxication and surgery. The complications of AF include congestive heart failure, myocardial infarction and thromboembolism.¹

Medical management of AF aims to re-establish normal sinus rhythm. For this purpose, one of a variety of anti-arrhythmic agents may be prescribed (e.g., quinidine, procainamide, propafenone, flecainide, sotalol, ibutilide and amiodarone).² Patients with AF might also take acetylsalicylic acid (ASA) or warfarin to prevent formation of thrombi in the atria, which can release emboli, a major cause of stroke. The international normalized ratio (INR) is used to assess blood clotting in patients who take warfarin. The optimal therapeutic INR range is between 2.0 and 3.0 in patients with AF.³ Many

patients with AF wear a MedicAlert bracelet to inform health care providers of their medical status (Fig. 2).

Dental Management of Patients with Atrial Fibrillation

Before dental care is initiated, the dentist should consult the family physician to confirm the medical history, current drug therapy and the underlying cause of the patient's AF. These details will establish whether antibiotic prophylaxis is indicated for concurrent disease (e.g., mitral valve prolapse with regurgitation).⁴ Some patients with AF may have memory, language or attention deficits and may find it difficult to communicate. Therefore, it is prudent to include a family member in all treatment discussions.

A patient with AF is at greater risk for cardiac ischemia; a stress-reduction protocol will minimize this risk. Appointments should be kept short. Late morning or early afternoon appointments are better for AF patients, because the risk of an ischemic event is highest during the first few hours of daily activity. Oral sedation is appropriate, but if such sedation is used an escort should be available to take the patient home. Inhalation sedation with nitrous oxide (at a concentration below 30%) and oxygen has negligible effects on respiration, circulation and organ function and will provide sufficient psychosedation to reduce anxiety after 5 minutes of inhalation.

Patients with asymptomatic AF can undergo minor dental surgery in a general practice setting, but some general precautions are advised. Care should be taken to administer local anesthetic solution slowly, with frequent aspiration, to

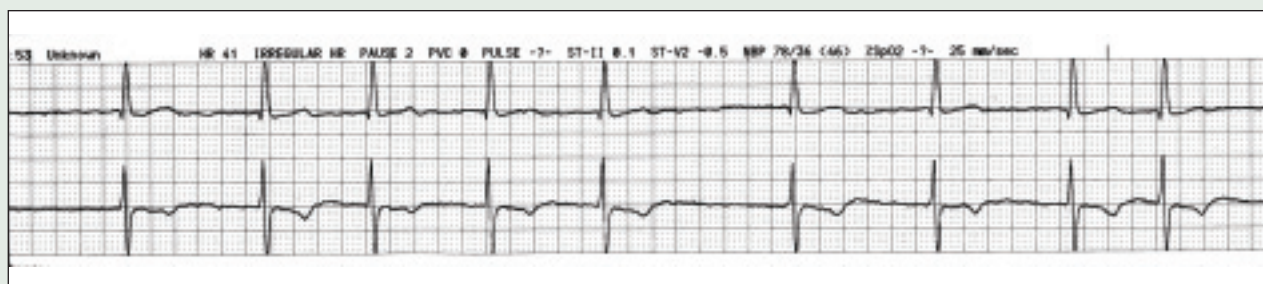


Figure 1: An electrocardiogram tracing (lead 2) for a patient with atrial fibrillation shows fine undulations instead of P waves, with an irregularly irregular ventricular rhythm.



Figure 2: MedicAlert bracelet worn by a patient with various medical problems, including atrial fibrillation.

minimize the risk of intravascular injection. Periodontal ligament injections and intraosseous injections are not recommended for any patient with a history of cardiovascular disease. Restricting the amount of vasoconstrictor injected (epinephrine to 0.04 mg, levonordefrin to 0.2 mg) is generally recommended for patients with cardiac arrhythmia.⁵

Patients with AF do not have to cease their daily ASA medication before a simple extraction or other minor dental surgery. The patient's family physician should be consulted about discontinuing other antiplatelet drugs (e.g., ticlopidine, clopidogrel, or dipyridamole) before the dental extraction.⁶ A patient with AF who takes warfarin does not have to alter the warfarin dosage before minor dental surgery if the up-to-date INR is within the optimal range of 2.0 to 4.0.^{7,8} Nevertheless, before any invasive treatment is undertaken for a patient with AF, the dental practitioner should be aware of all medications that might influence the formation and establishment of clots.

Local measures (e.g., suturing, application of a topical hemostatic agent) should be employed if there is troublesome bleeding after minor surgery. A tranexamic acid mouth rinse is a useful adjunct

to encourage clotting. A solution of 0.5 mg/5 mL (0.1 mg/mL) is applied directly to the surgical site, followed by 2-minute applications every 6 hours for 2 days.⁴

With sufficient background knowledge of the patient's medical history, minor dental and oral surgery procedures may be undertaken within the dental practice setting. If there is any doubt about the patient's fitness to undergo a dental procedure, the patient should be referred for specialist care. ♦

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QUESTION 3

How do I gain access to the area of the maxillary tuberosity for removal of the third molar or other surgery?

Background

The principles of good flap design include maintenance of adequate blood supply to the tissues, good visualization and surgical access, and maintenance of the health of the periodontal tissues.¹ Ensuring adequate flap vascularity is the primary goal.² The traditional design is an envelope flap, with incisions extending “2 teeth anteriorly, and 1 tooth posteriorly” of the tooth being extracted.¹ Although it generally provides adequate surgical access, this type of flap design has several limitations. First, incision through the gingival sulcus of a tooth carries a risk of gingival recession. A sulcular incision is an intervention to the periodontal ligament and may lead to periodontal damage.³ Second, excessive tension can lead to inadvertent tearing of the flap, which might further compromise the gingival tissues.

An alternative surgical approach to the region of the maxillary tuberosity is a releasing incision that avoids the gingival margin of the adjacent

teeth. In routine clinical practice, the resulting flap fulfills the criteria for good flap design, provides excellent visualization of the tuberosity area, is easier to retract than the envelope flap and carries a lower risk of tearing.⁴ Furthermore, with this flap design it is easier to visualize the third molar at all times during removal. This flap design is referred to as the “palatal diagonal flap.”

Technique

Local anesthetic (greater palatine nerve block with either buccal infiltration or posterior superior alveolar nerve block) is administered. Proper patient positioning aids in visualization of the surgical site. The chair is moved toward a Trendelenburg position (head down), and the patient’s neck is extended slightly to improve visualization. The head is rotated 45° away from the side on which the procedure is to be performed, and the patient opens the mouth halfway to improve access. The incision is made with a #15 scalpel blade approximately 0.5 to 1.0 cm posterior to the distal surface of the second molar, in line with the palatal surface of that tooth (Fig. 1). The incision extends through the periosteum to the bone, but to avoid hemorrhage from the greater palatine artery, it should not begin or extend palatally over the tuberosity. The incision is linear and should be made in a mesiobuccal direction, with the tip of the scalpel blade approaching within 1 to 2 mm of the gingival sulcus of the maxillary second molar, at the angle of the distobuccal line. The incision extends anteriorly and superiorly in the fashion of a vertical releasing incision, approximately 1.0 cm in length (Figs. 2 and 3).

The flap is raised with a #9 Molt periosteal elevator, reflecting tissues posteriorly and superiorly. Retraction of the flap is accomplished with a Minnesota retractor, a Bishop’s retractor or (preferably) a Laster cheek retractor (Fig. 4); the latter type simultaneously retracts the cheek and the flap, as well as protecting the third molar from being inadvertently pushed posteriorly

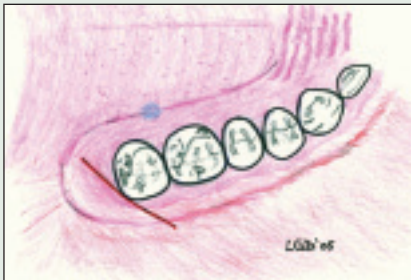


Figure 1: Diagram of the incision for a palatal diagonal flap (occlusal view).

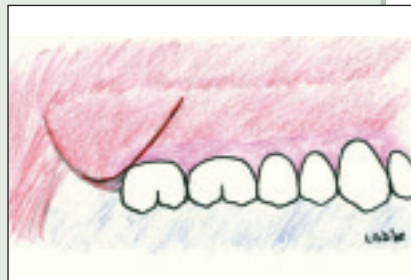


Figure 2: Diagram of the incision for a palatal diagonal flap, with extension into mucosal tissues (buccal view).



Figure 3: Photograph of the incision for a palatal diagonal flap, showing the buccal extension before delivery of the third molar.



Figure 4: The Laster cheek retractor, available in Canada through Surgical Science (Toronto, Ont.).

into the infratemporal fossa. For the bony impacted maxillary third molar, the periosteal elevator can be used to remove buccal bone in the manner of a bone gouge, which allows access to the area below the height of contour of the impacted third molar while offering purchase for extraction. The tooth is delivered with a 77R, Cryer or Potts-style elevator. All 3 of these are suitable for elevating the tooth in a bucco-occlusal direction.

Suturing

The design of this flap is such that in most cases pressure from the cheek combined with gravity obviates the need for suturing, because the flap is approximated well. This allows for a significant saving in surgical chair time. Suturing of the flap should be undertaken if there is poor approximation or in the presence of an oro-antral communication.

Conclusions

The so-called palatal diagonal flap offers superior visualization and surgical access to the maxillary tuberosity area for extraction of maxillary third molars and for other surgical procedures involving the maxillary tuberosity (e.g., harvesting of autogenous bone for grafting). It satisfies the design criteria of a mucoperiosteal flap and has the benefit over the traditional envelope flap of not violating the dentogingival attachment of the first or second maxillary molars, thereby eliminating the risk of gingival recession secondary to flap elevation. The design of the flap eliminates the need for suturing, affording the operator a significant saving in chair time. ♦

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QUESTION 4

The avian influenza is all over the news — should I be doing anything?

Background on Avian Influenza (H5N1 Virus)

As of the writing of this update, Health Canada, the Centers for Disease Control and Prevention, and the World Health Organization (WHO)¹ have issued dire warnings about avian influenza (caused by the H5N1 virus, an influenza A virus) and the possibility of a global pandemic. If (some would say when) a pandemic hits Canada, the population will have mere weeks to months from the first warnings (expected to come from Asia) until the country is ravaged by the virus. Prepandemic preparedness is therefore essential to minimize loss of life and social disruption.

Influenza viruses undergo frequent changes in their structure. Major antigenic changes (called antigenic shifts) cause influenza pandemics. In this situation, a new strain arises to which humans have not previously been exposed and to which we therefore have no immunity. The H5N1 virus is found in the migratory waterfowl of Asia and has become epidemic in the domestic poultry populations of that continent. It is 100% fatal to chickens and most other domestic bird populations that become infected. It is also extremely lethal in humans (approximately 50% mortality) and other mammalian species but has shown only limited human-to-human transmission. The WHO is concerned because the virus is now spreading from Asia to Kazakhstan, Turkey and Russia and has crossed species barriers. To date, most human cases have been the result of close contact with poultry. In 2004, the H5N1 virus was found in tigers in the Bangkok Zoo who had been fed raw chicken carcasses. Tiger-to-tiger transmission is believed to have occurred thereafter.²

If the H5N1 virus develops the capability of human transmission, it will likely infect each region it reaches in 2 to 3 weeks and encircle the globe in 6 to 9 months. The WHO hopes to slow the spread through quarantine, vaccination and antiviral treatments, but these measures are largely untested in pandemics. Therefore, Canada may only have weeks to prepare for a pandemic that can be expected to last locally for 8 to 12 weeks.

Preparedness for Avian Influenza

The dental community needs to prepare now for the possibility of an influenza pandemic because the time from emergence to an international pandemic is expected to be measured in

weeks. Preparation in 4 main areas will minimize loss of life and social disruption:

1. Minimize the likelihood of contracting H5N1 infection, and deal with the effects if there is exposure to droplets.
2. Organize the office to continue functioning during disruptions of the global supply chain.
3. Protect owners and staff from the financial fallout of a major pandemic.
4. Make provisions to survive a general quarantine, when there will be loss of local emergency, government and private sector services.

Each of these areas can be further divided into 3 levels of readiness and implementation: prepandemic, emergence of a pandemic virus and international spread. Measures to prevent droplet exposure should be in place throughout all phases, but in the face of a pandemic extra precautions may be required, as dictated by local health officials (e.g., use of masks and eye shields). A 6- to 9-month stock of a limited number of office and dental supplies will be required; food, water and money should also be available for 8 to 12 weeks as local social supports may be limited during this time. Historically, government officials have been late in calling a general quarantine, so the ultimate decision to close a practice rests with the dentist.

Checklists for each phase are listed in **Box 1**. In the event of droplet exposure, consult public health officials and consider starting prophylactic doses of an antiviral agent immediately; continue these drugs beyond 2 full incubation periods (7 days) or until there is no chance of further exposure. At present, the only recommended prophylactic agent is oseltamivir 75 mg orally once daily. Those exposed could also wait for symptoms to appear (but at that point the effectiveness of the antiviral may be less) or could simply quarantine themselves until beyond the incubation period (3 days). Each office should have contingency plans for what to do in the event of droplet exposure, what to do if the office remains open during an outbreak and what to do if the office closes (see checklist). It is important to develop habits that will limit the spread of any contagious biologic agents through droplet exposure as the health care community may not identify the next pandemic until it is already established in Canada. Universal precautions, including good hand-washing technique, dramatically reduce the risk of contracting influenza.

Box 1 Steps for dealing with avian influenza

Prepandemic	<input type="checkbox"/> Assume that many businesses will close for 8–12 weeks, so have a stock of food, water and money for this period.
<input type="checkbox"/> Enforce frequent hand-washing (with either soap and water or a waterless agent). <input type="checkbox"/> Enforce universal precautions during procedures. <input type="checkbox"/> Enforce basic screening for patients and staff with fever and cough so that others are not exposed (consider asking questions about these symptoms during confirmation calls and when patients present to the office). <input type="checkbox"/> Read financial reports and develop a financial plan on how best to protect investments in the event of a lethal pandemic. <input type="checkbox"/> Hold drills in the office for protocols to be followed in the event of exposure to droplets of a biologic agent: <ul style="list-style-type: none"> <input type="checkbox"/> Isolate patient and transfer to a health care facility. <input type="checkbox"/> Notify municipal health unit. <input type="checkbox"/> Consider having a stock of antiviral agents in the office in case staff are exposed. <input type="checkbox"/> Have masks and eye shield protection available for staff (i.e., droplet precautions). 	Pandemic declared and spreading internationally
Early pandemic	<input type="checkbox"/> Take steps to reduce morbidity, mortality and social disruption. <input type="checkbox"/> Consult public health offices for information on antiviral prophylaxis. <input type="checkbox"/> Consult public health offices for information on whether or not to close your business.
<input type="checkbox"/> Get vaccinated (if vaccine is available). <input type="checkbox"/> Strictly enforce hand-washing, universal precautions and screening. <input type="checkbox"/> Have antiviral agents available for prophylaxis in case of exposure. <input type="checkbox"/> Stock practice for 6–9 months, in case of supply chain problems. <input type="checkbox"/> Ensure that all contact information for staff and doctors is up to date to allow for proper communication during pandemic.	If practice remains open: <ul style="list-style-type: none"> <input type="checkbox"/> Enforce extremely strict patient screening, with universal screening of anyone entering facility for fever and cough. <input type="checkbox"/> Enforce whatever infection control processes are deemed necessary by public health officials during procedures where exposure would be likely (i.e., procedures that produce aerosol). <input type="checkbox"/> Enforce strict hand-washing before and after administrative contacts with persons coming into the office. If practice closes: <ul style="list-style-type: none"> <input type="checkbox"/> Keep staff up to date about situation and projected reopening of the office. <input type="checkbox"/> Consider either paying staff or providing a stipend, as social services offices may not be open or may be overwhelmed if a general quarantine occurs.

In conclusion, the H5N1 virus has a widespread natural reservoir in migratory birds, has shown adaptive changes that allow it to spread to other species and is extremely lethal to humans, but it has shown limited human-to-human transmissibility. The WHO has warned that a lethal pandemic is likely to occur. It is therefore in the dental community's best interests to take small but necessary precautions now, rather than in the weeks before the pandemic virus arrives in Canada. ✦

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Further Reading

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