

Dental Management of the Organ Transplant Patient

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Every year, more than 28,000 transplantation procedures are performed in the United States to replace solid organs, including the heart, intestine, kidney, liver, lung, and pancreas. Patients with conditions including end-stage renal disease, severe diabetes, advanced heart disease, and liver disease may undergo transplant procedures. Because advances in medical techniques and drug therapy have extended lives of organ transplant recipients, you may treat some of these patients in your practice.

Organ transplant patients need specialized dental care. The compromised health and immune system of patients place them at increased risk for systemic as well as oral infections. This fact must be considered when planning dental treatment before and after transplantation and requires consultation with your patient's physician.

MANAGING ORAL HEALTH BEFORE ORGAN TRANSPLANTATION

Before treating a prospective transplant recipient, obtain and review the patient's medical and dental histories and perform a non-invasive initial oral examination (without periodontal probing). After the examination, discuss the current status of your patient's health and immune system, and the degree of organ dysfunction with his or her physician. Decisions about the timing of treatment, the need for antibiotic prophylaxis, precautions to prevent excessive bleeding, and appropriate medication and dosage should be considered during your discussion. Whether a patient can tolerate dental treatment is another crucial concern. In some cases, it will be safer for patients to undergo extensive treatment after transplant as the new organ improves their health.

Preparing for Dental Treatment

Several factors should be considered before starting treatment:

- **Antibiotic Prophylaxis:** Decide with the patient's physician whether antibiotic prophylaxis is required to prevent systemic infection from invasive dental procedures. Unless advised otherwise by the physician, the American Heart Association's standard regimen to prevent endocarditis (<http://www.heart.org>) is an accepted option.
- **Infection:** If the patient presents with an active infection, such as a purulent periodontal infection or an abscessed tooth, antibiotics should be given to the patient before and after dental treatment to prevent systemic infection. Confirm the choice of antibiotic with the patient's physician.

— **Excessive Bleeding:** Several factors can cause bleeding problems in organ transplant candidates, such as organ dysfunction or their medications. Many may be anticoagulated, and some may have a decreased platelet count. Patients with end-stage liver disease may have excessive bleeding because the liver is no longer producing sufficient amounts of clotting factors. Before treatment, assess the patient's bleeding potential with the appropriate laboratory tests and take precautions to limit bleeding.

- Consult with your patient's physician about whether antifibrinolytic drugs, vitamin K, fresh frozen plasma, or other interventions are appropriate. The physician also may decide to temporarily decrease the patient's level of anticoagulation before extensive dental surgeries. Some patients are only suitable for surgery in a hospital setting or dental offices designed to handle emergency medical situations.
- Use aggressive suctioning techniques when performing extractions or other invasive procedures to prevent your patient from swallowing blood. In a small number of patients with advanced liver disease, swallowed blood may increase risk for hepatic coma.
- Manage bleeding sites with careful packing and suturing techniques.

— **Medication Considerations:** Patients preparing to undergo organ transplantation usually take multiple medications. These include

anticoagulants, beta blockers, calcium channel blockers, diuretics, and others. Be aware of the side effects of these medications, which range from xerostomia and gingival hyperplasia to orthostatic hypotension and hyperglycemia, and their interactions with drugs you might prescribe.

Likewise, use caution when prescribing medication to patients with end-stage kidney or liver disease. Many medications commonly used in dental practice, including NSAIDs, opiates, and some antimicrobials, are metabolized by these organs and are not removed from circulation as quickly in patients with markedly reduced kidney or liver function. Prior to dental treatment, consult the patient's physician on appropriate drug selection, dosage, and administration intervals.

— **Other Medical Problems:** Patients with end-stage organ failure may have other major medical conditions. A person with end-stage kidney disease, for example, may have diabetes and/or significant pulmonary or heart disease. Carefully review your patient's medical history to determine what additional treatment considerations your patient may have.

Dental Treatment

Whenever possible, all active dental disease should be aggressively treated before transplantation, since post-operative immunosuppression decreases a patient's ability to resist systemic infection.

— Eliminate or stabilize sites of oral infection. Patients with active dental disease who can tolerate treatment

should receive indicated dental care. Depending on the patient's condition, temporary restoration may be appropriate until his or her health improves.

- Extract nonrestorable teeth.
- Consider removing orthodontic bands or adjusting prostheses for patients expected to receive cyclosporine after transplant, as some patients taking this drug will develop gingival hyperplasia. The overgrowth can be minimized with good plaque control, and removing orthodontic bands may make it easier to maintain good oral hygiene.
- Conduct dental procedures on days that your patient with end-stage renal disease does not undergo hemodialysis.
- Counsel your patients about their oral health. Explain that effective oral hygiene is crucial before and after transplantation and that more frequent dental appointments may be necessary if new dental disease develops.
- Pay special attention to anxiety and pain tolerance in organ transplant patients.
- Instruct patients to bring a current list of their medications, including over-the-counter drugs, to every appointment and note those that may be problematic.

MANAGING ORAL HEALTH AFTER ORGAN TRANSPLANTATION

Except for emergency dental care, patients should avoid dental treatment for at least

3 months following organ transplantation. Dosage of immunosuppressive medications is highest in the early post-transplant period, and patients are at greatest risk for rejection of the transplanted organ and other serious complications during that time. Once the graft has stabilized, typically 3 to 6 months post-surgery, patients can be treated in the dental office with proper precautions.

Preparing for Dental Treatment

Treatment after transplantation requires consultation with your patient's physician. The medical consult can help you understand your patient's general health and ability to tolerate treatment. Post-transplant patients vary widely in their ability to endure dental treatment and heal following invasive procedures. Your discussion needs to address whether your patient requires antibiotic prophylaxis and if the physician will need to adjust other medications before treatment.

- **Infection:** Patients who have undergone organ transplant surgery are at increased risk for serious infection. Bacterial, viral, and fungal infections are more common, especially immediately after surgery. The decision to premedicate for invasive dental procedures and selection of the appropriate regimen should be done in consultation with the patient's physician.
- **Medication Considerations:** Organ transplant recipients may be taking one or more medications that affect dental treatment. Immunosuppressive agents can cause gingival hyperplasia, poor healing, and infections and may interact with commonly prescribed

medications. Anticoagulant medications may contribute to excessive bleeding problems, whereas a patient taking steroids is at risk for acute adrenal crisis. The patient's physician may want to adjust these medications several days before an invasive dental procedure.

Dental Treatment

All new dental disease should be treated after the patient's transplant has stabilized.

- Check your patient's blood pressure before you begin treatment. Know baseline levels for each patient and call his or her physician immediately if blood pressure exceeds accepted thresholds. Do not treat a patient when this problem is present.
- Examine the patient's mouth thoroughly for dental infection, since immunosuppressive medication can hide signs of a problem. As a result, infections are often more advanced than they appear when detected. Treat all infections aggressively.
- Know your patient's bleeding potential and take appropriate steps to manage excessive bleeding.
- Watch for signs of adrenal insufficiency with surgical stress in patients taking steroids. These patients may require increased doses of steroids at the time of extensive dental procedures to avoid adrenal insufficiency syndrome. A person experiencing this condition may become hypertensive, weak, feverish, and nauseated and should be transported immediately to a hospital for treatment.

- Exercise care in prescribing medications to avoid potentiating the renal and hepatic toxicities of immunosuppressants. Consult the patient's physician to ensure proper drug selection and dosing.
- Prescribe an antimicrobial rinse when appropriate.
- Recommend saliva substitutes and fluoride rinses for your patients with dry mouth.
- Advise your patients to follow a conscientious oral hygiene routine and emphasize the importance of oral health before and after transplantation.

Oral Complications

Side effects from immunosuppressive drugs to prevent organ rejection are among the most frequent oral health problems affecting transplant recipients. Common immunosuppressive agents and their side effects include:

- **Cyclosporine:** Changes in liver/kidney function, hypertension, bleeding problems, and poor wound healing are among the adverse effects of this potent agent, which also interacts with a number of other drugs. Gingival hyperplasia occurs in some patients; incidence varies and is dependent on each patient and his or her drug regimen. Calcium channel blockers, for example, may exacerbate the problem. Children tend to be more susceptible to gingival overgrowth than adults. Emphasize conscientious daily oral hygiene to all patients.

- **Tacrolimus:** An immunosuppressive agent used increasingly in place of cyclosporine, tacrolimus causes less gingival overgrowth but is associated with oral ulcerations and numbness or tingling, especially around the mouth.
- **Azathioprine:** Bone marrow suppression and related complications such as stomatitis and opportunistic infections are significant side effects of this drug. A decrease in white blood cell counts and excessive bleeding may occur.
- **Mycophenolate mofetil:** This immunosuppressant is commonly used as an alternative to azathioprine. Adverse effects include decreased white cell counts, opportunistic infections, and gastrointestinal problems.
- **Corticosteroids:** Hypertension and high blood glucose (steroid-induced diabetes) are among the numerous side effects of these drugs, along with increased risk for infection, poor wound healing, and depression. Adrenal suppression may occur, making invasive dental and medical procedures more difficult for your patient. Corticosteroids may also mask the early signs of oral infection. The trend toward using lower doses of corticosteroids in combination with other immunosuppressants for post-transplant maintenance therapy has helped mitigate these side effects.

- **Sirolimus:** Side effects of this anti-rejection drug can include hypertension, joint pain, low white cell count, hypercholesterolemia, and oral ulceration.

Marked Immunosuppression

Several complications associated with marked immunosuppression manifest in the mouth, including oral candidiasis, herpes simplex/herpes zoster, hairy leukoplakia, aphthous ulcers, and uncommon viral and fungal infections. Progressive periodontal disease, delayed wound healing, and excessive bleeding may also become problems for these patients.

Notify the patient's physician if you notice signs of marked immunosuppression. In some cases, the dosage of anti-rejection agents prescribed for patients may need to be reduced. This may help control the opportunistic infections and other oral complications. However, there will be patients who must be maintained on high-dose immunosuppression to prevent organ rejection. Treatment of oral opportunistic infection is necessary in any transplanted patient.

Oral Malignancies

Screen patients for oral malignancies at every appointment. Kaposi's sarcoma, lymphoma, and squamous cell carcinoma of the lip are among the oral malignancies that sometimes occur in organ transplant patients. Malignancies can occur decades earlier in transplant recipients than in people who are not immunosuppressed.

Organ Rejection

If a patient's body begins to reject a transplanted organ, only emergency dental care may be provided. Talk with the patient's physician about antibiotic prophylaxis or other special needs before treatment.

POINTS TO REMEMBER

- Organ transplant recipients are growing in number and living longer, increasing demand for specialized dental treatment.
- Effective dental treatment can play an important part in these patients' lives by preventing serious infection.
- Stay in close contact with your patient's physician and tailor your treatment to meet his or her special needs.

ADDITIONAL READINGS

Little JW, Falace DA, Miller CS, Rhodus NL. *Dental Management of the Medically Compromised Patient* (7th ed.). St. Louis, MO: Mosby Inc., 2008.

Goldman KE. Dental Management of Patients with Bone Marrow and Solid Organ Transplantation. In *The Dental Clinics of North America* 50 (2006) Elsevier Saunders pp. 659-676.

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