The Restoration of Patients with Head and Neck Cancer: A Prosthodontist’s Perspective
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The question that I am asked most frequently is: “What is a Prosthodontist?” Prosthodontists are dentists that have specialized training in the diagnosis, treatment planning, rehabilitation and maintenance of patients with clinical conditions associated with missing or deficient teeth and/or oral and maxillofacial tissues. We maintain the oral function, comfort, appearance and health of patients using biocompatible prosthetic materials. In addition to treating both the average and complex dental patient, a prosthodontist is a key member of the team once a diagnosis of head/neck cancer has been given.

Typically, a pathologist is the person who makes the definitive diagnosis based on submitted biopsy tissue. Though the clinical presentation of certain head and neck cancers are often a “give-away,” examining tissue samples retrieved by biopsy is the only way to reach a definitive diagnosis. Pathologists give a very specific diagnosis of the cancer type that is present. It is then up to the “team” to determine prognosis and course of treatment.

Typical treatment for head and neck cancers often include combinations of chemotherapy, radiation, and resection (removal of tumors and some surrounding tissues). The first job of the prosthodontist is to provide preventive approaches to make the process more comfortable and to help patients avoid some unwanted sequelae or complications associated with these necessary treatments. Some of the problems are as follows:

Chemotherapy
Many patients will exhibit oral manifestations and complications as a result of chemotherapy. These problems could be acute or chronic, and occur primarily due to the fact that the chemotherapy affects both the immune system and the way that blood cells behave. For example, chemotherapy patients often experience “mucositis.” This involves changes in the tissues lining the mouth whereby the tissues become thinned out, red, and irritated. Also, opportunistic infections may develop as a result of a weakened immune response. Though bacterial and viral infections can develop as a result of immunosuppression, fungal infections such as candidiasis or thrush are one of the most commonly seen. Xerostomia, also known as “dry-mouth,” is also a tremendous problem in patients undergoing radiation and or chemotherapy. This is directly related to a reduction in salivary gland function. Saliva is critical in lubricating our food for swallowing, and a reduction in salivary flow can make swallowing more difficult. Dry mouth can also make foods stick to the cheeks and tongue, making eating uncomfortable and unpleasant. This can also make an existing mucositis even more uncomfortable. Saliva is also a pH buffer, and a reduction in saliva can mean a more acidic environment in the mouth. This typically presents an ideal environment for tooth decay-causing bacteria to flourish. Cavities can become widespread or rampant, particularly on exposed root surfaces (in the case of gum recession and periodontal disease).

The most important approach in addressing these common issues is to be seen in regular intervals by your dentist/prosthodontist. They can often spot fungal or bacterial infections early, and can prescribe mild analgesics to relieve the symptoms of mucositis. Oral appliances, such as dentures, should be properly adjusted. If these appliances apply pressure inappropriately in compromised tissues, ulcerations and bleeding can often occur. The application of in-office fluoride, or home application of fluoride gels in custom fabricated appliances or trays can go a long way in preventing the dry-mouth related tooth decay. Over-the-counter products can often help with the dry mouth symptoms. Though seemingly harmless, sucking candies can often exacerbate tooth decay. It is important that if sucking candies are going to be used to relieve symptoms of xerostomia, they be sugar free (Xylitol is an acceptable sugar substitute).

Radiation
Radiation in high enough doses can seriously alter cell structure and function. By directing radiation to the area of a tumor, any remaining disease or tumor can be eliminated. As you can probably imagine, radiation oncology is a complex field of medicine, where it is critical to define the area to be irradiated and the amount of radiation to be given over a several week time span. Radiation does not discriminate in that it affects both “bad cells” and “good cells,” which means that we typically irradiate health tissues along with the tumor.
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Prosthodontists are often called upon to make appliances that help improve the efficiency of radiation therapy. Among these appliances are positioning appliances, shielding appliances, and brachytherapy appliances. In order to achieve consistency in the direction of the radiation beam in many cancers of the perioral region, positioning appliances are fabricated. These appliances, often held in position intraorally, help position the radiation beam. Since the appliances are precision fit, the beam is directed in the same orientation every time. This reduces unintended radiation of healthy tissue. To aid in the protection of healthy tissues, shielding appliances can also be fabricated (positioning appliances can also contain shielding elements). Shielding appliances contain areas that have an alloy metal embedded in them that will block radiation much like the “lead vests” used at the dentist’s office.

When dealing with radiation, it must be understood that radiation effectiveness diminishes with the distance between the tumor and the radiation source. Specifically, the further the tumor is from the source of the radiation beam, a higher radiation dosage must be delivered to achieve the expected result at the cellular level. For example, a tumor on the surface of the skin would need a more varied approach to radiation delivery than would a tumor of equal size on the soft palate. For a palatal tumor, an extraoral radiation beam must pass through a larger volume of tissue before reaching its target, with healthy tissues being irradiated along the way. The concept of brachytherapy was developed to solve some of these dilemmas. Brachytherapy involves the application of lower intensity radiation, for a longer period of time, in close proximity to the target site. The most well known example is the use of “seed therapy” in prostate cancer. When it comes to intraoral cancers, an intraoral appliance can sometimes be fabricated with a source of ionizing radiation. For example, a “retainer” with an extension can be worn in the mouth to help direct radiation directly to the soft palate, instead of using high doses through an extraoral beam. Use of brachytherapy, when indicated, spares a larger fraction of healthy tissues from radiation.

Though chemotherapy and radiation play major roles in the treatment of most cancers, resection (removal) of the tumor and an adequate healthy margin beyond the tumor is typically indicated. We are fortunate to have imaging technologies that allow us to better pre-plan surgeries and understand how much tissue needs to be removed. Whenever possible, we like to reconstruct what is removed surgically, but if a defect cannot be reconstructed surgically, it must be repaired prosthetically.

It goes without saying that our appearance is very important to our psychosocial well being. The literature supports that people with visible oral/facial deformities have a lower self-image than people whose faces are unremarkable. Additionally, others perceive patients with visible deformities differently as compared to people without them. The difficulty of “looking different” is experienced most often during face-to-face encounters with strangers. This usually occurs when travelling to work, shopping, entering and eating in a restaurant, walking along the street, or standing in line. Though these activities seem mundane to a person with an unremarkable face, these encounters are filled with anxiety and fear for those who look “different.” As such, it is critical to restore patients with the best prosthetic results. The goal is not only to restore appearance, it also requires a prosthetist to understand the limited options for oral rehabilitation. Of course, this is not always possible, but it is crucial to understand that prosthetic rehabilitation is an integral part of oral rehabilitation, and not something to be neglected.
but also function and comfort. By achieving this, we can maintain positive self-images in our patients, and provide them with the confidence they need to return to their normal lives.

Prosthodontists and maxillofacial prosthodontists are uniquely trained to prosthetically restore any missing part of the head and neck, be it an ear, an eye, a nose, a part of the skull, or anything inside the mouth. Most commonly, prosthodontists are called upon to make obturators which are prostheses intended to close off “holes” in the mouth. (Obturate, Latin for “to obstruct”) Commonly, when a tumor is removed from the upper jawbone, a good portion of the palate is removed with it, creating a defect. A defect of the palate can create many issues, such as hypernasal speech, difficulty swallowing, and leakage of water through the nose when drinking. Obturators can eliminate these issues and replace teeth that have been removed with the resection.

From the moment a resection is planned, the prosthodontist is called upon to fabricate a surgical obturator. A surgical obturator is a custom device that is intended to be placed in the mouth at the time of surgery. The sole purpose of a surgical obturator is to hold the surgical pack (gauze) in place immediately following surgery. By keeping the fresh surgical site closed, the chance of infection is reduced significantly. Additionally, function is often immediately regained in terms of the ability to speak and swallow. Whenever possible, we place teeth in the prosthesis (if teeth will be removed), to restore the best esthetics possible. Once the surgical team has decided enough healing has taken place (typically 1 week), the surgical obturator (which is usually wired into place) is removed and replaced with an interim obturator.

Interim obturators are an important link between the surgical resection and the final prosthesis. Though temporary, an interim obturator is critical in maintaining the comfort, esthetics, and function of the patient throughout the healing process. For 3-5 months following surgery, the mouth and surgical site is constantly changing. There is shrinkage, scar tissue formation, and tissue remodeling on an ongoing basis. The prosthodontist must reline and modify the interim obturator to account for changes in the mouth during this phase of healing, patients will typically complain that “water is leaking out of my nose when I drink,” or “my speech is getting very nasal,” or “my obturator is getting loose.” These are all signs that there has been tissue shrinkage and that the obturator is not fitting as well as it should. There are many changes in the first six weeks, and weekly relines are usually appropriate. Once little to no changes are needed in the interim obturator (3-5 months), it signals that it is time to make the definitive obturator.

The definitive obturator theoretically has the same form as the interim obturator. After all, if the interim obturator has been modified over time to “close the hole” and to restore function, the definitive obturator should be no different. However, the definitive obturator is usually made with stronger materials, such as metal substructures to provide strength and rigidity. Another difference is that teeth can be tried in the mouth in advance. This will allow creation of ideal esthetics. It is appropriate at this time to discuss the possibility of dental implants. Though the placement of implants can be challenging in irradiated bone, their presence can allow for an obturator to snap into place and be more secure.

Obturators, though seemingly awkward appliances at first, are critical in maintaining quality of life for patients. They help patients regain function, appearance, confidence, and self-esteem. With practice and time, patients learn to do quite well with them.

Prosthodontists play key roles in the “team approach” to treating head and neck cancers. The prosthodontist can participate in many phases of the patient experience from diagnosis to treatment, through postoperative care and reconstruction. Being a prosthodontist is one of the most rewarding and satisfying specialties in dentistry. I am proud that patients allow us into their lives and put their faith in us to render the best care possible, and to help them get back to normal living again.

Editors Note: Dr. Lavie, a life-long New Jersey resident, is a graduate of UMDNJ-NJ Dental School where he obtained his DMD degree, Prosthodontics Specialty Certification, and MSD degree. Dr. Lavie currently maintains a private practice limited to Prosthodontics in Chatham NJ. He serves as attending Prosthodontist at Mountainside Hospital in Montclair, NJ. Dr. Lavie also serves on the boards of the West Essex

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References:

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A TIME FOR SHARING...Daniel & Maggie’s Story

The official start of my journey with cancer began the morning of April 1, 2007. That’s right, April Fool’s Day. Only there was no joke on that morning. I awoke to my mother screaming, “He’s dead, he’s dead!” When I became fully conscious, a sea of red surrounded me. My entire upper body, the bed pillows, and bed linen to my waist were covered in blood. It was determined later that the tumor in my mouth had hemorrhaged during the night. I was rushed to the nearest hospital and was immediately admitted.

The unofficial start of my journey with cancer started Thanksgiving Day 2006. As a family we never went the traditional route by having turkey, ham or lamb. We always saved the major holidays to have a good piece of beef, usually a prime steak. That day I had made a Porterhouse steak on the charcoal grill for my mother and myself. As we were eating our dinner, I bit down on a piece of steak that had a bone in it. I felt something break in my mouth and upon examination I found that I had broken the wisdom tooth and the last molar in the lower left part of my jaw.

I went to my local dentist as soon as possible to see about having the two teeth removed. After taking an X-ray he told me he could not remove them for me because the nerves to my lower left jaw were wrapped around one of the teeth. He sent me to an oral surgeon, who removed the two teeth and then gave me some news that floored me. He told me that there was a suspicious spot on the lower left part of my jaw. I was admitted to the hospital, examined and given a CT scan. I was told that I had cancer of the mouth. They only kept me for two days and then told me there was nothing that they could do for me there. I was transferred to Advocate Illinois Masonic Hospital, where I was fortunate enough to be placed in the hands of one of the top head and neck doctors in Chicago.

Following my admission to Illinois Masonic, the head and neck doctor gave me another CT scan and an examination. I was diagnosed with stage four cancer of the tongue. The doctor would not do surgery because by that time, the cancer had spread throughout the lower part of my face. The tongue, bones and the glands from my nostrils to my throat were all infected. I was given a less than 10% chance of making it to the end of April, let alone surviving the cancer treatments.

I then fell into the hands of two doctors who I call my “earthly guardian angels.” They took me under their care and agreed to do all they could do for me to at least prolong my life. They did what in football terms is called a “Hail Mary” pass. They gave me everything as far as radiation and chemotherapy that a human body can stand, and hoped for the best.

Before the cancer treatment could begin they had to first stabilize my failing body. I had double pneumonia from aspirating my food or liquids during the last two weeks before being hospitalized.

For the first two weeks of April they pumped me full of drugs, saline and glucose solutions. The third week of April I had the surgeries to prepare for my treatments. I was given a tracheotomy, a feeding tube and an in-line catheter. I was allowed one day’s rest, and was then taken back into surgery to have all my teeth removed. I was allowed three day’s rest and then the radiation and chemotherapy began.

Beginning at the end of April and continuing until the end of July, I was given three shots of radiation each day (except for the weekends, Memorial Day and the Fourth of July) - one to the left side of my face, one to the right side of my face and one to my throat. In addition, every two weeks I was given a dose of chemotherapy.

At the beginning of May, I was placed in a nearby nursing home, where I stayed until early December of 2007 for the balance of my cancer treatments, rest and rehabilitation.

By the time I got out of the nursing home I was pretty much a physical wreck. Worst yet was the psychological toll that had befallen me. The only support I had was my mother, who at the time was eighty-six years old and confined to a wheel chair with spinal arthritis. Since the distance from our home to the hospital was so great, she was only able to visit me maybe once a week - if one of our neighbors or pastor was able to bring her. In addition, almost every one of my friends that came to visit me only came once. I was in such bad shape and had changed so much physically (my head and neck had enlarged to the size of a basketball) that everyone who looked at me was sure that I was going to die. For the most part, that meant that I went through almost all of my diagnosis, surgeries and treatment by myself.

So how bad were the results of my treatment? I was unable to take anything by mouth (food, water or drugs) for seven long months. Everything went through my feeding tube. I lost the ability to speak or swallow and had to relearn both functions while I was in the nursing home. I lost a large part of my hearing due to the chemotherapy (70% in my left ear and 50% in my right ear). I lost a tremendous amount of weight, dropping from over two hundred pounds when admitted to the hospital.
to less than one hundred ten pounds when I got out of the nursing home. I lost my upper body strength (being able to lift 350 lbs over my head before treatment and only being able to lift 10 lbs when dismissed from the nursing home). I was only able to stand up for twenty minutes at a time when I got home. I lost the ability to taste any food or liquids. I lost my thyroid function. I lost all saliva production. My speech was highly slurred and I could eat nothing but baby food. I was convinced psychologically that I would never be able to have a meaningful relationship with anyone because of the inability to function as I had before cancer, especially since I could not hear a normal conversation and I was unable to eat like a “normal” person.

As bad as the physical limitations were, it was the emotional issues that I was having the most problems with. I had largely gone thru my cancer journey alone, and I could not comprehend what had happened to me in a short nine months. Because of the changes to my face (especially losing all my teeth) every time I looked in a mirror I got sick to my stomach. I had convinced myself that I was a social outcast; that no one would want anything to do with me and that I would probably end up in some “freak show” at a carnival having normal people laugh and throw things at me. I kept watching Phantom of the Opera over and over again as I commiserated with the plight of Erik.

That was the state I was in at the beginning of 2008. I needed help! Unfortunately, no one at the hospital or the nursing home had talked to me about support groups. I had no idea that there were organizations out there to help cancer patients with their physical, emotional and spiritual needs. I had used a computer in my business to write contracts and do my bookkeeping, but I had never been on the Internet. Consequently, in January, I started going to the library for Internet classes, and I learned how to do research using Google and how to set up an email account. By February I had found three cancer support groups that changed my life: the Jennifer Flick Cancer Support Group in Homewood, Illinois, Gilda’s Club in downtown Chicago, and SPOHNC.

Daniel Milkovich
*Join Daniel & Maggie again in the March issue of News from SPOHNC, where their story will continue*
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