MOHS MICROGRAPHIC SURGERY: PATIENT INFORMATION

Danielle K. Moul, M.D., F.A.A.D.

Dear Patient:

Your doctor has referred you for Mohs surgery, a very effective treatment available for skin cancer. The Mohs surgery not only provides a high cure rate (98-99%) for most primary tumors, but also permits optimal cosmetic results by minimizing the amount of tissue removed.

This pamphlet will familiarize you with the Mohs procedure, and tell you what to expect when you come for surgery. It will also teach you about the causes of skin cancer, and how to recognize it and how to prevent it. If you have any questions that are not answered by this booklet, please feel free to call our office at any time.

Sincerely,

Danielle K. Moul, M.D., F.A.A.D.
What is Skin Cancer?

Cancer is tissue composed of abnormal cells that grow at an uncontrolled and unpredictable rate. As cancerous or malignant tissue grows, it invades and destroys the surrounding normal tissue. The most common types of skin cancer are:

- Basal cell carcinoma – commonly appears as a pearly white, pink or red patch or bump that may bleed or scab repeatedly.
- Squamous cell carcinoma – typically a firm, red bump or patch with a crusty surface.
- Malignant melanoma – usually a brownish-black patch or bump that enlarges, changes in shape size, color and/or may bleed.

These cancers originate in the skin, but, if neglected, can invade and destroy muscle, bone and other structures. Metastasis is the migration of the cancer cell beyond the site of its original growth or lesion. Basal cell carcinomas rarely metastasize; squamous cell carcinomas can metastasize at a rate of about 2-5% especially if left untreated. Malignant melanoma can metastasize and is life threatening if not treated early. Unlike the other forms of cancer in internal body organs, skin cancer can be seen without the aid of sophisticated medical equipment. This allows patients or their dermatologist to identify the problem and seek treatment early while the cancer is still small and easily cured.

What is a Biopsy?

A biopsy is the removal of tissue from the body for purposes of diagnosis by microscopic examination. There are many benign (non-malignant) skin growths or lesions that may display some of the signs of skin cancer listed above, but that are obviously not cancer when seen under the microscope. In many cases, a biopsy is the only way to distinguish between a cancer and a benign (non-malignant) mole or wart. Usually, only a small portion of a skin growth is removed upon biopsy, so additional surgery is required to remove the remainder if it proves to be cancerous.

How is Skin Cancer Treated?

Techniques for the treatment of skin cancer include curettage and electrodessication (scraping away the cancerous tissue with a surgical instrument, and then using cautery to stop the bleeding), surgical excision (cutting out cancerous tissue), cryotherapy (freezing with liquid nitrogen), topical creams (such as 5-Fluorouracil or imiquimod cream approved for superficial basal cell carcinoma), radiation therapy, such as electronic brachytherapy (eBx), and Mohs micrographic surgery.

What is Mohs Micrographic Surgery?

Mohs micrographic surgery is named in honor of Dr. Frederic Mohs, the physician who developed the technique in the 1930s. The terms chemosurgery, Mohs surgery and microscopically controlled surgery all refer to the same technique. In the years since Dr. Mohs pioneered the procedure, many technical
improvements and refinements have contributed to make micrographic surgery a safe and highly effective means of treating skin malignancies.

The main difference between micrographic surgery and other methods of removing skin cancer is microscopic control. In Mohs surgery, cancerous tissue is removed in thin horizontal layers. Each layer is divided into sections, and each section is carefully identified and “mapped” by the surgeon so its exact location can be pinpointed on the wound.

After careful preparation in the laboratory, Dr. Moul inspects each tissue section under the microscope. As long as cancer cells are seen within a section, then Dr. Moul continues to remove and examine tissue layers from that part of the wound. Because each layer is examined microscopically the Mohs surgery provides the highest cure rate. In addition, because no healthy tissue is removed unnecessarily superior cosmetic results can be achieved.

What are the advantages of Mohs Micrographic Surgery?

- High cure rate (98%-99%)
- Smallest possible wound
- Optimal cosmetic result
- Convenient: cancer removed in one outpatient treatment session
- Cost-effective: fewer cancer recurrences - fewer return visits.
- Safe: avoids risks of general anesthesia

Which Skin Cancers Should Be Treated With Mohs Surgery?

Mohs micrographic surgery is now universally recognized as a precise and effective method of treating skin cancers. It is especially effective in treating cancers of the face and other cosmetically sensitive areas because it can eliminate cancer cells while causing minimal damage to the surrounding normal skin.

Mohs micrographic surgery is also ideal for recurrent skin cancers, those that grow back after previous treatment. While skin cancers are often easily visible, individual cancer cells are microscopic. Root-like extension of cancer cells may reach beyond the cancer’s visible borders with nests of cells growing in unpredictable areas. Therefore, what is apparent to the naked eye on the surface of the skin may actually be on the “tip of the iceberg”. Any cells left behind can cause the cancer to recur, just as roots left behind when pulling weeds may cause weeds to regrow. With the Mohs technique, tumor nests can be identified and removed with a high degree of accuracy, producing extremely high cure rates, as high as 94-98% even for recurrent skin cancers. Your dermatologist has referred you to Dr. Moul because he/she feels that Mohs micrographic surgery is the best treatment for your skin cancer.
Who Performs Mohs Micrographic Surgery?

The Accreditation Council for Medical Graduate Education (ACGME) has recognized a limited number of training programs in the United States where highly qualified applicants receive comprehensive training in Mohs micrographic surgery through a Procedural Dermatology fellowship. The training period is usually one year, during which time the dermatologist acquires extensive experience with all aspects of the Mohs technique. Once the physician’s training is successfully completed, he or she becomes eligible for membership in the American College of Mohs Micrographic Surgery (ACMS).

About Dr. Moul

Dr. Moul is a fellowship-trained Mohs surgeon and board certified dermatologist. Dr. Moul completed a prestigious Mohs Surgery/Procedural Dermatology Fellowship at Scripps clinic in La Jolla, California. Her fellowship is approved by both the American College of Mohs Micrographic Surgery (ACMS) and the Accreditation Council for Graduate Medical Education (ACGME). She trained under Dr. Hugh Greenway, who, he himself was trained by Dr. Frederic Mohs. Dr. Moul has had extensive training in facial reconstruction including skin flaps and grafts. She has worked in collaboration with Plastic Surgery, Oculoplastics, Otolaryngology, and Radiation Oncology. She has experience in managing complicated tumors such as recurrent tumors, tumors previously treated with radiation, and rare tumors including merkel cell carcinoma, sebaceous carcinoma and dermatofibrosarcoma protuberans.

She has published a book chapter in International Ophthalmology Clinics on Mohs Micrographic Surgery for Periorbital Skin Cancer. In addition, she was selected to present research on the importance of pre-biopsy site photograph at the American Society of Dermatologic Surgery’s national meeting, which was also published as “Where is it? The utility of biopsy-site photography”. She is a member of the American Board of Dermatology, American College of Phlebology, American Dermatologic Surgery and American College of Mohs Surgery. Her goal is to provide you with the best possible care available. She welcomes any questions or concerns you may have.

How Should I Prepare for Surgery?

If you are taking medication, continue taking it as prescribed unless we direct otherwise. If you are taking Coumadin or warfarin, Eliquis® Pradaxa®, or Xarelto® please notify the office. If you have not had a heart attack, stent or stroke, etc., and are taking it for prevention only please discontinue aspirin and medications that contain aspirin (Anacin®, Bufferin®, Excedrin®, Alka-Seltzer®, etc.) for at least ten days (10) days prior to and 5 days following surgery. Also avoid anti-inflammatory medications (Advil®, Aleve®, diclofenac, Ibuprofen, Naprin®, indomethacin, Naprosyn®, etc. for the same time period. These medications tend to increase and prolong bleeding during surgery and may interfere with wound healing. You may take Tylenol® (acetaminophen). Alcoholic beverages should be avoided for 72 hours prior to and 72 hours following surgery as alcohol dilates blood vessels and can promote bleeding. Please discontinue CoQ10, vitamin E, fish oil and St. John’s worth for 10 days prior to surgery and 5 days following the surgery; these vitamins can increase your risk of bleeding.
If you have a heart murmur, an artificial heart valve or any artificial joints or implants with the past 2 years (other than pacemaker), you will need to take an antibiotic the day of surgery to prevent infection.

Please notify us so that this may be prescribed in advance. Get a good night’s rest, eat breakfast and come to the office at your scheduled time.

The Day of Surgery

Surgery usually begins early in the morning so that the surgical stages can be continued throughout the day, if necessary. You should plan to spend the entire day with us. Please don’t make other commitments for the day. Surgery is nearly always finished the same day, unless the tumor is extensive or a more involved repair is required. While the length of time required for Mohs surgery is initially surprising and perplexing to some patients, the following description of the process generally alleviates such concerns.

First, a local anesthetic is used to numb the skin around the tumor to prevent discomfort during surgery. If you suffer from anxiety or nervous about the procedure, please let your doctor know so they may prescribe medication if needed. When the skin is numb, Dr. Moul then removes a layer of tissue involved by the cancer, bleeding is stopped with electrocoagulation, and a dressing is applied. The procedure to this point typically requires 10-15 minutes for each time tumor is removed.

The removed tissue is sent to the laboratory where it is prepared for microscopic examination. Laboratory preparation and examination under the microscope are delicate procedures and require great precision. They are also time-consuming approximately an hour is required each time tissue is excised.

The most difficult part of the procedure for you will be waiting for the results of the microscope examination. You will want to wear comfortable clothing, consider bringing a snack or lunch, as well as reading material, IPAD, computer, paper work, crossword puzzles or other activities to help pass the time.

If for some reason, you must leave the office, it is very important that you first check with a nurse and leave a number where you can be reached. Please bring a friend or a relative to drive you home after the surgery if you are having surgery near your eye, are anxious about the procedure and receiving a sedative or require extra assistance.

Once the skin cancer is completely removed, Dr. Moul will discuss with you the options for management of the surgical wound, usually there are two choices: let the wound heal by itself which usually takes 4 to 12 weeks or close the wound with stitches. Depending on your wound it may be closed side by side, by a skip flap (tissue moved from nearby skin) or a skin graft (tissue removed from another site and transferred to the wound). A side-to-side closure is the most common closure and is known as a complex linear closure. Complex linear closures are typically 3 times the length as the width of the wound. You will notice your incision is 3 times longer than the size of the defect. This is so the scar will heal into a fine thin line without the ends being raised. Dr. Moul will recommend which of these choices will be best in your case. If it is determined that the wound should be repaired, this is usually performed by Dr. Moul the same day.
The Post-Operative Course

Since you will probably be fatigued you should plan on taking it easy and getting plenty of rest the first night. Most patients do not complain of pain. Two Tylenol (1,000 mg acetaminophen) taken every 6 hours are usually sufficient to relieve the discomfort some patients experience the first 12 to 24 hours. Swelling and bruising are very common, particularly when surgery is performed on the nose or around the eyes, and generally resolve within a week to 10 days. Painless red, purple or yellow bruising and swelling of the eyelids often appear 2-3 days after surgery on the forehead, front portion of the scalp, nose or temples and are no cause for concern. The use of extra pillows the first 4 nights following surgery to keep the head and shoulders elevated while sleeping and ice packs wrapped in towels as tolerated for 10 minutes at a time help minimize this.

Very occasionally there is continued bleeding following the surgery. If this occurs, lie down and remove all the bandages, and with gauze, apply firm, steady pressure for 20 minutes (timed) over the area of the wound that is oozing blood. Do not lift the gauze to check on the bleeding before 20 minutes have passed. If the bleeding persists after 20 minutes of steady pressure, immediately notify our office, or go to the nearest hospital or emergency room.

All wounds normally develop a small halo of redness around them, which gradually disappears. If increasing redness, warmth, tenderness or pain develop, the wound is malodorous, or there is pus draining from the wound, call our office immediately. The wound may have become infected and an antibiotic may be necessary. If the skin around the wound becomes very itchy and red, you are probably having a reaction to the adhesive tape or the antibiotic ointment used to dress the wound. You should call our office if this occurs.

After the Wound Has Healed

Some patients may experience sensations of tightness, numbness, tingling, sensitivity to the temperature change, or itching around the surgical site. These sensations are normal and tend to improve with time over several months. Gently massaging the site several times each day can speed up the process, however, this should not be done until at least 3 weeks after surgery as advised by Dr. Moul. Itching may be due to dryness and can be improved with plain Vaseline. Redness at the site is also normal and will gradually fade, usually by 6 months.

A follow-up period of regular skin checks at intervals of every 6 months to yearly is essential. 50% of patients will develop another skin cancer in their lifetime. Therefore, patients return to their dermatologist, for examination to detect any new or recurrent skin cancers and treat them in their early stages. Be sure to report immediately to your dermatologist any suspicious lesions you have noticed on your skin to see if a biopsy is necessary.
Commonly Asked Questions:

1. **Will the Surgery Leave a Scar?**
   Yes. Any surgical treatment will leave a scar. However, the Mohs technique tends to minimize this as much as possible and Dr. Moul is specially trained in the reconstruction to minimize scarring.

2. **Should Plastic Surgery Be Performed?**
   Dr. Moul is a fellowship-trained Mohs surgeon who has completed a prestigious fellowship at Scripps clinic in La Jolla, California. Her training included careful evaluations of Mohs defects and facial reconstruction including flaps and grafts. She has worked directly with plastic surgery, oculoplastic surgery and ENT and has been trained to help provide you with optimal cosmetic results. The overall cosmetic appearance will continue to improve for at least a year after surgery. In rare instances your repair maybe coordinated with a plastic surgeon if the surgical wound requires sedation or is a large defect requiring a repair in an operating room.

3. **Mohs Micrographic Surgery Preoperative Checklist**
   - **10 days prior to surgery**
     1. If you have NOT had a heart attack, stent, blood clot or stroke and taking it purely for prevention stop aspirin and aspirin-containing medications (including Excedrin®, Bufferin®, Alka-seltzer®, Ecotrin®, etc.)
     2. Stop taking CoQ-10, Vitamin E, Fish Oil, or St. John’s wort supplements
     3. If you are on Coumadin or warfarin, please notify the office of your recent lab work, INR.
     4. If you are taking Eliquis®, Pradaxa® or Xarelto®, please notify the office.
     5. Stop anti-inflammatory pain medications (including Advil®, Aleve®, Ibuprofen, Naprosyn®, and Daypro® etc.)
   - Continue all other prescription medications.
   - Cancel other commitments for the day of surgery – you’ll want to take it easy for at least 24 hours.
   - **72 Hours before and after surgery:** discontinue alcoholic beverages
   - Arrange for a ride home after the surgery if needed
   - Fill any previously ordered prescriptions for pre-operative antibiotics and/or sedatives
   - Eat breakfast and take your usual medications (except those listed above) the day of surgery
   - It is a good idea to bring a snack or lunch.
   - Bring reading material, paperwork, IPAD, laptop, Kindle, etc.