

## MOHS MICROGRAPHIC SURGERY INFORMATION

### Introduction

Our goal at **University Dermatology Associates** is to provide you with the highest quality care for the treatment of your skin cancer. You have been scheduled for treatment with Mohs micrographic surgery. This is designed to explain the procedure in detail and answer questions commonly asked by patients. **Please make every effort to carefully read the instructions for surgery as they contain important information for your upcoming appointment.**

### What is Mohs Micrographic Surgery?

A skin cancer that has been biopsied often resembles a “tip of an iceberg” with more tumor cells growing downward and outward into the skin, like roots of a tree. These “roots” are not visible with the naked eye, but can be seen under a microscope. Mohs micrographic surgery is a highly specialized and precise treatment for skin cancer in which cancerous cells are removed in stages, one tissue layer at a time. Once a tissue layer is removed, its edges are marked with specially colored dyes, and a map of the specimen is created. The tissue is then processed onto microscope slides by a trained Mohs surgery histotechnician in our on-site laboratory. These slides are carefully examined under the microscope by Dr. Redbord so that any microscopic roots of the cancer can be precisely identified and mapped. When cancer cells are seen, an additional tissue layer is removed only in areas where the cancer cells are still present, leaving normal skin intact. This allows Dr. Redbord to save as much normal healthy skin as possible.

The term “Mohs” refers to Dr. Frederic Mohs, who developed this surgical technique in the early 1940s. The technique has undergone many refinements and has come to be known as “Mohs surgery” in honor of Dr. Mohs.

### What are the Advantages of Mohs Micrographic Surgery?

Mohs micrographic surgery is safe, reliable, and has a significantly higher cure rate than any other available treatment, even when dealing with difficult cases and those that have failed other forms of treatment. In addition, Mohs surgery is a “tissue-sparing” technique, which allows for selective removal of cancerous tissue while preserving as much normal skin as possible. Mohs surgery is done as a same-day outpatient surgical procedure that eliminates the need for general anesthesia, and operating room or hospital fees. Mohs surgery is performed by a physician who is both the surgeon and the pathologist and has received specialized training or certification in this technique.

With standard skin cancer excision, only a small fraction of the removed tissue is sampled and examined microscopically by a pathologist to determine whether the cancer is completely removed. In contrast, Mohs micrographic surgery uses specialized laboratory processing techniques so that the entire underside and all edges of the tissue are examined completely under the microscope. This results in a higher cure rate while minimizing removal of normal tissue.

Because Mohs surgery is a highly specialized technique, not all skin cancers require this treatment. Your doctor has referred you for Mohs surgery based on special considerations regarding your skin cancer. Examples include a skin cancer which has “come back” after previous treatment, a tumor with microscopic features suggesting it may be aggressive or have extensive roots, and a skin cancer on the face or another areas in which sparing of normal tissue is essential. Please see “*What You Should Know About Your Options for Skin Cancer Treatment*” for additional information.

### About Our Staff

Our Mohs Micrographic Surgery Center is staffed by a team that includes a Mohs micrographic surgeon, surgical technicians, laboratory histotechnicians, and office staff who are here to serve you. Dr. Kelley Redbord, who heads the team, has had comprehensive specialty training in Mohs micrographic surgery and dermatologic surgery and has surgical experience in treating over 3,000 cases of skin cancer. Our surgical technicians will assist in surgery, respond to your concerns, help answer questions, and instruct you in wound care following your surgery. Our laboratory histotechnician works in our on-site laboratory and performs the essential task of preparing the tissue slides, which are examined by Dr. Redbord under a microscope. Our front office staff is available to answer any questions relating to appointment scheduling, insurance forms, and payments.

## How Do I Prepare for the Day of Surgery?

1. The best preparation for Mohs micrographic surgery is a good night's rest followed by a normal breakfast.
2. You should expect to spend the entire day with us. For your comfort, you may wish to pack a light lunch, snacks and/or beverages. You may also wish to bring a book or magazine to read or another quiet activity since there is waiting time between stages of surgery. Because the day may prove to be tiring, you can bring a companion to accompany you on the day of surgery.
3. You should shower normally the night before or the morning of your appointment since your wound and bandage must remain dry for 48 hours after your surgery. Do not apply perfume, aftershave, or cologne. Do not wear makeup or facial moisturizer if your skin cancer is on or near your face. Because you may leave with a bulky dressing, please wear loose clothing and a button-down shirt to facilitate undressing and redressing. Avoid any "pullover" clothing.
4. If you have been instructed to take antibiotics before dental procedures or surgery, take your first dose of antibiotic 1 hour before your appointment. If you do not have a prescription, please call us as soon as possible before your surgery date so that we may call in a prescription to your pharmacy. Ask to speak with one of the Mohs surgery staff.
5. Please do not take any aspirin (including baby aspirin, Bufferin, Alka-Seltzer, and Anacin) for one week prior to your surgery. All of these medications cause thinning of the blood, which can result in increased bleeding during your surgery. If you are taking aspirin for a history of heart problems, stroke, blood clot, or other medical condition, do not discontinue it unless specifically advised to do so by your prescribing physician. Aspirin may be resumed 48 hours after your surgery. Tylenol (acetaminophen) does not contribute to increased bleeding and can be used for relief of aches and pains.
6. Please do not take any vitamin E, ginkgo, ginseng, garlic, fish oil, herbal supplements, or anti-inflammatory pain medications (such as ibuprofen, Advil, Motrin, Alleve, Nuprin and others) for one week prior to your surgery. These also cause thinning of the blood, which can result in increased bleeding during your surgery. These medications and supplements may be resumed 48 hours after your surgery.
7. With the exceptions noted above, you should take all of your daily medications as usual on the morning of your surgery.
8. Please be sure to completely fill out the Preoperative Health Information Form included with this booklet and bring this form with you on your appointment day. Please make sure that your list of medications is accurate and up-to-date including those that you have temporarily discontinued for surgery.
9. Alcohol use may increase bleeding and should be stopped for 3 days before and 3 days after surgery.
10. Smoking causes changes in the bloodstream that interfere with the process of normal wound healing; this can negatively affect the cosmetic outcome of your surgery and limit our options for repairing your wound. Please make every attempt to quit smoking for at least 2 days before and two weeks after surgery.
11. If you have a history of high blood pressure or anxiety, you may wish to avoid caffeine on the day of your appointment. Your surgery will need to be rescheduled if your blood pressure is too high.
12. If you are unable to keep your scheduled appointment for surgery, please contact our office immediately to reschedule.

## What happens on the day of surgery?

You should plan on spending the entire day with us. The area around the site of your skin cancer will be anesthetized (numbed) with a local anesthetic. Once the area is numbed, a thin layer of tissue will be removed and any bleeding will be controlled. The tissue will be mapped, color-coded, and sent to our

on-site Mohs laboratory to be processed onto microscope slides. A bandage will be placed over the wound, and you will return to the waiting area.

On average, it takes an hour for the slides to be prepared and studied. Occasionally, tissue requires special attention and may take longer for processing or examination. If there is cancer still present, an additional layer, or stage, is taken. Most Mohs surgery cases are completed in two or three stages. Therefore, Mohs surgery is generally completed in one day. Occasionally, however, a tumor may be extensive enough to necessitate continuing surgery a second day. Once the tumor has been cleared, surgical repair of the skin will require additional time.

### **What Happens After the Tumor Has Been Removed?**

After the skin cancer has been completely removed, you will have a surgical wound. Dr. Redbord will discuss your options with you and make recommendations. At this point, optimizing the wound healing and final cosmetic result of your surgery becomes our highest priority. The wound can be treated in one of several ways:

1. Healing by “second intention” (see below)
2. Closing the wound in a straight line with stitches.
3. Closing the wound with a skin flap. A skin flap uses nearby skin to help fill in the wound. Flaps can be used when simpler repair options (second intention healing or a linear wound closure) will not adequately heal the wound with a good result.
4. Closing the wound with a skin graft. A skin graft is skin borrowed from a different area to fill in the wound. Skin grafts are used when simpler repair options will not adequately heal the wound with a good result.
5. In special cases, a consultation with one of several reconstructive surgeons may be necessary.

### **What is “Healing By Second Intention?”**

Occasionally, a wound is allowed to heal in by itself without stitches. This is referred to as “healing by second intention.” In certain areas of the body, nature will heal a wound as nicely as a surgical procedure involving stitches. In other areas of the body, healing by second intention is avoided since unacceptable scars can result. Use of this option for healing will depend on the size and location of your wound following surgery.

If a wound is allowed to heal by itself, the dressing must be changed every day until healing is complete. The surgical staff will teach you how to change the dressing and will give you printed instructions. If a wound is allowed to heal by second intention, it usually heals in four to eight weeks, depending on the size of the wound and on how quickly an individual tends to heal.

### **What Happens if the Wound is Closed with Stitches?**

Wounds are often closed with stitches. This speeds healing and can optimize the cosmetic result. For example, a scar can be camouflaged into a facial line or wrinkle line. The resulting line of stitches tends to be longer than the length of the original wound. This is done to avoid unnatural puckering and dimpling of the skin that would occur if the incision were not lengthened.

The surgical staff will teach you how to change the dressings daily and provide you with printed instructions. You will be given specific activity restrictions. The stitches will need to be removed in 5 to 14 days, depending on the location. If you are traveling to us from a long distance, removal of stitches at the office of your referring physician can sometimes be arranged.

## **What Can I Expect After the Surgery?**

Following your surgery, we will discuss postoperative care with you, and you will be given detailed written instructions on the care of your wound. Swelling and slight bruising are common following Mohs surgery. A “black eye” is common with surgery around the eye, or on the forehead. These symptoms usually subside within 5 to 7 days after surgery and may be reduced by sleeping with your head slightly elevated and by using an ice pack for short periods of time during the first 24 hours.

**Restrictions:** Depending on the size and location of the wound, Dr. Redbord may recommend restrictions in your physical activity following the surgery. Details will be discussed with you after the surgery is complete. Depending on the extent of your surgery and the requirements of your occupation, you may wish to take off one or more days from work following your surgery. Many patients are able to return to work the day after surgery.

**Pain:** In most cases, patients experience very little discomfort after Mohs surgery. We request that you do not take aspirin or ibuprofen-containing drugs for pain control. Tylenol (acetaminophin) does not contribute to increased bleeding and can be used for discomfort. Additional pain medication may be prescribed.

### **Potential Complications:**

**Bleeding:** Mild bleeding or oozing at the surgical site is fairly common following Mohs micrographic surgery. When it occurs, bleeding is typically a slow ooze at the wound edges and is best controlled through the use of pressure. If you experience bleeding, you should move to a seated position and apply constant pressure on a gauze pad over the bleeding point for 20 minutes (timed); do not lift up or release the pressure at all during that period of time. If bleeding persists after continued pressure for 20 minutes, remain seated and repeat the pressure for another 20 minutes. If this fails, call our office or phone numbers provided on your postoperative instructions.

**Infection:** Infection following Mohs surgery is uncommon. A small amount of drainage on the bandage is to be expected. In addition, a small red area may develop around your wound. This is normal and does not indicate infection. However, if the redness worsens and the wound becomes tender, warm or begins to drain pus, you should notify our office immediately.

**Allergic reaction:** Itching and redness around the wound can indicate allergy to bandage materials such as tape adhesive or antibiotic ointment. Following your surgery, you will be given specific instructions for wound care to minimize this risk. If you experience itching or a rash on the rest of your body after you have started an oral antibiotic or pain medication prescribed by Dr. Redbord, this may indicate a medication allergy. If this occurs, please discontinue the medication and immediately call our office.

**Numbness:** It is common for the area around the surgery site to feel numb to the touch. This area of numbness may persist for several months before returning to normal or near normal. In rare instances, the area stays numb permanently. In addition, some areas may be sensitive to temperature changes (such as cold air) following surgery. This sensitivity improves with time.

**Itching:** Patients frequently experience itching after their wounds have healed. This occurs because the new skin that covers the area does not have as many oil glands as previously existed. Plain petroleum jelly will help relieve the itching.

### **Will There Be a Scar?**

Yes. Any treatment for skin cancer will leave a scar. Mohs surgery preserves as much normal skin as possible to maximize options for repairing the area where the skin cancer had been. Once Dr. Redbord has removed your skin cancer completely, optimizing the final cosmetic result of your surgery becomes our highest priority. In general, a postsurgical scar improves with time and can take up to one year or more to fully mature. As your surgical site heals, new blood vessels can appear to support the healing changes occurring underneath the skin. This can result in a red appearance of the scar. This change is temporary and will improve with time. In addition, the normal healing process involves a period of skin contraction, which often peaks at 4-6 weeks after the surgery. This may appear as a bumpiness or hardening of the scar. On the face, this change is nearly always temporary and the scar will soften and improve with time. If you have a history of abnormal scarring, such as hypertrophic scars or keloids, or if there are problems with the healing of your scar, injections or other treatments may be used to optimize the cosmetic result. Dr. Redbord is available for you throughout the healing process to discuss any concerns that arise.

### **How Often Will I Return For a Follow-Up Visit?**

If you have sutures, you will need to return for suture removal. You may also need to return within one to three months after the surgery to ensure that the healing process is progressing smoothly. If you travel a long distance to reach us, it may be possible to arrange suture removal with your referring physician. If you have questions or concerns, please call our office or schedule a return appointment at any time.

### **Can My Skin Cancer Come Back?**

The goal of Mohs micrographic surgery is to remove your skin cancer while preserving your normal healthy surrounding skin. The cure rate for Mohs surgery is very high, even for the most difficult tumors. The cure rate is approximately 99 percent for new skin cancers and 95 percent for recurrent skin cancers (those which have been treated in the past and have come back.) However, no one can guarantee a 100 percent cure rate with any treatment method.

### **Will I Develop More Skin Cancers?**

Studies have shown that once you develop a skin cancer, there is an increased risk of developing others in the years ahead. For this reason, it is important for you to continue seeing your primary dermatologist at regularly scheduled intervals and to schedule an appointment if you are concerned about new or changing growths on your skin. The best way to minimize your risk of developing more skin cancers is to protect your skin from the sun's damaging rays.

# **Skin Cancer Treatment and Prevention: Frequently Asked Questions**

## **What is Skin Cancer?**

Cancer is an abnormal growth of cells at an uncontrolled rate. Left alone, cancerous cells will continue to grow and destroy surrounding normal tissue. The most common cancers that occur on the skin are **basal cell carcinoma**, **squamous cell carcinoma**, and **malignant melanoma**. The names refer to the type of skin cell from which the cancer originates. The growth of a skin cancer is visible on the skin and can often be readily identified in the early stages. Therefore, skin cancer can be more easily cured than other types of cancers.

## **Will My Skin Cancer Spread to Other Parts of My Body?**

This largely depends upon the type of skin cancer you have. In general, basal cell carcinoma is the skin cancer type least likely to spread to other parts of the body. If untreated, it tends to grow locally and can invade surrounding tissue and structures. Squamous cell carcinoma tends not to spread, or metastasize, if treated early. However, if treatment is delayed or neglected, this skin cancer can spread to lymph nodes and other body areas. Malignant melanoma is a skin cancer that can be life threatening if not treated at its earliest stages. If untreated, this skin cancer has the greatest chance of spreading to other organs. Fortunately, this type of skin cancer is less common than basal cell carcinoma and squamous cell carcinoma.

## **What Causes Skin Cancer?**

**Sunlight:** Unlike other forms of cancer, the cause of skin cancer is known. A history of excessive exposure to sunlight is the single most important factor associated with the development of skin cancers on the face (the most common site) and other sun-exposed parts of the body. Tanning booths are another source of the ultraviolet rays that are responsible for causing skin cancer. Fair-skinned people develop skin cancer more frequently than dark-skinned people do. Skin cancers rarely occur in children and tend to occur later in life following decades of accumulated sun exposure. The tendency to develop skin cancer also can be hereditary and occurs very frequently in certain ethnic groups, especially those with fair complexions. These individuals usually sunburn easily and tan poorly.

**Uncommon Causes:** Superficial X-rays, which were used many years ago as treatment for certain skin diseases, such as acne and “ringworm,” have sometimes been linked to skin cancers occurring in the treated areas many years later. Routine X-rays, such as chest and dental X-rays are not associated with skin cancer. Trauma (burns or scars), certain chemicals, and rare inherited conditions may also contribute to the development of skin cancer. Finally, patients who have undergone organ transplantation or have other forms of immunosuppression are often at increased risk for developing skin cancer.

## **Why Do I Need a Biopsy?**

There can be other benign growths, or lesions, on the skin, which resemble skin cancer. Since there are different treatment options for the many different types and subtypes of benign and malignant skin lesions, a biopsy of any suspicious lesion is performed prior to treatment with Mohs Micrographic Surgery

## **I Don’t See Anything Left After My Biopsy. Do I Really Need to Treat This?**

Yes. Following a biopsy, your skin cancer may no longer be visible. However, the surface lesion that was removed can represent the “tip of an iceberg.” More tumor cells often remain in the skin. These can continue to grow downward and outward, like roots of a tree. These “roots” are not visible with the naked eye. If they are not removed, the tumor will likely reappear and require more extensive surgery. Tumors that are neglected can spread deeply into the skin and invade nearby structures. Rarely, these cancerous cells can metastasize and spread to lymph nodes and other organs in the body.

## What You Should Know About Your Options For Skin Cancer Treatment

Mohs surgery is a highly specialized technique and not every skin cancer requires this treatment. Your physician has referred you for Mohs surgery because your skin cancer falls into a category requiring specialized treatment. Common indications for Mohs surgery are listed below:

### Common Indications for Mohs Micrographic Surgery

- Recurrent tumor which has been previously treated
- Location in a cosmetically sensitive area (face, nose, lip, eyelid, ear, finger, etc) where sparing of normal tissue is essential
- Tumor that is large in size
- Tumor that has been incompletely removed by another procedure
- Tumor with an aggressive growth pattern on microscopic examination of the biopsy
- Tumors appearing in patients or locations with a high risk for recurrence.
- Poorly demarcated tumors in which the borders are difficult to determine

For many skin cancers, Mohs surgery may not be indicated, and there are several effective methods available for treatment. The treatment choice depends on many factors including size, location, previous treatment, and tumor type. When detected early, most skin cancer treatments respond to common treatment procedures including:

Electrodessication and curettage—This commonly used treatment, also known as ED&C, involves scraping away a cancerous tumor and its extensions. An advantages of this method is that it is relatively quick with an easy recovery. The disadvantages of this method include a slightly lower cure rate since no tissue is available for microscopic examination to ensure that all the cancer has been removed. Depending on the area treated, a round, whitish scar may result.

Cryosurgery—This treatment method involves the prolonged application of liquid nitrogen on cancerous tissue and the surrounding area. Like electrodessication and curettage, an advantage of this method is that it is relatively quick and simple. The disadvantages of this method include a slightly lower cure rate with no tissue available for microscopic examination to ensure that all the cancer has been removed. In the area treated, a round, whitish scar may result.

Radiation therapy—This method involves a series of treatments using X-rays to treat the skin cancer. Radiation is sometimes used along with surgical treatment of an aggressive skin tumor to obtain a higher cure rate. Radiation therapy can also be used alone in cases where the skin cancer may be inoperable. The disadvantages of this method include the inconvenience of multiple treatment sessions, a lower cure rate when used alone, and damage to the surrounding normal tissue. In addition, there may be an increased long-term risk of developing additional cancers within the treated area as a result of radiation damage.

Topical immuno-modulating agents—Topical agents can be used to treat skin cancer by application of the drug to the cancer over a period of 6-8 weeks. One advantage is that these drugs are relatively simple to use and can be applied by the patient at home. The disadvantages include a lengthy treatment course, and the risk of burning and pain associated with treatment. In addition, there is a lower cure rate since no tissue is available for microscopic examination to ensure that all the cancer has been removed. Finally, these drugs may not be FDA-approved to treat certain skin cancer types.

Standard surgical excision—This is a common skin cancer treatment in which cancerous tissue is cut out along with a portion of normal skin. The tissue is then sent to a laboratory where the tissue is processed by slicing it vertically, similar to cutting several slices from a loaf of bread. Excision is commonly done in the outpatient office setting where it may take up to one week to find out if the skin cancer is completely removed. If surgical excision occurs in the operating room setting, under general anesthesia, it may take less than 1 to 2 hours to determine if the skin cancer is completely removed. In either of these settings, only the sampled sections of the tissue are examined by a pathologist. Therefore, the cure rate is slightly lower than with Mohs micrographic surgery, in which the entire underside and all edges of the tissue are examined completely under the microscope.

## **Know the Signs of Skin Cancer**

You should inspect your skin periodically and become familiar with all spots and moles. Pay special attention to their sizes, shapes, edges, and color. If you have any of the following symptoms, you should schedule an appointment for a checkup with your primary dermatologist.

- A skin growth that bleeds spontaneously or with only minimal trauma
- A skin growth that increases in size and appears pearly, translucent, irregular, brown, black, or multicolored.
- A mole or birthmark that changes in color or texture, bleeds, or increases in size or thickness
- A spot or growth that continues to itch, hurt, crust, erode, or bleed
- An open sore or wound on the skin that does not heal or persists for more than four weeks, or heals and then reopens.

## **What Can I Do to Prevent the Development of More Skin Cancers?**

The damage that your skin has already received from the sun cannot be completely reversed. However, several precautions can be taken to reduce your risk of developing further skin cancers:

### **Sun Safety Tips**

1. Minimize sun exposure from 10:00 AM to 4:00 PM when the sun's rays are the strongest. If you enjoy outdoor activities such as golfing, gardening, running, walking, or boating, try to schedule them outside of these "peak sun hours."
2. Apply a sunscreen with an SPF of 30 or greater at least a half an hour before going outdoors and reapply as directed on the product label. Look for products containing Parsol 1789, titanium dioxide, or zinc oxide. Choose a cream-based sunscreen if you have dry skin, and a gel-based, or non-comedogenic formula if you have oily or acne-prone skin. If the ears or portions of the scalp are exposed due to short or thinning hair, remember to apply sunscreen to these areas as well.
3. Protect your lips with lipstick or a lip balm containing sunscreen.
4. Wear protective clothing, including a long-sleeved shirt, wide-brimmed hat and ultraviolet blocking sunglasses.
5. Avoid use of tanning salons.
6. Don't forget to use your sunscreen on overcast days. The ultraviolet rays can be as damaging to your skin on cloudy, hazy days as they are on sunny days.
7. Use a sunscreen while at lower latitudes or high altitudes. The sun is stronger near the equator and at high elevations where the sun's rays strike the earth most directly.