# Saving Face

The Skinny on Mohs Micrographic Surgery for Skin Cancer

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More than a million Americans will be treated for skin cancer this year and about one in five will develop a skin cancer in their lifetimes. The number of cases diagnosed every year is in- how would you design the ideal skin creasing at near epidemic rates and will continue to do so for the foresee- to save face? able future. The other bad news is that

most skin cancers occur on the face, and can be very disfiguring. If you were to find yourself in this unfortunate but ever more common situation. cancer treatment? What would you do



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You would develop a technique that would do two very important things. First, it would remove the cancer. Second, the removal would involve the least amount of healthy tissue to ensure the smallest possible wound. Small wounds heal better than large wounds and obviously the best wound is the one that has no cancer in it.

As it happens, Dr. Frederick Mohs came very close to achieving this ideal treatment in the 1930s. With a few refinements over the years, the Mohs surgical technique is now the most precise and effective way to treat skin cancer. This has resulted in the very rapid increase of its use for all sorts of skin cancers. Mohs surgery's popularity is likely to keep increasing as the number of skin cancers continues to rise and as more people become aware of the surgery's advantage.

# THE PROCEDURE'S ELEGANCE AND EXACTNESS

What is Mohs surgery? It is the excision of a cancer from the skin, followed by the detailed mapping and complete microscopic examination of the cancerous tissue and the margins surrounding it. If the margins are indeed cancer-free, the surgery is ended. If not, more tissue is removed, and this procedure is repeated until the margins of the final tissue examined are clear of cancer.

Mohs surgery thus eliminates the guesswork in the removal of skin cancers and pinpoints the cancer's location when it is invisible to the naked eye. Mohs surgery differs from other techniques since the microscopic examination of all excised tissues during the surgery eliminates the need to "estimate" how far out or deep the roots of the skin cancer go. This allows the Mohs surgeon to remove all of the cancer cells while sparing as much normal tissue as possible.

The cure rate of the Mohs technique is 99 percent for most skin cancers, considerably higher than that of other methods; it also provides the greatest chance of cure when other methods have failed.

But don't other techniques also use the microscope to make sure all of the cancer is removed? Some do and some don't. In those that do, not nearly as much of the tissue margin is examined as in the Mohs procedure. Furthermore, the report establishing whether the treatment was successful is often not available until after the wound has been stitched. Thus, if the margins are involved, the wound will have to be reopened. Without immediate examination of the excised tissue, it is difficult and, indeed, risky for the non-Mohs surgeon to make the wound as tiny as possible by taking very narrow margins around the cancer. Therefore, in other

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types of excisions and destructive treatments, it is routine to treat well beyond the visible edges of the cancer. This leads to potential destruction of normal skin, a larger wound, more scarring and a higher chance of recurrence than with Mohs surgery.

# **CONTROLLING SIZE AND DEPTH**

There is another advantage of Mohs surgery: With the careful microscopic examination of all tissue edges, the Mohs surgeon can tailor the size and depth of the surgery. For instance, if the surgeon suspects the cancer is thin

and non-invasive, then a very thin excision of tissue is taken. If the cancer proves to be invasive, no problem! The cancerous cells will immediately be detected by the microscope and thanks to the meticulous mapping technique so crucial to Mohs surgery, the precise location of the remaining cancer cells will be determined. Subsequent excision involves just the skin that is known to still contain cancer. This results in some wounds so shallow that they can heal like small scrapes rather than large wounds that require suturing. This not only eliminates some surgery that would otherwise be necessary but also saves patients valuable skin.

Another little known benefit of Mohs surgery is that in many cases both the removal of the cancer and the repair of the wound is accomplished on the same day. Some of the less complicated skin cancers can even be treated in as little as a few hours.

# TIME LOST OR SAVED?

That brings us to one of the supposed disadvantages of the Mohs procedure: the time it requires. Mohs surgery tends to be so time-consuming because a lot of the work is done behind the scenes while the patient waits. After the excision, the surgeon marks the tissue with colored ink to maintain orientation of the tissue when it is viewed under the microscope. Then a meticulously drawn map of the inked tissue is made; this will be used to document the location of the remaining cancer. The tissue is sliced into wafer-thin sections, which are placed on a glass slide. The slides are then stained to make any residual cancer visible. The physician examines the slides, indicating the exact location of any remaining cancer on the map. Finally, the doctor uses the map to pinpoint the exact location of the cancer on the patient and then excises any remaining cancerous tissue. This process is repeated until complete removal of the cancer is confirmed. [See Table 1.]

All of this of course takes time. But even if Mohs surgery lasts somewhat longer than other procedures, doesn't it potentially save significant time by reducing the number of recurrences and repeat surgeries?

## TABLE 1

1



ABOVE: Two years after the surgery.

# WHEN TO USE MOHS

If Mohs surgery provides the highest cure rate with the smallest loss of skin, why would anyone have a skin cancer treated any other way? Well, not all tumors require Mohs surgery.

Few skin cancers cannot be treated with Mohs surgery, especially when it may give the individual an advantage to do so. So, if the cancer is recurrent or large, is in a delicate area of the face, hands or feet, or is considered an "aggressively growing" type, the benefit of microscope-based removal has obvious advantages. Beyond that, if keeping the wound as tiny as possible or having confidence that the cancer has been removed by the procedure with the highest cure rate is important, then any tumor may benefit from Mohs surgery. On the other hand, if the chance of recurrence or the size of the wound is less important, quicker and less involved treatments may be preferred. For some small or less aggressive cancers, or those located in areas of the body known to be easier to

treat, the cure rates of other treatments can be nearly as good as with Mohs surgery, and therefore those treatments are reasonable to consider.

# The Mohs surgical technique is now the most precise and effective way to treat skin cancer.

Another reason that Mohs surgery may not be chosen is that some cancers are more difficult to examine microscopically than others. One such cancer has been melanoma, the most dangerous of the skin cancers. In recent years,

# THE STEPS INVOLVED IN MOHS SURGERY [refers to photos above]

- 1. Original tumor site is presented
- 2. Tissue is removed
- 3. Tissue is inked for orientation
- 4. Map of tissue is drawn
- 5. Tissue is sectioned and placed on a glass slide
- 6. Glass slide is stained
- 7. Surgeon examines slide and identifies residual cancer
- 8. Surgeon marks the map corresponding to location of cancer
- 9. Surgeon returns to bedside with map to precisely excise remaining cancer
- 10. Process is repeated until no cancer remains; wound is closed



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however, efforts to improve and refine the Mohs surgeon's ability to identify melanoma cells have resulted in the development of special stains that highlight these cells. These special stains are known as immunocytochemistry stains and use substances that preferentially stick to the pigment cell, where melanoma occurs, making these cells much easier to see with the microscope.

Thanks to the ingenuity of Dr. Mohs and his technique, surgeons can provide the highest cure rates while making the smallest wounds. More Mohs surgeons are now using this procedure with melanoma.

Mohs surgery can take the better part of the day, while other procedures can be done more quickly. But again, these other procedures either do not evaluate the adequacy of tissue removal, evaluate only a small fraction of the total margin of skin removed, or examine the excised tissue days after the wound has been stitched. In the event that cancer remains in the wound, a second surgery will be necessary and the exact location of the remaining cancer may still not be known. When the treatments that do not examine the skin for adequacy of removal are performed, the only way of knowing whether the removal was successful is to wait and see if the cancer comes back.

# **ECONOMICS**

Finally, Mohs surgery is expensive, like any procedure that requires large numbers of medical personnel and technicians. However, when one takes into account the costs of additional

surgeries for cancers that are incompletely removed, as well as the repair of larger wounds, Mohs surgery compares very favorably to other cancer removal techniques. The personal cost to individuals who must undergo additional procedures for recurrent cancers versus the knowledge that their skin cancer has been removed meticulously is very difficult to quantify. Most medical insurers recognize the value added and do cover the cost of Mohs surgery for most tumors. Recent reductions in the cost of the procedure to some insurance companies and Medicare make Mohs surgery's cost-effectiveness even better. Well over a million skin cancers occur in the United States per year and presently 1 in 5 are treated with Mohs surgery.

Thanks to the ingenuity of Dr. Mohs and his technique, surgeons can provide the highest cure rates while making the smallest wounds. Even though skin cancers can often be very difficult to see, Mohs surgeons have no need to worry since they use a microscope. And this is how Mohs surgeons save face.

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