

Mohs Micrographic Surgery

FACT SHEET

Mohs Micrographic Surgery, performed by a fellowship-trained member of the American College of Mohs Surgery, is an advanced treatment for skin cancer that offers the highest cure rate – even if the skin cancer has been previously treated by another procedure. Mohs Micrographic Surgery is a state-of-the-art treatment in which the physician serves as surgeon, pathologist and reconstructive surgeon. It relies on the ability of a microscope to trace out and ensure removal of the skin cancer's roots. This procedure allows physicians who have completed a fellowship in Mohs surgery to see beyond the visible disease and to precisely identify and remove the *entire* tumor, leaving healthy tissue intact and unharmed. Mohs surgery is most often used to treat two of the most common forms of skin cancer: basal cell carcinoma and squamous cell carcinoma, however it is also an effective treatment for other types of skin cancer.

Clinical studies have shown that the cure rate for Mohs Micrographic Surgery is the highest of all treatments for previously untreated basal cell carcinoma – *99 percent* – and *95 percent* for recurrent basal cell carcinomas. As the most exact and precise method of tumor removal, this procedure minimizes the chance of recurrence and decreases the potential for scarring or disfigurement. As such, **Mohs surgery offers the highest potential for complete removal of the cancer, while sparing the surrounding healthy tissue.**

History

Developed by Frederic E. Mohs, MD, in the 1930s, the Mohs micrographic surgical procedure has been refined and perfected for more than half a century. Initially, Dr. Mohs removed tumors with a chemosurgical technique, which entailed the application of a chemical to the tumor before tissue was removed. This process was time consuming and it was usually necessary to extend the surgery over the course of a number of days during which time, thin layers of tissue were excised, frozen and then pathologically examined. The surgery included a unique technique for color-coding excised specimens and created a mapping process to accurately identify the location of remaining cancerous cells.

As the process evolved, surgeons omitted the chemical treatment and refined the technique so surgery could be completed in one day. However, the color-coded mapping of the excised specimens and the thorough microscopic examination of excised tissue plus the fact that the same physician acts as both surgeon and pathologist remains central to Mohs Micrographic Surgery to this day and generally permits immediate reconstruction of the wound.

Treatment Issues

Common treatment procedures such as curettage, and electrodesiccation, cryosurgery, and radiation therapy often prove less effective because they destroy the tissue and leave no specimen for pathological examination. Standard surgical excision relies on the human eye and examines only a fraction of the actual surgical margins for cancer, whereas Mohs surgery evaluates 100 percent of the surgical margins. In an effort to preserve healthy tissue, too little

tissue may be removed, which can cause the cancer to recur. It can also result in the removal of too much healthy tissue, resulting in unnecessary scarring.

Some tumors often do not respond well to common treatments, including those tumors greater than two centimeters in diameter, those in difficult locations and those complicated by prior treatment. Removing a recurrent skin cancer is more complicated because scar tissue may hide cancerous cells. In these cases Mohs surgery is the most appropriate treatment.

Procedure

The Mohs process includes a specific sequence of surgery and pathological investigation. Mohs surgeons examine the removed tissue for evidence of cancer cells. Once the visible tumor is removed, Mohs surgeons trace out the paths of the tumor using two key tools:

- a map of the surgical site;
- a microscope.

Once the obvious tumor is removed, Mohs surgeons:

- remove an additional, thin layer of tissue from the tumor site;
- create a “map” or drawing of the removed tissue to be used as a guide to the precise location of any remaining cancer cells;
- microscopically examine the removed tissue thoroughly to check for evidence of remaining cancer cells.

If any of the sections contain cancer cells, Mohs surgeons:

- return to the specific area of residual tumor as indicated by the map;
- remove another thin layer of tissue *only* from the specific area where cancer cells were detected;
- microscopically examine the newly removed tissue for additional cancer cells.

If microscopic analysis still shows evidence of disease, the process continues, layer-by-layer, until the cancer is completely removed.

Indications

Mohs Micrographic Surgery is used primarily to treat basal and squamous cell carcinomas, but can also be used to treat less common tumors.

Mohs surgery is indicated when:

- the cancer is in a difficult area where it is important to preserve healthy tissue for maximum functional and cosmetic result, such as eyelids, nose, ears, lips, fingers, toes and genitals;
- the cancer was treated previously and recurred;
- the cancer is large;
- the edges of the cancer cannot be clearly defined;
- the cancer grows rapidly or uncontrollably;
- scar tissue exists in the area of the cancer.

Reconstruction

The best method of managing the wound resulting from surgery is determined after the cancer is completely removed. Once the final defect is known, management is individualized to achieve the best results and to preserve functional capabilities and maximize aesthetics. The Mohs surgeon is also trained in reconstructive procedures and usually will perform the reconstructive procedure necessary to repair the wound. A small wound may be allowed to heal on its own, or the wound may be closed with sutures, a skin graft or a flap. On some occasions another surgical specialist may complete the reconstruction as part of a team approach.

Cost Effectiveness

In addition to its high cure rate, Mohs Micrographic Surgery also has been shown to be cost effective. In a study of costs of various types of skin cancer removal, the Mohs process was found to be comparable to the cost of other procedures, such as electrodesiccation and curettage, cryosurgery, excision and radiation therapy.

In addition, Mohs Micrographic Surgery has other advantages:

- Because it preserves the maximum amount of normal skin, Mohs surgery often results in smaller scars.
- With its high cure rate, Mohs surgery minimizes the risk of recurrence and eliminates the need for more complicated surgery, which may be necessary if the cancer recurs.
- Because the Mohs procedure is performed in the surgeon's office and pathological examination of the tissue is conducted immediately, the entire process can often be completed in a single day.

The Fellowship-Trained Mohs Surgeon

The American College of Mohs Surgery (formerly The American College of Mohs Micrographic Surgery and Cutaneous Oncology) is the oldest professional organization of physicians who have attained extensive training and experience in Mohs Micrographic Surgery. The organization was founded by Dr. Frederic Mohs in 1967. One of the major goals of the Mohs College is to ensure the highest quality of training in Mohs surgery, which thereby ensures the highest quality of care for patients undergoing this procedure.

To be accepted as members of the Mohs College, dermatologist must complete a one- or two-year Micrographic Surgery and Dermatologic Oncology (Mohs) fellowship training program. Qualified applicants undergo an extremely competitive review and selection process to obtain a 1- to 2-year fellowship position with a program accredited by the ACMS (international programs), the Accreditation Council for Graduate Medical Education (ACGME; U.S. programs), or the Australasian College of Dermatologists. ACGME and ACD programs are recognized by the ACMS, and fellowships accredited by these organizations safeguard the standards of Micrographic Surgery & Dermatologic Oncology (Mohs) by ensuring that fellows-in-training are properly trained and acquire the necessary expertise to perform the Mohs procedure. Accredited programs follow a structured curriculum that includes graded responsibility, operative and non-operative education, and exposure to long-term results, recurrences, and complications.

The Cost Case for Mohs Micrographic Surgery*

Method	Cost	Rate of Recurrence
<i>Mohs Micrographic Surgery</i>	\$1,243	1%
Destruction	\$ 652	N/A
Office Excision/Permanent Sections	\$1,167	10.1%
Office Excision/Frozen Sections	\$1,400	10.1%
Ambulatory Surgical Facility Excision/Frozen Sections	\$1,973	10.1%
Radiation Therapy	\$4,558	N/A

*Based on a study of 400 tumors published in the *Journal of the American Academy of Dermatology*, Nov. 1998