

January 2021

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Recommended Citation

Volis, Michelle J. (2021) "Dermatology Technique: Mohs Micrographic Surgery," *Mako: NSU Undergraduate Student Journal*: Vol. 2021 , Article 3.

Available at: <https://nsuworks.nova.edu/mako/vol2021/iss1/3>

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Dermatology Technique: Mohs Micrographic Surgery

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Abstract:

This paper aims to educate the readers about a novel surgery approach that is becoming popular among dermatologists. This technique, Mohs surgery, is implemented in order to treat malignant skin cancer types. This paper incorporates the history of Mohs micrographic surgery, the advantages and disadvantages of the procedure, and alternatives to this approach. The main advantage is healthy tissue preservation while disadvantages include holes in fragmented tissue margins and tissue orientation complications.

Keywords: dermatology, Mohs micrographic surgery, skin cancer, surgery, medicine, treatment.

Skin cancer is the abnormal growth of skin cells. Basal cell carcinoma and squamous cell carcinoma are two of the most common types. These types are often classified under non-melanoma skin cancer types and can be treated through simple surgical removal procedures, but malignant skin cancer types such as melanoma require more complex procedures such as Mohs micrographic surgery (MMS) often called Mohs surgery (Ho, 2019). Mohs surgery is a technique that aims to preserve healthy tissue while treating skin malignancies and offering high cure rates. Surgeons who perform MMS also serve as pathologists, microscopically examining the biopsies of the skin tissue in efforts to remove all the malignant cells in a precise manner. MMS is considered to produce high quality cosmetic and functional results because the performing surgeon is able to attain the necessary surgical margins to remove the cancer prior to carrying out reconstruction (Chen et al., 2018).

Mohs micrographic surgery was first performed on June 30, 1936 by a surgeon named Fredric Mohs. The procedure was called “chemosurgery” upon discovery. This technique was named as such because a chemical fixative (zinc chloride) was placed on the skin that was in association with the tumor. After 24 hours post the in-situ fixation, the tumor was cut out and examined under the microscope. This process was repeated until the tumor was completely excised. Unfortunately, chemosurgery had its drawbacks such as the process was long and painful and the wounds required intensive care and healing due to the zinc chloride paste which weakened the wound margins and made surgical closure unprecise (Finley, 2003).

Today, Mohs surgery is improved and presents a fresh tissue technique; it no longer uses zinc chloride fixation. The updated approach, freezing fresh tissue and sectioning it in a cryostat microtome, comes with many advantages as compared to the original chemosurgery technique. Those advantages include increased tissue conservation and decreased patient discomfort. The

tissue conserving properties of this procedure help in areas of aesthetic importance which include the head and neck areas. One of the improvements includes faster processing times: fifteen to thirty minutes. A major benefit to the Mohs surgery technique is that the surgeon can gain precise microscopic control of the entire tumor (Prickett & Ramsey, 2020).

Nearly a million Mohs surgery procedures have been performed as of the year 2012, and the rate of performing MMS per year in the United States has surged (Asgari et al., 2012). While Mohs started off as a field that only included men, an increase of female membership has been observed over the past few years. It is predicted that by the year 2042, the number of female surgeons performing Mohs micrographic surgery will further grow, and there will be a 50% female membership in the American College of Mohs Surgery (Papac & Collins, 2018).

Mohs surgery is often executed for skin cancers with a high risk of recurrence and in cases where tissue conservation is crucial. Surgeons utilize the Mohs Appropriate Use Criteria (AUC) guidelines to determine whether a specific tumor can be effectively controlled with this technique. Some components of the criteria incorporate the location of the tumor on the body and the patient and tumor characteristics. According to the AUC guidelines, MMS is most suitable for a variety of areas of the body such as the central face, eyelids, eyebrows, nose, lips, chin, ear, genitalia, hands, feet, ankles, and nail units. The higher-risk patient characteristics are immunocompromised, prior radiated skin, genetic syndromes such as basal cell nevus syndrome (group of genetic defects), and patients with history of high-risk tumors. The tumor characteristics are those with a positive margin on a recent excision (Prickett & Ramsey, 2020). Such criteria are employed in order to best ensure that Mohs surgery would be a valuable technique that can appropriately manage a specific lesion.

In some cases, Mohs surgery is not the best treatment option and alternatives are used. Those alternatives include curettage, cryosurgery (using intense cold to destroy unwanted tissue), radiotherapy, topical imiquimod (cream used to treat certain types of actinic keratoses), photodynamic therapy and topical 5-fluorouracil (Smith & Walton, 2011). Substitutes are sometimes used because MMS can have consequences. Some disadvantages of Mohs micrographic surgery for the removal of skin cancer include holes in fragmented tissue margins, tissue orientation inconveniences, excessively narrow or wide margins, problems with cutting the tumor, and the process can be time-consuming (Rapini, 1990). A more recent study presents pitfalls of the MMS technique those of which include complications in differentiating between the tumor cell types on the frozen section, using poor-quality frozen section tissue, and folds in the tissue which can affect the ability to determine the extent of the disease (Tsay et al., 2020). Nonetheless, Mohs microscopic surgery is still being performed and more surgeons are beginning to implement this technique because it enables them to treat complicated skin malignancies.

MMS is quickly becoming a more popular procedure and the American College of Mohs Surgery is gaining new members because of the procedure's efficacy and comparatively low cost. As current studies dictate, Mohs surgery is considered to be the only technique that enables 100% margin examination. The thorough margin examination as facilitated by this procedure has contributed to its 99% five year cure rates for basal cell carcinoma (Otley & Salasche, 2004). While other surgical procedures are available, MMS is becoming more popular because of its many advantageous properties such as healthy tissue preservation.

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