

When I started aeromodeling nine years ago, I had just finished my dermatology residency and had successfully started a thriving practice. Since I was a kid, I had always wanted to fly remote-control airplanes, but I never had the money or the time, being either a poor high school/college student or an overworked medical student/resident.

I finally reached a point in my life where I had both the time and the money to participate in a hobby in which I had always had an interest. Little did I know that my professional life and hobby would soon collide.

by Dr. Joseph Gadzia

Visit your
dermatologist
before it's
too late

Skin Cancer and the Aeromodeler

It wasn't long after I had joined the Jayhawk Model Masters in Lawrence, Kansas, that I developed some true friendships. Through these interactions I soon became not only their friend, but also their physician.

After diagnosing two members of the club with melanomas, and three members with both basal cell and squamous cell carcinomas of the skin, it was clear to me that our hobby puts our members at risk of developing skin cancer.

I wrote this article to give aeromodelers the knowledge and information they need to protect themselves from the harmful rays of the sun and hopefully to encourage members who have suspicious spots on their skin to see a dermatologist before it's too late.

Protect yourself from the sun!

You'll find a wide variety of caps and hats at www.modelaircraft.org/shopama. Order one today!

The sun is the life-giver on our planet. It provides the light and the warmth that we need to survive. However, it also gives off two types of radiation that penetrate the atmosphere, the clouds, and even the layers of our skin. That radiation is in the form of ultraviolet A and B (UVA and UVB) rays. These non-visible forms of light interact with the DNA of our skin cells, causing damage to the genes that control how often a cell divides and multiplies.

When these cells are irrevocably damaged, the cell loses the ability to control itself and it repeatedly divides while ravaging nutrients and space from the nearby normal cells. If the damaged cell also starts losing its anchors to the skin, it can start migrating to other areas of the body in the form of metastasis. Depending on the type of skin cancer, this can rapidly be fatal because the cancer kills off the normal cells in other organs and stops their proper function.

More than 3.7 million skin cancers were diagnosed in 2008 and the incidence is increasing drastically. There are many different types of skin cancer that I will not delve into in this article for the sake of brevity, but all of these cancers are different based on the type of cell from which the cancer is derived.

The three most common types of skin cancer are: 1) basal cell carcinoma (BCC), 2) squamous cell carcinoma (SCC), and 3) melanoma. BCCs are derived from cells in the hair follicles. SCCs are derived from the squamous cells. These are the cells that you see

with your eyes and feel with your fingers when you rub your skin. Finally, melanomas are derived from the melanocytes which are the cells that give your skin its pigment or color.

The damage done by the sun however, doesn't always lead directly to cancer. Sometimes there can be an early form of damage that we term precancerous lesions or medically termed as actinic keratosis (actinic means sun or light, and keratosis refers to a scaly spot on the skin).

These lesions sometimes are almost better felt than seen, and they present as rough "sandpaperish" spots on the skin (Figure 1). They also can be

noticeable as thick, red, scaly spots on the skin (Figure 2). These early types of precancers can be readily treated by your physician without surgery.

There are various methods to remove these and reduce the chance of progression to cancer. Such modalities as freezing the lesions with liquid nitrogen, application of chemotherapy creams, and treatment with phototoxic chemicals are the most common methods used and can usually be done with minimal downtime.

Failure to treat actinic keratosis increases the risk that these lesions will progress to SCC. Roughly 5% to 10% of all actinic keratosis left untreated will



Figure 1: A 50-year-old male with actinic keratosis on his forehead. These precancerous spots are barely visible to the patient or the physician.



Figure 3: A fast-growing SCC. This cancer reached this size within two weeks of the patient noticing it.



Figure 2: A close-up view of an aggressive precancerous lesion termed a proliferative actinic keratosis. This spot required multiple treatment modalities to prevent it from developing into cancer.

progress to this type of cancer; however, it is possible to develop a SCC without having an actinic keratosis. SCC is the second most-common type of skin cancer.

Fortunately, if caught early, it is easily removed and cured; however, it does have the potential to metastasize to other organs. Left untreated, SSC can rapidly spread to the lymph nodes, lungs, and other organs which can result in death.

Sometimes these cancers grow very rapidly, even within a matter of weeks. The treatment for these types of cancers is usually surgery. On the body, these cancers are usually removed with a standard surgical margin and sent to a pathologist who takes several slices of the specimen and looks to see if it involves the margin. This usually results in a 90% cure rate.

Particularly on the face, these types of cancers can spread beneath the skin, along the different planes of the skin and muscle, and be invisible to the patient and the physician (Figure 3). A

special type of surgery is usually used to treat these cancers called Mohs surgery (named after its inventor, Frederick Mohs).

This surgery involves cutting around the cancer with thin surgical margins and then processing it immediately within the doctor's office in such a way that 99% of the margins can be visualized at one time. This special type of surgery allows for high cure rates (98% or greater) and still permits the surgeon to spare tissue in delicate areas of the face for the best cosmetic outcome.

BCC's are the most common type of skin cancer (in fact, they are the most common type of *any* cancer). Fortunately, these cancers rarely metastasize or spread to other organs, even if left untreated for years, although it is possible. However, these cancers can be extremely aggressive locally, and they can grow quite large and deep without any evidence to the patient or the physician until the time of surgery (Figure 4).

Again, surgical excision is the treatment of choice, although radiation and chemotherapy creams may be utilized by the physician to remove these cancers. Mohs surgery is the treatment of choice for basal cell carcinomas on the face because of its high cure rate, and tissue-sparing ability.

Finally, I come to melanoma skin cancer. This is the Tyrannosaurus Rex of skin cancers, because if not caught early, it rapidly spreads throughout the body, particularly the lymph nodes, liver, and brain.

It is the most ruthless of the skin cancers—and of almost any cancer, for that matter—because once it is out of the skin it is almost impossible to stop. It responds poorly to radiation and chemotherapy.

Because these cancers need to be diagnosed early, it is important that an aeromodeler know what to look for.

Dermatologists often talk of the ABCDs of melanoma. Does a mole have Asymmetry (does one side look different if you draw a line down the middle)? Does a mole have irregular Borders? Does a mole have different Colors? Does the mole have a Diameter greater than 6mm (bigger than an eraser head)?

If the answer to any of these questions is "yes," then you should have it looked at by a dermatologist (Figure 5). This doesn't necessarily mean its cancer, but it should be examined to rule it out.

I want to add an E to this list, referring to Everything else. Is the mole changing, growing, bleeding, or hurting? These are also warning signs that a spot needs to be checked. Remember these rules apply to melanoma, but any new growth on your skin that is not going away after several weeks, should be checked to make sure it is not cancer, because there are many types of skin cancer and they can all look different.

What can an aeromodeler do to protect himself or herself from these awful cancers? Short of becoming a full-time indoor modeler, we need to protect ourselves from the sun. As I stated previously, the radiation that causes skin cancer is invisible to our eyes, and it penetrates even the clouds, so it is damaging us even when it is cloudy outside.

Sunscreen and protective clothing is our best defense. Most people do not apply enough sunscreen. If you were going to the beach, you would need to apply 1 ounce of sunscreen to adequately protect your body (roughly a quarter of an average-size bottle). Also sunscreen lasts approximately two hours at best, so it needs to be applied every two hours. Choose a sunscreen with at least a sun protection factor (SPF) of 45, and make sure it covers both UVA and UVB radiation.

A study determined that for every inch of brim the hat you wear has, you decrease your chance of getting skin cancer on your face by 10%. I will give you this warning: enjoy flying your aircraft, but make sure you can still see it under the brim of your sombrero!

—Joseph Gadzia
jgadzia@sbcglobal.net

SOURCES:

American Cancer Society
www.cancer.org

Figure 4: A BCC prior to Mohs surgery that ended up being much wider and deeper than expected.



Figure 5: A melanoma with all of the ABCDs: Asymmetry, Irregular Borders, Different Colors, and a Diameter greater than 6mm. This patient eventually died from her melanoma because she waited too long to see a dermatologist.

