Roenigk's Dermatologic Surgery

Current Techniques in Procedural Dermatology

Third Edition

Edited by
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John Louis Ratz
Henry H. Roenigk, Jr.
DEDICATION

To those who learn from this book and are happy with their success practicing dermatologic surgery

To the patients who entrust us with their care and benefit from a physician’s dedication to life-long learning

To institutions such as Cleveland Clinic, Mayo Clinic, Northwestern University, and others that provided training for our authors

To professional colleagues with whom we have interacted over the years teaching courses, working with professional societies, educating the public and who appreciate our efforts on behalf of the specialty

To support staff at our institutions and private practices without whom we could not do what we do

And to our wives Julie, Kathie, and Shirley, along with our children, who put up with many extra hours away from them to see patients, write, teach, and do research. Without your support we would not be able to succeed at work and our lives would be incomplete.
The first edition of this textbook was published in 1988 and at that time, we felt we were helping to define a growing subspecialty in dermatology—dermatologic surgery. We asked a prominent plastic surgeon and an otorhinolaryngologist to write forewords for the book. Both acknowledged the dermatologist’s expertise in some surgical procedures but reminded us that collaboration across specialties was important. We continued that theme in the second edition published in 1996. In both editions, we mentioned the experience of Dr. Jacques Joseph who was dismissed from Wolff’s Clinic in 1896 for performing a cosmetic procedure. His example serves as a reminder that change is not easy, and agents of change are often ostracized.

Fred Mohs, a general surgeon from Madison Wisconsin, published his first paper on chemosurgery in 1941. At that time, Dr. Mohs was not highly regarded by the surgical community. When I came to Mayo, I heard comments from general surgeons, such as “we hoped the Mohs procedure would die when Dr. Mohs died!” It takes time and perseverance, but good ideas with real value normally prevail to become the standard of care. It turns out Dr. Mohs had two good ideas: a better method to completely check the margins of a specimen and, since he used zinc chloride paste to fix the tissue and did not close the wounds, we learned a great deal about second intention wound healing.

General surgeons and other surgical specialties ignored Mohs’ procedure because they did not want to read the pathology, and it was not practical to perform this procedure in a traditional operating room. In the late 1960s, some bold dermatologists who were willing to practice outside the normal bounds of dermatology began to expand their skills in surgery. This included novel procedures such as hair transplantation, dermabrasion, and laser, among others. Since dermatologists were learning surgery and are trained during their residency in the clinical and pathology diagnosis of skin cancer, the Mohs procedure was a natural fit. The efficiency of this practice was helped because dermatologists routinely practice in a clinic, not an operating room, and frozen section technology became readily available in the 1970s. As a result, a dermatologist could operate on three or four patients at one time in the clinic using local anesthesia, get a frozen section in about one hour, and read the histology before taking additional tissue. In those days, most wounds were left to heal by second intention. It did not take long before dermatologists realized that they could close surgical defects after Mohs surgery for skin cancer, so the wound healed better and faster. Thus was born oncologic and reconstructive dermatologic surgery, two of the three major areas that make up the body of knowledge of our subspecialty.

Since the first edition of _Roenigk’s Dermatologic Surgery_ in 1988 and the second edition in 1996, the reconstructive skills of dermatologic surgeons have expanded considerably. Dermatologic surgeons now repair most of their defects, including many that would have been referred to other surgeons in the past. We do these procedures with better skill because of the number of cases we perform. Based on Medicare data, dermatologists perform more skin lesion excisions, Mohs surgery for skin cancer, primary repairs, and skin flaps than any other medical specialty. Because dermatologic surgeons today routinely perform these procedures on an outpatient basis instead of a hospital operating room, the cost of care has greatly reduced while quality and access have also improved. As a result, the reconstructive surgery section of our book has been greatly expanded in this edition.

All population and demographic studies tell us that skin cancer will continue to increase because of the aging of the baby boomers. At the same time, even more patients are looking for ways to avoid the signs of aging. Combine patient demand with the surgical skills learned through removing cancer along with the dermatologist’s appreciation for the appearance of the skin, and the third major area—cosmetic dermatologic surgery—becomes a logical extension of our subspecialty and ever-expanding body of knowledge. This edition of _Roenigk’s Dermatologic Surgery_ has added new chapters on technology used for cosmetic procedures, such as lasers and light sources as well as minimally invasive procedures such as soft tissue augmentation, ambulatory phlebectomy, and Botox®. We have greatly expanded our cosmetic dermatologic surgery section while also maintaining a balance, since many older procedures still have value, having withstood the test of time.

In the 1970s, several societies were founded to promote education in dermatologic surgery, including the American Society for Dermatologic Surgery and the American College of Mohs Micrographic Surgery and Cutaneous Oncology, among others. A peer-review journal, now named _Dermatologic Surgery_, was started, which currently enjoys the seventh highest impact factor among 35 peer-reviewed dermatology journals. It became clear that residents must learn dermatologic surgery as part of their dermatology training. The American Board of Dermatology and the Residency Review Committee for Dermatology recognized this change in practice and adopted new program requirements for dermatology training and reorganized the certifying exam in dermatology, adding a section on surgery. It also became clear that fellowship training beyond the residency was an important way for some residents to gain added skills. Most of these fellowships were established by the American College of Mohs Micrographic Surgery and Cutaneous Oncology, but in 2003, the Accreditation Council for Graduate Medical Education approved the adoption of a new subspecialty of dermatology—procedural dermatology.
The Residency Review Committee now accredits 35 fellowships in this subspecialty while the American Board of Dermatology is considering a subspecialty-certifying exam in procedural dermatology. Regardless of when a dermatologist was a resident or how much surgery was taught in their training program, it is incumbent on all physicians to maintain their skills and engage in lifelong learning.

Population demographics and the increasing cost of health care have supported the growth of dermatologic surgery over the past 40 years because we provide ready access to cost-effective, high-quality outpatient care for skin disease and the signs of aging, which was heretofore unavailable. Our mission as editors of the Third Edition of Roenigk’s Dermatologic Surgery: Current Techniques in Procedural Dermatology has been to provide one source for the most up-to-date yet comprehensive information that broadly describes what is currently accepted as state of the art in dermatologic surgery. Reading this text is an important way for dermatologists who perform surgery to maintain or improve their surgical skills. We hope that the pages of this book become wrinkled and the binding cracked with regular use.

Randall K. Roenigk, MD
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INTRODUCTION
To deliver the highest level of surgical care to the patient in the office setting, there must be adequate preparation prior to surgery. The steps include proper preparation of the skin, appropriate instrument selection and care, and an adequate facility for the procedure as well as to meet any unexpected needs.

SURGICAL PREPARATION OF THE SKIN
The goal of surgical preparation is twofold. The surgeon must do everything possible to decrease the chance of wound contamination and subsequent infection, which may lead to complications secondary to the infection. In addition, adequate antisepsis is essential to prevent infection transfer to office personnel, medical equipment, and other patients.

Bacteriology
It is impossible to sterilize the skin completely. Ten to twenty percent of the resident flora is found in the deeper layers of the skin, primarily within the pilosebaceous units. Most of the resident flora, however, is in the superficial layers of the skin. The normal flora varies considerably with the anatomic site. Approximately 90% of the resident aerobic bacteria is Staphylococcus epidermidis. Additional strains include Staphylococcus aureus, micrococci, diphtheroids, streptococci, and some gram-negative bacilli. The skin may also contain several transient and pathogenic microorganisms. These are the bacteria usually involved in wound infection and, fortunately, are easily removed by adequate surgical preparation. The single most commonly found organism in wound infections is S. aureus. Staphylococci and, to a lesser degree, streptococci are the most common offenders in outpatient surgery. In the hospital setting, the majority of pathogens in surgical wounds are gram-negative bacteria. These include Escherichia coli, Pseudomonas aeruginosa, Klebsiella, Enterobacter, and Proteus species. This difference between the hospital and the private office reflects cross-contamination in the hospital environment.

Antiseptic Agents
An ideal antiseptic agent should rapidly destroy all microorganisms without any risk of toxicity, irritation, or allergenicity. No one antiseptic agent satisfies all of these criteria, but some come closer than others (Table 1).

Soaps
Ordinary soaps have very little antibacterial effect. However, their mechanical emulsifying action removes a large portion of the superficial transient and pathogenic bacteria. Thus, an adequate scrub with a soap or detergent, preferably combined with the killing power of an antiseptic, is the first and most important step in prepping the skin.

Chlorhexidine
Chlorhexidine gluconate is a biguanide agent that is very effective against a wide range of gram-positive and gram-negative bacteria. Chlorhexidine produces rapid bacterial destruction and binds with the protein of the stratum corneum to leave some degree of residual action. It is not damaging to the skin and is not absorbed through it. There is no evidence of systemic toxicity. It also appears to be more resistant to contamination than many of the other antiseptic agents. Chlorhexidine has been shown to be safe for use on the oral mucosa, but the sudsing base can be irritating to the conjunctiva, so it should be kept away from the eyes. It can also be toxic to the middle ear. Therefore, it should not be placed into the auditory canal. This precaution applies to many other antiseptic agents. At the present time, chlorhexidine appears to be the agent of choice for a surgical scrub.

Iodophors
Pure iodine is a rapidly acting, powerful antiseptic agent. However, it tends to be unstable and is irritating to the skin.
some of these organisms. Viruses. In fact, the product may become contaminated by Mycobacterium tuberculosis, P. aeruginosa, seldom used because it lacks effectiveness against gram-negative bacteria and fungi. However, it is now

<table>
<thead>
<tr>
<th>Type</th>
<th>Composition</th>
<th>Spectrum</th>
<th>Onset</th>
<th>Sustained Activity</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>Isopropy/ethyl alcohol</td>
<td>Gram +</td>
<td>Fast</td>
<td>None</td>
<td>No killing of spores, antibacterial only; 70% more effective than 90%</td>
</tr>
<tr>
<td>Iodophor</td>
<td>Iodine + surfactant (betadine)</td>
<td>Gram +, gram –</td>
<td>Moderate</td>
<td>Up to 1 hr (longer acting than plain iodine)</td>
<td>Must be dry to be effective tissue damaging; inactivated by blood, serum; may be absorbed through skin</td>
</tr>
<tr>
<td>Hexachlorophene</td>
<td>Polychlorinated biphenyl (Phisohex)</td>
<td>Gram +</td>
<td>Slow- must remain in contact with skin &gt;3 min</td>
<td>Yes</td>
<td>Teratogen, not sporicidal–do not use in pregnant women; CNS toxic–do not use in infants</td>
</tr>
<tr>
<td>Chlorohexadine</td>
<td>Biguanide (Hibiclens)</td>
<td>Gram +, gram –</td>
<td>Fast</td>
<td>Yes</td>
<td>Do not use near eyes or ears. Use betadine instead</td>
</tr>
<tr>
<td>Benzalkonium</td>
<td>Quaternary ammonium detergent (Zephiran)</td>
<td>Gram +, gram –</td>
<td>Slow</td>
<td>None</td>
<td>Prone to contamination</td>
</tr>
</tbody>
</table>

Most of the problems associated with elemental iodine have been addressed by the development of iodophors, which are a combination of iodine and a polymer. The water-soluble complex slowly releases free iodine. The lower concentration of iodine is less irritating to the skin, and, although less effective than iodine, is still an excellent antiseptic. Povidone-iodine is one of the most popular iodophor complexes. This aqueous solution may be applied as a final skin prep. A detergent base may be added (betadine surgical scrub) to produce a sudsing antiseptic preoperative scrub. These agents have a wide range of antibacterial activity, including the destruction of some bacterial spores.

The iodophors may occasionally cause skin reactions in iodine-sensitive individuals. Although it is of little risk in cutaneous surgery, iodine toxicity can result from absorption when iodophors are applied to large areas of denuded skin. Aqueous iodine preparations should not be used as wound cleansers because the iodine may have a denaturing effect on the exposed tissues.

Alcohols
Alcohols are good antiseptics, but their full effectiveness is not often achieved in the usual clinical application. Seventy percent ethyl alcohol can destroy 90% of cutaneous bacteria within two minutes if constant alcohol moisture is maintained during that time period. However, a single wipe with an ethyl alcohol-soaked swab produces a reduction of only 75% of the cutaneous bacteria. This reduction is predominantly mechanical and not bactericidal, and relies on alcohol as an organic solvent to remove oil and debris containing large numbers of bacteria. Alcohol should not be applied to an open wound because, like iodine, it denatures and damages tissue protein. Isopropyl alcohol is somewhat less irritating to the tissues than ethyl alcohol. It can cause some degree of vasodilatation, which may enhance the bleeding of small needle puncture sites. Because they are flammable, alcohol-based products should not be used in the presence of electrosurgical equipment.

Benzalkonium Chloride
Quaternary ammonium compounds are cationic agents and are easily inactivated by anionic compounds such as soaps, detergents, blood, and other organic materials. Benzalkonium chloride destroys many gram-positive and some gram-negative bacteria and fungi. However, it is now seldom used because it lacks effectiveness against Mycobacterium tuberculosis, P. aeruginosa, spores, and many viruses. In fact, the product may become contaminated by some of these organisms.

Hair Removal
Shaving should be avoided if possible. It has been shown that shaving traumatizes the skin and promotes bacterial growth, which results in an increased incidence of wound infections. If hair must be removed, it is preferable to clip away only the hair that interferes with surgery. Small areas may be cut satisfactorily using scissors. Electric clippers are convenient, but small spicules of hair should be removed carefully to avoid their introduction into the surgical site.

Marking Proposed Incision Lines
Most skin surgery is facilitated by drawing proposed incision lines on the skin prior to the actual incision. Traction and contraction often cause tissue distortion, and deviation from the proposed incision can thus be avoided. The proposed incision lines should be marked prior to injection of local anesthesia. The patient should be sitting up or standing so as to account for gravitational effects on relaxed skin tension lines. The use of dots instead of lines reduces the smudging and allows for more precision in the marking. There are a number of types of surgical markers available. Standard markers use gentian violet and are nontoxic. Preoperative prepping with alcohol will rub off the gentian violet, but Betadine and Hibiclens may not. There have been no reported cases of tattooing.

Draper
Most office procedures are performed using disposable drapes. These are impermeable to moisture. Cotton drapes, in contrast, are supple, porous, and more comfortable for the patient. If a fenestrated paper drape is used, it should be laminated with a layer of plastic between two sheets of paper. Nonlaminated paper drapes are chemically treated to resist moisture. Pure plastic drapes are available with an adhesive margin around the fenestration. This keeps the drape stable and is particularly useful when one is working in anatomic concavities.

Preparation of the Surgeon
The surgeon must also be prepared to enter the new sterile surgical environment in an antiseptic manner. Because gloves are occasionally punctured or defective, and because bacteria multiply rapidly in the warm, moist environment inside gloves, there should be minimal bacteria present on the hands prior to placing on sterile surgical gloves. Standard surgical scrubs are used for hospital operating rooms; however, studies show that a brief scrub with effective agents may be just as effective. Regular washing with an antiseptic detergent, such as chlorhexidine gluconate, before and between cases should result in a very low degree of
bacterial contamination of the hand, in part because of its residual antibacterial effect.

Masks clearly help protect the staff from splashes of blood or other fluids (such as injected anesthesia, irrigation, etc.). However, whether masks provide protection to the patient is less clear. According to Ritter, there appears to be no difference in the total number of airborne bacterial pathogens in surgical rooms whether face masks are worn or not. A comparison by Caliendo of infection rates between lacerations repaired by physicians with \( n = 47 \) and without \( n = 44 \) face masks revealed no statistically significant difference. In fact, the single wound infection observed in that study occurred in a patient treated by a mask-wearing physician. On the basis of these data and his own report showing no change in the incidence of hospital operating room wound infections after discontinuing the use of face masks for a six-month time period, Orr concluded that the use of face masks may not serve any purpose vis-à-vis patient protection. It should be noted, however, that talking and coughing or sneezing may propel significant amounts of bacteria up to 1 and 3 m away, respectively, and as Belkin points out, masks significantly decrease such flow.

Clothing should be specific for the operating room. Street clothes should not be worn, as such clothing not only can bring microorganisms into the surgical area, but can also become contaminated by blood or other fluids; therefore, street clothes can transfer contamination to other areas at work or at home. It should be noted, however, that, as Belkin points out, specific surgical attire has not been shown to decrease infection rates, although this has not been extensively studied.

**PREPARATION AND STERILIZATION OF SURGICAL INSTRUMENTS**

**Instrument Cleaning**

After instruments have been used, they should be rinsed with warm water to remove debris. If they are soaked, it is best to add a detergent to the water. A detergent used for cleaning instruments should be of neutral pH. Acid detergents will break down the stainless steel surface and result in a black stain. Basic detergents leave a brown, rust-like deposit on the instrument. This appears after autoclaving and may interfere with the operation of the instrument since it is usually retained in the joint areas. All tissue and foreign materials must be carefully removed from the instruments. This material may be removed manually by scrubbing with a stiff plastic brush, or by means of an ultrasonic cleaner. If using the latter, the instruments are placed in ultrasonic cleaner fluid, which consists of water and a neutral pH detergent. Sonic waves are produced and are transformed in the fluid to mechanical energy, which dislodges foreign material from instrument surfaces. The ultrasonic cleaner removes only surface debris; it is not a disinfecting or sterilizing process. After the instruments have been removed from the ultrasonic cleaner and rinsed, they should be dried. Ultrasonic cleaning can remove lubrication in hinged areas. To restore this lubrication, instruments should be placed in instrument oil. This restores lubrication but may leave a greasy film on the surface, and some physicians prefer to use instrument oil only when necessary. Other oils, silicone spray, or grease should be avoided because they tend to bake when autoclaved and stiffen rather than lubricate the joints. Before the instruments are packed, they should be inspected to make sure they are in proper working order. Scissor blades can be tested for sharpness by cutting a piece of tissue paper. The cut should be smooth and without resistance. The tips of forceps and hemostats should be aligned. The opposing surfaces of needle holders should meet completely and be able to grasp 6–0 nylon suture securely from any angle. Many instrument manufacturers will sharpen and repair instruments at a very reasonable cost.

**Sterilization**

Most methods of sterilization efficiently destroy vegetative forms of bacteria. However, it is imperative in the sterilization of surgical instruments to use a method that will adequately destroy bacterial spores as well.

**Steam Autoclave**

Steam at 100°C destroys vegetative bacterial forms, but not spores. By increasing the pressure above ambient levels, the steam autoclave reaches a temperature of 121°C. When this environment is maintained for more than 15 minutes, all microorganisms are destroyed. The recommended cycle times for most autoclaves are somewhat longer. The 15-minutes exposure time begins when steam has penetrated all areas. This may require an additional 5 to 15 minutes, depending on the size of the surgical pack. The main disadvantage of steam sterilization is the gradual dulling of sharp edges, although this is less of a problem with high quality instruments. The steam autoclave may be used for the sterilization of most surgical materials including metal, cloth, paper, glassware, and heat-resistant plastics. Steam autoclaves are best operated with distilled water.

**Chemiclave**

The chemiclave is very similar to the steam autoclave but with lower humidity, usually less than 15%. The low humidity reduces damage to sharp surgical edges. Instruments are drier at the end of the autoclave cycle. However, instead of distilled water, the chemiclave uses a special chemical solution that contains formaldehyde, methylethyl ketone, acetone, and a mixture of several alcohols. Use of this system requires close adherence to protocol to prevent environmental contamination.

**Dry Heat**

Dry heat autoclaves are small, modified ovens. These units are inexpensive, and, due to the absence of moisture, there is no problem with corrosion or dulling. Dry heat sterilization requires high temperatures and prolonged exposure times. The usual instrument-packing materials (cloth, paper, or plastic) cannot be used for dry heat sterilization due to the high temperatures. The instruments must be placed in special containers or sterilized in metal trays or foil packs.

**Gas Sterilization**

Gas sterilization is an effective alternative for instruments and materials that cannot be exposed to heat. This process requires elaborate equipment and prolonged exposure times. Because it relies on the use of ethylene oxide gas, a known carcinogen, mutagen, and neurotoxin, this sterilization method is restricted to large institutional settings. Dermatologic surgeons may need to make arrangements for access to such a facility for sterilization of specialized equipment such as a dermabrasion handpiece or dermatome. It is important to remember that ethylene oxide penetrates porous materials and aeration is necessary prior to use: 24 hours for paper and thin rubber; 96 hours for
plastics; and 7 days for polyvinyl chloride and items of plastic or rubber sealed in plastic.

Chemical (Cold Tray) Sterilization
A variety of disinfectant solutions or germicides are available. Most are a combination of ingredients such as a low concentration of alcohol, a detergent, an antitrust additive, and a quaternary ammonium compound antiseptic. These antiseptic agents are easily inactivated and contaminated and are not effective against M. tuberculosis, Pseudomonas, or bacterial spores. Glutaraldehyde preparations are the only agents that are reliable for use as cold sterilizing agents. Glutaraldehyde reaches its maximum antibacterial effect when it is buffered to a pH of 8.5. However, it is relatively unstable at this pH and tends to polymerize over a period of weeks. Therefore, activated glutaraldehyde must be renewed frequently. Unbuffered glutaraldehyde antiseptics are also available, and although they are more stable, studies indicate that the unbuffered forms are less effective. Glutaraldehydes, however, are not without problems. First, although vegetative forms of bacteria are adequately destroyed within a few minutes, several hours are required to destroy spores. Second, if contamination occurs or a contaminated instrument is replaced in the solution, 8 to 10 hours must elapse before any instrument in that solution can be considered sterile. Third, because glutaraldehyde can be irritating to the skin and mucosal surfaces, it should be rinsed from the instruments with sterile water prior to use, potentially introducing an additional contamination factor. In short, chemical sterilization should not be performed on instruments used for incisional surgery.

Instrument Packing
Cloth
The traditional instrument pack material used in hospitals is cloth, but this is not as frequently used in the private office. Cloth must be laundered and, due to its permeability, the instrument storage time is significantly reduced. To be an effective barrier, the cloth wrapping material should be a tight-weave 270-thread count Pima cotton fabric.

Paper
Disposable paper packs are far more convenient than cloth for use in the private office. Crepe paper wraps are available for use as a wrap similar to cloth. Paper envelopes are easier to use. The most convenient choice is a paper/transparent pack that is self-sealing. The transparent side of the pack allows one to see the contents. A built-in heat-sensitive indicator on the paper surface changes color when it has been exposed to the autoclave cycle. It is important to remember this indicator shows that the pack has been exposed to heat but does not guarantee the adequacy of the sterilization process. For this purpose, special autoclave monitors are available. These are inserted into the packs to check periodically on the thoroughness of sterilization.

Open Containers and Solutions
Some prefer to autoclave instruments unpacked in metal trays. After the sterile trays are removed, the instruments are removed as needed from them. Another variation is to remove the freshly sterilized instruments from the autoclave tray and transfer them to a germicide holding solution. Both of these techniques introduce all the possibilities of storage contamination associated with cold sterilization, and should be avoided if possible.

All surgical instruments should be compartmentalized into separate packs or containers so that the container is violated only once for a particular procedure (Fig. 1).

Instrument Storage
After instruments have been autoclaved, they should be stored in a manner that will maintain sterility. Prior to autoclaving, the date should be written on packs for later reference. Storage time will vary depending upon the packing material used (Table 2). Well-sealed paper/transparent pouches have the longest storage time—up to 12 months. Instruments must be stored away from moisture. Any wet surgical pack must be considered contaminated. Packs should be subjected to limited handling. Handling traumatizes the paper surfaces and may result in breaks in the barrier. An instrument pack filing system should be devised so the office assistant does not have to search through several packs to find the desired item.

Surgical Tray Setup
In preparation for surgery, the surgical instruments must be arranged on a sterile tray. This is usually done by placing a sterile barrier drape over a tray such as the Mayo stand (Fig. 2). A disposable barrier drape consists of a layer of polyethylene film laminated between two layers of paper. Instruments should be packed such that, when the pouch is opened a short distance above the tray, the instruments fall out handle-first onto the tray. This avoids damage to the delicate instrument tips as well as preventing puncture of the barrier drape. The instruments are then arranged neatly on the tray with transfer forceps (Fig. 3). Suture material and scalpel blades may be added last.

SURGICAL FACILITY
Not all offices have space available for a room devoted exclusively to surgical procedures. The largest examination room available should be equipped for minor surgical procedures. The physician who performs only limited minor surgical procedures will not require a fully equipped suite; however, those with a larger surgical practice will require most of the recommended items and perhaps two or three similar surgical rooms.

Surgical Suite
A separate room should be reserved for surgical procedures. The surgical suite will usually contain more equipment than
an examination room. Minimizing the patient volume in this room will decrease the chance of damage to delicate and expensive items. The room should be at least 160 square feet. For major procedures 250 square feet is recommended. It is possible to do surgery in a much smaller room, but space will be tight and there will be insufficient room for ancillary and emergency equipment (Fig. 4). A hard-surfaced floor is easiest to keep clean; however, floor contamination is rarely a problem in dermatologic surgery. Although explosive anesthetic agents are no longer used, laws in some states require a conductive, hard-surfaced floor for licensed operating rooms. The walls should be covered with a washable material. The ceilings in most offices are constructed of standard suspended acoustic ceiling material. Acoustic tile is satisfactory for office surgery, but not adequate to meet the requirements for a licensed facility. That may require a ceiling of solid, nonporous material, which is easier to clean and is possibly more sanitary.

There should be ample counter space with a large, laboratory-style sink (licensing may require the sink to be near, but outside, the operating room) (Fig. 5). There should be adequate cabinet space, while overhead cabinet storage is recommended. The entry doors should be oversized to allow easy passage of a wheelchair or stretcher cart. The operating room should be situated so there is room for additional storage nearby. Laboratory and sterilizing areas should also be in close proximity.

**Lighting**

The basic room lighting should be fluorescent. Three to four ceiling modules containing four 48-inch fluorescent lights each should provide adequate basic room light for 160 square feet or less. Ceiling or wall-mounted lights are preferred because they do not use valuable floor space and are usually more flexible in their range of coverage (Fig. 6).

Single-point source, spotlight-type lights should be avoided. Harsh shadows are produced and make surgical visualization difficult. Single-point lights, such as head-mounted lights, are useful for supplemental lighting. The primary surgical light should come from multiple points or from a large reflector to produce shadowless light. Halogen lights produce a high-intensity natural light with minimal heat production. All surgery lights should have a transparent, protective safety shield to minimize the hazards associated with bulb failure. The light head should be periodically cleaned and inspected to make sure there are no loose or defective parts. Once the surgeon is gloved, the assistant can manipulate the light into the optimal position. Many surgery lights have accessory handles that can be sterilized and attached to the light for manipulation by the gloved surgeon. The sterilized handles should be cuffed to prevent contamination.

<table>
<thead>
<tr>
<th>Method</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Safe storage time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercially packaged, pre-</td>
<td>Fast and simple</td>
<td>Expensive</td>
<td>Sterile until opened or damaged</td>
</tr>
<tr>
<td>sterilized, disposable items</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sealed paper transparent pouches</td>
<td>Fast packing and opening;</td>
<td>Expensive; moisture retention</td>
<td>3–4 months</td>
</tr>
<tr>
<td></td>
<td>excellent barrier; instruments are visible</td>
<td>Tears and punctures easily</td>
<td>3–8 weeks</td>
</tr>
<tr>
<td>Nonwoven synthetic fabric</td>
<td>Disposable; tear resistant</td>
<td>Must be laundered; produces lint; short shelf life</td>
<td>3–4 weeks; 6–12 months if immediately sealed in plastic after sterilization</td>
</tr>
<tr>
<td>Paper wrap</td>
<td>Inexpensive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muslin wrap</td>
<td>Most economical; lies flat and becomes sterile field drape</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disinfectant holding solution</td>
<td>Minimal materials required;</td>
<td>Unreliable; prone to contamination; skin irritation</td>
<td>Must be replaced and instruments resterilized every 2 weeks or more often</td>
</tr>
</tbody>
</table>

**Table 2 Instrument Packing and Storage**

**Figure 2** The Mayo stand.

**Figure 3** Proper arrangement of instruments on a tray.
Atmosphere

Hospital operating rooms often have laminar flow air systems to minimize contamination, and such a system may be required for accreditation. However, there is little evidence to indicate that these systems alter the rate of infection. Most postoperative infections do not arise from contamination from the inanimate environment. They are usually due to contamination from the patient, surgeon, surgical material, or breaks in sterile technique. The room should have good temperature control. Preferably, the operating room should have its own temperature-regulating system. The temperature of the room may rise considerably during long procedures performed under warm surgical lights. A sound system providing soothing music serves to distract the patient and minimizes the awareness of strange noises produced during surgery.

Surgical Table

Next to adequate lighting, a good surgical table is one of the most important features of the operating room. The ease of surgery will be greatly facilitated by an adaptable table that allows proper positioning. A full-power table is highly recommended. However, for those who wish to have a licensed operating room, some codes require the operating table to be ungrounded and have no electrical connection.

Surgical Stool

Some procedures are best performed with the surgeon seated. A good surgical stool should be on rollers and have pneumatic height adjustment. The height adjustment is usually hand-controlled but a foot adjustment is a convenience for the gloved surgeon. Some stools are available with an extended backrest, which can provide valuable arm support.

Surgical Stands

A surgical tray attached to a power table is inflexible and may present problems. It is better to have an independent table that may be moved about the surgical field. The most common choice is a Mayo table or stand. A Mayo table is recommended because it rests on four casters and can be easily shifted with the surgeon’s foot. The traditional Mayo stand is constructed with two casters and one or two legs and is not as stable. The advantages of the Mayo stand is the ease of placement directly over the patient.

Electrosurgical Equipment

A wide variety of electrosurgical equipment is available. The surgeon must tailor the equipment to the procedures performed. Most simple office procedures require coagulation and electrodesiccation. Dermatologic surgeons involved in advanced micrographic and reconstructive procedures, however, may not benefit from a higher degree of coagulation or the ability to generate cutting current. Sterile sheaths are available to cover electrosurgical handpieces; alternatively, autoclaveable units may be purchased and packed with each surgical setup. When extensive electrosurgery, particularly cutting current, is used in the course of a procedure, a large amount of smoke and a disagreeable odor are produced. This plume is not only offensive to patients, but is potentially infectious. Therefore, a smoke evacuation system is needed to remove the smoke and odors.
system should be a standard equipment in any surgical suite (Fig. 7).

**Emergency Equipment**

**Fire Extinguisher**

An often overlooked hazard in the operating room is fire. This is a particular risk with laser surgery, but combustible items may also be easily ignited with electrosurgery. Many of the fire extinguishers supplied with medical offices dispense a fire-retardant powder. This may be effective but is not recommended for spraying in the region of a surgical wound. A gas fire extinguisher should be available.

**Resuscitation Equipment**

Every office should be equipped with a crash cart or emergency kit to store drugs and equipment for cardiopulmonary resuscitation (Fig. 8). All offices should be equipped with devices that permit medical personnel to provide mouth-to-mouth resuscitation without risk of contamination. Such masks equipped with one-way valves should be available to all of the treatment areas. Surgeons, particularly those involved in advanced procedures and especially those working in accredited facilities, should maintain current their advanced cardiac life support certification.

**Oxygen**

An oxygen system is recommended for use in patients with respiratory distress. The physician should be familiar with the indications and contraindications of oxygen administration.

**Suction**

Suction equipment is a useful addition to any operating room. It may be necessary in some emergencies and also for fluid aspiration during some procedures. For nonemergency suction use, an electrical pump-type suction unit is recommended. Venturi suction attachments are available for use with oxygen tanks. These are satisfactory when a brief period of suction is required for emergency procedures. However, these attachments require a high oxygen flow and deplete the oxygen supply rapidly.

**Defibrillator**

Although not a common item in private offices, a defibrillator with a cardiac monitor is a useful addition to the office in which advanced surgical procedures are performed, particularly on elderly patients.

**Monitoring Equipment**

In addition to a cardiac monitor combined with a defibrillator, other forms of patient status should be considered in a complete surgical facility. Such monitoring devices are mandatory for patients who undergo some form of conscious sedation, particularly intravenous sedation, and are standard equipment in accredited surgical facilities. A digital pulse oximeter provides continuous monitoring of the pulse rate as well as the oxygen saturation level. This allows the physician to readily identify the patient who has significant respiratory depression that interferes with adequate blood oxygenation. Pulse oximeters are useful in all patients, but may be somewhat unreliable in patients with severe chronic obstructive pulmonary disease or significant peripheral vascular disease. Continuous blood pressure monitoring is essential for sedated patients. An automatic blood pressure monitoring device is highly recommended. For any of these monitoring devices, it is recommended to have a machine that prints out a hard copy record of the data. Otherwise, the information should be carefully charted on a flow sheet at regular intervals.

**Wheelchair**

Some patients may need assistance exiting the surgery suite. An office wheelchair may prove valuable in such an occurrence.

**Back-Up Equipment**

The surgeon should be adequately prepared to deal with power failures should they occur during the course of a surgical procedure. Emergency lights are available that have a continuous charging battery system. When a failure to the charging system is detected, the lights are automatically activated. These units will provide adequate ambient lighting for the room. An auxiliary source of power should be available for the operation of electrosurgical equipment, power surgical table, and surgical lights. A 600-watt generator will run all of these devices adequately. Storage battery back-up systems with similar outputs are available and may
Individual Protective Equipment
Because of increasing concerns about physician and employee exposure to contagious diseases, such as human immunodeficiency virus and the hepatitis viruses, special attention needs to be directed at protecting the medical care worker. Universal precautions dictate that surgical gloves be worn for all potential contact with bodily fluids. Employees should also wear gloves when handling and sorting used instruments. Strong consideration should be given to the use of masks and eye protection for nearly all surgical procedures. There is clear evidence that the smoke plume generated by lasers and electrosurgical units may harbor viable viral particles. Standard surgical masks are designed to prevent droplet transmission from physician to patient, and offer little protection against potentially infectious plumes. This emphasizes the importance of utilizing an adequate smoke evacuation system during such procedures.

Accreditation
In the 1970s, a trend toward office-based surgery led to the creation of a specialty-specific accrediting body charged with developing standards and ensuring compliance with office-based surgery protocols. Since then, it has become possible for advanced dermatologic surgeons to establish their own accredited ambulatory surgical facilities. Accreditation may be obtained through the Accreditation Association for Ambulatory Health Care (AAAHC), the Joint Commission of Accreditation of Hospitals (JCAHO), the Institute for Medical Quality (IMQ), or Medicare. The laws for state licensing vary and may be different from requirements of the national agencies. It is now possible to hire consultants to streamline the process of accreditation, an option that is particularly appealing for those contemplating designing and building their own surgical facility.

While this is undoubtedly a major undertaking and requires significant commitment of time and capital, there are countless reasons in favor of pursuing accreditation. First, and most importantly, such a setting maximizes patient comfort and safety. Second, it provides the surgeon with an ideal environment that is at once customized to the surgeon’s preferences and capable of meeting any eventuality that may be encountered in the course of advanced surgical procedures. Third, procedures performed in such facilities, while meeting hospital-level standards, offer significant cost savings to patients and third-party payors when compared with hospital-based facilities. Fourth, Medicare reimburses accredited ambulatory surgical facilities. Finally, and perhaps of greatest significance to the field, accreditation validates and legitimizes the dermatologic surgeon’s unique training, skills, and expertise vis-a-vis other surgical specialties. As such, accreditation should be, if not sought, then at least strongly considered by any physician for whom dermatologic surgery encompasses a major component of clinical practice.

BIBLIOGRAPHY
Surgical Preparation of the Skin


Preparation and Sterilization of Surgical Instruments


Association for Advancement of Medical Instrumentation. Sterilization Committee. Good Hospital Practice: Ethylene Oxide Gas-Ventilation Recommendations and Safe Use. AAMI. 1981.


Doust BC, Lyon AB. Face masks in infection of the respiratory tract. JAMA 1918; 71:1216–1219.


**Surgical Facility**


References

1 PART I. Basic Principles

Surgical Preparation of the Skin


Doust BC, Lyon AB. Face masks in infection of the respiratory tract. JAMA 1918; 71:1216-1219.


Surgical Facility


surgical diathermy: principles of operation and safe use.
Chapter 2. Instrumentation

Figure 13 Disposable stapler with preloaded staples (top) and staple remover (bottom). Figure 14 Halstead hemostat. Figure 15 Backhaus towel clamps. Figure 16 Chalazion clamp. Figure 17 Freer periosteal elevator.
Chapter 3. Closure Materials


Table 9 Example Retail Prices for Staplers and Tissue Adhesives a

Dermabond Topical Skin Adhesive $329.50
Dermabond, High Viscosity $456.00 b

3M DS & MS Precise Multi-Shot Disposable Skin Stapler (Arcuate) $75.01

Reusable handle for use with 3M DS & MS Staplers $222.00

3M PGX disposable, regular style (no additional handle required) $112.29

3M precise staple remover $36.00

a Prices were obtained by web search on 12/29/04 and 1/16/05 for retail suppliers.

Prices are for 12 tubes of Dermabond TM, 12 staplers with 15 staples, 12 stapler handles, and 12 staple removal kits.

b May be falsely elevated because no prices were available from the least expensive vendor.


4 Chapter 4. Medical Evaluation


Table 5 Reasons for Patient Dissatisfaction with Surgery

Physical complication or disappointment in anatomic change

Unrealistic psychological expectations


Edgerton MT, Knorr NJ. Motivational patterns of patients


6 Chapter 6. Informed Consent

Arato vs. Avedon. 5 Cal. 4th 1172. 23 Cal Rptr 2d 131, 858 P.2d 598 (1993).


Schoendorff vs. Society of New York Hospital case (211 N.Y. 125, 105 N.E. 92, 93 (N.Y. 1914)).


Chapter 7. Standard Precautions

Table 2 Recommendations for Adherence to Standard Precautions

1. Promote a culture of compliance by ensuring employee knowledge of Standard Precautions through regular educational and reinforcement activities.

2. Post a list of the key provisions of Standard Precautions in a highly visible location.

3. For each patient-care room, provide easily accessible sinks, hand washing soap, gloves (in several sizes), eye protection, masks, gowns, puncture-resistant sharps containers, and biohazardous waste containers.

4. Encourage the use of safety needles and other innovative safety devices as appropriate.

5. Clearly and comprehensively record breaches in compliance with Standard Precautions so problematic factors may be identified and remedied.
8 Chapter 8. Cutaneous Anesthesia


Hanke CW. The tumescent facial block: tumescent local


Chapter 9. Tumescent Anesthesia

Albright GA. Cardiac arrest following regional anesthesia with etidocaine or bupivacaine. Anesthesiology 1979; 51:285.


Kolenic SA Leffell DJ. The use of cryopreserved human skin
allografts in wound healing following Mohs surgery.


Chapter 11. Complications in Cutaneous Procedures


Grabb WC. A concentration of 1:500,000 epinephrine in a local anesthetic solution is sufficient to provide excellent hemostasis. Plast Reconstr Surg 1979; 63:834.


Gainey SP, Robertson DM, Fay W, et al. Ocular surgery on


Niessen FB, Spauwen PH, Schalkwijk J, Kon M. On the nature


Polk HC Jr., Simpson CJ, Simmons BP, Alexander JW.


Wenzel RP, Perl TM. The significance of nasal carriage of
Additional resources concerning postexposure management can be found online at www.needlestick.mednet.ucla.edu and from the National Clinician’s Hotline (PEPline) at www.uscf.edu/hivcntr/resources/pep/index.html.


Table 4 Recommended HIV Postexposure Prophylaxis for Mucous Membrane Exposures and Nonintact Skin a Exposures Infection
status of source

Exposure type HIV-positive Class 1 b HIV-positive Class 2 b Source of unknown HIV status c Unknown source d HIV-negative

Small volume e Consider basic 2-drug PEP f Recommend basic 2-drug PEP Generally, no PEP warranted; however, consider basic 2-drug PEP f for source with HIV risk factors g Generally, no PEP warranted; however, consider basic 2-drug PEP f in settings where exposure to HIV-infected persons is likely No PEP warranted

Large volume h Recommend basic 2-drug PEP Recommend expanded 3-drug PEP Generally, no PEP warranted; however, consider basic 2-drug PEP f for source with HIV risk factors g Generally, no PEP warranted; however, consider basic 2-drug PEP f in settings where exposure to HIV-infected persons is likely No PEP warranted

a For skin exposures, follow-up is indicated only if there is evidence of compromised skin integrity (e.g., dermatitis, abrasion, or open wound).

b HIV-positive, Class 1—asymptomatic HIV infection or known low viral load (e.g., <1500 RNA copies/mL). HIV-positive, Class 2—symptomatic HIV infection, AIDS, acute seroconversion, or known high viral load. If drug resistance is a concern, obtain expert consultation. Initiation of PEP should not be delayed pending expert consultation, and, because expert consultation alone cannot substitute for face-to-face counseling, resources should be available to provide immediate evaluation and follow-up care for all exposure.

c Source of unknown HIV status (e.g., deceased source person with no samples available for HIV testing).

d Unknown source (e.g., splash from inappropriately disposed blood).

e Small volume (i.e., a few drops).

f The designation ‘‘consider PEP’’ indicates that PEP is optional and should be based on an individualized decision between the exposed person and the treating clinician.

g If PEP is offered and taken and the source is later
determined to be HIV-negative, PEP should be discontinued.

Large volume (i.e., major blood splash).

Abbreviation: PEP, postexposure prophylaxis.


Eisenberg MS, Bergner L, Hallstrom A. Cardiac resuscitation in the community. Importance of rapid provision and implications for program planning. JAMA 1979; 241:1905-1907.


Lowenstein DH, Bleck T, MacDonald RL. It’s time to revise the definition of status epilepticus. Epilepsia 1999; 40:120-122.


14 PART II. Standard Procedures


Crabb WC. A concentration of 1:5000,000 epinephrine in a local anesthetic solution is sufficient to provide excellent hemostasis. Plast Reconstr Surg 1979; 63:834.


Huang CC, Boyce S, Northington M, et al. Controlled surgical trial of preoperative tumor curettage of basal


Chapter 15. Excision


Figure 16 Full-thickness skin graft donor site (A), completely closed with pursestring suture of 3-0 Vicryl (B), 20 months postoperatively (C).


Whitaker DC, Grande DJ, Johnson SS. Wound infection rate in
dermatologic surgery. J Dermatol Surg Oncol 1988; 14:
525-528. Wong NL. The running locked intradermal suture: a
cosmetically elegant continuous suture for wounds under
Zitella JA. Wound healing for the clinician. Adv Dermatol
Zitelli JA. Tips for a better ellipse. J Am Acad Dermatol
Chapter 16. Scissor Surgery


17 Chapter 17. Simple Repairs

Figure 22 Simple repairs with octyl-2-cyanoacrylate (Dermabond). (A) Dermabond topical liquid skin adhesive applicator. (B) Laceration to lower eyebrow. (C) Closed with Dermabond adhesive. (D) Three months after treatment with adhesive. Source: From Stasko (1994).


Chapter 18. Suturing Techniques

Figure 13 The running subcutaneous suture is used to minimize wound tension and close dead space before cutaneous sutures are placed.

Figure 14 The running subcuticular suture is used to enhance cosmetic results in wounds under virtually no tension.
Chapter 19. Electrosurgery and Electroepilation

Electrosurgery


Electroepilation


Michel CE. Trichiasis and distichiasis: reflections upon their nature and pathology with a radical method of treatment. St. Louis Cour Med 1879; 1:121-144.


Figure 26 Retraction of upper lip two-and-a-half months after treatment of a basal cell carcinoma.

Figure 27 Notching of left ala nasi after treatment of a basal cell carcinoma.

Figure 28 Mild notching on left helix six months after treatment of a basal cell carcinoma.
21 PART III. Regional Dermatologic Surgery


24 Chapter 24. The Nose


Table 2 Tumor nodal metasis (TNM) Classification for Oral Cavity Carcinoma

**Primary tumor (T)**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX</td>
<td>Tumor that cannot be assessed by rules</td>
</tr>
<tr>
<td>T0</td>
<td>No evidence of primary tumor</td>
</tr>
<tr>
<td>TIS</td>
<td>Carcinoma in situ</td>
</tr>
<tr>
<td>T1</td>
<td>Tumor 2 cm or less in greatest diameter</td>
</tr>
<tr>
<td>T2</td>
<td>Tumor greater than 2 cm but not greater than 4 cm in greatest diameter</td>
</tr>
<tr>
<td>T3</td>
<td>Tumor greater than 4 cm in greatest diameter</td>
</tr>
<tr>
<td>T4</td>
<td>Massive tumor greater than 4 cm in diameter with deep invasion to involve antrum, pterygoid muscles, roof of tongue, or skin of neck</td>
</tr>
</tbody>
</table>

**Nodal involvement (N)**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NX</td>
<td>Nodes cannot be assessed</td>
</tr>
<tr>
<td>N0</td>
<td>No clinically positive node</td>
</tr>
<tr>
<td>N1</td>
<td>Single clinically positive homolateral node less than 3 cm in diameter</td>
</tr>
<tr>
<td>N2</td>
<td>Single clinically positive homolateral node 3-6 cm in diameter or multiple clinically positive homolateral nodes, none over 6 cm in diameter N2a: Single clinically positive homolateral node, 3-6 cm in diameter N2b: Multiple clinically positive homolateral nodes, none over 6 cm in diameter</td>
</tr>
<tr>
<td>N3</td>
<td>Massive homolateral node(s), bilateral nodes, or contralateral node(s) N3a: Clinically positive homolateral node(s), none over 6 cm in diameter N3b: Bilateral clinically positive nodes (in this situation, each side of the neck should be staged separately; that is, N3b: right, N2a: left, N1) N3c: Contralateral clinically positive node(s) only</td>
</tr>
</tbody>
</table>

**Distant metastasis (M)**
MX Not assessed
M0 No (known) distant metastasis
M1 Distant metastasis present Specify site

Abbreviation: TNM, tumor nodal metasis.
26 Chapter 26. The Face (Forehead, Cheeks, and Chin)


Figure 18 Bilateral island pedicle flap repair of a shoulder defect.
Figure 27 A dorsal wrist ganglion generally has its deepest attachments at its origin on the scapholunate interosseous ligament. An arthrotomy may be required for complete removal.
Figure 22 Crescent-shaped excision of cuticle-proximal nail fold for evaluation of connective tissue disease.

Figure 21 Lateral nail groove thoroughly cleansed and dried prior to phenolization.


32 Chapter 32. The Genitalia


DeMatos P, Tyler D, et al. Mucosal melanoma of the female genitalia: a clinicopathologic study of forty-three cases


Lapins J, Emtestam L, et al. Angiokeratomas in Fabry’s disease and Fordyce’s disease: successful treatment with


Moodley, 2004 #40.


PART IV. Surgical Management of Skin Tumors and Disease


Cox, Sue Ellan. Rapid development of keratoacanthomas after a body peel. ASDS J 2003; 29:201-203.

De Villez RL, Roberts LC. Premature sebaceous gland


Orth G, Jablonska S. Favre M, et al. Identification of


34 Chapter 34. Benign Soft Tissue Tumors


New therapies for the management of keloids. J
JP. Ear-lobe keloids: treatment by a protocol of surgical
excision and immediate postoperative adjuvant radiotherapy.
Br J Plast Surg 2001; 54:504-508. Rosian R, Goslen JB,
Brodell RT. The treatment of benign sebaceous hyperplasia
with the topical application of bichloracetic acid. J
HH Jr., Garden JM, et al. Liposuction for lipomas. J
Prevention of earlobe keloid recurrence with postoperative
corticosteroid injections versus radiation therapy: a
randomized, prospective study and review of the literature.
Carbon dioxide laser excision of earlobe keloids. A
prospective study and critical analysis of existing data.
EL, Lupton JR, Alster TS. Lasers in dermatology: four
Wong TW, Chiu HC, Yip KM. Intrallesional interferon Alfa 2b
has no effect in the treatment of keloids. Br J Dermatol
1994; 130:683-685.
35 Chapter 35. Benign Pigmented Lesions


Consensus Development Conference of the National Institutes of Health: precursors to malignant melanoma. JAMA 1984; 251:1864-1866.


de Wit PE, van’t Hof-Grootenboer B, Ruiter DJ, et al. Validity of the histopathological criteria used for


Figure 23 A large, pigmented lesion of LM melanoma on the cheek temporal area of an 83-year-old fair-skinned individual. These tumors are characterized by a flat (macular) lesion with a prolonged radial growth phase, and developed invading tumor with pigmented nodule formation.

(See color insert.)


Bowen JT. Precancerous dermatoses: The further course of 2 cases previously reported. Arch Dermatol Syphilol 1920; 1:23.


Callen JP. Cutaneous Aspects of Internal Disease. Chicago:


Chapter 37: Basal Cell Carcinoma


Jacob A. Observations respecting an ulcer of peculiar character which attacks eyelids and other parts of the face. Dubl Hosp Reptrs 1827; 4:231-239.


Maalej M, Frikha H, Kochbat L, et al. Radio-induced malignancies of the scalp about 90 patients with 150
Nordin P, Larkin G, Stenquist B. Five-year results of curettage cryosurgery of selected large primary basal cell carcinomas on the nose: an alternative treatment


Chapter 38. Squamous Cell Carcinoma


Evans HL, Smith JL. Spindle cell squamous carcinomas and


Ghadially FN. The role of the hair follicle in the origin and evolution of some cutaneous neoplasms of man and experimental animals. Cancer 1961; 14:801.


Blomh  I, Larko  O. No difference in skin cancer incidence with or without cyclosporin—a 5-year perspective. Transplant Proc 1992; 24:313.


Ghadially FN. The role of the hair follicle in the origin and evolution of some cutaneous neoplasms of man and experimental animals. Cancer 1961; 14:801-816.


Maxwell TB, Lamb JH. Unusual reaction to application of podophyllum resin. AMA Arch Derm Syphilol 1953; 70: 510-511.


Melendez ND, Smoller BR, Morgan M. VCAM (CD-106) and ICAM (CD-54) adhesion molecules distinguish keratoacanthomas from cutaneous squamous cell carcinomas. Mod Pathol 2003;


Morita H, Sagami S. Analysis of lymphocyte subpopulations using monoclonal antibodies in a case of keratoacanthomas. Acta Dermatol (Kyoto) 1985; 80:209–211. Muir EG, Bell AJY, Barlow KA. Multiple primary carcinomata of the colon, duodenum, and larynx associated with kerato-acanthomata of


Ramselaar CG, van der Meer JB. Non-immunological regression of dimethylbenz(A)anthracene-induced experimental keratoacanthomas in the rabbit. Dermatologica (Basel) 1979; 158:142-151.


Reid BJ, Cheesbrough MJ. Multiple keratoacanthomata. A


40 Chapter 40. Mohs Micrographic Surgery


Chi CC, Tsai RY, Wang SH. Syringocystadenocarcinoma


41 Chapter 41. Malignant Melanoma

Table 2 Recommended Surgical Margins

<table>
<thead>
<tr>
<th>Breslow thickness</th>
<th>Surgical margin (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In situ</td>
<td>0.5</td>
</tr>
<tr>
<td>&lt; 2mm</td>
<td>1</td>
</tr>
<tr>
<td>2mm</td>
<td>2</td>
</tr>
</tbody>
</table>


Blessing K, Sanders DS, Grant JH. Comparison of immunohistochemical staining of the novel antibody melan-A with S100 protein and HMB 45 in malignant melanoma and melanoma variants. Histopathology 1998; 32:139–146.


Buzaid AC, Ross MI, Balch CM, et al. Critical analysis of


42 Chapter 42. Fibrohistiocytic Tumors

Table 6 Treatment of Fibrohistiocytomas

<table>
<thead>
<tr>
<th>Tumor</th>
<th>Excisional margins (cm)</th>
<th>Mohs surgery</th>
<th>Adjuvant radiation/chemo Rx</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFX</td>
<td>1</td>
<td>Tissue sparing for important cosmetic areas</td>
<td>No; XRT can be considered</td>
</tr>
<tr>
<td>MFH</td>
<td>3</td>
<td>Yes (except for deep skeletal and retroperitoneal tumors)</td>
<td>Yes, for high-risk tumors</td>
</tr>
<tr>
<td>DFSP</td>
<td>3</td>
<td>Yes</td>
<td>No; imatinib for metastases or unresectable tumors</td>
</tr>
</tbody>
</table>

Abbreviations: AFX, atypical fibroxanthoma; MFH, malignant fibrous histiocytoma; DFSP, dermatofibrosarcoma protuberans; XRT, adjuvant radiotherapy.

Figure 6 Atypical fibroxanthoma on sun-exposed areas of cheek and helix. Clinical differential diagnosis includes squamous cell carcinoma and basal cell carcinoma. (See color insert.)

Figure 7 Cellular spindle cell lesion with marked nuclear pleomorphism (hematoxylin and eosin stain, x10).


Brown MD, Swanson NA. Treatment of malignant fibrous


Fletcher CD, et al. Dermatofibrosarcoma protuberans: a
clinicalopathological and immunohistochemical study with a review of the literature. Histopathology 1985; 9(9):921-938.


Kemp JD, et al. Metastasizing atypical fibroxanthoma.


West RB, et al. Apo D in soft tissue tumors: a novel marker
43 Chapter 43. Unusual Tumors


Figure 14 Cylindroma: large violaceous nodule of the scalp. The patient had similar lesions elsewhere on the scalp.


Miescher G. Trichofolliculoma. Dermatologica 1944; 89:193.


Acne Keloidalis


Breasted JH. The Edwin Smith surgical papyrus. In:


Manuskiatti W, Fitzpatrick RE. Treatment response of keloidal and hypertrophic sternotomy scars. Arch Dermatol


45 Chapter 45. Vault Disorders


Jemec B. Abrasio axillae in hyperhidrosis. Scand J Plast


Table 3 Surgical Options of Cicatricial Alopecia

Scalp reduction

Primary excision (primary closure or heal by secondary intention)—scalp reduction

Staged excision

Hair transplantation—stem cells, follicular units (micro, mini, or punch grafts)

Flaps (pedicle or free, bilobed, Juri, or multiple mini flaps)

Tissue expansion

Combinations (primary or staged)


Epstein JS. The treatment of female patterned hair loss and


Inaba Y, Inaba M. Prevention and treatment of linear scar formation in the scalp: basic principles of the mechanism


Viglizzo G, Verrini A, Rongioletti F. Familial
Chapter 47. Evaluation and Management of Leg Ulcers


Rothe M, Falanga V. Growth factors: their biology and promise in dermatologic diseases and tissue repair. Arch


Chapter 48. Cure Rates for Cancer of the Skin: Basal Cell Carcinoma, Squamous Cell Carcinoma, Melanoma, and Soft Tissue Sarcoma

Table 9 Five-Year Survival by Tumor Size for Intermediate and High-Grade Sarcomas in Patients Treated with Surgery and Radiation

<table>
<thead>
<tr>
<th>Tumor size (cm)</th>
<th>No. of patients</th>
<th>Percentage disease-free at 5 yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2.5</td>
<td>17</td>
<td>94</td>
</tr>
<tr>
<td>2.6–4.9</td>
<td>48</td>
<td>77</td>
</tr>
<tr>
<td>5.9–10.0</td>
<td>55</td>
<td>62</td>
</tr>
<tr>
<td>10.1–15.0</td>
<td>24</td>
<td>51</td>
</tr>
<tr>
<td>15.1–20.0</td>
<td>9</td>
<td>42</td>
</tr>
<tr>
<td>&gt;20.0</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>159</strong></td>
<td><strong>65</strong></td>
</tr>
</tbody>
</table>

Source: Modified from Suit, et al. (1988). Figure 12
Survival rates for soft tissue sarcomas.


Callaway MP, Briggs JC. The incidence of late recurrence (greater than 10 years); an analysis of 536 consecutive cases of cutaneous melanoma. Br J Plast Surg 1989; 42:46–49.


Chang AE, Sondak VK. Clinical evaluation and treatment of


Roenigk RK, Roenigk HH Jr, eds. Surgical Dermatology. St.


Veronesi U, Adamus J, Bandiera DC, et al. Stage I melanoma


49 Chapter 49. Skin Cancer in Organ Transplant Recipients


Epidermal Healing


Complications


Second Intention Healing and Special Dressings


Eaglstein WH, Mertz P, Alvarez OM. Effect of topically


Chapter 51. Complex Closures


52 Chapter 52. Skin Grafts


Table 2 Causes of Graft Failure

Technical errors Improper size or thickness Tension Incomplete hemostasis resulting in hematoma Error in timing of surgical repair Improper dressing: too tight; not immobilizing
Improper patient care Dependent position Motion

Insufficient bed vascularity Improper bed (fat, bone, cartilage, tendon) Necrotic debris Hematoma Seroma

Infection Staphylococcus Streptococcus Pseudomonas

Trauma

Motion

Systemic disease Diabetes Immunologic dysfunction
53 Chapter 53. Rotation Flaps


54 Chapter 54. Transposition Flaps


Chapter 55. Pedicle Flaps


56 Chapter 56. Interpolation Flaps

Figure 13 (A) Defect of the upper lip and nasal sill. (B) Intraoperative view after tunneling the subcutaneous melolabial interpolation flap under the inter
vening normal tissue of the cutaneous lip. Donor site dissection of the donor site along the nasofacial sulcus and melolabial flap. (C) Immediately after reconstruction. The donor site is closed in a lazy S-shape. (D) Results two months after surgery.


57 Chapter 57. Random Pattern Flaps


Figure 63 (A) Transposition flap immediately after repair. (B) Hematoma 48 hours postoperative and ecchymosis of the cheek. (C) Six weeks after evacuation of the hematoma.


59 Chapter 59. CO2 Laser Resurfacing Scar Revision

Figure 9 Patient (same as in Fig. 7) four months after resurfacing. 2
60 Chapter 60. Nonablative Laser Revision of Scars and Striae


Figure 4 Striae distensae before (A) and 2 months after (B) second 585 nm PDL treatment.
61 Chapter 61. Basic Laser Physics

Figure 24 Diode laser. Electrons flow from N to P semiconductor layers creating laser light.


62 Chapter 62. Basic Laser Safety


Borland RG, Brennan DH, Nicholson AN. Threshold levels for damage of the cornea following irradiation by a continuous wave carbon dioxide (10.6 millimicron) laser. Nature 1971; 234(5325):151-152.


Institute AANS. Standards for lasers and light devices:


Organizations JCAHO. website: http://www.jcaho.org/.


63 Chapter 63. CO2 Laser Treatment of Epidermal and Dermal Lesions

Figure 2 (A) Rhinophyma, preoperative view, (B) rhinophyma, preoperative view, (C) rhinophyma, immediately post-procedure, and (D) rhinophyma, 6 months followup.


Figure 17 When performing plasmakinetic resurfacing, the tip of the handpiece should be held approximately 5mm from the skin’s surface, and pulses should be delivered in a paintbrush fashion across the treatment area. Source: Rhytec, Inc., Wattham, Massachusetts, U.S.A.

Figure 18 Patient before (A) and 3 months after (B) three low energy plasma skin regeneration treatments.


Nahm WK, Su TT, Rotunda AM, Moy RL. Objective changes in brow position, superior palpebral crease, peak angle of the eyebrow, and jowl surface area after volumetric radiofrequency treatments to half of the face. Dermatol Surg 2004; 30:922-928.

Narins DJ, Narins RS. Non-surgical radiofrequency facelift.


65 Chapter 65. Laser Treatment of Tattoos and Pigmented Lesions


Chapter 66. Laser Treatment of Vascular Lesions


Chapter 67. Hair Removal by Photoepilation with Lasers and Intense Pulsed Light Sources


Chapter 68. Non-Ablative Facial Rejuvenation


Leffell DJ. Clinical efficacy of devices for nonablative

Chapter 69. Soft Tissue Augmentation and Fillers


Woerle B, Hanke CW, Sattler G. PolyL-lactic acid: a temporary filler for soft tissue augmentation. J Drugs Dermatol 2004; 3(4):385-389. Figure 14 (A) A 67-year-old woman (non-HIV) has subcutaneous atrophy on both cheeks. (B) The areas of subcutaneous atrophy have been improved following two polylactic acid treatments (one vial per cheek).
Chapter 70. Injectable Skin Fillers


Chapter 71. Injectable Fluid Silicone


Figure 14 In older patients, injection of the infraorbital orbicularis may produce an effect opposite to that desired.


Carruthers J, Carruthers A. A prospective, randomized, parallel group study analyzing the effect of BTX-A (Botox) and nonanimal sourced hyaluronic acid (NASHA, Restylane) in combination compared with NASHA (Restylane) alone in severe glabellar rhytides in adult female subjects: treatment of severe glabellar rhytides with a hyaluronic acid derivative compared with the derivative and BTX-A. Dermatol Surg 2003; 29:802-809.


Burke J, Marascalco J, Clark W. Half-face planning of precancerous skin after five years. Arch Dermatol 1963; 88:140.


Figure 21 (A) Severe photoaging (Glogau Type IV) with very deep rhydites. (B-C) Immediately after treatment with fullface CO2 laser resurfacing and spot dermabrasion to deeper wrinkles. All done at the same original surgical time. Good postoperative results (D-H) before and after 6 months.


Chapter 75. Hair Restoration

General


Chapter 76. Treatment of Veins and Varicosities


Chapter 77. Liposuction and Fat Transfer


Courtiss EH, Chouair RJ, Donelan MB. Large-volume suction


Chapter 78. Fat Transplantation


Triglyceride cyst formation after fat transplantation.
Chapter 79. Blepharoplasty and Brow Lifting

Figure 18 Hypertrophic scar along the postauricular incision line. The risk of this complication can be reduced by reducing the tension on the flap through undermining, accurate trimming, and taking large anchoring bites when placing the buried sutures.


Massiha M. Short scar facelift with extended SMAS plaatysma dissection and lifting and limited skin undermining. Plast Reconstr Surg 2003; 112:663.


Chapter 81. Endoscopic Facial Plastic and Reconstructive Surgery


Chapter 82. Postsurgical Cosmetics


