

# PRESSURE ULCERS

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Pressure ulcers are frequently seen in the nursing home geriatric population. These ulcers are commonly treated by applying topical antibiotics, attempting to clean the wound and removing pressure. Family members or nursing home staff with little or no medical training in wound care are frequently the primary care givers.

Although pressure ulcers are challenging to manage, the patients are very grateful for the help, and the entire experience is very rewarding when the ulcers are healed. The basis for this paper comes from the author's experience at the Eastside Wound Clinic in Sneville, Georgia. At Eastside, pressure ulcers are treated with good success using basic wound care principles that can easily be duplicated in any podiatric office setting.

## PRESENTATION

The typical pressure ulcer occurs on the bony prominences of the lower extremity after long hours of exposure to the surface of the bed in the non-ambulatory patient. A pressure ulcer can also occur in active patients, such as in the arch of a foot in a patient with a Charcot deformity, (Fig. 1) or on the dorsal aspect of a digit with a rigid contracture. All of these ulcers have the element of pressure in their etiology.

The proposed treatment for these ulcers is simply a variation of the way any ulcer should be treated, but with more of an emphasis on the living environ-

ment of the patient and limitations that the overall health of the patient places on treatment options.

## ETIOLOGY

Pressure ulcers obviously have an element of ischemia due to excess pressure of an area of skin, but there must be more to the formula. Peacock<sup>1</sup> relates that cadavers do not get pressure ulcers and they certainly have exposure to hard surfaces on bony prominences. Studies have demonstrated in trophic skin under pressure that there is an imbalance of collagenase activity which may lead to the rapid breakdown of soft tissue sometimes seen in pressure ulcers.<sup>1</sup> Although the exact process that leads to pressure ulcers is not completely known, it is generally understood that when living tissue has prolonged pressure combined with changes in tissue dynamics, ulcers develop.

## EXAMINATION

The work-up of an ulcer patient is where the treatment truly begins. As each part of the examination is performed, the physician should be looking for clues as to why the ulcer is in the current condition and what is interfering with healing. When an ulcer fails to respond to treatment it is possible that an important fact was missed in the workup, which is now preventing an ulcer-healing environment.



Figure 1A Initial presentation of pressure ulcer in medial arch.



Figure 1B. Appearance at post-treatment

## History

When performing the history, it is frequently helpful to have assistance from someone close to the patient who can give details about the current living conditions and past history of the patient. It is important to ascertain the cause of the ulcer, previous treatment, and speculation as to why the ulcer has not yet healed. In many cases, the ulcers will not heal because of current treatment such as soaking in cytotoxic materials, or vigorous cleansing of the wound which prevents growth of the granulation tissue. In some cases padded material is placed over the ulcer in an attempt to eliminate pressure, thus causing more damage to the ulcer site.

When previous treatments have been attempted, try to find the cause of the failure. Often, the patient may have been told to use a walker to eliminate pressure from the ulcer site and this has either been misunderstood or ignored. It may be that alternative strategies are necessary to ensure non-weightbearing. If the patient has difficulty understanding instructions, it is important to make sure someone will be helping them, or that they fully understand their instructions before leaving to prevent repeating future episodes of failed ulcer treatment.

It is important to find out details of the patient's daily activities. This should include the position of the ulcer site during both rest and times of activity. The patient may be sleeping in a position that places excessive pressure on the ulcer. A particular pair of shoes or a favorite reclining chair may do the same. If neglect or abuse is suspected because of information gained during the history or physical, the appropriate family member or government agency should be contacted.

## Physical Examination

A thorough physical examination should be performed. This accomplishes two important tasks. First the patient is examined for pressure ulcers in locations such as the sacral area which may have gone undetected, second the examination may reveal clues as to why the ulcer has not healed. The overall health of the patient needs to be established since the treatment options may be limited by this.

*Vascular.* The vascular exam is extremely important. Pressure ulcers do not heal without an adequate vascular environment. Pulses should be checked. If foot pulses are inadequate, popliteal

and femoral pulses should be palpated to identify the level of blockade. If the pulses are nonpalpable or there are ischemic changes in the skin, an arterial doppler study with segmental pressures should be performed. Based on the results of the doppler studies the patient may need a vascular surgeon consultation to consider medical or surgical methods of increasing the blood flow to the ulcer area.

*Neurologic.* The neurological exam needs to cover the basics. Muscle strength, protective sensation and deep tendon reflexes should all be tested. If the patient has neuropathy, it is important for the patient to understand the significance of this and keep in mind that the patient may not feel the wound surface to know if it is under pressure.

*Orthopedic.* The orthopedic examination should include range of motion of the joints and inspection of any bony prominences and deformities, paying special attention to Charcot joints. Ankle range of motion should be checked and correlated with any forefoot or midfoot ulcers which may be present. The first metatarsophalangeal joint should also be checked for adequate dorsiflexion because limitation of this motion can be the cause of pressure ulcers on the plantar aspect of the hallux. During this exam take a moment to check the shoes or slippers the patient wears and their fit. See if the shoe is placing pressure on the contracted digit or if the shoe is too narrow across the metatarsals causing a fifth metatarsal head ulcer. Prominences anywhere on the foot from Charcot deformity should be checked and radiographs should be taken to visualize the relationship of the deformity to the location of the ulcer.

*Dermatologic.* The dermatologic examination should be conducted last. This is where all the elements of the physical exam and the information learned in the history come together and provide the practitioner with the blueprint to create a healing environment. The skin should first be inspected for any lesions other than the ulcer. Signs of infection and ischemia should be checked for during the exam.

The ulcer is then inspected. First the size of the ulcer should be determined and recorded. This should include the length and width, the depth, and any undermining that may be present. The ulcer should be checked for penetration to bone or joint space. The quality of the tissue should be determined. Necrotic tissue and drainage should be checked for. Granulation tissue and bleeding should be noted. The odor of the wound should be checked. Foreign bodies should also be looked for especially in neuropathic patients.

## TREATMENT

After concluding the history and physical most of the work is done if the reason for the nonhealing environment is determined. Frequently the most difficult challenge at this point is to persuade the patient to follow the appropriate treatment protocols. The treatment plan should eliminate obstacles that prevent healing. These include poor blood flow, pressure, infection and edema. The patient with a lack of blood flow will need a vascular consult. In the pressure ulcer patient who is not a candidate for any type of vascular intervention, the wound should be treated to keep it as clean as possible or consider an amputation at an appropriate level.

The patient who does have successful vascular intervention such as bypass or angioplasty can then move on to the next level of care. When infection is suspected as a reason for non-healing, the ulcer should be cultured and appropriately treated. It is important in any ulcer, infected or not, for the wound to be kept dry during showering or bathing because of the exposure to pathogenic bacteria. If osteomyelitis is suspected, this should be confirmed with MRI and if possible bone biopsy. Appropriate IV antibiotics and resection if indicated would then be appropriate. In wounds with no evidence of bone involvement, oral antibiotics can be used.

When a wound does not culture out a pathogen but has an infected appearance, topical antibiotics will often improve the appearance and eliminate mild infections.

Although edema does not play as much of a role in the etiology of pressure ulcers as it does in other types of ulcers, it can prevent the healing process from proceeding. The best treatment for edema is compression dressings. This can be accomplished through compression socks or gauged elastic wraps. For more acute edema, Jone's compression wraps with cast padding combined with elastic bandages works very well. Elevation of the extremity, and the use of compression pumps can also assist in the reduction of the edema.

The process of eliminating pressure from the wound site begins in the history section of the examination. The patient needs to understand all of the times when pressure is applied to the wound area. This step also requires thorough patient education about what off-loading the wound means. In a pressure wound on the plantar aspect of the foot,

it may be possible to use foam or felt in a surgical shoe or boot to off-load the foot. This requires strict diligence by the patient because the wound will always get some pressure from the edge of the cut-out no matter how far it is from the wound edge. The optimal situation is when the patient is completely non-weightbearing using crutches, a walker or a wheelchair. If the wound is located on a surface that comes in contact with the bed or foot rest surface, a protective boot designed to off-load the wound works well. Unfortunately, the patient will frequently not use the protective devices because the patient does not feel the need to wear them or there is lack of help in putting them on.

Pressure ulcers resulting from joint deformity or contracture require a more involved treatment process. A good pair of custom-molded inserts can compensate for joint deformity such as a Charcot joint, but the wound needs to be healed prior to using the inserts. Even perfectly-fitted inserts may not relieve enough pressure to heal a chronic pressure wound. Surgical release of tendons may be required to relieve the pressure needed to heal the joint. If reconstruction is necessary, it should be postponed until the ulcer is healed.

The preference is to heal the wound first and then perform surgery to prevent further breakdown. This order is critical when performing a joint reconstruction, however when releasing tendons such as the Achilles tendon this can be done with plantar ulcers still present.

### Dressing Changes and Debridement

Regular dressing changes and debridement are the mainstays of pressure ulcer care. Dressing changes can dramatically increase the cost of wound care. The author's preference is to use saline wet to dry gauze dressings twice a day. Frequently this type of dressing routine requires home health nursing which can easily be arranged if needed. Visits to the office and debridement are performed weekly until the wound begins to respond with significant granulation tissue growth. The visits and debridement are then done every two weeks until the wound heals.

The level of the debridement is determined by the wound. The purpose of the debridement is to remove any nonviable tissue and to stimulate growth of granulation tissue. Instruments for debridement can include scalpels, curettes or tissue nippers. Tissue to remove from the wound includes

any necrotic or fibrous tissue that may have built up after dressing changes. Ideally, good bleeding tissue should be present in the wound following debridement. If the wound has a dry eschar this can be left in place to act as a bio-occlusive dressing.(Fig. 2) As the edges of the eschar peel away from the wound they can be trimmed back. If pus begins to appear from the edge of the eschar it should be debrided until granulation tissue is seen and the infected area treated with either systemic or topical antibiotics. Topical antibiotics work well in a wound which has minimal drainage and no cellulitis around the edges. As the wound begins to improve in appearance the topical antibiotics can be stopped and saline dressing changes can resume.

### Post Healing Instructions

After the wound is healed, it is important to address issues to prevent return of the ulcer. At the very least the patient needs to have a pressure-free environment for the ulcer site regardless of the location. This can also be an ideal time for reconstructive surgery, if appropriate, such as hammer toe or bunion repair for a healed ulcer at the site of contracture. The patient can also be fitted with custom-molded shoes, or instructed in the use of protective boots if wheelchair bound or bedbound.

If this final phase of the wound care process for pressure ulcers is not performed, the ulcers can rapidly return. The patient should also understand what to look for before a pressure ulcer returns. The patient may be a candidate for preventative



Figure 2. Pressure wound with eschar

debridement of calluses in which case the patient should return for follow-up care. Pressure ulcers are often undertreated and occur frequently in the geriatric population. With a flexible protocol that is thorough and complete, a regular podiatry office can treat patients as well as any wound center. The types of materials needed such as dressing supplies or debridement instruments can be simplified to effective, low cost products that do not require a great deal of overhead and staff to use.

### REFERENCE

Peacock E: *Wound Repair* 3rd ed. W.B.Saunders, Philadelphia, pp. 141-182, 1984.