

Pressure Ulcers

Pressure ulcers, or decubiti, are a common problem for women with disabilities. Some authorities estimate that over half of individuals who use wheelchairs eventually develop a pressure sore. Complications from pressure sores include infection, dehydration, anemia, electrolyte imbalance, deconditioning, contractures and depression. A large Stage III or IV ulcer can lead to osteomyelitis or septicemia. 60,000 people a year in the United States die of complications from pressure ulcers (Tan, 1998). The economic impact is difficult to evaluate, as many pressure ulcers go unreported, but may be as high as \$836 million annually (O'Connor and Kirschblum, 1998). It has been estimated that in any one year, pressure sores may develop in as many as 30% of those with spinal cord injury (Woolsey and McGarry, 1991). Because treatment is often costly, frequently requiring hospitalization, and because a pressure sore significantly interferes with functional mobility and employment, an emphasis on prevention is essential.

CAUSES OF PRESSURE ULCERS

Pressure sores occur when the pressure on tissues that are compressed between a bony prominence and a hard surface exceeds the closing pressure in the venous capillaries, which is 32 mm Hg. This generally occurs with prolonged lying or sitting in a bed or wheelchair when there is no change in position. People who do not have any sensory or motor impairments are able to unconsciously shift position even during sleep to avoid prolonged pressure. Those who are paralyzed, especially if they also do not have intact sensation, are at very high risk for developing decubiti over bony prominences, particularly over the sacrum, ischium, trochanter, or heel (O'Connor and Kirschblum, 1998). Skin breakdown can also occur when there is shear or friction, for example when bare skin is scraped against a transfer board, when the patient is dragged across a surface instead of lifted, or when the individual slides down from a slumped sitting or semi-supine position. Other common biomechanical causes of skin breakdown in those who are paralyzed include pressure from tight clothing or shoes, and trauma to insensate lower extremities during transfers and other activities of daily living.

There are many secondary factors that can increase the risk of skin breakdown. Moisture from sweating or from urinary or fecal incontinence macerates the skin and makes it more vulnerable. Circulatory dysfunction, edema, anemia, malnutrition with the associated low serum albumin, dehydration and smoking are all factors which reduce tissue oxygen and nutrient supply, and can make the skin and underlying tissues less resilient and more susceptible to damage. Spasticity can make it more difficult to maintain an optimal position, or cause involuntary movements that can damage the skin from shear or friction. The elderly are more susceptible, as the skin loses elasticity and becomes more dry and fragile (Garrison, 1995).

Stages of Pressure Ulcers

- Stage I** Nonblanchable erythema of intact skin that does not resolve several hours after relief of pressure may be difficult to detect in dark-skinned individuals
- Stage II** Partial thickness skin loss involving epidermis and/or dermis. May present as abrasion, blister or shallow crater.
- Stage III** Full thickness skin loss involving damage or necrosis of subcutaneous tissue that may extend down to, but not through, underlying fascia. Presents as deep crater with or without undermining of adjacent tissue
- Stage IV** Full thickness skin loss with extensive destruction, tissue necrosis or damage to muscle, bone or supporting structures. Undermining and sinus tracts may be present.

Adapted from AHCPR (1992).

PREVENTION OF PRESSURE ULCERS

Prevention of skin breakdown requires a diligent adherence to a regular schedule of changes in position and weight shifts, to relieve the pressure and restore full circulation to tissues over bony prominences. In bed, these weight shifts may be accomplished by turning for example from a lying on the side to a supine position. Flotation devices can be used to elevate the heels of the bed, and foam wedges or pillows to separate and protect the knees and ankles in the side-lying position. The best side-lying position is one that avoids direct pressure over the trochanter itself. If the woman is able to tolerate lying in the prone position, this is a good alternative, as the anterior of the body has fewer susceptible bony prominences. It is important to try to limit the time that is spent in bed with the head of the bed elevated more than 30 degrees; this can lead to tissue damage from shearing forces, when the superficial fascia and skin maintain contact with the bed sheets, but the deeper tissues slide towards the foot of the bed (AHCPR, 1992).

There are dozens of pressure reduction support surfaces available on the market today, designed to minimize the pressure over bony prominences while lying in bed. These include foam, gel, static air or water-filled mattresses and overlays. They do not eliminate the need for regular pressure relief, but may help lengthen the time that the skin can tolerate being in any one position. They need to be replaced every few years, and should be checked regularly for signs of wear and tear. There are also dynamic, alternating pressure pads and overlays and other specialty beds which do significantly reduce the pressure, but these are expensive, and are typically covered by insurance companies and Medicare/Medicaid only if a Stage III or Stage IV wound is present. They also require a constant power source, have noisy motors, and can make transfers into and out of bed much more challenging. Selection of an appropriate mattress or overlay must be based on an individualized assessment of all of the patient's needs. Referral to an experienced occupational therapist who can assist with this is often appropriate.

"My HMO would only pay for a cheap wheelchair cushion. I ended up with a pressure sore, and the HMO had to pay more to treat me for it than they would have paid to get the right cushion in the first place."

-- Woman who uses a wheelchair

Special foam or air-filled overlay cushions are also available for wheelchairs to help reduce pressure when sitting. Like the mattresses, they require regular maintenance and replacement as indicated, and the air-filled devices need to be correctly inflated to be effective. "Donut" type cushions are NOT recommended, because these cause venous congestion and edema, and can actually lead to further tissue damage (AHCPR, 1992). However, no cushion can eliminate the need for regular pressure relief. Weight shifts are accomplished by reclining to at least 45 degrees in an electric wheelchair that has an automated reclining function, by leaning side to side, or by doing "push-ups" to lift the buttocks off the seat (Tan, 1998). Patients who are unable to demonstrate effective mechanisms for pressure relief while seated, should be referred to an experienced physical or occupational therapist for evaluation and training in this. Computerized evaluation tools are now available which can indicate the areas of the buttocks that are under the most pressure, and provide feedback on the effectiveness of weight shifting maneuvers. It is also important to assess the individual's posture, alignment and weight distribution in the chair, and make sure that sliding forward is not creating damage from shear and friction.

Traditionally, the recommendation is for changes in position to be done every two hours while in bed, but the reality is that it may not always be practical for the disabled person living independently in the community to get this type of assistance during the night. Many individuals can build up tolerance to longer intervals with good positioning and the use of a quality mattress. The important thing is the response of the skin. Women or their care providers must perform twice daily inspections of all pressure areas, especially over the trochanters, the sacrum, the ischial tuberosities and the heels. A woman doing this herself will need a mirror with a long flexible handle, which can be obtained from a medical supply company. Any residual redness that persists several hours after the pressure has been relieved is cause for concern, and requires modification of the repositioning schedule. It is important to note that this early sign of problems from pressure may be difficult to detect in very dark-skinned individuals.

The required frequency of weight shifts in the wheelchair will also vary, but the usual recommendation is to change position every 20 to 30 minutes, with a push-up or lean to the side being held for at least one minute. If a woman has difficulty remembering to do weight shifts on a schedule, setting the alarm on a wrist-watch can be helpful. In a sitting position, it is the ischial tuberosities that bear the brunt of the pressure, and these areas need to be carefully inspected after a full day of being up in the chair.

TREATMENT OF PRESSURE ULCERS

A prompt response to the development of Stage I or Stage II ulcers is essential. Once a full thickness (Stage III) decubitus has been allowed to develop, a major health crisis exists, which may require weeks if not months of immobilization, and lead to permanent damage and scar tissue. The best early treatment for Stage I or Stage II pressure ulcers is unequivocally to stay off the area, even though this is often difficult for the patient to accept or impractical to implement. Persistent redness or superficial breakdown in the ischial area means staying out of the wheelchair, and not going to work or school. It also means not sitting up in bed, as this will put pressure on the same area. A decubitus on the sacrum or coccyx must be carefully evaluated to determine if there is pressure on that area from the back of the wheelchair when the patient is seated. If there is, this will

"My doctor doesn't realize that when he says, 'Stay off of this pressure sore' on my buttocks, that he is telling me to stay in bed until it is healed. I can't go to work if I'm lying in bed."

-- Woman who uses a wheelchair

also require eliminating sitting up until the area is healed. Certainly a sacral pressure sore means there should be no lying in the supine position while in bed.

These proscriptions may seem harsh, but the woman who can stay off an early decubitus, and control any other aggravating or secondary risk factors, will typically be able to heal in a week or so, instead of having the problem persist for months. The physician needs to be knowledgeable about the patient's lifestyle and aware of the sacrifices and arrangements she'll have to make to accomplish a week or more in bed. Without this level of understanding between physician and patient, the risk of non-compliance is high, and the problem become a much more complex and longer-term condition to treat.

Whether the focus is on prevention or on the treatment of an existing pressure ulcer, it is appropriate to review some basic principles of good hygiene and skin care. The skin should be gently cleansed promptly after any soiling, with a mild soap. If there is a problem with urinary or fecal incontinence, steps should be taken to prevent this if possible (see [Bowel and Bladder Management](#)). If incontinence seems to be inevitable, a good barrier cream should be used to protect the skin, and this should be applied each time the area is washed. If there are wound dressings in place, these need to be changed immediately if they become soiled with urine or feces. The skin should be gently patted to dry, not rubbed with excessive friction, and the areas over bony prominences should NOT be massaged; this is now known to cause deep tissue damage (AHCPR, 1992). Dry skin should be treated with a gentle moisturizing cream. If there is evidence of any fungal irritation, this should be treated with an appropriate agent such as Nystatin powder. There are some products, such as Baza Cream, that combine both skin barrier and antifungal properties.

Good nutrition is essential for both the prevention of skin breakdown, and wound healing. It is important to pay attention in particular to adequate intake of fluids, protein, minerals especially iron and zinc, and Vitamins C and E. It is prudent to check for anemia and low serum albumin, and to provide supplementation as indicated. Those with poor calorie or protein intake should be encouraged to take supplements such as Ensure. Smoking should be strongly discouraged (Yarkony, 1994).

As a woman ages, she may find the skin more susceptible to breakdown, so that a system that has worked well for 20 years is no longer adequate. This can be a difficult adjustment, and calls for a supportive, non-judgmental approach from the health care provider. She may need to use nutritional supplements, change position more frequently or modify her seating system. Changes in body composition or posture, related to increasing obesity or scoliosis will alter seating requirements and affect transfer techniques, and these should be addressed to avoid increasing the risk of skin breakdown. Spasticity may increase over time, and this can be another aggravating factor that should be treated (see [Spasticity](#)). Medical management of these issues should be done in conjunction with referral to a skilled physical or occupational therapist.

An open Stage II through IV pressure ulcer will require wound care following established guidelines. There are dozens of different wound dressings available, all designed to protect the wound from further damage and infection, promote the growth of new granulation tissue and assist in the debridement of necrotic tissue if indicated. If a skilled Wound/Ostomy nurse is available, this can be a great resource for wound management and patient or caregiver education and training. Certainly, visiting nurse services can be ordered, but current reimbursement policies significantly limit the

frequency of visits that can be made, and the bulk of the dressing changes will have to be done by the patient herself, or her attendants and family members. The choice of dressing must take into account the realities of the disabled woman's life, and the level of assistance available to her. Wet to dry saline dressings, for example, are not usually practical in the home setting, because they need to be changed several times a day. Hydrocolloid or foam dressings are more expensive, but they are much simpler to apply, and can be left in place for 24 to 48 hours, unless they become soiled. One-piece dressings which include their own adhesive, are the best option for the woman who is going to have to perform the wound care herself in a hard-to-reach area. Patients need to be instructed not to use hydrogen peroxide or iodine to cleanse the wound, as these are damaging to granulating tissue. Normal Saline solutions are available in convenient spray bottles. Necrotic tissue should be surgically removed by the provider in order to promote healing, and the wound re-evaluated about once a week to assess progress and review all the aspects of the treatment plan. Eschar should generally be removed either chemically or surgically, although the current recommendation is to leave heel eschar intact. A large or persistent Stage III and any Stage IV wound will require referral for surgical repair, and monitoring for bone involvement with Xrays and/or bone scans (Garrison, 1995).

Once a wound is healed, previous activities can be resumed, but sitting tolerance needs to be built up again gradually. Newly healed skin is much more fragile than the skin that was present before the breakdown occurred. After a period of bed rest for wound healing, it is prudent to start slowly with sitting up for perhaps one-half hour twice a day, and carefully inspecting the skin on return to bed for any signs of recurring damage. Large, deep wounds will require several weeks of gradually increasing time up before a full schedule of activities can be resumed, and the area may be permanently more susceptible to breakdown.

Pressure sores are much easier to prevent than treat, but both prevention and treatment requires a coordinated team approach, involving the disabled woman, her health care provider, attendants and family members and allied professionals such as physical and occupational therapists. A good skin care plan is one that can practically be incorporated into the woman's daily life, and is flexible enough to be modified as conditions change over the years.

EDUCATION FOR PREVENTION OF PRESSURE ULCERS

- Shift positions every 20-30 minutes while up in wheelchair. Lean all the way over to the side, do a full push-up, or recline fully in an electric chair.
- Turn every 2 hours while lying in bed if awake. Increase skin tolerance gradually to allow for longer between turning at night.
- Raise your heels up off the bed on pillows. Use elbow or heel protector pads.
- Try to lie in the prone position (on your stomach) to sleep.
- Inspect all pressure areas twice a day. Use a long-armed mirror to inspect hard-to-see areas.
- Any redness that does not go away in a few hours, or any superficial skin breakdown must be treated seriously as early signs of a pressure sore.

- Use a good quality mattress and wheelchair cushion, learn how to use them correctly, and replace them when they get worn out, or if your body goes through changes in weight or posture. Do not use donut or ring-shaped cushions.
- Maintain good hygiene; keep all areas dry. Do not massage the areas over bony prominences.
- Maintain continence of bowel and bladder. Use a good barrier cream if accidents sometimes occur.
- Eat smart, with plenty of low fat protein, fruits and vegetables. Take a daily multivitamin. If your appetite is poor, or you have difficulty eating regular meals, try supplements such as Ensure. Try not to put on weight.
- Practice safe transfer techniques; avoid friction and shearing movements.
- Check the position of your legs if they have no feeling. Do not use heating pads on areas without sensation.
- Wear shoes in the wheelchair to protect your feet.
- Check your skin carefully when first wearing new shoes or denim jeans with thick seams.
- Use a backpack on the rear of the wheelchair instead of storing objects under the chair cushion.
- Be aware of warning signs that can accompany the start of a decubitus, such as increased spasms, sweating or elevated temperature.
- The most important treatment for an early decubitus is to keep all pressure off the area. Expensive dressings are no substitute for pressure relief.

RESOURCES

International Association of Enterostomal Therapy

27241 La Paz Road, Suite 121
Laguna Niguel, CA 92656
714-476-0268

National Pressure Ulcer Advisory Panel (NPUAP)

11250 Roger Bacon Drive, Suite 8
Reston, VA 20190-5202
Phone: 703-464-4849
Fax: 703-435-4390
rguggolz@drohanmgmt.com / www.npuap.org

You're Not Alone Video Series. This series of educational videos was developed specifically for patients with chronic wounds. Included in the series are tapes on Understanding Diabetic Ulcers, Understanding Pressure Ulcers, and Understanding Venous Ulcers that present patients and their caregivers with basic etiology, prevention, care, and management of these 3 specific types of chronic wounds. Frank Ferris, MD; Anne Kenshole, MB, BS, FRCPC, FACP; Diane Krasner, PhD, RN, CWOCN, CWS, FAAN; and Gary Sibbald, BSc, MD, FRCPC, discuss critical principles of care in easy-to-understand language. Educational booklets accompany each video; a compilation video, consisting of the 3 tapes, is also available. Information: 1-800-463-0106; <http://www.woundcaresdirect.com>.

Braden Scale Video. This 30-minute video describes in detail how to assess for the risk of pressure ulcers using the Braden Scale for Predicting Pressure Ulcer Risk. The video, from Barbara Braden, PhD, RN, FAAN, and Nancy Bergstrom, PhD, RN, FAAN, developers of the Braden Scale, provides rationales for scoring the Braden Scale and uses clinical examples to illustrate appropriate scoring. The video is available for rent (\$50) or purchase (\$150). Information: <http://www.bradenscale.com>.

Video: Pressure Ulcers: An Educational Seminar, by Gaymar Industries, Inc. This 1-hour, 4-part video discusses etiology, risk assessment, prevention, and treatment of pressure ulcers. Each of the 4 sections includes easy-to-read bulleted information, clearly labeled diagrams and charts, and a closing summary of important points. An emphasis is placed on the role of the multidisciplinary team in prevention of pressure ulcers and the use of pressure-reducing and pressure-relieving devices. The video seminar can be purchased for \$29.95; supplemental materials are available at no additional cost. Information: 1-800-828-7341.

Clinical Pathways for the Multidisciplinary Home Care Team, 2nd edition, by Barbara Stover Gingerich, MS, RN, CHE, CHCE, and Deborah Anne Ondeck, MS, RN, CHCE, CPHQ, March/April, 2001. This new edition contains detailed clinical pathways for common conditions, including pressure ulcers, wounds, and urinary incontinence, in an easy-access loose-leaf reference and companion CD-ROM. Each pathway is spelled out in a step-by-step, fully coordinated plan of care and includes initial assessment, progress notes, and disease-specific outcomes measurement tools. Information: Aspen Publishers, 1-800-638-8437; <http://www.aspenpublishers.com>.

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