COMMONWEALTH of VIRGINIA

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Office of Integrated Health
Health & Safety Alert/Information

Pressure Injury Health & Safety Alert

What is a Pressure Injury?

Through the years, what is now deemed a "pressure injury" (PI), has been referred to as a decubitus ulcer, a bedsore, and a pressure ulcer; but all previous terminology is synonymous. Currently, the Mayo Clinic's definition of a PI is: "an injury to the skin and the underlying tissue resulting from prolonged pressure" (2020, p.1). Often the localized damage to skin and/or underlying tissue occurs over a bony prominence, such as the elbows, heels, hips, sacral area (tail bone), due to increased and prolonged pressure at these points (Mayo Clinic, 2020).

Prolonged pressure to the skin results in poor circulation, lack of effective tissue oxygenation (ischemia) and tissue breakdown (Mayo Clinic, 2020). The National Pressure Injury Advisory Panel (NPIAP) defines a PI as "localized injury to the skin and/or underlying tissue usually occurring over a bony prominence, or related to medical or other devices" (NPIAP, 2016, p. 1). The injury itself can present as intact skin or an open ulcer, and it may or may not be painful (Edsberg et al., 2016). There are several risk factors, which may increase each person's chance of acquiring a PI.

Risk Factors

Moisture

Skin can become moist from a variety of reasons. Incontinence and sweat can be major contributors to moisture. Moisture trapped between skin and fabrics places the person at a higher risk of developing a PI (Schwartz et al., 2018). As confirmation, evidence indicates urinary incontinence increases the risk of a PI in individuals (Gray and Giuliano, 2018). Keeping an incontinent individual dry and moisture-free lowers their overall risk of developing a PI. Developing regularly scheduled monitoring reduces the time an individual remains in wet clothing and/or briefs.

Occasionally, dermatitis (inflammation of the skin) is mistaken for a PI (Paulin and Dowling-Castronovo, 2017). Changes in the skin's appearance and the diagnosis of a PI vs. dermatitis is made by a physician. Always report changes in skin appearance to the individual's primary care physician as soon as possible.

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Shearing

Shearing is the physical force which acts on an area of skin in a direction parallel to the body's surface (Hess, 2004). It occurs during repositioning when the body is not lifted off the surface completely, which then pulls the bones in one direction and the skin in the other. The person is typically positioned at an angle when a shearing injury occurs. When the head of the bed is elevated, it increases shear injury in deep tissue and may account for the high incidence of sacral pressure injuries seen in individuals (Hess, 2004). A shear injury is not seen on the outside of the body, because it happens beneath the skin when the blood supply is cut off to the tissue under the skin surface, which results in cell death (necrosis).

Friction

Friction is the resistance to motion and is similar to shear in many ways. However, unlike a shearing injury, a friction injury can be seen on the outside of the body. Friction injuries occur when the skin is dragged or pulled across a surface, such as when an individual is moved or slid across bed sheets. If the skin is moist from incontinence or after a bath, the friction of each surface will be elevated, so the risk for a friction injury will be greater; resulting in more extensive skin and tissue damage (Hess, 2004). Great care should be taken when moving an individual when their skin is damp or moist, in order to avoid injury.

Individuals at Highest Risk for Pressure Injury (PI)

Individuals at increased risk for pressure injuries should have an ongoing risk-prevention protocol in place for routine monitoring of their skin, which should include documenting and reporting (to a healthcare professional), any early signs of prolonged pressure. There are a number of factors which increase a person's risk for developing pressure injuries. The list below is not an exhaustive resource. However, the information provided should aid caregivers in understanding which individuals may be at greatest risk of developing a PI.

- **Non-Ambulatory Individuals -** An individual who is unable to ambulate (walk) independently and/or change their body position independently is at an increased risk of developing a PI. The use of durable medical equipment (DME) (such as wheelchairs), can cause pressure injuries if proper precautions are not taken (Galetto et al., 2019). However, individuals do not have to be completely non-ambulatory or immobile to be at increased risk for PI. If an individual who can ambulate suddenly becomes less ambulatory or non-ambulatory, due to an injury, illness or surgery, they will then be at increased risk of developing a PI.
- **Older Individuals -** Individuals over age 65 are at greater risk of pressure injuries as the body's built-in protective agents (such as fat and muscle) begin to decline and atrophy (Neloska et al., 2016).
- . As a natural part of aging, the fatty layer under the skin (dermis) begins to thin. Fluids in the body serve as a natural insulator and cushioning agent for the body's organs, bones and tissues. However, as the body ages, the thirst instinct becomes reduced (which leads to a higher risk of dehydration), and the functioning of taste buds deteriorates, which can lead to lower nutritional and fluid intake overall. In addition, as the body ages an individual is at greater risk of chronic health conditions such as diabetes, cardiovascular disease, osteoporosis, arthritis, or cancer, which can leave the body in a more weakened state overall.

Individuals who take more than seven medications a day (polypharmacy); those who have experienced repeated hospitalizations; and/or those who suffer from reduced immobility (for whatever reason), are also at increased risk for developing a PI (Neloska et al., 2016).

- **Diagnosis of Diabetic Neuropathy -** This condition occurs when people diagnosed with diabetes experience a loss of sensation in their hands, feet and legs (extremities), due to poor metabolic balance of sugar within their bodies. Due to this lack of sensation in the hands, feet and legs, people with neuropathy lose the ability to sense pain or discomfort, which typically cues the brain to reposition the body in healthy, well-functioning individuals. Decreased repositioning or lack of repositioning, increases the risk of a PI (Philips and Mehl, 2015).
- **Diagnosis of Peripheral Arterial Disease (PAD) -** People with this condition have a narrowing or blockage of the vessels which carry blood from the heart to the legs. The buildup of fatty plaques in the arteries is called atherosclerosis (National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), 2019). Overtime, the blockage can cause damage, which results in a loss of sensation. As mentioned previously, when a person experiences neuropathy (the loss of sensation in any part of their body), they are at an increased risk of developing a PI, because the sensation of discomfort or pain is the brain's cue to reposition the body (Twilley and Jones, 2016).
- **Spinal Cord Injuries (SCI) or Paralysis -** Research indicates people with SCI are more likely to develop a PI. In fact, a PI is the most common complication of a SCI (Lemmer et al., 2019). For example: an individual with SCI and constipation, would likely spend an extended period of time sitting on a toilet seat, which as a result, increases their risk for PI to their sacral area (Lustig et al., 2018).
- **Severe Cognitive Impairment or Brain Injury** - People with severe cognitive impairments that affect their brain, (such as dementia, stroke, TBI, or any other brain-related injury), are at a higher risk of developing a PI because these conditions can also compromise one's ability to perceive pain and/or pressure. Similarly, there is also a link between cognitive impairments and immobility. The more cognitively impaired a person is, the less likely they are to ambulate, move or reposition themselves independently. Their lack of movement (in general) is a primary reason cognitively impaired individuals are more prone to pressure injuries (Efraim and Meiron, 2017).
- **Incontinence** - People who suffer from incontinence (bowel or bladder) typically experience skin dampness or moistness and may frequently suffer skin breakdown and/or dermatitis (skin inflammation). Due to these skin-related complications, they are at a higher risk of developing a pressure (Gray and Giuliano, 2018; Woo et al., 2017,).
- **Communication Difficulties** - Individuals who are unable to communicate effectively may be at a higher risk of developing a PI. Someone who is non-verbal (i.e. has no intelligible speech), and is unable to use an assistive device for communication, may not be able to effectively express their pain or discomfort level to their caregiver. Facial expressions and sounds are often misinterpreted as a request for something completely different than what the individual desires and/or is trying to communicate. Since pain is an early sign of a developing PI, an inability to communicate pain, puts someone at higher risk for the development of a PI (McGinnis et al., 2014).

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Pressure Injury Diagnosis, Staging and Treatment

A few of the early and most common signs of prolonged pressure to the skin include: changes in color or appearance, swelling, and/or prolonged redness or warmth to the touch (Mayo Clinic Staff, 2019). Early recoginition of these signs should be brought to the attention of the individual's primary care provider (PCP), nurse, or wound care specialist immediately to halt their progression.

Once identification of a PI has occurred, the next step is called 'staging'. Staging of a PI occurs when a healthcare professional (physician, nurse, certified wound specialist) examines the skin at and around the site of an injury, and the injury is subsequently classified based on the extent of tissue damage observed (Edsberg et al, 2016). There are numerous assessment tools for PI identification. These tools include both skin visualization techniques and risk assessment tools (Borzdynski et al., 2015). Based on the criteria below, the healthcare provider will determine the severity of the PI (National Pressure Injury Advisory Panel, 2019). Once a PI has been identified and staged, a treatment protocol can begin.

Wound Care Specialists

Healthcare professionals who are qualified to stage a PI include physicians, nurses and board certified wound specialists. A board-certified wound specialist is a healthcare professional who has received additional training and education in order to qualify for a national board certification examination. (American Board of Wound Management, 2019). The American Board of Wound Management (ABWM) offers three levels of specialty certification for those who have additional training and expertise relating to wounds.

There are several types of wound care specialists. The Certified Wound Specialist Professional (CWSP) wound care certification is specifically developed for physicians (MD's, DO's and DPM's). Certified Wound Care Associates (CWCA's) are those professionals who demonstrate a distinct and specialized knowledge in wound management, which can promote the quality of care for persons with wounds. A Certified Wound Specialist (CWS) is someone who demonstrates a master's level knowledge and specialty practice in wound management.

If you are caring for an individual who has a PI, consultation with someone who has advanced training in wound care is considered "best practice" and is highly recommended. Please consult the individual's PCP for additional guidance or clarification, if needed. *Most insurance companies are less likely to approve specialty Durable Medical Equipment (DME) used in the treatment of a PI (e.g. alternating pressure mattresses, gel wheelchair seat cushions, etc.); if the PI has not been evaluated, staged and documented by a wound care specialist or a licensed healthcare professional (an MD, an NP, an RN, etc.).*

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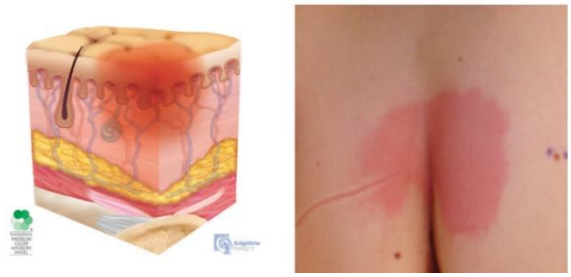
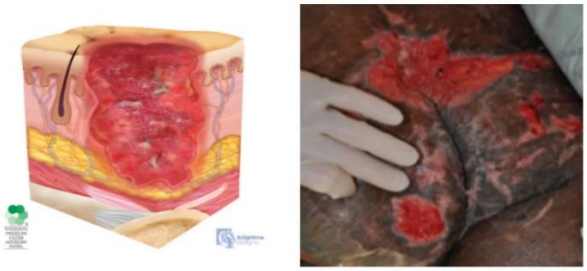
Pressure Injury Stages

Stage 1: Non-blanchable erythema of intact skin. Intact skin with a localized area of non-blanchable erythema, which may appear differently in darkly pigmented skin. Color changes do not include purple or maroon discoloration; these may indicate deep tissue PI.	
Stage 2: Skin is broken but there is no depth to the wound. Partial-thickness loss of skin with exposed dermis. The wound bed is viable, pink or red, moist, and may also present as an intact or ruptured serum-filled blister. Adipose (fat) is not visible and deeper tissues are not visible. Granulation tissue, slough and eschar are not present.	
Stage 3: Skin is broken, but there is obvious depth to the wound; fat tissue may be noted. Full-thickness loss of skin, in which adipose (fat) is visible in the wound and granulation tissue and epiboly (rolled wound edges) are often present.	
Stage 4: Skin is broken; muscle or bone may be visible. Full-thickness skin and tissue loss with exposed or directly palpable fascia, muscle, tendon, ligament, cartilage or bone in the wound. Slough and/or eschar may be visible. Epiboly (rolled edges), undermining and/or tunneling often occur.	
Stage 5: severe tissue loss is noted; wound may appear as empty hole. Full-thickness skin and tissue loss in which the extent of tissue damage within the wound cannot be confirmed because it is obscured by slough or eschar.	

(National Pressure Injury Advisory Council, 2019)

Person-Centered Pressure Injury Treatment

Proper Treatment of a PI is a team-based approach which should be led by the individual's PCP (MD or Nurse Practitioner), and should be tailored to the individual's specific needs. Certified Wound Specialists (CWS) and/or Certified Wound Ostomy Care Nurses (CWOCN) are often part of the treatment team. The PI treatment plan starts with a thorough assessment performed by the individual's PCP to determine the cause and diagnosis. The treatment options outlined below are offered as an overview of what a generic treatment plan for pressure injury might include.

Wound Care

Wound healing is optimized when the wound is kept in a moist environment rather than air dried, dried under heat lamps or by using topically-applied drying agents (NPUAP, 2009). There are many types of dressings on the market today. Which one to use, when to use it, and how long to use it, should be determined by the individual's PCP or wound care specialist only.

Pain Management

Pain management (for painful wounds) is an important part of the Plan of Care (POC) that should be addressed by the PCP. Pain can also be an indicator of infection. The amount and type of pain experienced needs to be conveyed to the treating physician. Pain, regardless of the cause, can be debilitating. Addressing pain, should be part of a comprehensive treatment plan for pressure injuries (Jackson et al., 2017).

Repositioning Protocol

An individual's response to pressure should guide repositioning frequency. Repositioning schedules or protocols need to be individualized based on tissue tolerance, patient rights, and the specific support surface being used (Gillespie et al., 2014; Schank, 2016). All support surfaces, regardless of their quality or pressure-reducing abilities, still apply *some* pressure to the skin's surface. No support surface provides complete pressure relief. Standard repositioning protocols call for repositioning every two hours (Gillespie et al., 2014; Schank, 2016).

Transferring Protocol

Using a draw sheet or cloth/absorbent bed pads will significantly reduce friction and shearing during transfers. "Slide sheets" or "transfer sheets" are specially made pieces of fabric which can be positioned between the patient and the regular mattress sheet. These sheets are made of a treated fabric which allows them to slide easily in all directions. This transferring method requires the individual to be lifted off the underlying surface during the repositioning procedure by two staff. This can be difficult at times due to the weight of the individual, staff strength, height of bed vs. staff, etc. and requires the uses of good body mechanics (Mannheim et al., 2019).

Nutrition/Dietician Consultation

Nutrition and proper hydration are vital parts of wound healing and management which requires a consultation with a Nutritionist or a Dietician. Blood tests may be ordered to assess hemoglobin levels, iron levels, etc. Making sure an individual has adequate levels of protein,

vitamins, minerals and water in their diet is an important part of the wound healing process (Citty et al., 2019; Munoz et al., 2020).

Physical and or Occupational Therapy Consultation

A physical and/or occupational therapist (PT/OT) may be consulted to address an individual's DME needs (wheelchair seating, positioning devices, etc.), and training of caregivers regarding positioning and transferring issues which will reduce the risk of a PI.

Lowering the Risk of Pressure Injuries

Caregivers/Care Team Collaboration

Educating all caregivers and direct support professional so they have a basic understanding of how pressure injuries occur is the first step. Individuals should have a person-centered plan in place to monitor and address areas of risk. Developing a collaborative, multi-pronged PI prevention program designed by healthcare professionals is essential. All staff and caregivers should be fully trained on protocols, and routine competencies completed, to ensure proper care is being administered. A quality PI prevention program includes individualized protocols, as well as standard policies and procedures aimed at addressing all of the following:

- Skin assessments (formal or informal) need to be performed regularly by all caregivers. Signs of redness, edema, localized heat, or induration (hardness) are warning signs of PI development. Complaints of pain to a specific area could be attributed to PI development. Caregivers should monitor individuals with a history of pressure injuries, skin breakdown or scars from surgery. Scar tissue is not as tolerant of pressure as the original skin tissue and will breakdown sooner. Two commonly used tools used by medical professionals for predicting PI risk are the Braden and the Norton Scale (Rappl, 2012).
- Caregivers need to be trained to provide routine skin care. Caregivers should be taught the specific steps and methods needed in order to keep individual's skin clean, dry and free of urine, stool or sweat to maintain healthy skin. Individuals who are incontinent of urine and/or stool should be monitored at regular intervals throughout the day and night. A routine, scheduled protocol for checking individuals for soiling, (and documenting those checks) should be implemented to ensure individuals are kept clean and dry. Inspecting the skin and seeking treatment from a medical professional for changes in the skin can reduce long term complications including PI.

Routine application of skin protectant products is an important step in maintaining healthy skin. Well lubricated skin prevents break down and reduces chances of skin becoming torn and/or infected. Applying a lubricant cream or lotion per a health care provider's prescription is a valuable part of skin care. Routine use of skin lotions, barrier creams, emollients and skin protectants to hydrate and protect the skin can promote skin health and can lower the risk of PI's (Schank, 2016; Serena et al., 2016).

Memory Aid/Mnemonic Tools for Pressure Injury Monitoring

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NO ULCERS is a mnemonic tool or memory aid which can help caregivers remember the steps needed for PI prevention (Lyder and Ayello, 2008).

NO ULCERS	**N**utrition and fluid status **O**bservation of skin **U**p and walking or assist with position changes **L**ift, don't drag **C**lean skin and continence care **E**levate heels **R**isk assessment **S**upport surfaces

Positioning Devices and Support Surfaces

Changing someone's position means the individual will be in a completely different position than they were previously (ie: sitting <> lying down; sitting upright <> fully reclined). All individuals are supported or positioned by use of a "support surface", which is a generic term that encompasses all surfaces and specialized devices which are used for positioning and pressure redistribution, management of tissue loads, and management of microclimate variances (temperature and moisture levels of the body) (Schank, 2016). A support surface can be powered or non-powered (i.e. specialty mattresses, mattress overlays, or customized wheelchair seat cushions, tilt-in-space wheelchairs, standers, etc.) Listed below are various support surfaces and a description of how each can be used to lower PI risk.

Durable Medical Equipment (DME) Positioning Devices

Individuals with a history of PI, or those at high risk, should be evaluated for any/all types of DME positioning devices to help lower the risk of a reoccurring PI, or a future PI.

- Standers: May be a good option for individuals who can bear weight, but are at high risk for PI's. For those individuals who are non-ambulatory and those who spend a significant amount of time in wheelchairs; a prone stander can be especially beneficial at reducing pressure in the sacral area (tailbone/buttocks). Schedule an assessment with a PT or OT who can evaluate the appropriateness of this device for your individual.
- Gait Trainers: These devices are very similar in overall function as a walker, but are designed for individuals who need to have more trunk support in order to ambulate. Schedule an assessment with a PT or OT who can evaluate the appropriateness of this device for your individual.
- Tilt-in-space wheelchairs are designed for individuals who have decreased ability to reposition and/or have more significant postural needs. Wheelchairs with tilt and recline features can provide a change of both positon and pressure to different areas of the body. A tilt feature on a wheelchair can also improve circulation in the lower extremities, thus bringing pressure relief and greater comfort to the user (Wilson & Miller Polgar, 2005).

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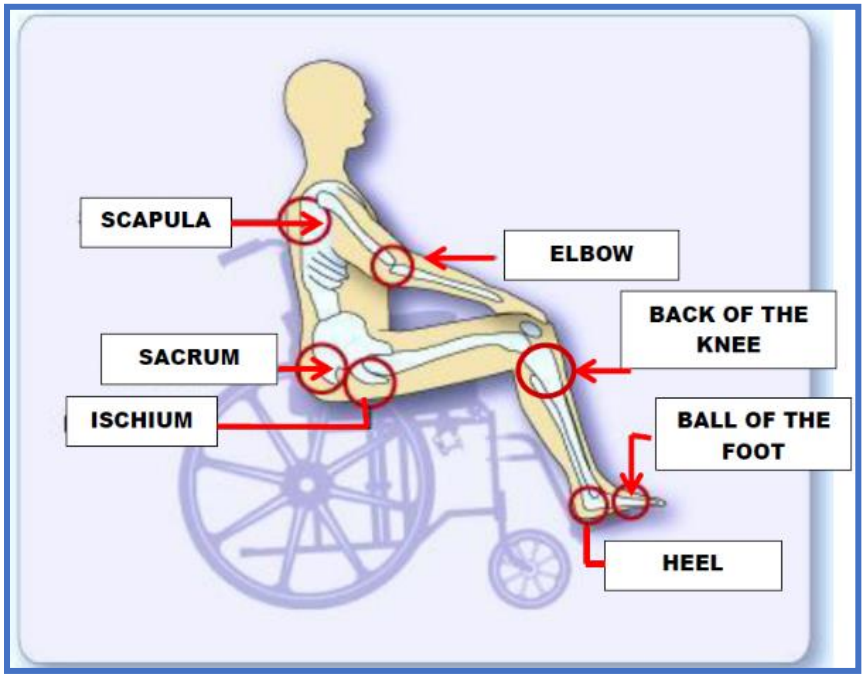
Special Considerations/Interventions for Wheelchair Users with a History of Pressure Injuries

Seating Assessments

Routine Seating Assessments are recommended for any individual who spends a significant amount of time in a wheelchair. Wheelchair seating is a dynamic process performed by a healthcare professional to monitor fit and function of the individual's DME and modify/customize options to match the individual's changing needs. The most common sites for pressure injuries in wheelchair users are the:

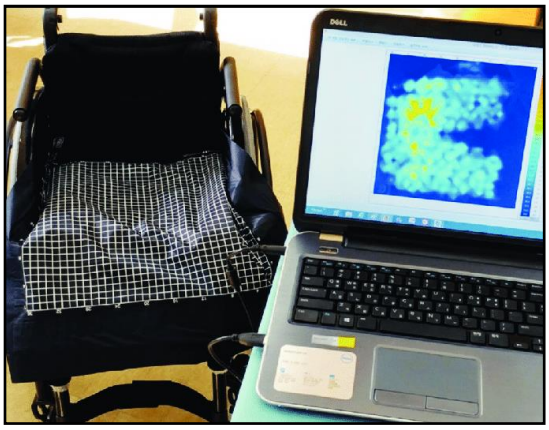
- Scapula
- Sacrum/Coccygeal area
- Ischial tuberosity
- Heel
- Ball of the foot
- Back of the knee
- Elbow

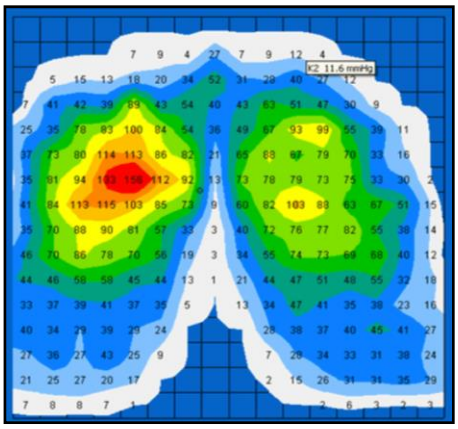


Pressure mapping

The use of a pressure mapping device during a seating assessment can help with the selection of the proper seat cushion or overlay for wheelchair users. If an individual has a history of any PI, pressure mapping should be included in their seating assessment. A

pressure mapping device is a square, pliable, fabric-like device that is placed in the seat section of a wheelchair (during a seating assessment), so the individual is sitting on it. The device contains thousands of micro-sensors which measure the pressure that the seat of the wheelchair exerts on the individual. As the information is collected (via the sensors), it is transmitted to a computer screen. The computer displays a visual image of the specific pressure areas and gradients exerted on the individual's body. Red indicates the greatest pressure, and blue indicates the least pressure. This allows the assessor to see exactly where the pressure is greatest and to what degree. Different cushions and positions (reclining, etc.) can be evaluated and compared while the pressure-mapping device is still in place, allowing the selection of the best pressure-relieving cushion for the individual.





Lateral Supports

Lateral supports are padded devices which can be attached to the wheelchair's frame, and can be customized and adjusted to support a person's trunk area. Lateral supports can assist individuals who cannot maintain an upright posture in their wheelchair independently. They are especially useful for lowering the risk of pressure injuries developed on the forearms or elbow areas. These injuries are often caused by extended periods of leaning in a wheelchair. Once lateral supports are added, the underarm area of individuals will need to be monitored for signs of pressure and the lateral supports should be assessed and adjusted at least once a year and/or as needed, if they shift or become loose or wobbly.

Padded Arm Rests

Standard armrests have a thin layer of padding and are in frequent contact with the bony part of the arm. Custom-padded armrests can be fabricated which may lower the risk of a forearm pressure injury. All armrests need to be monitored for cracks or tears in the material that can cause small cuts and scratches to the skin on the arm.

Padded Leg Rests

Like armrests, leg rests need to be monitored for cracks or tears in the material that can cause small cuts and scratches to the skin on the back of the individual's legs and calves. The skin in this area should also be monitored for any pressure related changes.

Customized/Specialty Cushions

Pressure-redistributing cushions reduce the incidence of sitting-induced pressure injuries in wheelchair users (Brienza, et al., 2010; Geyer, et al., 2001). Customized/specialty cushions require an evaluation by a PT or OT and a DME vendor/sales representative, to match the appropriate cushion with the individual. The vast majority of these surfaces are static and are available in different sizes and thicknesses. The static pressure relieving materials are foams, gels, foam/gel combinations, air bladders (e.g. Roho cushions), silicone grids, or layers of honeycomb shaped cells. Some seat cushions are filled with multiple small envelopes of air which can be moved around from one section to another to match the individual's needs. A dynamic seat cushion is an air cushion which is battery operated and alternates pressure by inflating and deflating air chambers. All help lower the risk of PI to an individual.

Specialty Beds/Mattresses

Specialty mattresses and beds are support systems which can be non-powered (e.g. foam/gel mattress overlays, water-filled mattresses, etc.); or powered (e.g. an alternating pressure mattress or an intermittent/alternating pressure pad (IPP/APP, etc.). Alternating pressure devices prevent any one area of the body from experiencing constant pressure for more than four minutes by inflating and deflating air chambers continuously (Elsabrout et al., 2018; Rappl, 2012).

Resources

- For more information on the stages of pressure injuries, please go to the National Pressure Ulcer Advisory Panel website (National Pressure Ulcer Advisory Panel, 2019) https://npuap.org/page/PressureInjuryStages
- Information regarding board certified wound specialists and the services they can provide (American Board of Wound Management, 2019): http://www.abwmcertified.org/
- (National Alliance of Wound Care and Ostomy, (2019) https://www.nawccb.org/wound-care-certification
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