BEDSIDE ERGONOMICS
TURN THERAPY FOR INJURY PREVENTION

PATIENT HANDLING ERGONOMICS FOR CAREGIVER SAFETY AND PRESSURE ULCER PREVENTION

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Jewell Nursing Solutions
Elements of Effective Repositioning
Safe Patient Handling
Caregiver Lift Safety
Effective Pressure Reduction

Pressure Ulcer Prevention
"Pressure ulcers are caused by long periods of uninterrupted pressure exerted on the skin...."


Increased risk with:
- Moisture
- Friction and Shear
- Poor Health
- Poor Nutrition

Pressure

Ischemia

Inflammation

Tissue Anoxia

Necrosis

Ulcer
Bony Prominences Under Pressure

Device Related Pressure Injuries: Something is pressing against the skin
- Medical devices such as trach tube, nasal cannula, Nasogastric tube, etc
- Foreign objects such as the Bed rail, items left in the bed by accident
WHERE DO PRESSURE ULCERS OCCUR?
MOST COMMON ON HEELS AND LOWER BACK
(SACRUM/COCCYX AREA)

<table>
<thead>
<tr>
<th>Bony Prominence</th>
<th>Rate of Occurrence *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacrum/Coccyx/Trochanter</td>
<td>~ 35%</td>
</tr>
<tr>
<td>Heels</td>
<td>~ 30%</td>
</tr>
<tr>
<td>Ischial Tuberosities</td>
<td>~ 28% (from wheelchair)</td>
</tr>
<tr>
<td>All other spots combined</td>
<td>~ 7%</td>
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</tbody>
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** Including those caused by a medical device

* Rates vary depending on source

Who Is At Risk For Pressure Injury?

Mobility impaired (Weakness, paralysis, pain)

High Moisture (Usually from incontinence)

Sensory compromise (nerve disorder, diabetes)

Circulatory compromise
- Vascular disease, hypotension, arteriosclerosis, edema
- Hypotension (low blood pressure)

Dehydration, Malnourishment
- Difficulty eating / drinking
- Obesity
Who Is At Risk?

Advanced Age is a risk factor due to compromised skin integrity,

But in the absence of other risk factors, old age itself is not a risk
Pressures Ulcers 101
How often do pressure ulcers occur?

2012 Pressure Ulcer Incidence Rates
Agency for Healthcare Research and Quality

- Home Care 0 to 17%
- Long Term Care: 2 to 24%
- Acute Care: 0.4 to 38%

Average of 3 Million Adults per Year

Pressure Ulcers 101
Evolution of the Pressure Ulcer

STAGES OF SKIN BREAKDOWN

- **Normal Skin**
  Normal skin showing intact epidermis, dermis, and the deeper layers of subcutaneous fat, muscle and bone.

- **Suspected Deep Tissue Injury**
  Purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue.

- **Stage I**
  Intact skin with non-blanchable redness of a localized area usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area.

- **Stage II**
  Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister.

- **Stage III**
  Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling.

- **Stage IV**
  Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunneling.

- **Unstageable**
  Full thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed.

Courtesy of the National Pressure Ulcer Advisory Panel
Pressure Ulcers 101
What do pressure ulcers look like?

STAGES OF SKIN BREAKDOWN

Stage I
Non-blanchable redness

Stage II
Broken skin top layers

Stage III
Visible fascia, muscle, tendons

Stage IV
Breakdown all the way to visible bone

Deep Tissue Injury (DTI)
Breakdown without broken skin (no friction/shear)

Images Courtesy of the National Pressure Ulcer Advisory Panel
Pressure Injury Prevention Caregiver To Do List

1. Frequent Skin Assessment
At least twice a day. During Toileting is a perfect time. Pay special attention to the heels and trunk area.

2. Keep skin clean and dry
Frequent toileting and pericare. Use incontinence supplies and equipment correctly and appropriately.

3. Assist with eating and drinking
Don’t rush. Your patient needs time, not choking!
How Do YOU Prevent Pressure Injuries

“THE TRICK IS TO GET THE PRESSURE OFF”

Dr. Joyce Black, National Pressure Ulcer Advisory Panel
CAREGIVER ERGONOMICS AND SAFE PATIENT HANDLING FOR TURNING AND REPOSITIONING
CAREGIVER ERGONOMICS

Nonfatal Occupational Injuries and Illnesses by Private Industry Sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare Workers</td>
<td>700</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>600</td>
</tr>
<tr>
<td>Construction</td>
<td>500</td>
</tr>
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ANA SURVEY 2011

❖ 8 OF 10 NURSES WORK WITH FREQUENT MS PAIN
❖ 13% WERE INJURED 3 OR MORE TIMES ON THE JOB IN THE LAST YEAR
❖ 56% WORK SHIFT THAT LAST 10 OR MORE HOURS
❖ 62% ARE AGE 50 OR OLDER
❖ RECOMMEND THAT WHEN WEIGHT OF LIFT EXCEEDS 35 POUNDS, ASSISTIVE DEVICES SHOULD BE USED !!


SOURCE: SAFE PATIENT HANDLING AND MOBILITY. AMERICAN NURSES ASSOCIATION, SILVER SPRING, MARYLAND 2013
What Is Ergonomics?

The science of fitting the task to the person

- Physical stresses - QUANTITATIVE
  - Force
  - Repetitive Motion
  - Vibration
  - Position

- Environmental Stresses - QUALITATIVE
  - Equipment and use of equipment
  - Conditions (moisture, temperature, surroundings)
  - Nature of work

http://ehs.okstate.edu/modules/ergo/What.htm
Why is Healthcare So Dangerous?

Working Conditions

* **Repetitive Movements**
  * Transfers - bed to bed, bed to chair, chair to bed
  * Boosting – Slumped patients need to be boosted up
  * Lifting – Especially patients, but also equipment
  * Pushing/Pulling – Equipment and patients
  * Bending/Stooping/reaching for things

* **Overexertion**
  * Long Hours, Fatigue, Lifting above recommended limits
**Why is Healthcare So Dangerous?**

**Working Conditions**

- **Excessive Weight**
  - Resistive weight from patients and heavy equipment
  - Heavy patients: Obesity or stiffness
  - Heavy equipment, damaged equipment
  - STATIC LOAD: Holding heavy weight for an extended time
  - Exponential lift: Holding weight that is far from your body

- **Unpredictable / Uneven Weights**
  - Sudden / Unexpected Patient movements – e.g. falling
  - Resistance during movement – e.g. grabbing, pushing, pull
  - Combativeness
  - Uneven forces – e.g. legs go one way, arms another
  - Equipment Failure – e.g. wheels stop on electric cords
Why is Healthcare so Dangerous?

Working Conditions

- Awkward Postures / Misalignment
  - Weight far from body
  - Reaching over/under objects to complete lift
  - Twisting while moving weight
  - Not directly facing work
  - Bending at lower back instead of getting close to lift
  - Working around, stepping over clutter (power cords, wheeled equipment, etc) instead of cleaning up
Tips to Avoid Ergonomic Injury

PRACTICE GOOD ERGONOMICS

* Do not lift your patient or force the turn
  If your patient cannot lift or turn themselves, neither can you. If your patient requires lift greater than 30 pounds (that’s not much!) you need equipment and help.

* Get close to what you are doing
  Get comfortable with getting up close and personal. Avoid long reaches

* Face what you are doing. Keep your back straight
  Don’t twist or reach to the side

* Plan your moves
  Think about how you are going to move so that everything is in place and that nothing is in the way or missing.
Know your patient, plan accordingly
Can he/she follow commands? How much movement is he/she to do independently? Is he/she prone to unpredictable movements or resistance? Do you need to provide pain management 1st? Do you need equipment or assistance?

Talk your patient through the move
ALWAYS discuss each step, ALWAYS request participation, ALWAYS tell them what and where you them to move, reach, turn toward

Do not force turning and repositioning
Forcing hurts your patient, and it hurts you. Patience is a virtue.
**Tips to Avoid Ergonomic Injury**

- **DO NOT RUSH !!**
  Prioritize your work when you get busy. Choose efficiency and good planning to get things done faster.

- **Stay calm**
  Frustration and anger lead to bad decisions and mistakes. Know when you need a time out!

- **Take care of yourself**
  Caregiving is a workout! Treat you mind and body like you’re an athlete!

- **Take care of your equipment and room**
  A cluttered room is a hazardous room. Get electric cords out of the way. Don’t try to use broken equipment or equipment not made for the job.
RECOMMENDATIONS FOR ERGONOMIC SAFETY

Limit Patient Lift to 35 Pounds or Less

When weight exceeds 35 pounds, Assistive devices should be used

- Professional Turning and lift equipment
- More one person

SOURCE: SAFE PATIENT HANDLING AND MOBILITY. AMERICAN NURSES ASSOCIATION, SILVER SPRING, MARYLAND 2013
Bedside Ergonomics

Applying the Science of Ergonomics to the Bedbound Patient

In other words: How to Get the Pressure Off!
59% of pressure injuries were related to Inconsistent Repositioning / Turning

**Why Reposition?**
Purpose of Repositioning

Protect Pressure Points
Avoid direct contact to bony prominences ESPECIALLY the trunk area (sacrum/coccyx & heels)

Provide Frequent Movement
Movement and position changes are critical to health

Distribute body weight evenly
Body weight should be evenly distributed so that no point of the body is under more excessive weight/pressure

Comfort
Maximize comfort by supporting a position that is aligned. Avoid twisting, hyperextension, hyperflexion, slumped.
Frequent movement/repositioning is important for a person's overall health and is critical to pressure ulcer prevention.
Considerations for Repositioning

- Ergonomically correct & comfortable position
- Effective pressure reduction offloading
- Adequate time in pressure reduced position
- Adequate Patient rest/sleep
- Patient tolerance: Not too often or the wrong time
- Patients ability: physical, cognitive, fear, pain
- Caregiver work load and time
Neutral Posture

"Neutral Posture" refers to the resting position of each joint. The position in which there is the least tension or pressure on nerves, tendons, muscles and bones.

Nicholas Warren, MS, MAT, ScD and Timothy F. Morse, PhD, ErgoCenter, UConn Health Center, Farmington, CT.

Pressure Ulcers
Around 70% of all pressure ulcers occur in the trunk: sacrum/coccyx, trochanter, Ischium

Ergonomics
A patient that is left in an uncomfortable position will do everything they can to get back onto the bedsore

Support a contracted limb in the position it is in. Do not try to straighten or bend it

Neutral
If you were floating in space and completely relaxed, your body would bend slightly

Not So Neutral
Our bodies are not flat. People need to bend slightly

FUN FACTS ABOUT BEDSIDE ERGONOMICS

Figure 2: Pressure points in the supine position
 Bedside Ergonomics

Distribute Body Weight as Evenly as Possible

- Uneven weight distribution
- Too much weight over small surface area

- **Even support = All parts supported**
- “Fill” open or under supported areas
- Goal is to lift off bony prominences as possible
- Support so that there is minimal twisting
- Avoid excessive extension of flexion of joints
- Support natural curvatures
Neutral Posture and Distributed Body Weight in Semi-Fowler Position

"Recliner Position" provides both neutral posture and even weight distribution across the body surface

- Slight bend at knee and hips
- Weight of LE supported evenly over surface, not heels
- Even weight distribution across low back and pelvis
- Pressure on sacrum/coccyx is shared with ishial tuberosity
- Small pillow under neck to support natural cervical curve

The Human Touch zero gravity chair
Supporting ergonomic neutral posture and even weight distribution support with cushions
Neutral posture and even weight distribution in a hospital bed
Fowler Position Slumping
Bedside Ergonomics Greatest Nemesis

Head of Bed Up = Patient Slide Down

Slumped position makes it difficult to eat and breath

Sliding motion causes
- Friction and shear
- Compromised skin is torn open
- End position has exponential pressure to Sacrum/coccyx

Slumped position causes
- Compressed Respiratory Capacity
- Shortened Esophagus and Airway
- Extreme musculoskeletal strain to back and neck
- Excessive Pressure to Sacrum

Courtesy of National Pressure Ulcer Advisory Panel
www.NPUAP.org
Avoid Auto-elevationitis Syndrome
Does the patient really need to have the head of the bed up?

Raise Knee Gatch Up FIRST
All the way BEFORE raising the Head Of The Bed

Elevate HOB one inch at a time
Maintain inertia, Stop slide momentum

Elevate angle of the bed instead
- If Angle elevation available
- If person is not a fall risk
How to Reposition

Now that you Know The Fundamentals of Bedside Ergonomics

Let's Learn to Turn!
Learn to Turn

TURNING & POSITIONING OBJECTIVES

- Get the pressure off bony prominences
- Provide ergonomic support & comfort
- Reduce pressure ulcer incidence/prevalence
- Avoid patient handling injury
- Avoid nurse caregiver lift injury
Learn to Turn

Rule of 30’s

- Keep the head of the bed 30 degrees or less
- Turn and support near 30 degrees side turned
- Even out support points to less than 30mm Hg
- 30 degrees Flexion/Extension of body joints
- Caregiver no more than 30 pound lift
- Less than 30% friction or sheer *

Minimize friction/sheer when moving a person by lifting off or using a slide sheet
LEARN TO TURN

Before you Reposition, Assess Ability

Remember, the best person to move someone is the person himself/herself;

- Is he/she able to follow instructions?
- Can he/she bend her knees, or bend with minimal assistance?
- Can he/she boost up from a slumped position independently?
- Can he/she lift her hips?
- Can he/she turn to the side?

Always communicate the plan and solicit participation!!
LEARN TO TURN

Suggested order of Repositioning

1. Boost
2. Turn to 30 degrees
3. Support to 30 degrees
4. Float Heels
5. Assure other bony prominences are protected (Support arms with pillows to protect elbows, flatten shoulders, make sure no medical devices are poking)
Cautions Before Boosting

Ergonomic and Friction and Shear Injuries occur from boosting when:
- Poor technique (twisting while lifting, rushing, not making sure everyone is ready first)
- Wrong equipment used (no slider sheet or lift equipment should be used but is not)
- There is more resistance than expected
  - "Sticking"
  - Boost momentum is impeded (sudden stops)
  - Caregivers do not lift evenly or at the same time
  - Startled or scared patient does something to try to stop boost

DO NOT TWIST YOUR BACK WHILE BOOSTING!
BOOSTING

Single Caregiver Assisted Boost
(Only if patient can assist)

- Place slider sheet under the shoulders and head
- Flatten the Bed
- Place the bed into trendelenberg (head lower than feet) if patient tolerates
- Have person bend her knees.
- Brace the persons feet to minimize slipping
- Have person put arms to side or use side rails
- Coach to push up as you hold the feet

Pressure Ulcers

Pressure causes ischemia, but the skin tears open with friction and shear

Ergonomics

When a patient pushes herself up using her bent legs, the hips automatically come up and minimize the friction to her sacral area

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Pressure Ulcers

Never boost a patient when she is wet. Clean and dry 1st

Ergonomics

Serious back injury can occur during boosting

- Uneven forces
- Twisting low back during lift
- Unexpected stop

Boosting

2 Caregiver Boost

- NEVER try to boost an "unable" person by yourself
- Don't Rush!
- Elevate to hip height of tallest caregiver
  - Lower bed rails
  - Place slider sheet under the person
  - Place the head of bed to flat
  - Adjust to trendelenberg if patient tolerates
  - Bend the patient's knees if possible
  - Both caregivers count to boost on 3
  - If patient does not slide easily, re-assess for correct equipment placement, or if lift equipment is needed

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Grip palms up
Wrists parallel to forearms
Elbows in close to ribs
Lift then lock shoulders, arms, back

Stand near upper third of bed
Keep your back straight
Look straight ahead
Hips always parallel to the bed, DON’T TWIST YOUR BACK

Boost weight with your legs by shifting from foot end of bed to head end of bed with back and arms locked
DON’T TWIST YOUR BACK, MOVE WITH YOUR LEGS!!

Recommended weight limit for manual boosts is 35 pounds per person (use sliders for heavy people!!)
Objectives for 30 degree turning

- Turn to the side far enough to lift sacrum off the mattress,
- Turn should not be so far that the patient lays on the side hips (trochanter)
- Lift enough to remove pressure from lower back (sacrum, coccyx area)
- Patient should be resting mostly on the buttocks and scapula
**TURNING**

**Ergonomics of the 30 Degree Turn**

- Always have patient do as much of the work as possible
- Provide rails for patient to pull
- If patient needs caregiver assistance, caregiver should use the palm of the hands to pull gently from side of knee, hip and scapula.
- If turn requires more than 30 pounds pressure, use lift equipment. DO NOT use draw sheet to force turn!
**Push or Pull?**

- **Single caregiver**: PULL to get static load close
- **Two caregivers**: whoever pulls the patient, holds the patient. Keep static load as close as possible

**Everybodys back should be straight**

- Log roll your patient to minimize twisting
- PULL with body weight & locked arms
- If you cannot reach the patient without bending your back, put one knee up on the bed to get closer
TURNING

Patient Ergonomics

- Coach patient to assist as much as possible
  Lead person toward side of bed. Provide rails to pull if patient able. Don't force. Never pull on persons arms.

- Bend the knees first

- Use your OPEN flat hands to Pull at lateral side of knee and scapula

- "Log roll" so that hips and back are aligned
Turning

Pitfalls of 30 Degree Lateral Turning

Don't try to turn a "crooked" patient

Align patient 1st
- Pull the shoulders toward center, then walk to other side
- Pull the hips & legs toward center
- Slide sheets are helpful

Some people don't want to turn

Let go!
- Drop the rail
- Try to address the reasons
- Reassure patient they are safe
- Remind not to do
- Never force through. Get a second person and or use lift

Don't bend and reach

Walk around to the other side to place cushions
Learn to Turn

Supporting a Turned Position: PRIMARY GOALS

- Support at 30 degrees to the side
  Far enough over to lift off Sacrum **but not too far onto** Trochanter (hips)
- Back & Hips aligned, not twisted
- **No contact to Sacrum/Coccyx**
- Head Square with Shoulders
- Legs Supported in Alignment with Spine

🚫 Avoid sacral area
Support under scapula & buttocks
Neutral Positioning

- Support back and hips in alignment
- Bend knees to 30 degrees natural angle
- Support legs with pillows so that knees don’t touch each other
- Keep legs level with hips. DO NOT elevate lower legs with knee gatch or pillows
- The lower to HOB, the better the alignment
Positioning 101

What is Wrong With These Positions?

1.

2.

3.

4.
HEEL FLOATING

Preventing Heel Pressure Injuries

FLOAT THE HEELS AT ALL TIMES
FLOATING THE HEELS

Most Wedges Lift Too High

Great Floating! but........

- Cannot use in turned position
- No support against foot drop
- People will need to take legs off cushion when "tired"
- Bulky, hard to manage and store
- Cannot use for hip fractures
- Not good for arterial or venous circulation problems
Heel Floating

Ergonomic and Pressure Relief for the Heels

PRIMARY GOALS

- Lift legs high enough to remove pressure from the heels
- Avoid excessive elevation
- Avoid “Trapping” the legs. Support to allow movement and turning
- Support the ENTIRE CALF below the knee, EVENLY & NEUTRALLY
- Avoid “bunching” or tangling under the knee.
- Avoid excessive pressure at the back of the knees
- Avoid hyper-extension or pin-point pressure spots
- For long term immobility, ankle joint should be supported also
FLOATING THE HEELS
WORLDS most common MISTAKE

1 Pillow Widthwise - Don't Bother
❖ Increases pressure on heels
❖ Always wiggles toward under knees and exposes heels

Use 2 Pillows Lengthwise
❖ Supports entire legs, knee bend for ergonomic comfort
❖ Does not protect against foot drop
❖ Slipping out of place from leg movement is common

Pressure Ulcers
Around 35-50% of all pressure ulcers occur on the heel(s)
Excessive pressure placed directly at the back of the knees reduces blood circulation to the feet and can contribute to PU’s

Ergonomics
Support under slightly bent knees decreases spinal load so a person may be more comfortable with pillows under the legs
Heel Floating Device Options

Worst Option
High foam block w/ side rails
- Elevates too high
- No ankle support
- Restricts leg movement
- Can use in turned position
- Leg elevation fatigue

Bad Option
One pillow under knees
- Too much under knees
- INCREASES pressure to heels
- Bottoms out
- Unstable

Best Option
The HeelBone
- Low profile lift
- Full leg support
- No elevation fatigue
- Ankle support

Ok Option
Foams Boots
- Effective pressure reduction
- Supports ankle
- Restricts leg movement
- Entangles and dislodges easily

Temporary fix
1 pillow under each leg
- Moderate lift
- Good leg support
- Leg elevation fatigue
- Bottoms out
- Unstable

One pillow under knees
- Too much under knees
- INCREASES pressure to heels
- Bottoms out
- Unstable

High foam block w/ side rails
- Elevates too high
- No ankle support
- Restricts leg movement
- Can use in turned position
- Leg elevation fatigue

Floats in bent leg position
- Floats in turned position
- Stable
Discussion - Questions - Comments