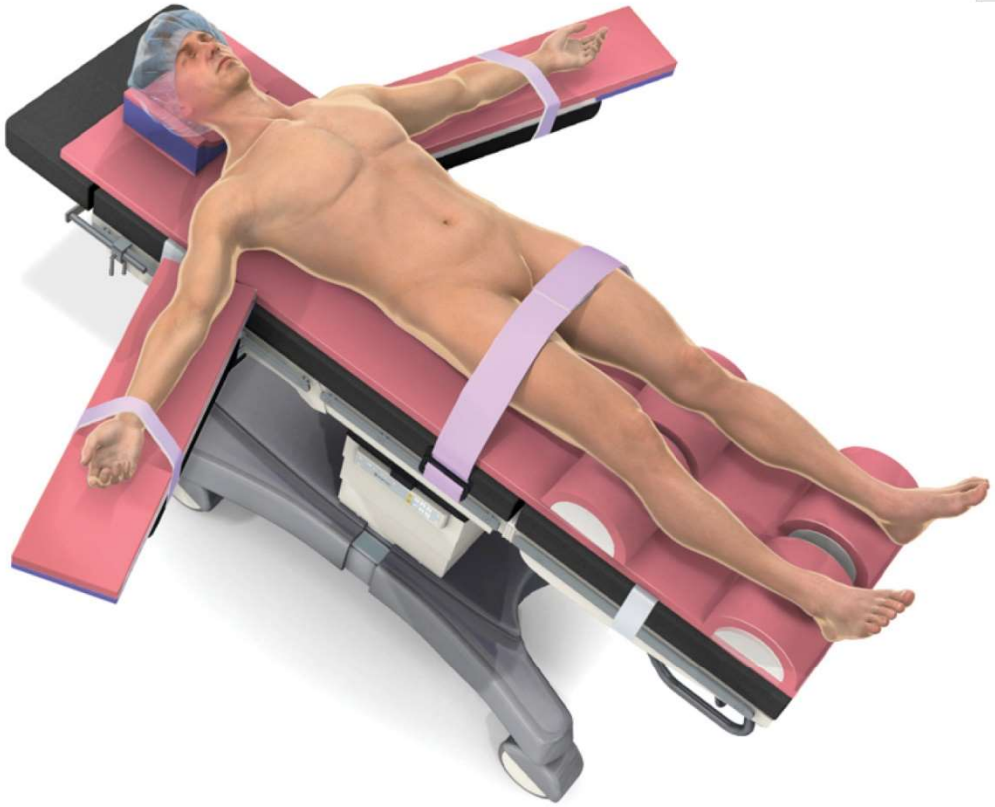
AORN | TOOL KIT

Prevention of Perioperative Pressure Injury



Funded in part by grants from Xodus Medical through the AORN Foundation

XODUS MEDICAL
Making Surgery Safer™

AORN | FOUNDATION

Let's Review the Basics: Positioning Patients in Surgery

Learning Outcome

- The perioperative RN and other team members will have increased their knowledge of safe patient positioning practices to implement in a clinical practice setting.
- The perioperative RN and other team members will be able to identify risk management strategies to implement in clinical practice to prevent perioperative pressure injuries and patient positioning injuries.

Goals of Patient Positioning

- Maintain the patient's privacy and comfort.
- Provide exposure to the surgical site.
- Provide access to intravenous (IV) lines and monitoring equipment.
- Stabilize the patient to prevent unintended shifting or movement.
- Observe and protect fingers, toes, and genitals.
- Allow for optimal ventilation
  - maintain a patent airway
  - avoid constriction or pressure on the chest or abdomen
- Maintain circulation.
- Protect muscles, nerves, bony prominences, joints, skin, and vital organs from injury.

Perform a Proactive Risk Assessment for Each Patient Preoperative Assessment- One Patient at a Time

For each perioperative patient:

Assess the patient's risks for

- Skin breakdown
- Pressure injury
- Injury due to patient positioning

Use a risk assessment tool to identify risks for pressure injury development

- Braden Scales (adult and pediatric)

Communicate the patient's risks for injury and pressure injury to all perioperative team members.

- Always include this information in the hand-over communication to the next care provider.

Positioning the Patient

- The perioperative RN and other team members must advocate for the patient during patient positioning.
  - Protect the patient's privacy and dignity.
- Advances in minimally invasive surgeries (eg, robotic, laparoscopic) may require extreme, higher-risk positions.
- Inadequate positioning solutions may result in patients experiencing short-term and long-term health complications.

Positioning Injuries – Patient Injury

General/Regional anesthesia

- Physiologic changes
  - Patients cannot feel pain or pressure.
- Patients are unable to move independently.
  - Patients lack protective reflexes.
  - Patients lack normal perception.

Respiratory Considerations

- A surgical position can compromise respiration.
- The abdominal viscera can shift upward toward the diaphragm and affect ventilatory force and may decrease tidal volume (ie, supine, prone, lateral).
- Patient conditions (eg, obesity, pregnancy, pulmonary disease) and the patient's position in surgery can affect the respiratory system.

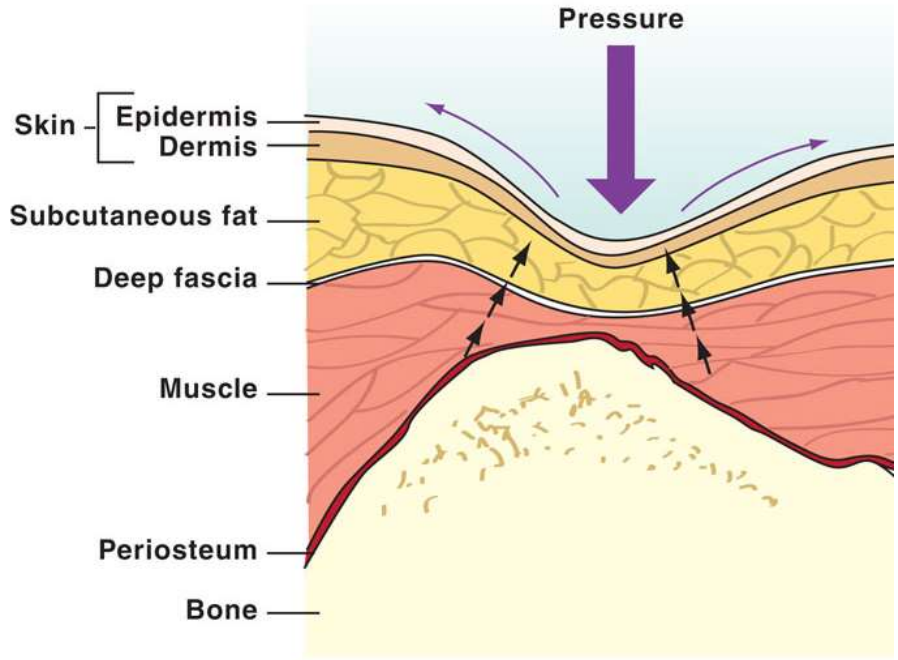
Vascular Considerations

- Peripheral vessels dilate during general anesthesia, reducing blood pressure.
- Blood pools to lowest body part or dependent areas.
- All surgical patients are at risk for venous thromboembolism.
- Acute compartment syndrome can occur when an extremity is not positioned correctly, or there is excessive constriction to the extremity.

Musculoskeletal Considerations

- Maintain the patient in a neutral alignment to avoid over-stretching of muscles, tendons, ligaments.
- Determine if the patient has limitations in range of motion.
- Support the extremities during position changes.
- Avoid excessive joint extension.

Positioning Injuries



Positioning Injuries – Extrinsic Factors

Pressure

Force placed on underlying tissue

Shear

- Displacement of the upper tissue layers in reference to the underlying fascia
- **Shearing:** A sliding movement of skin and subcutaneous tissue that leaves the underlying muscle stationary

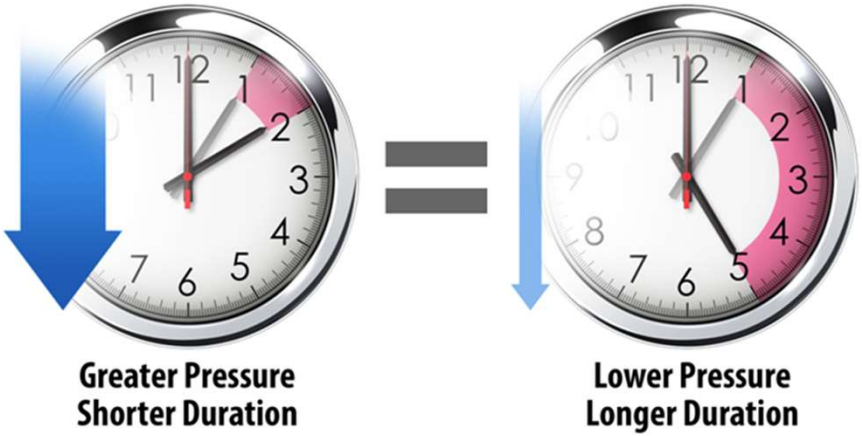
Friction

Force of two surfaces rubbing against one another

Positioning Injuries – Extrinsic Factors

The Relationship of Time and Pressure

Time and pressure are interrelated:
A trade-off between duration and amount of pressure



Pressure Injuries May Lead to…

Infection

Impaired Function

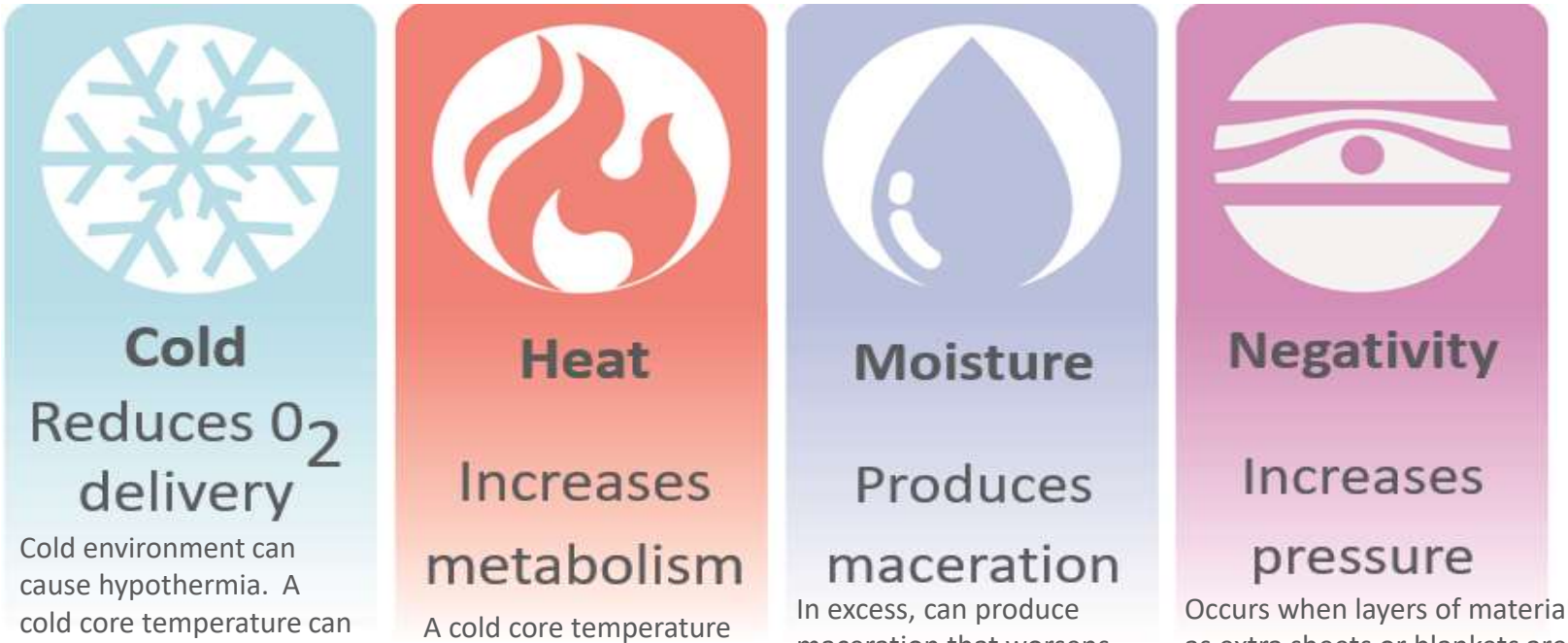
Poor Prognosis

Increased costs of care

Increased length of stay

Decreased quality of life

Other Factors that May Lead to Skin and Tissue Injury



Positioning Injuries - Nerves

Nerve Damage

- Stretching or compression
- Transient or permanent

Most Common Sites

- Brachial plexus
- Peroneal nerve
- Facial nerve

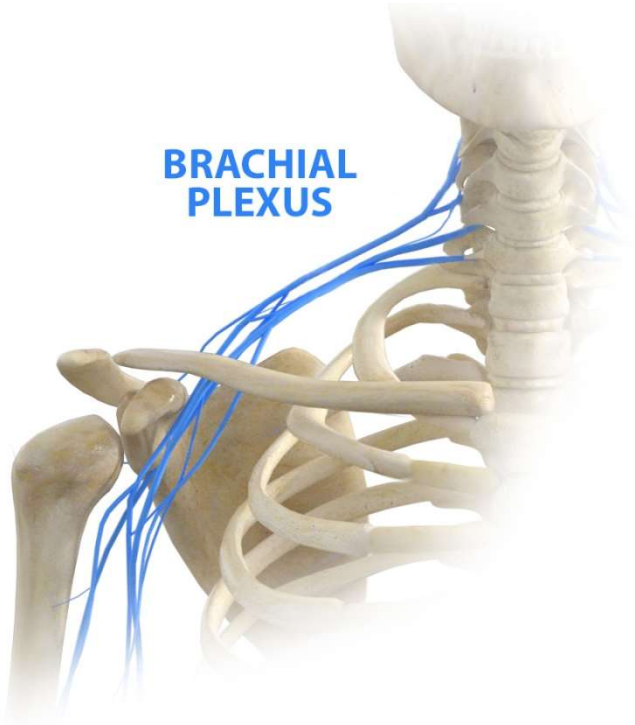
Nervous System Considerations

- Anesthetics depress the nervous system and normal compensatory mechanisms are compromised.
- Collateral damage to surrounding tissue can impact nourishment to nerves.
- Nerves can be injured by compression, ischemia, and stretching

Positioning Injuries

Brachial plexus innervates

- Shoulder
- Arm
- Hand



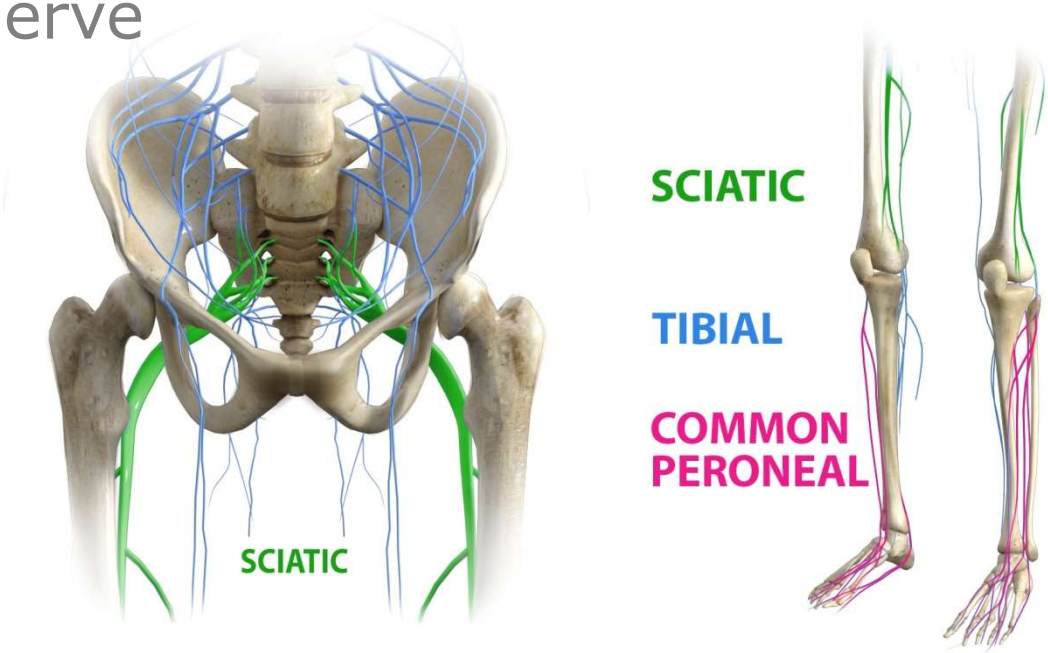
Positioning Injuries – Brachial Plexus Injury

- How an injury may occur
  - Arm boards are extended beyond 90 degrees
  - Arm boards are higher or lower than the OR bed
  - Lateral rotation of the patient's head
  - Team members' lean against the shoulder or arm
  - Use of shoulder braces

Positioning Injuries – Common Peroneal Nerve

Common peroneal nerve

- Lower leg
- Foot
- Toes



Positioning Injuries - Common Peroneal Nerve

How an injury may occur

- Direct compression
- Thin patients are at risk
- Hyperextension of knees
- Pressure behind the knee
- Graduated compression stockings are too tight
- Foot drop, lower extremity paresthesia

Positioning Can Affect Pulmonary Function

- Hypoxia
- Respiratory compromise

- Decreased O_2 saturation
- Pulmonary edema

- Congestion
- Atelectasis

Positioning Injuries - Eyes

Injuries

- Corneal abrasion
- Central retinal artery occlusion

Risk Factors

- Prone position
- Length of surgery
- Significant blood loss

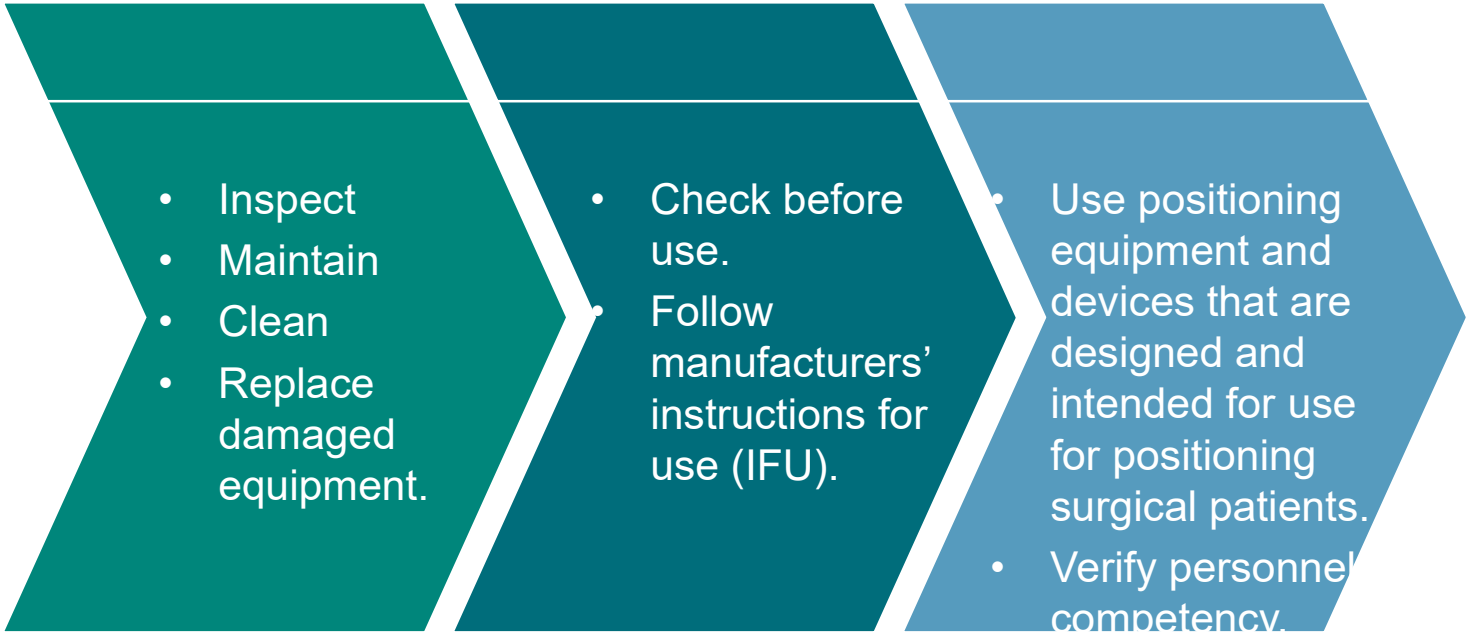
Positioning Injuries – Patient Factors

- High body mass index (BMI)
- Low BMI
- Poor nutritional status
- Advanced age
- History of smoking
- History of previous skin breakdown

Positioning the Patient – It is a Process

- Collaborative process
  - Selection of equipment
  - Preoperative assessment
  - Positioning
  - Documentation
  - Postoperative evaluation

Selection of Equipment



Selection of Equipment

Pressure relieving surface

- Disperses weight
- Prevents “bottoming out”
- Relieves shear and friction

Preoperative Assessment

- Age/Height/Weight/BMI
- Nutritional status
- Blood pressure
- Skin integrity
- Range of motion/Physical limitations
- Internal/External devices
- Preexisting conditions
- Medical history
- Diagnostic studies
- Psychological/Cultural considerations

Surgical Positions

OPER P-04 - Intraoperative Patient Positioning
PROC OPER P-04A - Lateral Positioning
PROC OPER P-04B - Lithotomy Positioning
PROC OPER P-04C - Prone Positioning
PROC OPER P-04D - Supine Positioning
PROC OPER P-04E - Trendelenburg/Reverse Trendelenburg Positioning
PROC OPER P-04F - Sitting or Semi-sitting (Beach Chair/Fowler/Semi-Fowler) Position

Supine

PROC OPER P-04D - Supine Positioning

https://upstate.ellucid.com/documents/view/10267?product=policy

Supine Positioning

A. A pillow or pad (i.e. waffle pad) may be placed under the patient's lumbosacral area.

B. A soft pillow may be placed under the patient's knees, to slightly flex patient's knees.

C. The safety strap should be placed approximately 2 inches (5 cm) above the patient's knees. Additional safety straps need to be placed when lateral tilting is anticipated.

D. Legs should be parallel and the ankles uncrossed.

E. Heels should be elevated off the underlying surface.

F. Effort to relieve pressure on heels should be made by:
1. Using a heel-suspension device designed to elevate the heel and distribute the weight of the patient's leg along the calf (i.e. gel, waffle pad) or
2. Elevating and supporting the patient's calves with a pressure-redistributing surface (i.e. pillow, foam padding) that is wide enough to accommodate the externally rotated malleolus.

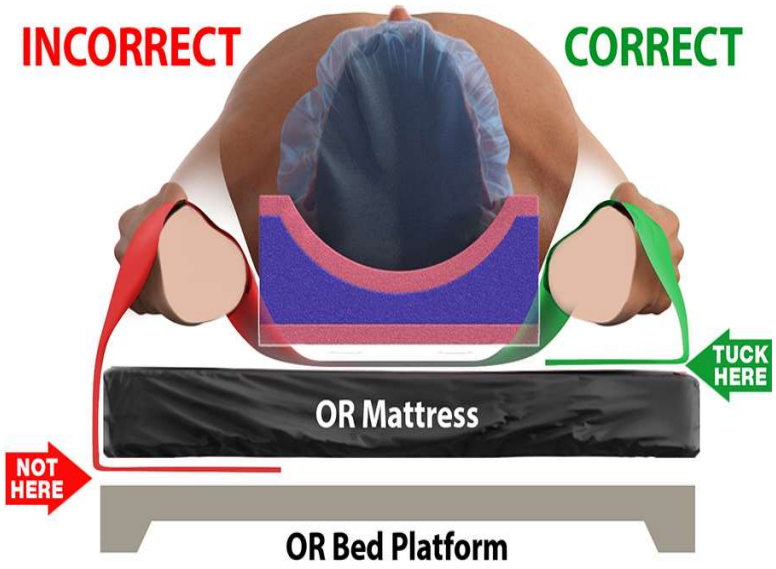
G. Perioperative team members should protect the patient's feet from hyperflexion and hyperextension.

H. When using a hyperlordotic position (i.e., supine with arched spine), do not hyperextend the patient beyond a physiologic degree.

I. Prior to draping, a tilt test should be performed and the patient should be checked for sliding, limb impingement, respiratory and circulatory problems.

PROC OPER P-04D - Supine Positioning

Supine



The patient's arms should be:

1. **tucked at the sides with a draw sheet,**
2. **secured at the sides with arm guards,**
3. **flexed and secured across the body, or**
4. **extended on arm boards.**
5. **Checked for positioning of the pulse oximetry cord (if pulse oximeter is on finger). It should not be pulling, causing flexion, or causing extension of the distal end of the finger.**

When the patient's arms are tucked at the sides and secured with a draw sheet:

1. **The patient's arms should be in a neutral position with the palms facing the body and without hyperextension of the elbows, with thumbs pointing upward.**
2. **The patient's elbows and hands should be protected with extra padding**
3. **The draw sheet should be between the patient's body and arm when tucked, and tucked between the patient and the OR bed mattress.**
4. **The draw sheet should be tucked snugly enough to secure the patient's arm, but not so tightly as to become a pressure source.**
5. **The draw sheet should extend from the mid-upper arm (i.e., above the elbows) to the fingertips.**
6. **When tucking arms PIVs and arterial lines (if present) are to be evaluated to assure they are free flowing and arterial line is not dampened.**
7. **Additional padding with gauze or foam should be placed to prevent pressure from hard or sharp edges from line components.**

PROC OPER P-04D - Supine Positioning

Supine

When the patient's arms are extended on arm boards (in positions other than prone):

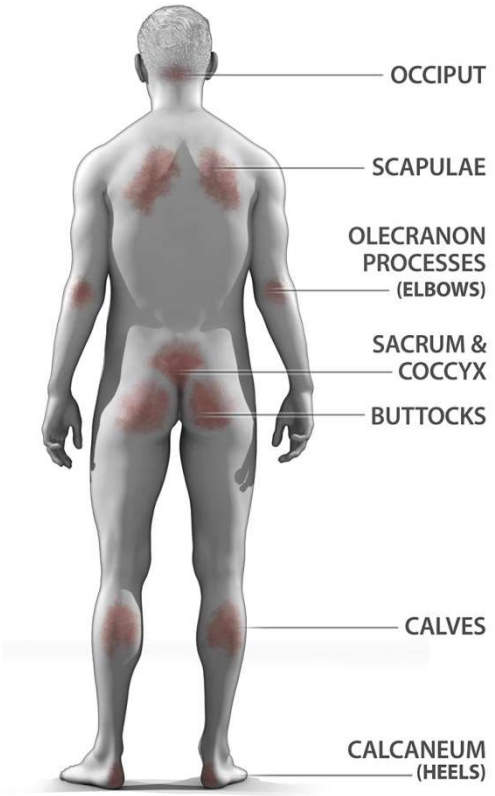
- the arms should be positioned with palms facing up,
- the arm boards should be padded,
- the arm boards should be level with the OR bed mattress,
- the arms abducted less than 90 degrees
- the arms should be positioned with the elbows slightly flexed, but not hyperextended
- the arms should not be positioned above the head,
- the arms and wrists should be maintained in neutral alignment,
- the arms should be secured to the arm boards

PROC OPER P-04D - Supine Positioning

Possible Complications and Risks for Injury in the Supine Position

Supine position causes extra pressure on the skin over the

- Occiput
- Scapulae
- Olecranon processes
- Sacrum
- Coccyx
- Calcaneum



Trendelenburg

PROC OPER P-04E - Trendelenburg/Reverse Trendelenburg Positioning
https://upstate.ellucid.com/documents/view/10268?product=policy

A. The degree of Trendelenburg position should be minimized as much as possible.

B. The patient should be in the Trendelenburg position for the shortest time possible.

C. It is recommended that the Trendelenburg position be avoided in patients that are extremely obese (i.e., BMI > 40 kg/m2), if possible and at the discretion of the Anesthesia and Surgery team.
   1. If using the Trendelenburg position for an extremely obese patient is necessary, it is recommended that the patient's arterial blood gas be carefully monitored, if possible and at the discretion of the Anesthesia and Surgery team.
   2. It is especially important to minimize the degree of Trendelenburg and the length of time that the patient is in Trendelenburg in extremely obese patients (i.e., BMI > 40 kg/m2).

D. Patients in the Trendelenburg position should be repositioned into the supine or reverse Trendelenburg position at established intervals during the procedure.
   1. It is recommended that patient be leveled to the Supine position for 5 minutes at 4 hour intervals throughout the case as appropriate at the discretion of the surgeon and anesthesia provider.
   2. The perioperative team should establish repositioning interventions and repositioning intervals based on the individual patient and the specific situation, if possible.

E. The anesthesia professional should check the patient's airway and take corrective actions as indicated.

F. The patient's arms should be tucked at the sides with a draw sheet or secured at the sides with arm guards.

G. Shoulder braces should not be used.

H. Prior to draping, a tilt test should be performed and the patient should be checked for sliding, limb impingement, respiratory and circulatory problems.

PROC OPER P-04E - Trendelenburg/Reverse Trendelenburg Positioning

Trendelenburg

- Visibility and accessibility to abdominal and pelvic organs is increased in this position
- Causes a decrease in respiratory exchange caused by the displaced viscera pressing against the diaphragm and pooling of blood in the upper torso poses a serious danger to the patient
- Intracranial pressure is also increased
- **Patients should be placed in the Trendelenburg position for the shortest amount of time possible**

Trendelenburg

"Patients who are positioned in the Trendelenburg position for prolonged periods may be at risk for postoperative vision loss."

Guideline for positioning the patient. In: *Guidelines for Perioperative Practice*. Denver, CO: AORN, Inc; 2020:629-704.

The risk for postoperative vision loss is caused

- by an ischemic process of decreased blood supply from the arteries of the optic nerve or
- by venous stasis that occurs as a result of decreased venous outflow.

Trendelenburg

Increased intraocular pressure may be a risk for postoperative vision loss.

MIS procedures

- Pneumoperitoneum in combination with the Trendelenburg position can lead to a greater increase in intraocular pressure
- Older patients
  - Are at greater risk for ischemic optic neuropathy if they have an elevated baseline intraocular pressure

Possible Complications and Risks for Injury in the Trendelenburg Position

- Decrease in limb perfusion
- Decreased venous return from the head, leading to venous pooling and increased intraocular pressure
- Edema (eg, eyes, lips, tongue, and larynx) can occur as a result of venous stasis.
- Laryngeal edema can lead to respiratory distress and the need to reintubate or delay extubation.

Trendelenburg

Patient sliding can lead to injuries:

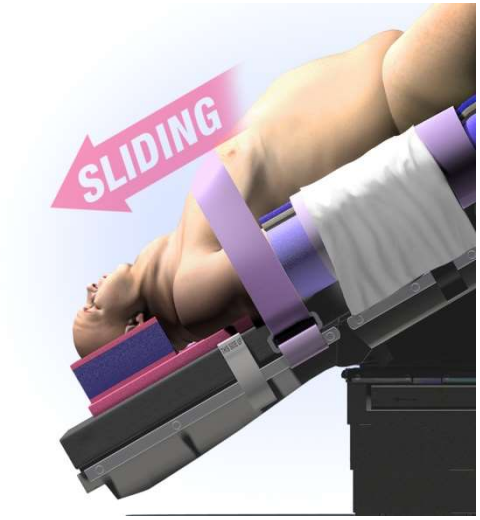
- Pressure Injury
- Stress on tissue, joints, and nerves
- Port Trauma (ie, MIS, robotic cases)
- Falls

Secure the patient's arms

- Tuck or secure the patient's arms at the sides.
- Secure the arms to reduce the potential for patient injury.

Safety Measures to Prevent Sliding

- Use positioning devices designed to prevent sliding.
- Preventing the patient from sliding on the OR bed de and reduces the potential for pressure on the brachial plexus.



Steep Trendelenburg Position

Steep Trendelenburg Position

What Is It?

Steep Trendelenburg

- A 30-degree to 45-degree OR bed tilt is generally considered "steep."
- Places a greater physiologic strain on the patient's body

Complications

Increases the potential for

- intracranial hypertension
- respiratory deterioration

The combination of pneumoperitoneum and steep Trendelenburg can lead to

- moderate to severe adverse hemodynamic changes
  - reduced stroke volume
  - cardiac output
  - left ventricular end-diastolic volume
- facial, ocular, and upper airway edema

Prolonged Use

Prolonged use of steep Trendelenburg can result in retinal detachment and blindness.

Variation in Supine – Reverse Trendelenburg Position

Reverse Trendelenburg

In the reverse Trendelenburg position, the feet are lower than the head.

A well-padded foot board should be used to help maintain alignment and prevent peroneal nerve damage.

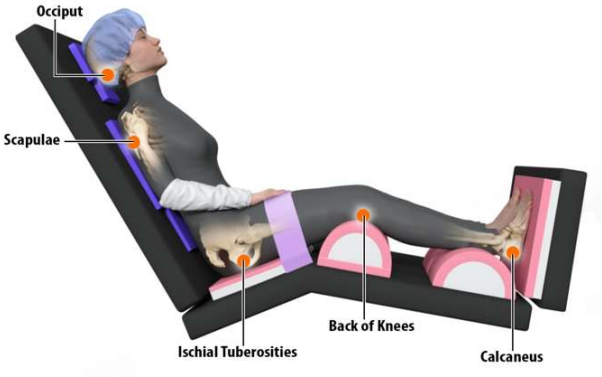
Lumbar and small pillows placed under the knees may help to prevent the body from slipping while lessening strain on the patient's back and legs.

PROC OPER P-04E - Trendelenburg/Reverse Trendelenburg Positioning

Possible Complications and Risks for Injury in the Reverse Trendelenburg Position

- Venous pooling in lower extremities
- Venous air embolism
- Potential for injury to the peroneal and tibial nerves from foot and ankle flexion
- Sliding

Sitting/Modified-Sitting



PROC OPER P-04F - Sitting or Semi-sitting (Beach Chair/Fowler/Semi-Fowler) Position

https://upstate.ellucid.com/documents/view/11306?product=policy

A. In the sitting or semi-sitting position, the degree of patient head elevation should be minimized as much as possible.

B. The patient's head should be maintained in a neutral position without excessive flexion, extension, or rotation.

C. Perioperative team members should assess and monitor the patient's head position after positioning activities and during the procedure and implement corrective actions as indicated.

D. Avoid use of horseshoe-shaped head positioner, if possible.

E. In the sitting or semi-sitting position, the patient's arms or nonoperative arm should be flexed across the body and secured or supported on an arm board.

F. The patient's operative arm may be held by the surgeon or surgical assistant or supported by an arm-positioning device designed for this purpose.
- **a.** Minimize extension and external rotation of the patent's operative arm as much as possible.

G. The patient's knees should be flexed to reduce stretching of the sciatic nerve and may help to prevent a postoperative neuropathy.

H. The patient's buttocks should be padded.

I. After the patient is moved into a sitting or semi-sitting position, the perioperative RN should prevent the patient's abdominal pannus from resting on the thighs, if possible, and verify placement and security of the safety restraint across the patient's thighs.

J. Sequential compression devices should be considered for use when the patient is in the sitting or semi-sitting position to prevent venous pooling and enhance venous return from the legs.

K. The sitting position should not be used for patients with ventriculoperitoneal shunts, if possible.

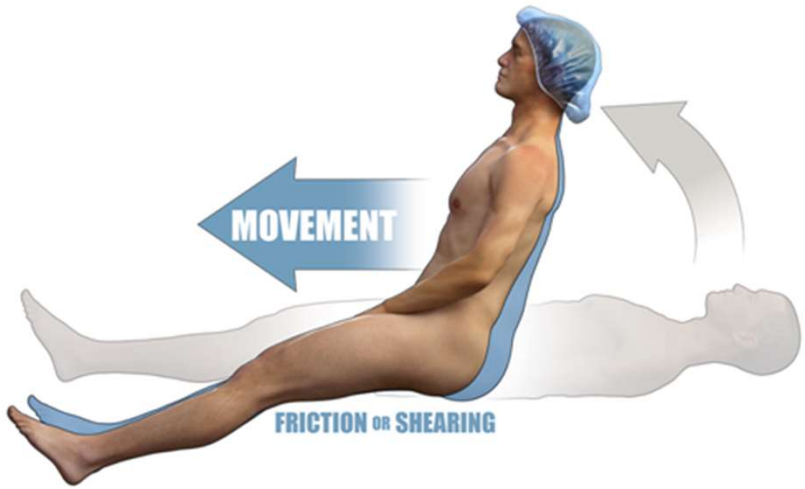
PROC OPER P-04F - Sitting or Semi-sitting (Beach Chair/Fowler/Semi-Fowler) Position

Possible Complications and Risks for Injury in the Sitting Position

- Redness and pressure injury to the
  - face
  - head
  - ears
  - neck
- Compressive peripheral neuropathy
- Hypotension and hemodynamic instability
- Venous air embolism
- Pooling in the lower extremities

Possible Complications and Risks for Injury in the Sitting Position

- Sliding
- Friction
- Shearing
- Stretching



Lithotomy

PROC OPER P-04B - Lithotomy Positioning

https://upstate.ellucid.com/documents/view/10265?product=policy

A. The patient's legs should be placed in and removed from the leg holders in a two-step process: A minimum of two people (i.e., a minimum of one person per leg) should remove the legs slowly and simultaneously from the leg holders and bring them together before the legs are raised or lowered to the OR bed.

B. The patient should be in the lithotomy position for the shortest time possible.

C. It is recommended that patient's legs be repositioned at 4 hour intervals throughout the case as appropriate at the discretion of the surgeon and anesthesia provider.
1. It is recommended that the circulating nurse provide updates of the time the patient's legs have been elevated in lithotomy position at 3 hour intervals.
2. The perioperative team should establish repositioning interventions and repositioning intervals based on the individual patient and the specific situation, if possible.

D. The patient's hands and fingers should be protected from injury when the foot of the OR bed is raised, lowered, or reattached.
1. Ensure that the patient's hands/fingers are out of the way of the stirrup attachments.
2. Test the stirrups in high lithotomy position prior to draping. Visualize the upper extremities and ensure that the hands/fingers are not impinged by the stirrups.

E. Position the patient's buttocks even with the lower break of the procedure bed and in a manner that securely supports the sacrum on the bed surface.
1. When the patient is in the exaggerated lithotomy position, support the patient's sacrum

F. Position the patient's hips in a manner that prevents excessive flexion, rotation, or abduction.

PROC OPER P-04B - Lithotomy Positioning

Lithotomy

G. Leg holders should be placed at an even height.

H. Support the patient's legs over the largest surface area of the leg possible

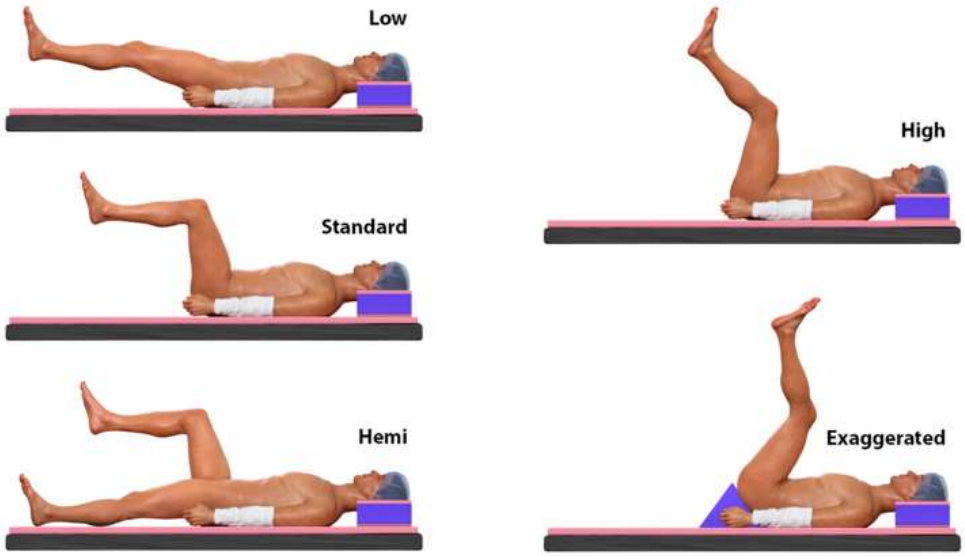
I. When using candy cane–shaped leg holders, additional padding should be placed around the patient's foot and ankle.

J. Place the patient's heels in the lowest position possible.

K. The patient's legs should not rest against leg holder posts.
   1. Scrubbed personnel should not lean against the patient's thighs.

PROC OPER P-04B - Lithotomy Positioning

Lithotomy

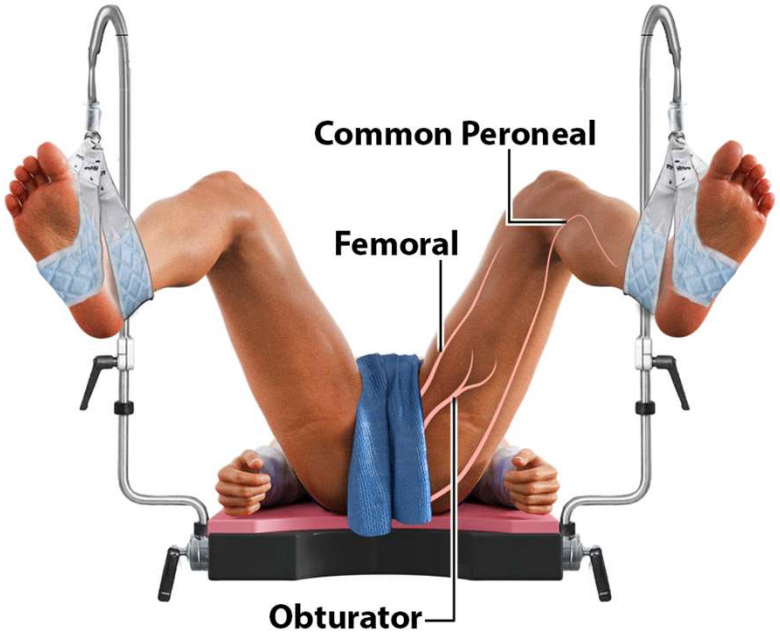


L. Avoid the use of the hemi-lithotomy position, if possible.

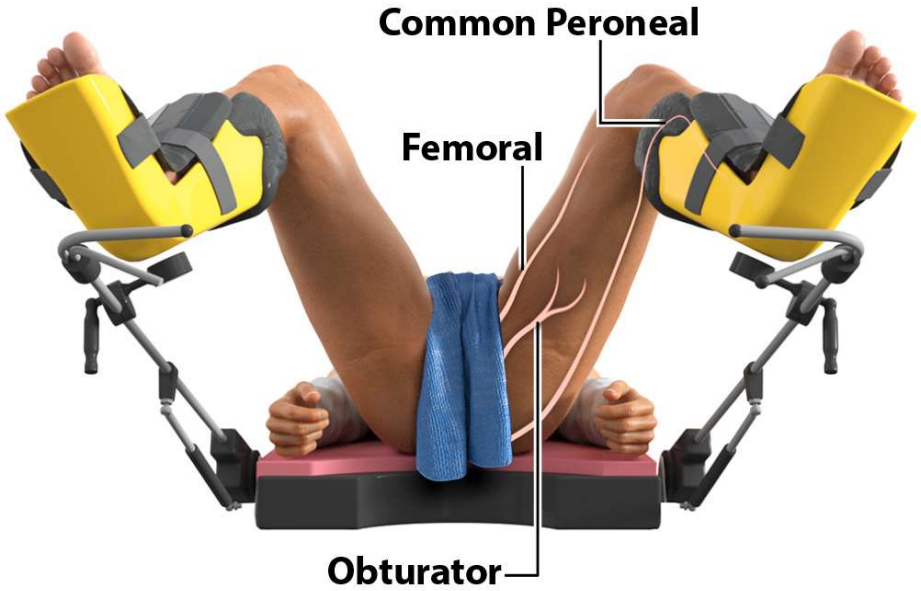
M. Prior to draping, a tilt test should be performed and the patient should be checked for
sliding, limb impingement,
respiratory and circulatory problems.

PROC OPER P-04B - Lithotomy Positioning

Lithotomy



Lithotomy



Lithotomy

Possible Complications and Risks for Injury in the Lithotomy Position

When a patient's legs are raised

- Blood from the legs shifts to the central circulation, which decreases perfusion to the legs.
- There is an increase in cardiac output and venous return.
- The abdominal organs shift, and respiratory complications can occur due to an increased pressure on the diaphragm.
- "In patients who are obese, there is additional chest weight and abdominal pressure, leading to an increased respiratory workload and an increased risk for aspiration."[1(p664)]

1. Guideline for positioning the patient. In: *Guidelines for Perioperative Practice*. Denver, CO: AORN, Inc; 2020:629-704.

Possible Complications and Risks for Injury in the Lithotomy Position

The longer the patient is positioned in lithotomy, the greater the potential for the development of

- Neuropathy
- Neurovascular complication
- Compartment syndrome

Fingers and hands can be injured during positioning.

Guideline for positioning the patient. In: *Guidelines for Perioperative Practice*. Denver, CO: AORN, Inc; 2020:629-704.

Prone

PROC OPER P-04C - Prone Positioning

https://upstate.ellucid.com/documents/view/10266?product=policy

A. The patient should be in the prone position for the shortest time possible.

B. The anesthesia professional should assess the patient's airway maintenance device throughout the procedure and should implement corrective actions as indicated.

C. After turning the patient from supine to prone on the OR bed, the stretcher/bed should remain in the OR room until the anesthesia provider gives permission for the stretcher to be removed from the room.

D. Prior to turning the patient from supine to prone on the OR bed, the lines (PIVs, catheters, and monitoring devices) need to be parallel to the torso not crossing the chest and abdomen to prevent them from being stuck under the patient.

E. The patient's head should be positioned in a neutral position, without excessive flexion, extension, or rotation.

1. Use a prone face positioner when the patient's head is positioned in the midline.
2. Avoid use of a horseshoe-shaped head positioner, if possible.
3. The position of the patient's face should be assessed and monitored after positioning activities and during the procedure (every 30 minutes), and corrective actions should be implemented as indicated.
4. Perioperative team members should implement interventions to prevent direct pressure on the patient's eyes.

F. Position the patient on ~~two chest~~ torso supports that extend from the clavicle to the iliac crest

1. Chest supports should be positioned to permit full lung and abdominal expansion.
2. If chest rolls are used:
   a. Place chest rolls under the patient's dependent thorax, distal to the axillary fold.
   b. Chest support should be wide enough to spread its lifting ability over the area of several contiguous ribs.
   c. A device designed for use as a chest support (i.e. gel pad) should be used.

PROC OPER P-04C - Prone Positioning

Prone

G. The patient's breasts, abdomen, and genitals should be positioned in a manner that frees them from torsion or pressure.

H. The patient's knees should be padded.

I. The patient's toes should be elevated off the bed by placing padding under the patient's shins so the shins are high enough to prevent pressure on the tips of the toes.

J. It is recommended that patients in the prone position be tilted slightly reverse Trendelenburg, if possible

K. Avoid using a Wilson frame, if possible.
   1. If a Wilson frame must be used, use foam padding to ensure that the patient's head is not lower than the heart

L. The perioperative RN should assess the patient's pedal pulses after positioning in the knee-chest position and during the procedure and should take corrective actions as indicated.

M. When the patient is in the prone position, a stretcher or bed should be readily accessible.

Prone

N. When positioned in the prone position, the patient's arms should be tucked at the sides with a draw sheet, secured at the sides with arm guards or placed on an arm board positioned parallel to the OR bed, or on an arm rest with adjustment joints designed for this purpose. Placement of the arms is determined by the needs of the surgical team and the physical limitations of the patient.

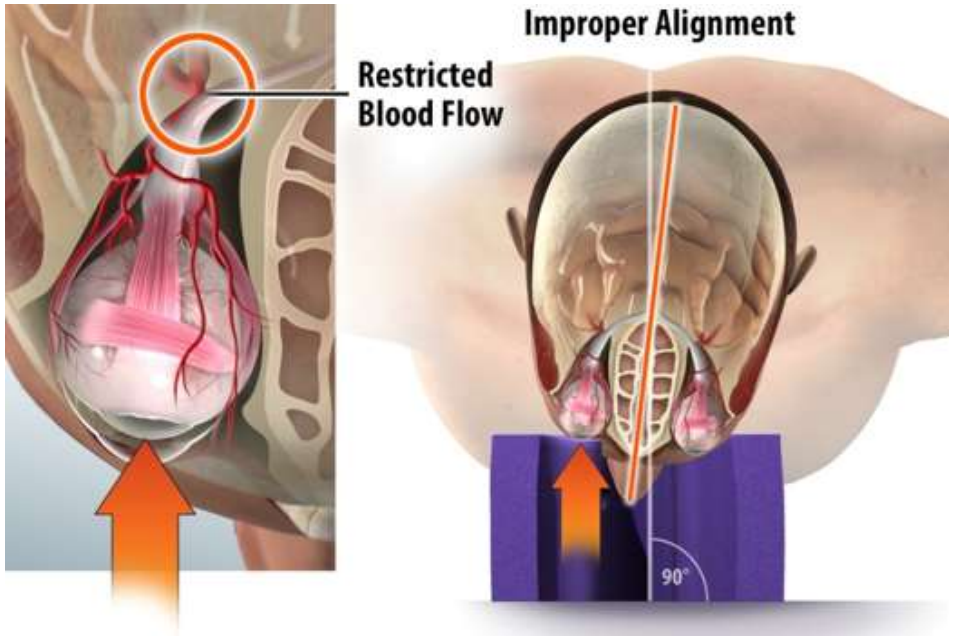
1. When the patient's arms are tucked at the sides and secured with a draw sheet:
   a. Arms should be in neutral position with palms facing the body and without hyperextension of the elbows.
   b. The draw sheet should be pulled up between the patient's body and arm, placed over the patient's arm, and tucked between the patient and the OR bed mattress
   c. The draw sheet should be tucked snugly enough to secure the patient's arm, but not so tightly as to create a pressure source
   d. The draw sheet should extend from the mid upper arm to the fingertips.
2. When the patient's arms are placed on arm boards or an arm rest *with adjustment joints*.
   a. the arm boards or arm rest should be padded
   b. the arm boards or arm rest should be at a level lower than the chest
   c. the arms should be abducted less than 90 degrees
   d. the arms should be positioned with the elbows slightly flexed, but not hyperextended
   e. the arms should not be positioned above the patient's head
   f. The arms should be positioned with palms facing downward
   g. the arms and wrists should be maintained in neutral alignment, and
   h. the arms should be secured to the arm boards

O. Prior to draping, a tilt test should be performed and the patient should be checked for sliding, limb impingement, respiratory and circulatory problems.

PROC OPER P-04C - Prone Positioning

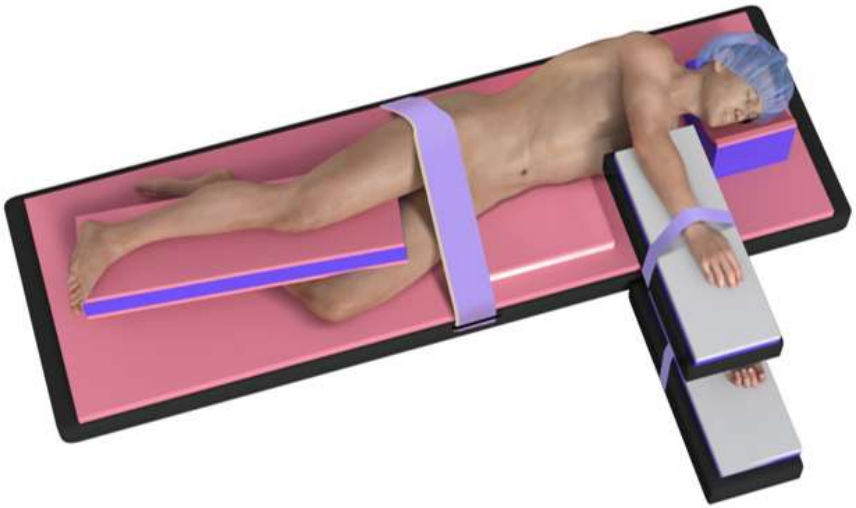
Possible Complications and Risks for Injury in the Prone Position

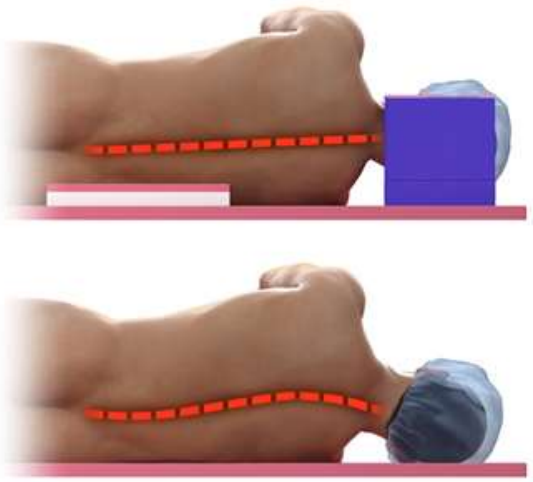
- Increased intraabdominal pressure
- Increased bleeding
- Abdominal compartment syndrome
- Limb compartment syndrome
- Nerve injuries
- Pressure injuries
- Cardiovascular compromise
- Thrombosis and stroke
- Hepatic dysfunction
- Ocular injuries
- Oropharyngeal swelling
- Airway maintenance device dislodgement
- Venous air embolism



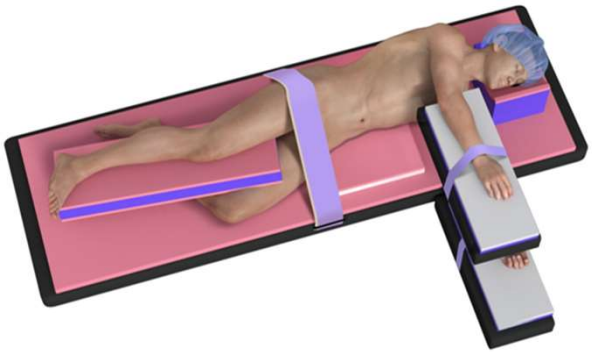
Jackknife

Lateral





Lateral



PROC OPER P-04A - Lateral Positioning

https://upstate.ellucid.com/documents/view/10264?product=policy

A. Use the dependent side as the reference point for documentation. This is the side of the patient that is in contact with the OR bed.

B. The patient should be in the lateral position for the shortest time possible.
1. Patients in the lateral position may be repositioned at established intervals during the procedure, if feasible.
2. The perioperative team should establish repositioning interventions and repositioning intervals based on the individual patient and the specific situation, if possible.

C. The patient's physiologic spinal alignment should be maintained.

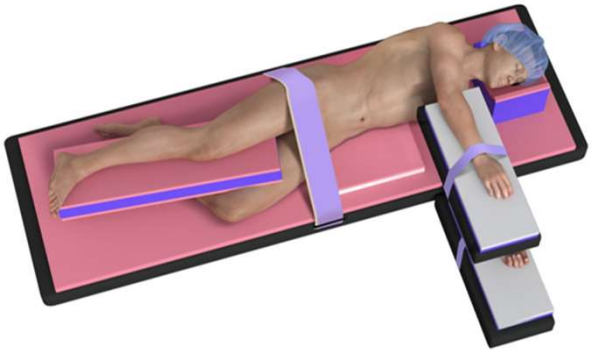
D. The patient's breasts and abdomen should not be compressed or hang over the edge of the OR bed. Bed extenders should be utilized to prevent the patient's breasts and abdomen from hanging over the bed.

E. Place a safety restraint across the patient's hips
1. Additional safety straps may be applied as necessary (i.e. with anticipated flexion of the bed).

F. The patient's dependent leg should be flexed at the hip and knee. The patient's upper leg should be straight and supported with pillows between the legs.
1. Pad the patient's dependent knee, ankle, and foot.

PROC OPER P-04A - Lateral Positioning

Lateral



G. The degree of bed flexion and the duration of kidney rest elevation used to provide additional exposure (e.g., renal procedures, thoracic procedures) should be minimized as much as possible.

H. A head positioner (i.e. a blanket, sheet or pillow) should be placed under the patient's head to maintain straight alignment with the spine.
1. The patient's dependent ear should be assessed and monitored after positioning and during the procedure and corrective actions implemented as indicated.
2. Avoid use of horseshoe-shaped head positioner, if possible.

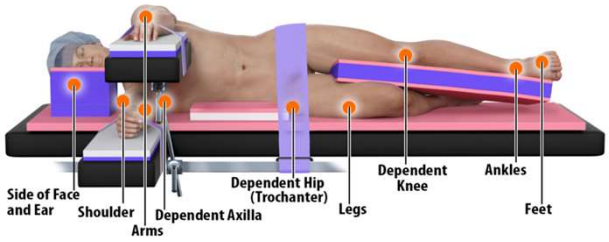
I. Place an axillary roll under the patient's dependent thorax, distal to the axillary fold.
1. Axillary support should be wide enough to spread its lifting ability over the area of several contiguous ribs.
2. A device designed for use as an axillary support (i.e. gel) should be used.
3. Perioperative team should verify the patient's bilateral radial pulses after positioning in the lateral position and placement of the axillary roll, and take corrective actions as indicated.

J. When using kidney braces, place the longer brace anteriorly, against the iliac crest and place the shorter brace posteriorly, against the lumbar back

K. Prior to draping, a tilt test should be performed and the patient should be checked for sliding, limb impingement, respiratory and circulatory problems.
1. During the procedure, upon change of position, vigilance should be taken to ensure that the patient remains secure and that patient position has not changed.

PROC OPER P-04A - Lateral Positioning

Lateral



Positioning of the arms

The position of the arms is determined by the needs of the surgical team and the physical limitations of the patient.

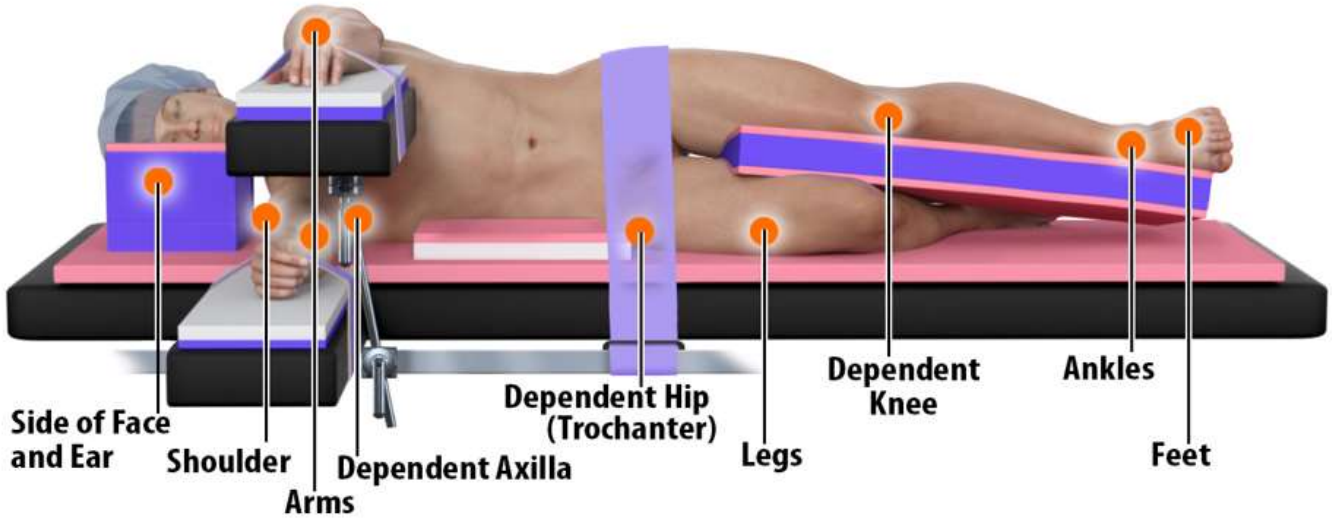
A. The patient's operative arm may be:
1. **suspended by a positioning device designed for this purpose.**
   - **If the patient's arm is suspended, do not abduct more than 90 degrees**

B. The patient's arms should be:
1. **secured at sides with foam,**
2. **flexed and secured across the body, or**
3. **extended on arm boards.**
4. **Checked for positioning of the pulse oximetry cord (if pulse oximeter is on finger). It should not be pulling, causing flexion, or causing extension of the distal end of the finger.**
5. **When tucking arms PIVs and arterial lines (if present) are to be evaluated to assure they are free flowing and arterial line is not dampened.**
6. **Additional padding with gauze or foam should be placed to prevent pressure from hard or sharp edges from line components.**

C. When the patient's arms are extended on arm boards in positions other than prone:
1. **Position the lower arm on the same plane as the OR bed mattress, with the forearm and wrist in a neutral position and the palm up.**
2. **Position the upper arm on the same plane as the shoulder, with the forearm and wrist in a neutral position and the palm down**
3. **the arm boards should be padded,**
4. **the arm boards should be level with the OR bed mattress,**
5. **the arms should be abducted less than 90 degrees**
6. **the arms should be positioned with the elbows slightly flexed, but not hyperextended**
7. **the arms should not be positioned above the head,**
8. **the arms and wrists should be maintained in neutral alignment,**
9. **the arms should be secured to the arm boards**

PROC OPER P-04A - Lateral Positioning

Lateral



Possible Complications and Risks for Injury in the Lateral Position

- Excess pressure on dependent side
- Patient movement
- Brachial plexus injury
- Prolonged surgery in the lateral position may lead to
    - local muscle compression with ischemia and subsequent reperfusion injury, leading to compartment syndrome or rhabdomyolysis
    - vascular congestion and relative hypoventilation in the dependent lung

Body Mass Index (BMI)

	BMI
Underweight	Below 18.5
Normal	18.5–24.9
Overweight	25.0–29.9
Obesity	30.0 and Above

Body Mass Index (BMI). National Heart, Lung, and Blood Institute. U.S. Department of Health & Human Services. https://www.nhlbi.nih.gov/health/educational/lose_wt/risk.htm

Patients with a High Body Mass Index

Health Concerns	Health Concerns	Health Concerns
Type II diabetes	Atherosclerosis	Sleep apnea
Hypertension	Arthritis	Gastroesophageal reflux
Alveolar hypotension	Urinary stress incontinence	

High BMI - Respiratory Concerns-Prone Position

Risks	Risks	Risks
Airway compromise Difficult intubation	Aspiration Hypoxia	Intraabdominal pressure on the diaphragm

High BMI - Circulatory Concerns

Risks

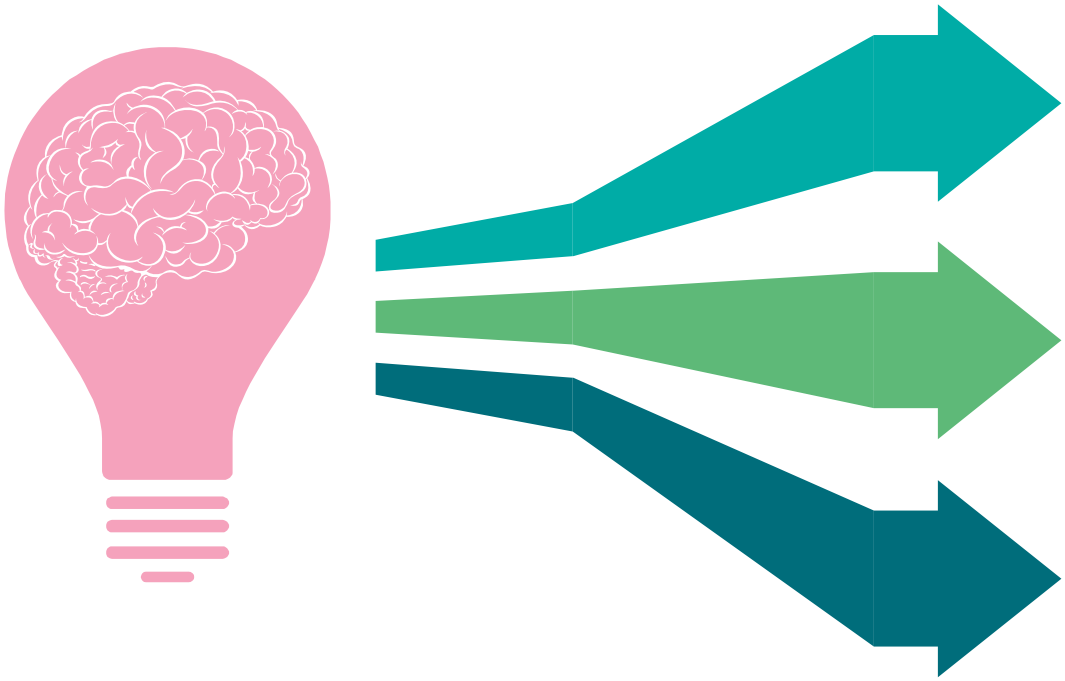
Increased cardiac output

Increased pressure on the pulmonary artery

Risks

Risk of compression of the inferior vena cava

High BMI - Skin Concerns



May be difficult to assess skin

Skin breakdown

Moisture present under skin folds

High BMI - Special Equipment Needs

Correctly-sized OR beds

Wide or extra large safety straps

Pressure-relieving surfaces

Patients with a High BMI

- May need to be positioned semi-sitting or lateral
- Supine: use a wedge under the patient's right side
- Use measures to prevent respiratory compromise
- Use measures to prevent circulatory compromise

Documentation

- Preoperative assessment
- Names/titles of participants
- Patient position
- Upper extremities
- Lower extremities
- Equipment/padding
- Specific actions
- Repositioning
- Postoperative assessment

Postoperative Assessment

- Nerve injury
  - decreased range of motion,
  - impaired muscle strength,
  - numbness or tingling, and
  - pain in limbs or joints not associated with the procedure
- Pressure injury
  - all pressure areas should be assessed for redness and inappropriate blanching of the skin
  - may not appear for 1 to 4 days after surgery
  - have a unique purple appearance and originate at the muscle over bony prominences and progress outward
- Reposition
  - during the postoperative period to avoid continuing to apply pressure to the same areas under pressure during the procedure
- Transfer of care
  - Included postoperative assessment in in report

Impact of Patient Injury - Caused by Incorrect Patient Positioning and Hospital-Acquired Pressure Injury (HAPI)

- Patient morbidities and mortality
- Malpractice lawsuits
- Longer hospital stays
- Reimbursement for services
  - May be limited or denied for "never events" (eg, Stage 3 and 4 HAPI)

Just Culture

- Promote a non-punitive environment.
- Speak up.
- Advocate for your patient.
- Communicate “near miss” situations and report risks.
- Collaborate and communicate to promote safe practices.

References

1. Guideline for positioning the patient. In: *Guidelines for Perioperative Practice*. Denver, CO: AORN, Inc; 2020:629-704.

Thank you to Sharon A. Van Wicklin, MSN, RN, CNOR, CRNFA(E), CPSN-R, PLNC for preparing the original educational slide deck.