Patient positioning...

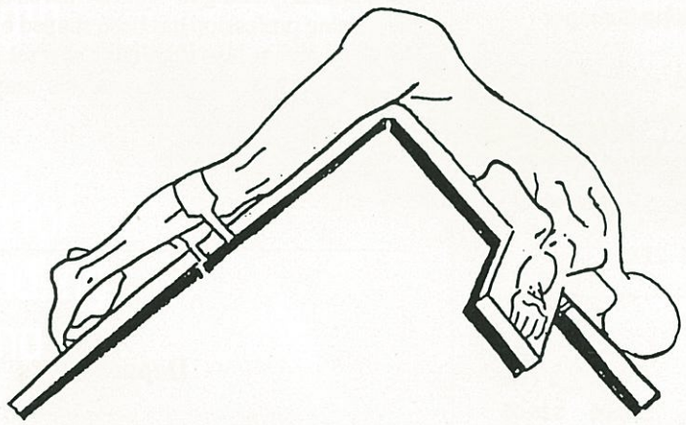
(A ready-reference guide)

By Marielle McLellan, R.N.

Proper patient positioning is an important surgical consideration. Positioning is a key factor in accessing and exposing the operative site. There are also key safety factors implicated. Such functions as circulation and respiration as well as neuromuscular status can be compromised if the patient is improperly positioned. It is incumbent upon the O.R. nurse to be fully aware of the interventions and rationale behind the various patient positions. The following fundamentals of positioning have been developed as a guide. They were compiled by Marielle McLellan, Clinical Co-ordinator, Rockyview General Hospital in Calgary, where they have been implemented as a standardized reference for operating room staff.

Position: Jacknife (Krashe) - (Haemorrhoidectomy, pilonidal sinus)

Interventions	Rationale
• Place patient in prone position with upper body over parallel chest rolls; hips are placed over larger roll and over the break in the table.	• Allows for expansion of diaphram and lungs. Avoid compression of abdomen and genitalia.
• Place both arms out on armboards at right angles to the body, and secure arms to armboards.	• Prevents patient's weight from resting on elbows.
• Support the arms continuously; do not allow forearms to hang over the sides of the table.	• Prevents displacement of forearms; prevents fractures and dislocations.
• Place a pillow under the lower legs.	• No pressure on feet.
• Position a safety strap below the knees.	• Prevent injury.
• Entire table is tilted head down.	• Hips are raisesd and body is balanced.



Disadvantages/possible complications

1. Adversely affects respiration and circulation. **2.** Vital capacity reduced 12.5% due to restricted diaphramatic movement and heavy volume of blood in lungs. **3.** Marked peripheral pooling in dependent portions of body, compounded by severe obstruction to inferior vena cava.

Position: Supine/Dorsal - (Most commonly used position - generally the least harmful to patient - circulatory changes are least pronounced)

Interventions	Rationale
• Maintain patient's head and hips in alignment.	• Prevent spinal injury; maintain body alignment.
• Small pillow/ring placed under the head.	• Relaxation of strap muscles; prevent neck strain; maintains open airway.
• Keep legs parallel, uncrossed, slightly separated.	• Prevent tibial and peroneal nerve injury and compromised circulation.
• Heels rest on padded surface.	• Assure good venous return in legs.
• Leg restraint/safety strap 2" above knees and not too tight.	• Prevent injury from accidental fall.
• Arms are placed by the patient's side on the mattress, padded and secured with a lifting sheet.	• Prevent pressure points and ulnar nerve injury.
• Hands are placed palms down, not under buttocks, and elbows not resting on metal edge of table.	
• When using armboards, place arm on board at less than 90° angle with palms down. Lock armboard into place.	• Decrease pressure on the brachial and ulnar nerves; ensure good venous return.
• Use additional padding if required.	• Maintain continuous flow of I.V. fluids.
• Secure the arm to the armboard with velcro strap. Check that it is not too tight.	

Disadvantages/possible complications

- Marked obstruction to venous return, i.e., abdominal retractors, packs, intra-abdominal mass as in pregnancy.
- Brachial plexus injury in abducted arm; causes motor and sensory loss to arm and shoulder girdle.
- Hyperabduction of arm causes compression/occlusion of subclavian and auxilary arteries.
- Radial nerve palsy, i.e., misplacing/compressing arm against the side of the table can cause wrist drop.
- Median nerve compression causes ape hand deformity.
- Ulnar nerve compression causes claw hand deformity.
- Leg vessel injuries, i.e., mechanical occlusion by leg straps/misplacing a pillow directly under popliteal space (compression causes venous thrombosis).
- Tibial/sural nerve damage, i.e., pressure injury under knee causes numbness on planter surface of foot.
- Skin pressure injuries occur most frequently in this position.
- Obese/underweight individuals are vulnerable to pressure(s).

- Underweight - pressure more intense in smaller areas.
- Overweight - pressure more extensive, but moderate.

Position: Prone - (Respiratory effectiveness is reduced)

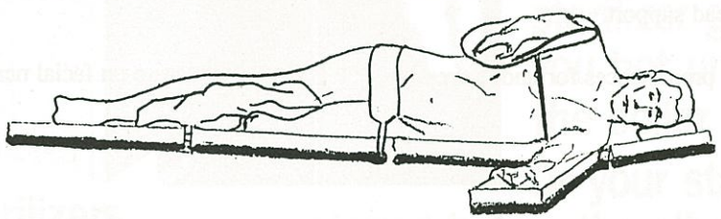
Interventions	Rationale
• Provide support to the patient; maintain body alignment. Adequate assistance to turn patient (i.e., 4 staff members).	• Prevent injury to patient and staff.
• Place patient's arms on padded arm boards; support the arms continuously; do not allow arms to hang over sides of table.	• Prevent the patient's weight from resting on elbows; prevent displacement of forearms, fractures/dislocations.
• Flex elbows slightly with palms pronated; elbows are padded and secured to arm boards.	• Prevent pressure on ulner nerves.
• Bolsters/chest rolls are placed under the chest lengthwise so they extend from the acromioclavicular joint to the iliac crest; padding under knees.	• Allow for expansion of diaphram and lungs; prevent hypoxia; avoid compression of abdomen and genitilia.
• Flex legs at the knees; place pillow(s) under the patient's lower legs.	• Avoid pressure on the toes and planter flexion (no higher than 45°).
• Place a blanket or pillow over the flexed knees.	
• Secure legs with a safety strap placed across the thighs and above the popliteal space.	• Prevent pressure on popliteal space.
• Head is turned to one side on a head ring; keep neck in alignment with the spine.	• Prevent spinal injury.
• Guard eyes against pressure/irritation from drapes, solutions and head support.	• Prevent corneal irritation.
• Check ear/bony prominences for undue pressure.	• Prevent pressure on facial nerves & blood vessels.

Disadavantages/possible complications

- Obstructed venous flow possible in obese patient/patient with abdominal mass.
- Pressure is greatest on chest, knees, ankles, shoulders and iliac crests on thin individuals.

Position: Lateral - (Respiratory effectiveness reduced)

Interventions	Rationale
• Need minimum of 4 staff to position patient. • Patient is turned onto the unaffected side. • Place a pillow under the patient's head.	• Maintain good alignment with cervical and thoracic spine.
• Support upper arm while patient is turned. • Arm placed on an arm rest/pillow(s).	• Prevent compression of venous return and intervenous site.
• Place padding under lower axilla and elbow.	• Allow for chest expansion; prevent pressure injury.
• Support upper leg as patient is turned. • Lower leg is flexed and upper leg is straight. • Bean bag, sand bag, or roll sheets may be used on either side of patient.	• Permits torso stabilization. • Stabilization of patient. • Stabilizes the patient's upper body.
• Place 2" adhesive strips across thighs, hips and shoulder to both sides of O.R. table.	
• Bring lower shoulder slightly forward and flex the elbow so arm is toward patient' s face.	• Prevent pressure on the brachial plexus; prevent compression of venous return.
• Place pillow between the legs.	• Support upper leg; decrease pressure points.
• Pad ankles and knees.	• Prevent pressure and nerve injury.

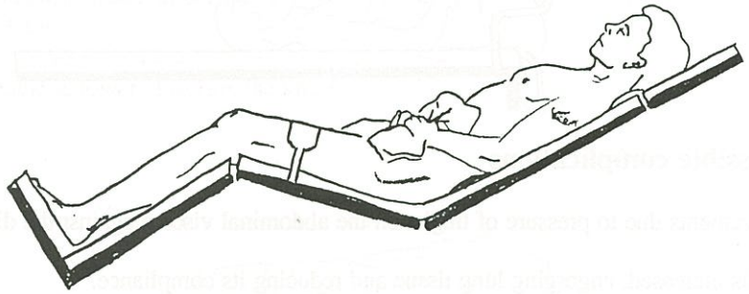


Disadvantages/possible complications

- Vital capacity is impaired due to restricted chest movement.
- Different gas-to-blood exchange ratio in each lung (i.e., for adequate ventilation, lung on lower side must fill enough to move mediastinum up, push diaphram down and spread the ribs on underside.
- Blood pools in dependent limbs.
- Skin pressure between the legs from the weight of the upper leg on the lower leg and greater pressure under greater trochanter of femur.
- Brachial plexus and medium, radial and ulner nerves (i.e., if upper arm extended to overhead position and not properly supported).
- Peroneal nerve damage from compression of lower knee against a hard surface.

Position: Sitting - (Craniotomy, some facial operations)

Interventions	Rationale
• Patient is placed in dorsal position with knees over the break of the table.	• Best for respiration as there is practically no abnormal restrictions on the chest.
• A padded footboard supports feet at right angles.	
• Upper portion of table is raised 45° (sometimes more if full sitting position is required).	
• Foot of operating table is lowered so knees are slightly flexed.	
• Small pillow/head ring is used under the head.	
• Arms are placed over abdomen; place the arms over a pillow making sure elbows are well padded.	• Prevent pressure points and ulnar nerve injury.
• Place a safety belt over the thighs.	
• Entire table is tilted slightly head down.	• Prevent patient from slipping toward foot of table.



Disadvantages/possible complications

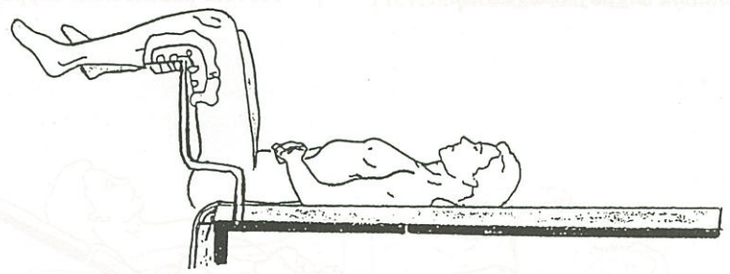
- Systemic circulation is greatly compromised resulting in hypotension and loss of consciousness.
- Skin pressure areas and sciatic nerve damage due to most of weight resting on ischial tuberositates.
- Foot injuries due to sacral pressure (place feet at right angles).
- Eye injuries due to improperly placed head support.

* With neuro patients, the maintainence of blood pressure without increasing intracranial pressure is a problem with this position.

Position: Lithotomy - (Respiratory effectiveness decreased)

Interventions	Rationale
• Stirrup height adjusted to patient's legs. • Patient positioned dorsal on bed with buttocks at the break in the bed.	• Prevent strain on lumbosacral ligaments/muscles.
• The patient's legs are raised simultaneously by two persons; support the knees and feet and flex the knees to place the feet in the stirrups.	• Reduce strain on lumbosacral musculature. Allows for changes in hemodynamics.
• Adjust stirrups so that there is no pressure on the legs against the metal post.	• Prevent venous thrombosis.
• Place patient's arms on armboards; fold arms across patient's chest and secure with the patient's gown/sheet folded across the chest and secured.	• Prevent injury to the hands during manipulation of the bed (i.e., pressure injuries).
• Lower legs simultaneously with two persons; support the knees and feet and lower gently.	• Allows body hemodynamics to adjust to change of position. Prevents sudden decrease in BP.

* 500 to 800 cc of blood may drain into the legs from the trunk and may lead to severe hypotension.



Disadvantages/possible complications

- Restricted chest movements due to pressure of thighs on the abdominal viscera against the diaphram.
- Pulmonary volume is increased, engorging lung tissue and reducing its compliance.
- Circulatory pooling of blood occurs in lumbar region. Venous flow may be reduced due to interference from lung expansion.

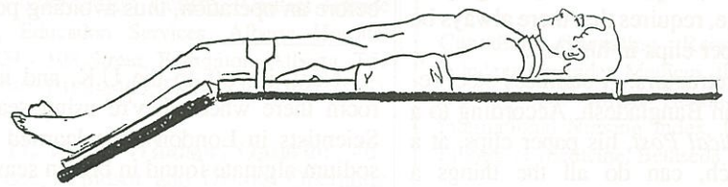
*** Possible injury:**

a) hand hanging over edge of bed - pressure injury.
b) hand caught in bed during raising/lowering end of bed - crushing injury.
c) folding arms across the chest - restricted respiratory effort.
d) pressure of elbow against bed - ulnar nerve damage.

- Femoral and obturator nerves (in groin) from pressure from misplaced instruments leading to sensory disturbances to inner aspects of legs.
- Damage to saphenous vessels/nerves (medial aspect of knees) due to improper padded/misplaced stirrups.
- Peroneal nerve damage (lateral aspect of knee) leading to foot drop.

Position: Tredelenberg - (Used for exposure on abdominal procedures)

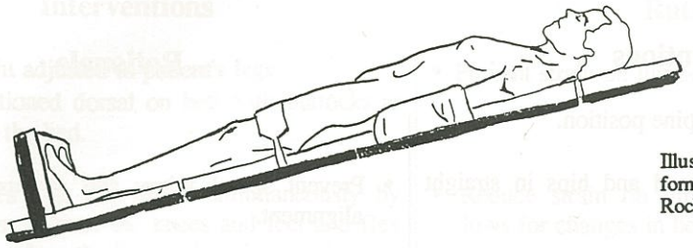
Interventions	Rationale
• Position the patient in supine position.	
• Maintain the patient's head and hips in straight alignment.	• Prevent spinal injury and maintain good body alignment.
• Small pillow/ring placed under the head.	• Relaxation of strap muscles; prevent neck strain; maintain open airway.
• Keep patient's legs parallel, slightly separated and uncrossed.	• Prevent tibial and peroneal nerve injury and compressed circulation.
• Heels rest on a padded surface.	• Assure good venous return in legs.
• Place leg restraint/safety strap 2" above knee and not too tight.	• Prevent injury from accidental fall.
• Place arms at the patient's side on the mattress, padded and secured with a lifting sheet.	• Prevent pressure points and ulnar nerve injury.
• Place hands palms down and not under buttocks; elbows are not to rest on the metal edge of bed.	
• Table is tilted downward to lower the head.	• Allows for better exposure by letting abdominal viscera fall into the upper abdomen.
• Place the patient's knees directly over the lower break in the table.	
• Foot of the table is lowered to flex the knees.	



Disadvantages/possible complications

- Marked obstruction to venous return
- Brachial plexus injury in abducted arm (causes motor and sensory loss to the arm and shoulder girdle).
- Hyperabduction of arm causes compression/occlusion of subclavia and axillary arteries.

Position: Reverse Tredelenberg - (Thyroidectomy)



Illustrations by Christian Ouellette, former O.R. nursing attendant, Rockyview General Hospital, Calgary

Interventions

- Maintain the patient's head and hips in straight alignment.
- Small pillow/ring placed under the head.
- Keep legs parallel, uncrossed, slightly separated.
- Heels rest on padded surface.
- A padded footboard prevents patient from sliding.
- Place leg restraint/safety straps 2" above the knees and not too tight.
- Place arms at patient's side, on the mattress, padded and secured with a lifting sheet.
- Bed is tilted so head is elevated and legs lowered.

Rationale

- Decrease blood supply to operative site.
- Facilitate operation.

Disadvantages/possible complications

- Circulation is compromised; peripheral pooling of blood in lower extremities.

* Movement from this position to normal must be slow to allow the heart time to adjust to changes in blood volume.

References: 1. AORN Journal, Volume 30, Number 2, August, 1979.
2. Alexander's Care of the Patient in Surgery, 8th edition; The C.V. Mosby Company, St. Louis, Mo.

Novel technologies finding their way way into the O.R.s of the world

One shouldn't be surprised at some of the new innovations that are taking place in operating rooms around the world. For example, a Bangladeshi surgeon has devised an innovative way of getting around the chronic shortage of medical equipment in his poverty striken country.

Dr. Shafiqul Hoque, a professor of surgery at Dhaka Medical College, requires that there always be a handful of sterile paper clips in his O.R.

He cannot afford retractors. A stainless steel retractor costs $100.00 in Bangladesh. According to a news item in the *Medical Post*, his paper clips, at a cost of one cent each, can do all the things a retractor can. He uses them to hold open the edges of small wounds, to retract blood vessels to allow access to deep organs and even as a skin hook on inserting stitches.

And up the coast a few thousand miles to China, we hear of another innovation, or re-innovation, this time with leeches. A Beijing surgeon considers leeches a mainstay of his surgical armamentarium.

Dr. Peng Jianqiang of China's Hubei Medical College has saved 22 fingers on 14 patients by using leeches to relieve extravasated blood.

He first introduced leeches while operating on a 20-yerar old women who had lost eight fingers in a paper-cutting machine in 1987.

Leeches have not been popular in modern times because of the fear of pernicious bacteria. But Dr. Jianqiang has a solution to that problem. He sterilizes the leeches with an antibiotic for several hours before an operation, thus avoiding post-op infection.

Next, it's off to the U.K. and into an operating room there where they're using seaweed bandages. Scientists in London have learned how to convert sodium alginate found in brown seaweed into a non-woven calcium alginate dressing that speeds up healing in such wounds as ulcers or pressure sores.

When the dressing is placed on the wound, it forms an alginate gel that creates moist conditions ideal fort healing. When the dressing is changed, the gel can be washed away with a saline solution, leaving the newly grown tissue unaffected.

Traditional dressings can damage healthy tissue on removal, and often cause pain and distress for the patient as well as delaying the process of healing.

Calendar of Events

National O.R. Conference

April 2 - 6, 1990, Toronto, Ontario: 11th National Operating Room Nurses Conference, Harbour Castle (Westin) Hotel. **Delegates** contact Audrey MacDonald, Operating Room, Mount Sinai Hospital, 600 University Avenue, Toronto, Ontario M5G 1X5. **Exhibitors** contact Valerie Shirreff, Operating Room, Mississauga Hospital, 100 Queensway West, Mississauga, Ontario L5B 1B8.

November 25-26, Toronto, Ontario Arthroscopy program for operating room nurses, Orthopaedic and Arthritic Hospital. Sponsored by Zimmer of Canada and the Orthopaedic and Arthritic Hospital. (For more information, contact Bette Hales, Zimmer of Canada, 2323 Argentia Road, Mississauga, Ont. L5N 5N3 (416) 858-8588. This program will also be held December 11 and 12).

Nov. 28 - December 1, Vancouver, B.C.: Health Conference '89: 2001 A Health Odyssey. Sponsored by the B.C. Hospital Association and the Registered Nurses Association of B.C. (Contact: R.K. Wood & Associates, Inc., 502 - 1281 West Georgia St., Vancouver, B.C. V6E 3J7 (604) 688-3787).

February 7 - 9, 1990, Calgary, AB: Quality of Nursing Life Conference: "Partners in Innovation;" Calgary Convention Centre. (Contact Jannice Moore, Director, Education Services, Alberta Hospital Association, 10009 - 108 Street, Edmonton, Alberta T5J 3C5. Telephone: (403) 498-8403; FAX: (403) 498-8465).

February 16 - 17, 1990, Windsor, Ontario: 4th Annual Conference, Windsor and District Operating Room Nurses Association, Hilton International Hotel. (Details: Darlene Beaudet, Windsor Western Hospital, Operating Room, 453 Prince Road, Windsor, Ont. N9C 3Z4 (519) 257-5178).

March 18 - 23, 1990, Houston, Texas: 37th Annual AORN Congress, the George R. Brown Convention Centre. (Contact AORN Meeting Services, 10170 East Mississippi Ave., Denver, Colorado 80231; (303) 755-6300).

October 18 - 20, 1990, Gander, Nfld: 11th Annual Conference, Newfoundland & Labrador Operating Room Nurses Association, Hotel Gander. (Exhibitors contact Henry Norris, James Paton Memorial Hospital, 125 Trans Canada Highway, Gander, Newfoundland A1V 1P7).

May 5, 1990, Windsor, Ontario: 11th Annual Symposium, Malignant Hyperthermia Association, Hotel Dieu Hospital, Windsor. (Contact Juliette Beaudet, Reg. N., Hotel Dieu Hospital, 1030 Ouellette Avenue, Windsor, Ontario N9A 1E1. (519) 973-4421; home (519) 728-2341).

June 27 - 29, 1990, Banff, Alberta: 21st Annual Scientific Sessions, Canadian Association of Neuroscience Nurses. (For more details on conference and for those submitting abstracts, contact Maureen Robertson, Box 676, Bragg Creek, Alberta T0L 0K0).

September 28 - 30, 1990, Regina, Ssak.: 6th Annual Conference, Saskatchewan Operating Room Nurses Group. (Contact Ginny Mielke, 106 Lockwood Road, Regina, Sask. S4S 3G2. Home: (306) 584-0692, Work: (306) 359-2325).

General Journal Information

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