

ANESTHESIA MATERIAL STUDY

THE SECOND STAGE

ANESTHESIA POSITIONS SUBJECT

القسم < تقنيات التخدير

المرحلة < الثانية

المادة < التخدير

الموضوع < مواقف التخدير

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ANESTHESIA POSITIONS

INTRODUCTION

- ❖ Positioning is the joint responsibility of the surgeon & anesthesiologist.
- ❖ Ideal pt. positioning involves balancing surgical comfort, against the risks related to the pt. position.
- ❖ Pt. positioning & postural limitation should be considered during the PAC.

OVERVIEW

- ❖ One must be aware of the anatomic and physiologic changes associated with anesthesia, patient positioning, and the procedure.
- ❖ The following criteria should be met to prevent injury from pressure, obstruction, or stretching:
 - No interference with respiration
 - No interference with circulation
 - No pressure on peripheral nerves
 - Minimal skin pressure
 - Accessibility to operative site
 - Accessibility for anesthetic administration
 - No undue musculoskeletal discomfort
 - Maintenance of individual requirements

ASSESSMENT

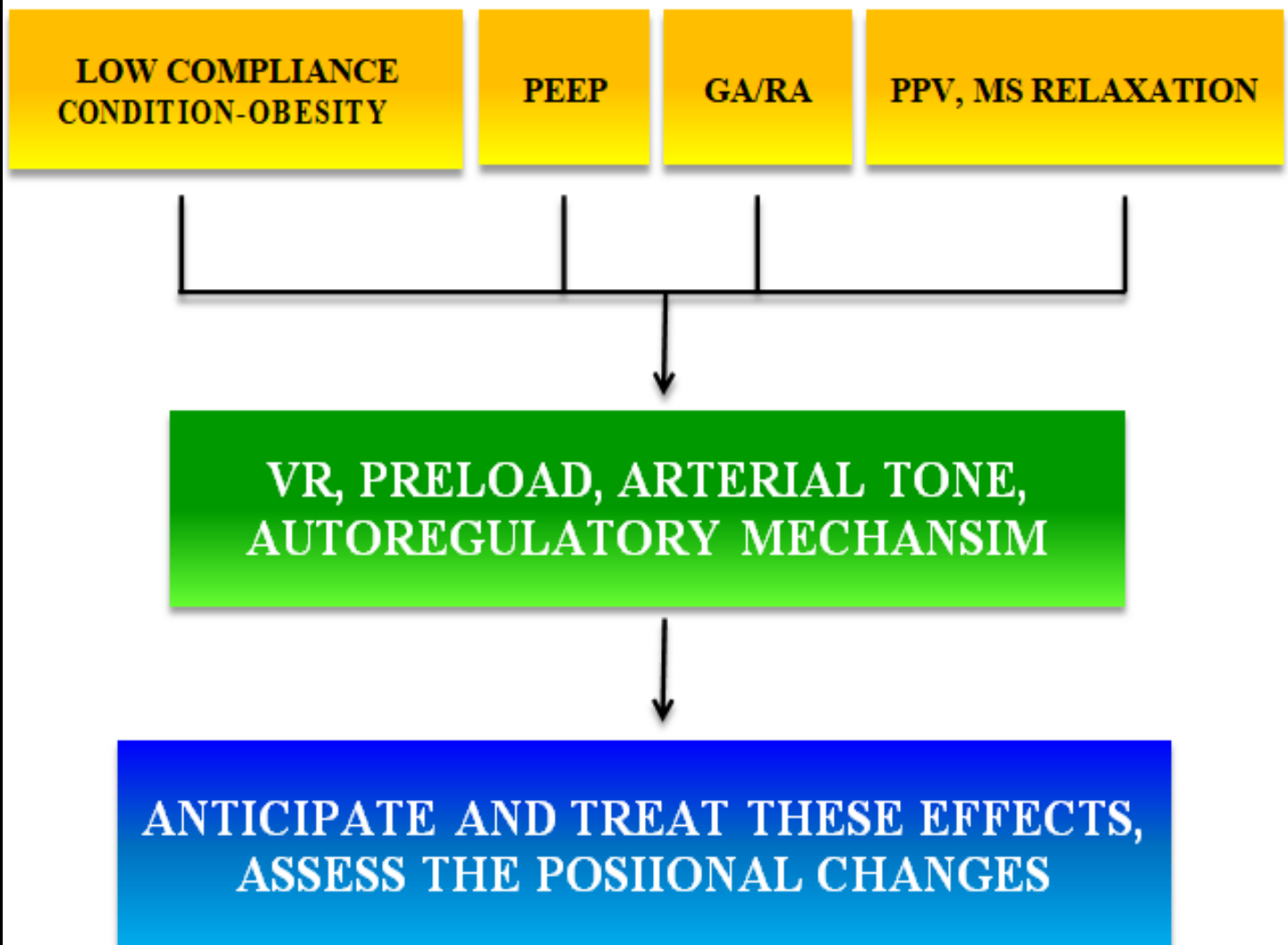
- ❖ **The team should assess the following prior to positioning of the patient:**
 - **Procedure length**
 - **Surgeon's preference of position**
 - **Required position for procedure**
 - **Anesthesia to be administered**
 - **Patient's risk factors**
- ❖ **age, weight, skin condition, mobility/limitations, pre-existing conditions, airway etc.**
 - **Patient's privacy and medical needs**

GENERAL PHYSIOLOGICAL CONCERNS

CVS CONCERNS

In an awake patient postural changes doesn't cause change in SBP

In anaesthetised patient:



PULMONARY CONCERNS

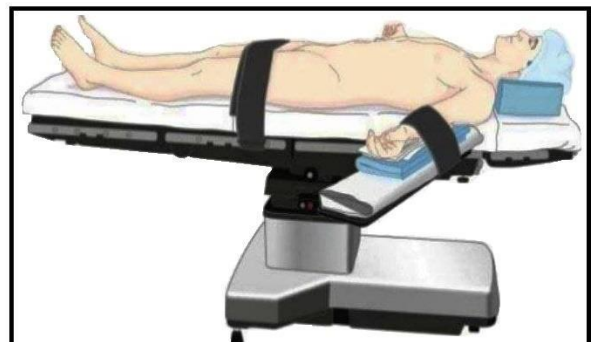
- ❖ Any position which limits movements of abdomen, chest wall or diaphragm increase atelectasis and intrapulmonary shunt
- ❖ Change from standing to supine - decrease FRC due to cephalad displacement of the diaphragm

BYBGICAL PQSITIONS

Four basic surgical positions include	Variations include
1.Supine	1.Trendelenburg
2.Lateral	2.Reverse trendelenburg
3.Prone	3.Fowler's/semifowler
4.Lithotomy	4.Beach chair position
	5.Wattson jone position
	6.Position for robotic surgeries

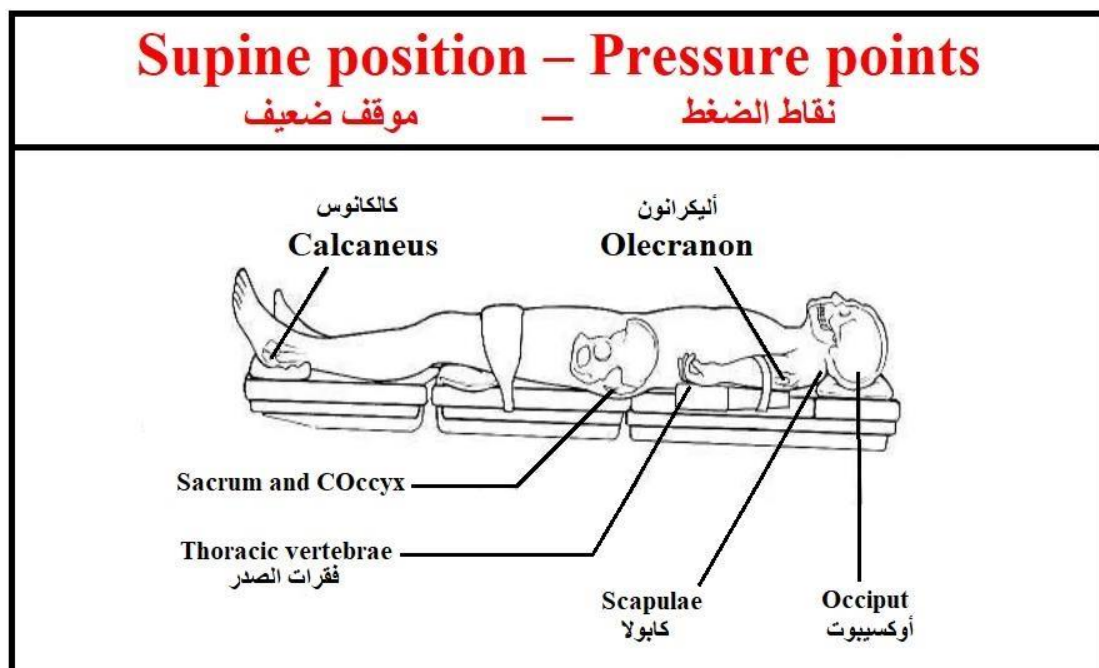
SUPINE

- ❖ Most common with the least amount of harm
- ❖ Placed on back with legs extended and uncrossed at the ankles
- ❖ Arms either on arm boards abducted $<90^{\circ}$ with palms up or tucked (not touching metal or constricted)
- ❖ Spinal column should be in alignment with legs parallel to the OR bed
 - Head in line with the spine and the face is upward
 - Hips are parallel to the spine
- ❖ Padding is placed under the head, arms, and heels with a pillow placed under the knees
- ❖ Safety belt placed 2" above the knees while not impeding circulation



SUPINE CONCERNS

- ❖ Greatest concerns are circulation and pressure points
- ❖ Most Common Nerve Damage:
 - **Brachial Plexus:** positioning the arm $>90^{\circ}$
 - **Radial and Ulnar:** compression against the OR bed, metal attachments, or when team members lean against the arms during the procedure
 - **Peroneal and Tibial:** Crossing of feet and plantar flexion of ankles and feet
- ❖ Vulnerable Bony Prominences: (due to rubbing and sustained pressure)
 - Occiput, spine, scapula, Olecranon, Sacrum, Calcaneus



TRENDELENBURG POSITION AND REVERSE TRENDELENBURG POSITION



TRENDELENBURG

- ❖ The patient is placed in the supine position while the OR bed is modified to a head-down tilt of 35 to 45 degrees resulting in the head being lower than the pelvis
- ❖ Arms are in a comfortable position either at the side or on bilateral arm boards
- ❖ The foot of the OR bed is lowered to a desired angle
- ❖ **ADVANTAGES**
 - To increase V.R after spinal anesthesia
 - To increase central venous volume / prevent air embolism / facilitate central cannulation
 - To minimise aspiration during regurgitation

TRENDELENBURG CONCERNS

- ❖ ↑ CVP
- ❖ ↑ ICP
- ❖ ↑ IOP
- ❖ ↑ myocardial work
- ❖ ↑ pulmonary venous pressure
- ❖ ↓ pulmonary compliance
- ❖ ↓ FRC
- ❖ Swelling of face, eyelids, conjunctiva , tongue, laryngeal edema observed in long surgeries

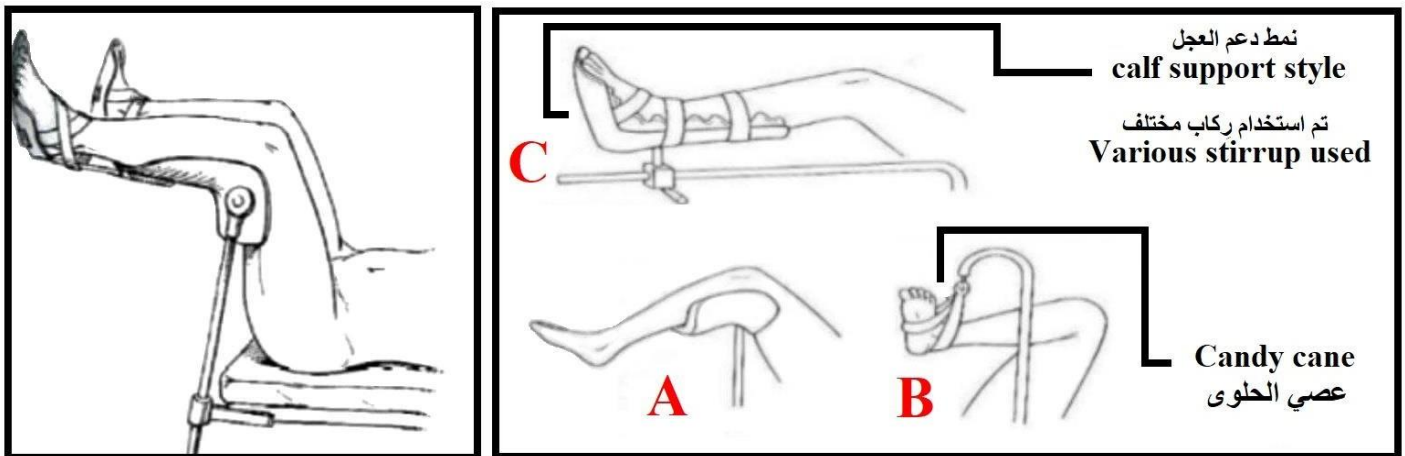
REVERSE TRENDELENBURG

- ❖ The entire OR bed is tilted so the head is higher than the feet
- ❖ Used for head and neck, laproscopic procedures
- ❖ Facilitates exposure, aids in breathing and decreases blood supply to the area
- ❖ A padded footboard is used to prevent the patient from sliding toward the foot
- ❖ Reduces venous return therefore hypotension
- ❖ Laproscopic cholecystectomy : reverse trendelenburg position with right up

SUPINE POSITION__COMPLICAIONS

- ❖ Pressure alopecia
- ❖ Back ache
- ❖ Peripheral nerve injuries/ ASA

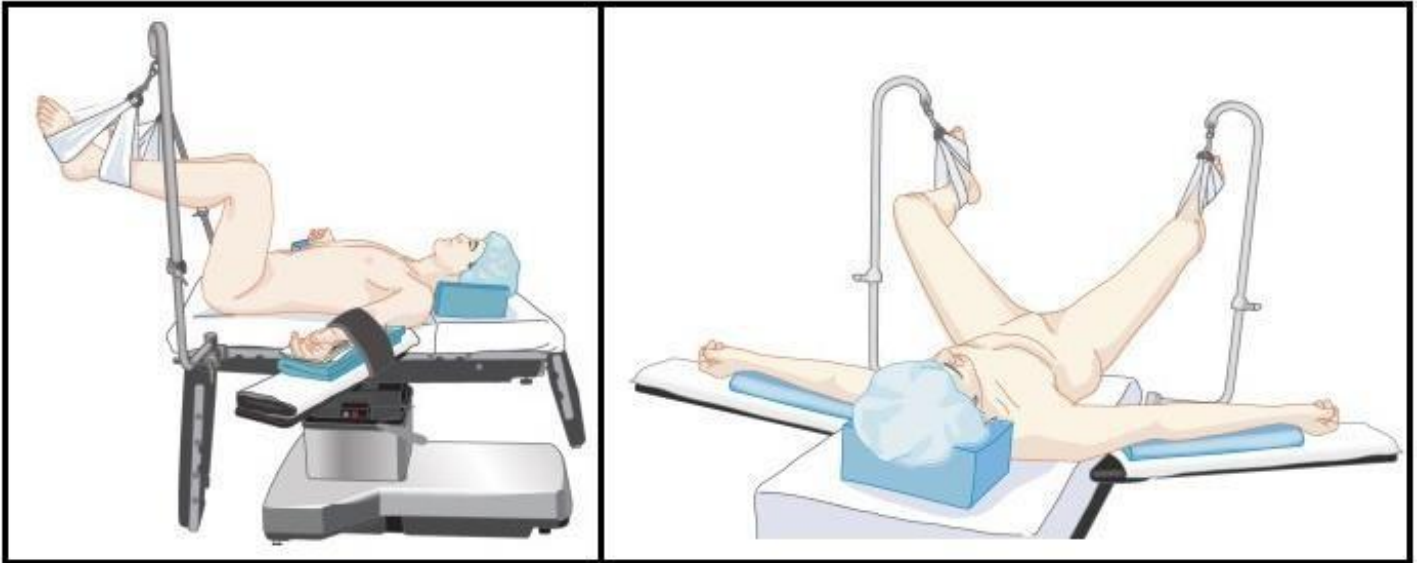
LITHOTOMY POSITION



LITHOTOMY

- ❖ With the patient in the supine position, the hips are flexed to 80-100 ° from the torso so that legs are parallel to it and legs are abducted by 30-45 ° to expose the perineal region
- ❖ The patient's buttocks are even with the lower break in the OR bed (to prevent lumbosacral strain)
- ❖ The legs and feet are placed in stirrups that support the lower extremities
- ❖ The legs are raised, positioned, and lowered slowly and simultaneously, with the permission of the anesthesia care provider
- ❖ Adequate padding and support for the legs/feet should eliminate pressure on joints and nerve plexus
- ❖ The position must be symmetrical
- ❖ The perineum should be in line with the longitudinal axis of the OR bed

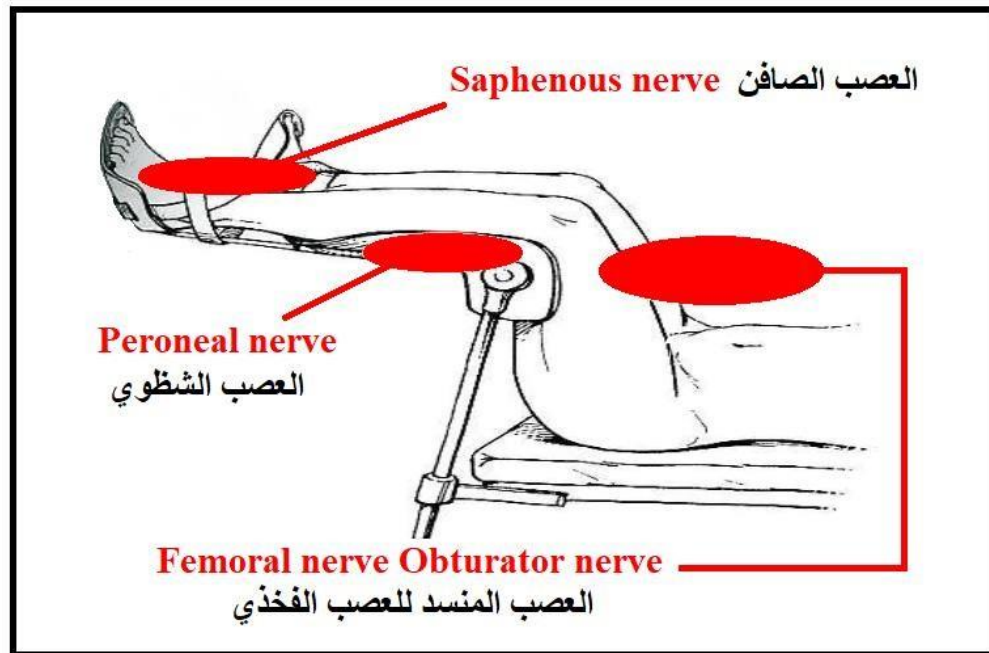
LITHOTOMY POSITION WITH "CANDY CANE" SUPPORTS



PHYSIOLOGICAL CHANGES

- ❖ **Preload increases, causing a transient increase in CO, cerebral venous and intracranial pressure**
- ❖ **Reduce lung compliance**
- ❖ **If obesity or a large abdominal mass is present (tumor, gravid uterus)- VR to heart might decrease**
- ❖ **Normal lordotic curvature of the lumbar spine is lost potentially aggravating any previous lower back pain**

NERVE INJURIES IN LITHOTOMY POSITION



LATEBAL

- ❖ Anesthetized in supine prior to turning
- ❖ Shoulder & hips turned simultaneously to prevent torsion of the spine great vessels
- ❖ Lower leg is flexed at the hip; upper leg is straight
- ❖ Head must be in cervical alignment with the spine
- ❖ Breasts and genitalia to be free from torsion and pressure
- ❖ Axillary roll placed caudal to axilla of the downside arm (to protect brachial plexus)
- ❖ Padding placed under lower leg, to ankle and foot of upper leg, and to lower arm (palm up) and upper arm



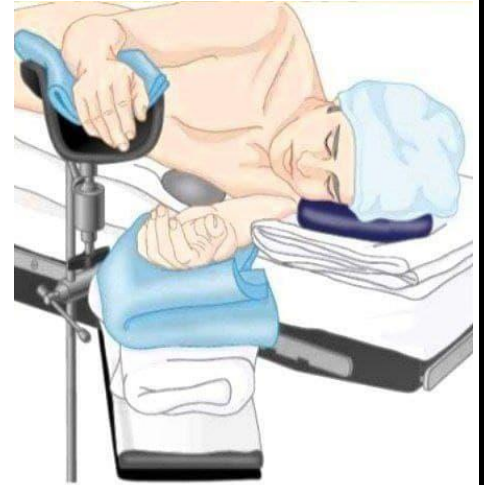
❖ Pillow placed lengthwise between leg and between arms (if lateral arm holder is not used)

❖ Stabilize patient with safety strap and silk tape, if needed

❖ Pulse should be monitored in the dependent arm for early detection of compression to axillary neurovascular structures.

❖ Low saturation reading in pulse oximetry may be an early warning of compromised circulation.

❖ When a kidney rest is used, it must be properly placed under the dependent iliac crest to prevent inadvertent compression of the inferior vena cava



PRONE POSITION

Access to the posterior fossa of the skull, the posterior spine, the buttocks and perirectal area, and the lower extremities

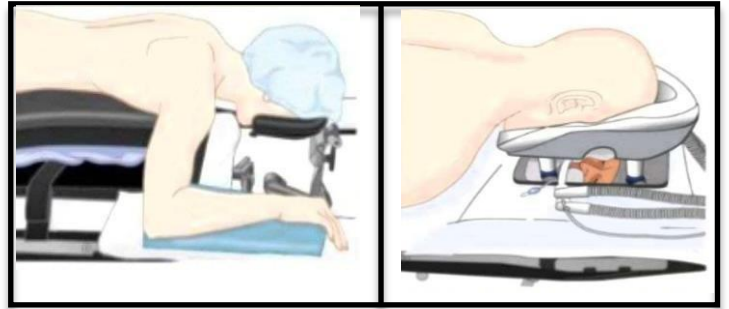


- ❖ **Arms tucked in the neutral position /placed next to the patient's head on arm boards-sometimes called the prone "superman" position/Extra padding under the elbow - prevent ulnar nerve**
- ❖ **When GA is planned, the patient is intubated on the stretcher/ i.v access is obtained/ETT is well secured/pt is turned prone onto the OT table/disconnect blood pressure cuffs and arterial and venous lines that are on the side to avoid dislodgment**
- ❖ **disconnection of pulse oximetry,arterial line, and tracheal tube, leading to hypoventilation, desaturation, hemodynamic instability, and altered anesthetic depth. Therefore its best to keep pulse oximetry and arterial line connected**
- ❖ **ETT position is reassessed immediately after the move**
- ❖ **Head position**
 - **Turned to the side(45 degrees) if neck mobility is fine.**
 - **Check the dependent eye for external compression.**
 - **Maintained by surgical pillow, horseshoe headrest, or Mayfield head pins Mostly, including disposable foam versions, support the forehead, malar regions, and the chin, with a cutout for the eyes, nose, and mouth**
 - **Mirror systems are available to facilitate intermittent visual confirmation**

SUPPORT DEVICES USED IN PRONE POSITION HEAR

1.MIRROR SYSTEM

2.HORSESHOE REST



- ❖ Increased intra-abdominal pressure decreases FRC, compliance and elevated VP of the abdominal and spine vessels-increase bleeding risk.
- ❖ Its imp that the abdomen hangs free and moves with respiration- space of atleast 6 cms!
- ❖ Thorax: firm rolls or bolsters placed each side from the clavicle to the iliac crest (wilson frame, jackson table, relton frame)
- ❖ Pendulous structures (e.g., Male genitalia and female breasts) should be clear of compression
- ❖ Its essential to check the ETT position at a required degree of flexion

HEMODYNAMICS AND VENTILATION

❖ **Increases intraabdominal pressure, decreases VR to the heart, and increases systemic and pulmonary vascular resistance- HYPOTENSION**

❖ **Oxygenation and oxygen delivery, however, may improve as**

1.Perfusion of the entire lungs improves

2.Increase in intraabdominal pressure decreases chest wall compliance, which under PPV, improves ventilation of the dependent zones of the lung

3.Previously atelectatic dorsal zones of lungs may open.

SITTING

- ❖ This is actually a modified recumbent position as the legs are kept as high as possible to promote venous return.
- ❖ Arms must be supported to prevent shoulder traction.
- ❖ Head holder support is preferably attached to the back section of the table.



"Sitting" position with Mayfield head pin

موقف "الجلوس" مع دبوس رأس مايفيلد

ADVANTAGE

- ❖ **Excellent surgical exposure**
- ❖ **Reduced perioperative blood loss**
- ❖ **Superior access to the airway**
- ❖ **Reduced facial swelling**
- ❖ **Improved ventilation, particularly in obese patients**
- ❖ **Modern monitoring- early indication of air embolism**

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PROBLEMS

- ❖ **Venous air embolism**
- ❖ **Hypotension (prevented by stocking)**
- ❖ **Arms if not supported well- brachial plexus injury**