

Unit V

Suture Materials and Needles

Suture Materials

- The noun *suture* is used for any strand of material used for ligating or approximating tissue; it is also synonymous with *stitch*.
- The verb to suture denotes the act of sewing by bringing tissues together and holding them until healing has taken place.
- If the material is tied around a blood vessel to occlude the lumen, it is called a *ligature* or tie.

I. Classification

Types of Suture Materials

- Surgical suture materials are classified as either *absorbable* or *non absorbable*

Absorbable sutures

- Absorbable suture is eventually absorbed by the body as a result of the enzymatic action of body fluids and does not require removal.
- Each have various half-lives and strengths.
- Absorption takes place in from 3 days to 3 months.

Absorbable sutures cont...

The most common absorbable sutures include:

A. Surgical Catgut:

- Collagen manufactured from the submucosa of sheep intestine or serosa of beef intestine. Used in tissue that heals rapidly.
- Digested by body enzymes and absorbed by tissue so that no permanent foreign body remains.

The rate of absorption is influenced by:

- Type of tissue
- Condition of tissue
- General health status of the patient

Absorbable sutures cont...

Type of surgical catgut

1. Plain Surgical Catgut

- Lose tensile strength absorbed quickly, usually in 5 to 10 days
- Used to ligate small vessels and to suture subcutaneous fat
- Not used to suture any layer of tissue likely to be subjected to tension during healing.
- Available in sizes 3 to 6-0.

Absorbable sutures cont...

2. Chromic Surgical Catgut

- Is treated in a chromium salt solution to resist absorption by tissues
- This treatment changes the color from the yellow-tan shade of plain surgical catgut to a dark shade of brown
- It is used for ligation of larger vessels and for suture of tissues in which nonabsorbable suture materials are not recommended
- Available in sizes 3 to 7-0. May be dyed blue or black

Absorbable sutures cont...

B. Synthetic Absorbable Sutures

- Are absorbed by a slow hydrolysis process in the presence of tissue fluids.
- They are used for ligating and suturing.
- They are extremely inert and have great tensile strength
- Can be used in nearly all tissues.
- As a disadvantage, it tends to drag through the tissue rather than passing smoothly. This action may slow down the sewing process.
- This type of suture also requires special techniques for tying.

Absorbable sutures cont...

The sutures included in this group are:

- Polyglycolic acid (**Dexon**) suture
- Polyglactin 910 (**Vicryl**) suture
- Polydioxanone (**PDS**) Suture
- Polyglycaprone (**Monocryl**) suture

Non absorbable Suture

- Nonabsorbable suture is either left in the body, where it becomes embedded in scar tissue, or it is removed when healing is complete, as in skin closure. It is used in tissues that heal more slowly than those requiring any type of absorbable suture.

A. Surgical Silk

- An animal product made from the fiber spun by silkworm larvae in making their cocoons
- Widely used non-absorbable suture that is easy to handle and is both supple and strong.
- Can be used in a wide variety of tissues, ranging from ophthalmic to cardiovascular.

Non absorbable Suture cont...

B Surgical Cotton

- **Manufactured from the fibers of the cotton plant**
- Supple and easy to handle
- Has inferior strength and tendency to flake
- Can be strengthening by dipping it into saline solution prior to use.
- Its application is nearly identical to that of silk.

Non absorbable Suture cont...

C. Polyester Suture

- The strongest of all sutures except for surgical steel
- Used in a wide variety of tissues, including facial, cardiovascular, and ophthalmic.

D. Nylon Suture

- Used primarily for skin closure, ophthalmic procedures, and microsurgery.
- Produces minimal tissue reaction
- Has high tensile strength, and resists capillary action

Non absorbable Suture cont...

Surgical Steel

- Made of stainless steel and is the most inert type of suture available
- Used mainly in the orthopedic surgery to approximate bone fragments
 - **Not widely used because of major disadvantages:**
- Extremely difficult to handle
- Kinks easily and has a “sawing” effect on tissue
- Because of its springiness it is easily
- contaminated at the field

II. Size and tensile (elasticity)

- The diameter of the suture strand determines its size. Size 0 is smaller than size 1. Size 2-0 (00) is smaller than size 0, and so on.
- Suture as small as 11-0 and as large as number 7 are available. Stainless steel sutures have an additional size indicator called Brow and Sharp (B & S) gauge.
- The length of the suture is standardized. Strands are precut (17, 18, or 24 inches) or full length (54 or 60 inches).

Surgical Needles

- Except for simple legating with free ties, surgical needles are needed to safely carry suture material through tissue with the least amount of trauma.
- **The best surgical needles are made of high-quality tempered steel that is:**
 - Strong enough so that it does not break easily
 - Rigid enough to prevent excessive bending, yet flexible enough to prevent breaking after bending. Sharp enough to penetrate tissue with minimal resistance (yet it need not be stronger than the tissue it penetrates).

Surgical Needles cont...

Many shapes and sizes of surgical needles are available.

- Surgical needles may be straight like a sewing needle or curved.

All surgical needles have three basic components:

- The *point*,
- The *body* (or *shaft*), and
- The *eye*.

Surgical Needles cont...

They are classified according to these three components.

Point of the Needle

- Points of surgical needles are honed to the configuration and sharpness desired for specific types of tissue. The basic shapes are cutting, tapered, or blunt

Body of the Needle

- The body, or shaft, varies in length shape, and gauge. The nature and location of tissue to be sutured influences the selection of needles with these variable features.

Surgical Needles cont...

Eye of the Needle

- The eye is the segment of the needle where the suture strand is attached. Surgical needles are classified as eyed, French eye, or eyeless (also known as swaged).

Handling of eyed and French Eye Needles

- Eyed and French eye needles have the following disadvantages for the scrub nurse, surgeon and patient:
- Each needle must be carefully inspected by the scrub nurse before and after use for dull or burred points, corruptions, and defects in the eye

Surgical Needles cont...

Eyeless Needle

- An eyeless needle is a continuous unit with the suture strand.
- The needle is swaged onto the end of the strand in the manufacturing process.
- This eliminates threading at the operating bed and minimizes tissue trauma because a single strand of material is drawn through tissue.
- The diameter of the needle matches the size of the strand as closely as possible.

Surgical Needles cont...

Type and usage of Needle

- Needles are used to prick a site and join with suture materials. Needles have different use according to their types.
- **Round needles**- the body of such needles is round
 - Used for suturing internal tissues and soft organs.
- * **Cutting needles**- the body of such needles is sharp/not round; they are only used on strong tissue which will not be damaged..
 - Used for suturing epidermis.

Unit VI

Common types of Stitch

- Stitches are made in different types. They may differ according to the purpose of stitch, site of stitch, age of pt and pt's interest.

The common types of stitches are:-

1. Continues: -

- With no interruption b/n thread insertion points.
- The stitch is tied only on two places: on the 1st & last point of needle insertion sites.
- Advantageous in saving suturing materials.

Common types of Stitch cont.

2. Interrupted stitch: -

- Is the type of stitch where many knot are made.
- Joins only just parallel tissues.
- Stitch is discontinued in many places.
- Advantageous in case denoting at one place occurs: the others separately noted stitches will remain intact.

Common types of Stitch cont.

3. Mattress type:-

- Of stitch made as stitch of mattress.
- Used to stitch triangular wounds.

4. Blanket

- ***Continuous running/locking***; also known as a *blanket stitch*. A single suture is passed in and out of the tissue layers and looped through the free end before the needle is passed through the tissue for another stitch. Each new stitch locks the previous stitch in place

Common types of Stitch cont.

A Purse-String Suture

- A *purse-string suture* is used to approximate the end of a lumen, such as a hernia sac or appendicle stump. The suture is passed around the lumen and tied in *purse-string* fashion.

Knot Placement

- Each suture placed in tissue usually requires the placement of a knot to secure the ends. Interrupted stitches require individual knots, and therefore placement of each knot can influence how well the wound heals and the cosmetic result.

Knot Placement cont.

1. The knot should be tied away from:

- Vital structures, such as the eye
- Source of contamination, such as the mouth
- Potential irritants, such as the nares
- Potential sources of increased inflammation, such as the incision line

2. The knot should be tied toward:

- The better blood supply
- The area that provides the best security of the knot
- If possible, where the mark would be less noticeable

Unit VII

General responsibility of the nurse in the operating room.

1. Patient Care

- The patient is the reason for the existence of the health care team. She or he looks to the operating room team to fulfill her or his diverse needs during the pre-, intra-, and postoperative phases of care. The patient is always the focus of attention, not just when she or he is under the operating room (OR) spotlight. The operating room team, therefore, is expected to practice the details mentioned below.

General responsibility of the nurse in the operating room cont...

2. Receiving the patient

- Regardless of the physical setting in which a surgical procedure will be performed, each patient should be adequately assessed and prepared so that the impact and potential risks of the surgical intervention are minimized. This involves both physical and emotional preparations.

General responsibility of the nurse in the operating room cont...

When we receive the patient:

- Greet the patient by name and introduce yourself and explain the purpose of coming to the OR
- Review the patient's chart for completeness
- Obtain information by asking about the patient's understanding of the surgical procedure
- Check whether all preoperative preparations have been done
- Answer the patient's questions about the surgical procedure

Continue

- Encourage the patient and his/her family to discuss their feelings or anxieties regarding the surgical procedure and anticipated results
- Identify any special needs of patient that will alter the plan for intraoperative care
- Offer the patient psychological reassurance and maintain an attitude of hope. Avoid using phrases such as, “Everything will be all right” or “You are okay.” Reinforce the concept that the team will provide good care.
- By fulfilling spiritual and psychosocial needs, the caregiver helps to provide the preoperative patient with as much peace of mind as possible.

Continue

3. Positioning according to the kind of operation and needs of the patient

- Each operative position represents an agreement between the surgeon and the anesthesia provider to the patient. The surgeon requires an accessible, stable operative area. The anesthesia provider must have space in which to administer the anesthetic and free flowing intravenous. The result must come well within the rules for maximum safety and comfort to the patient.

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Continue

Equipment for Positioning

The following are list of special equipment for positioning a surgical patient:

- Shoulder Bridge (Thyroid Elevator)
- Safety Belt (Thigh Strap)
- Anesthesia Screen
- Lift Sheet (Draw Sheet)
- Armboard, double Armboard
- Wrist or Arm Strap

Continue

- Body Rests and Braces
- Kidney Rests
- Body (Hip) Restraint Strap
- Metal Footboard
- Headrests
- Pressure-minimizing Mattress
- Operating Bed

Continue

4. Types of position

- **Laparotomy or supine (dorsal) position**
- The usual position for surgery is flat on the back; one arm is at the side of the bed/table, with the hand placed palm down; The other is carefully positioned on an arm board for intravenous infusion

Continue

Trendelenburg Position

- Usually used for surgery on the lower abdomen and the pelvis to obtain good exposure by displacing the intestines into the upper abdomen. In this position, the head and body are lowered and the knees are flexed. The patient is held in position by padded shoulder braces.

Continue

Prone position.

- Patient lies on abdomen. Chest rolls under axillae & sides of chest to iliac crests raise body weight from chest to facilitate respiration; pillow under feet protects toes

Lithotomy Position

- In this position, the patient is lying on the back with the legs and thighs flexed at right angles. The position is maintained by placing the feet in stirrups. Nearly all perineal, rectal, and vaginal surgical procedures require this position

Continue

For Kidney Surgery

- The patient is placed on the non-operative side in Sim's position with an air pillow 12.5 to 15 cm thick under the loin, or on a table with a kidney or back lift.

Thyroid position

- Neck surgery, for example, surgery involving the thyroid, is performed with the patient on the back, the neck extended somewhat by a pillow beneath the shoulders, and the head and chest elevated to reduce venous pressure

Continue

Thoracotomy position

- The position varies with the surgery to be performed. The surgeon and the anesthesia provider place the patient on the operating table/bed in the desired position..

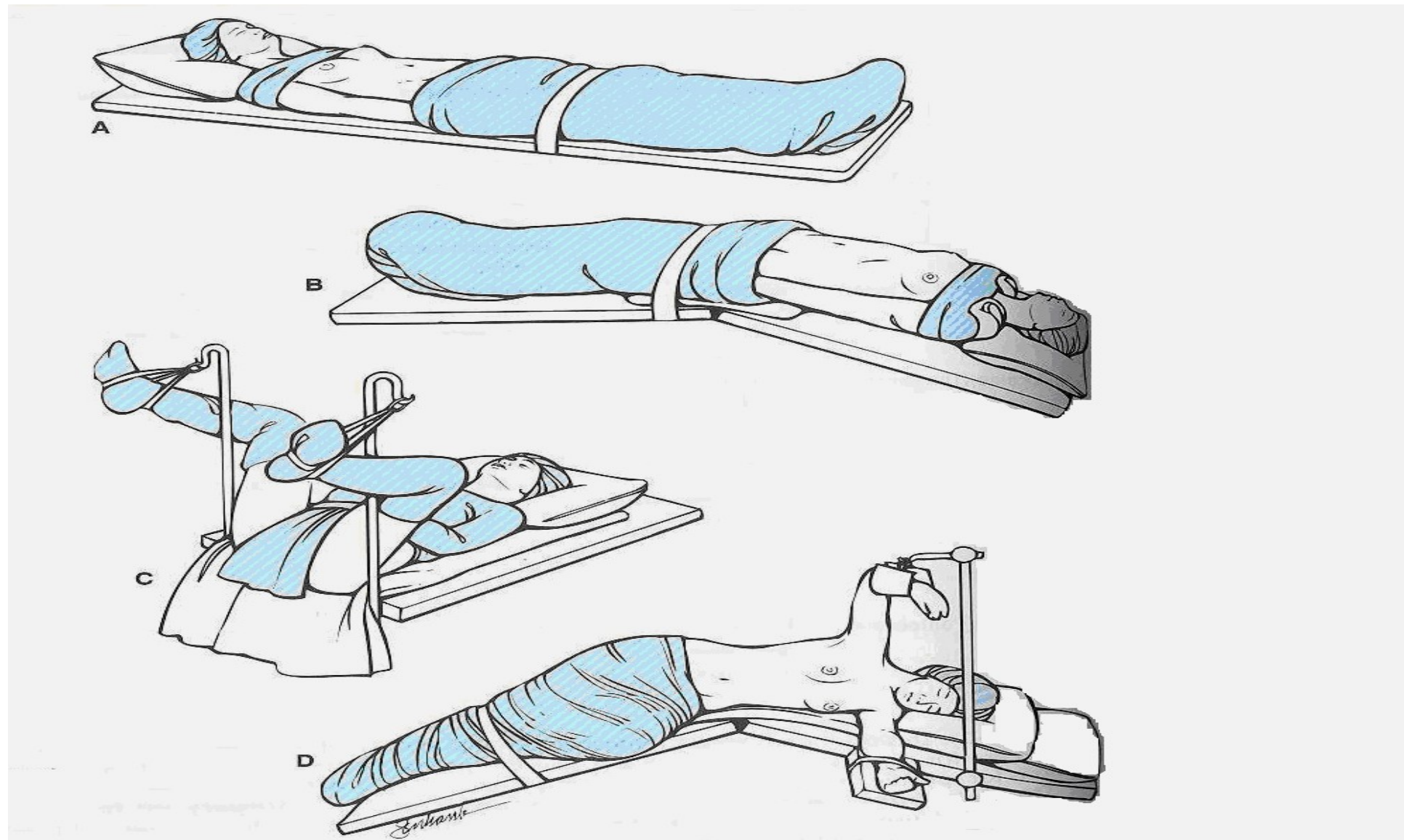
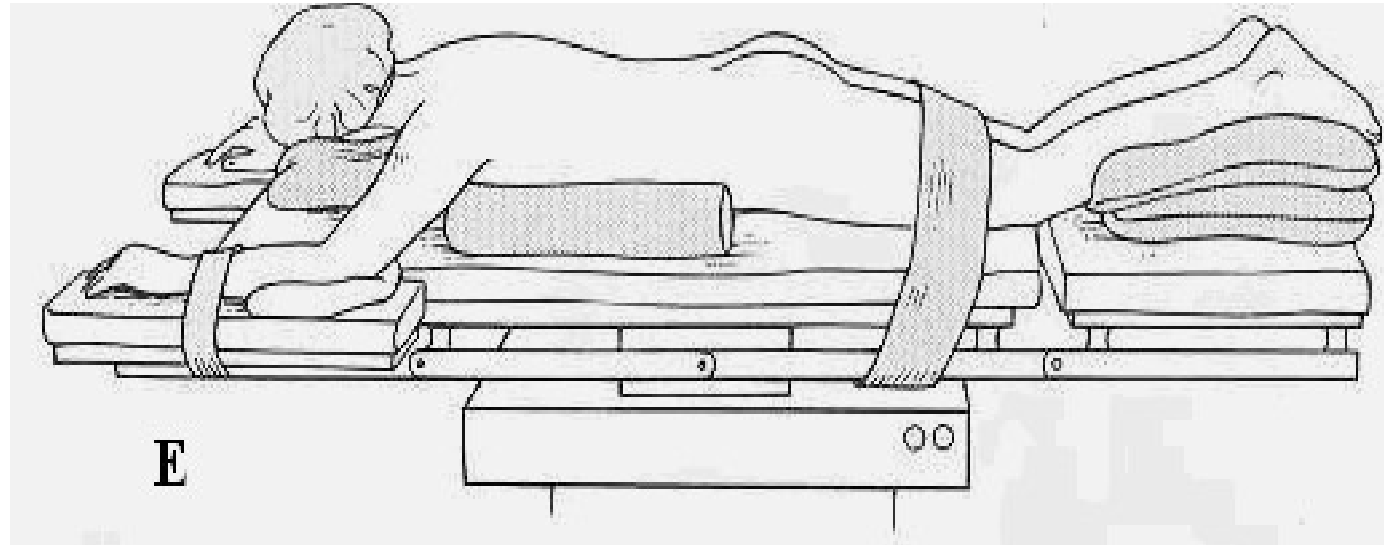


Fig. Positioning on the operating table; **(A)** Supine, **(B)** Trendelenburg, **(C)** Lithotomy, **(D)** modified Sim's/ Kidney position.



(E) *Prone position*

5. Preparation of operative area

Light adjustment

- Lighting in the operating suite is achieved by the use of main overhead fluorescent lights and by the surgical spotlights themselves. Halogen lamps are used within the surgical spotlights. The halogen light emits a pale bluish cast that is less fatiguing to the eyes. The bluish cast is an indication of immense energy. The energy is given off in brightness (intensity) rather than heat and is thus safe to use near delicate tissue.

Continue

- The overhead surgical spotlights are mounted on a post that is suspended from the ceiling. Typically, two spotlights are attached to each post, although a third satellite lamp may be added for increased visibility or extension of the lighted field. Track lights are undesirable in the surgical suite since dust and bacteria are trapped in the tracks, which are difficult to keep clean.

6. **Warping patient**

Safety measures, including the following, are observed while transferring, moving, and positioning patients:

- The patient is properly identified before being transferred to the operating bed and the surgical site is affirmed
- The patient is assessed for mobility status
- The operating bed and transport vehicle are securely locked in position, with the mattress stabilized during transfer to and from the operating bed

Continue

- Two persons should assist an awake patient with the transfer by positioning themselves on each side of the patient
- Adequate assistance in lifting unconscious, obese, or weak patients is necessary to prevent injury
- The anesthesia provider guards the head of the anesthetized patient at all times and support it during movement
- The anesthetized patient is not moved without permission of the anesthesia provider. He/she is moved slowly and gently to allow the control of airway and circulatory system during movement

7 .Care of specimen

- The preservation and identification of specimens is crucial. The nurse should be sure that each specimen is properly identified, preserved, and labeled.

Unit VIII

positioning to patient for surgery

Draping

- ***Drapes*** are pieces of cloth used to cover areas in order to provide sterile field, protective barrier against contamination and moisture.
- ***Draping***, on the other hand, is the process of covering the patient and surrounding areas with sterile linen, leaving only a minimum area of skin exposed at the site of incision.

Draping Cont...

1. Purpose of Draping

- The purpose of draping is to create and maintain an adequate sterile field during the operative procedure. However, drapes should not be larger than necessary, as they cause the patient to perspire excessively.

Draping Cont...

2. Care of patient

- The surgical client is usually sedated or anesthetized and therefore is unable to communicate any discomfort. Proper positioning ensures client comfort and safety, preserves vascular supply, and prevents neuromuscular damage to tissue. At the same time, positioning also provides access to the surgical site, airway, intravenous lines, and all monitoring devices.

Draping Cont...

- All sharp surfaces in contact with the client's skin are padded to prevent injury from positioning. Bony prominences (e.g., sacrum and heels) are padded to avoid excessive pressure on these points.
- The nurse ensures that skin surfaces are insulated from metal bed attachments (e.g., padded arm boards, headrest, stirrups). Appropriate devices are made available to support extremities to prevent compression of vital structures, such as the ulnar nerve or Achilles tendons.

Draping Cont...

- The circulating nurse ensures that at least four persons are available for positioning clients under general anesthesia.
- Restraints (or belts) are available to secure the client to the operating bed; sufficient soft padding is used to maintain anatomical alignment of the head and neck with the spine.
- Once the client is positioned properly and the site has been prepped, the circulating nurse applies the sterile drapes. OR drapes are designed to expose specific operative sites. The staff keeps the sterile drapes dry and in place.

Draping Cont...

3. Care of operating table

- The operating table on which the patient is positioned for surgery is fully adjustable for height, degree of tilt in all directions, orientation in the room, articular breaks, and length. This allows manipulation of the patient in any position while maintaining proper body alignment. The surface is covered with a firm pad that can be removed for cleaning.