

DRESSING MATERIALS

14th week

Dressing materials are used for;

- * Closing the wounded, traumatized or operated areas of the body
- * Ensuring that the drug remains on these areas
- * Protecting the wound from dusts, microorganisms or friction
- * Absorbing body fluids

An ideal dressing material;

- Should protect the wound from microorganisms and exogenous substances.
- Should absorb the exudate.
- Should prevent the loss of heat and fluid from wound.
- Should provide compression.

- Should prevent the injury of the recovering parts of wound.
- Should provide maximum epithelization and minimum pain.
- Should be aesthetically acceptable.

* A single dressing material can not provide all of these functions.

* It is not necessary to provide all of these functions for each type of wound.

Cotton

- * It is commonly used due to its absorbent feature.
- * It is made of cellulose.
- * It is insoluble in commonly used solvents such as water and alcohol.

Pharmaceutical Cotton Types

Absorbent cotton (Coton hydrophile, Purified cotton)

Fibers of *Gossypium* seeds which was purified from oils and waxes.

Pharmaceutical Cotton Types

Sterile absorbent cotton (Coton hydrophile sterilisé, Coton aseptique)

Oxidized cotton (Cellulosum oxydatum)

It is obtained by oxidation of cotton with nitrogen oxide (nitric oxide).

Pharmaceutical Cotton Types

Coton iode

Coton iodoformee

Coton borique

Coton sublime

Hemostatic dressing material

100 g cotton was immersed in the mixture of iron chloride (FeCl_3), glycerol and water (80:60:225) and dried in dark place.

Controls for absorbent cotton

Fiber length

Surfactant assay

Optical whiteners

Acidity and Alkalinity

Sinking time (Hydrophilicity)

Searching for Chloride Ion (AgNO_3)

Water holding ability

Searching for Sulfate Ion (BaCl_2)

Moisture content

Searching for Calcium Ion (Ammonium oxalate)

Ash amount assay

Oil and fatty substances assay

Water-soluble substance assay

Gauze

- * It is an open-textured cheesecloth which is woven with cotton yarn.
- * It is used to wrap the wounds.
- * It should not include chemical finish.

Vertical fibers

WEFT

Horizontal fibers

WARP

* Hydrophile Gauze

In an 1 cm² area;

- the number of weft threads should not be less than 10
- the number of warp threads should not be less than 10
- the total number of weft and warp threads should not be less than 20

* Sterile Gauze

It is sterilized by autoclave at 120 °C for 20 minutes.

* Hydrophile cheesecloth

* Gauze Compress

- Cotton is placed between quadrangle hydrophile gauze.
- It has an advantage like to prevent sticking of cotton.
- The gauze compresses for application to the eyes are prepared in round shape.

- * Vaseline gauze
- * Gauze with rivanol
- * Gauze with iodoform
- * Hydrophile gauze which is visible with X-ray
 - Hydrophile gauze is impregnated with a substance that does not penetrate X-rays.

Controls for Hydrophile Gauze

- Number of weft and warp
- Search of chemical finish
- Optical whiteners
- Hydrophilicity
- Breaking strength
- Chemical controls
- Weight loss with drying

Bandages

They are used to fix the dressing material on the wound or to fix the extremities by wrapping the fractures or dislocations.

Elastic Bandage

- They are generally used for tissue injuries.
- It can be extended 2.5-3 times when it is pulled.

Bandage for Burn

- It should absorb the secretion.
- It should not adhere to the wound.
- It should prevent infections in the burn area.
- It should facilitate the epithelization.

Plaster Bandage

- It contains unbaked plaster (CaSO_4).
- It is immersed in water before use.
- Then it is wrapped on the desired body location.

Plasters

They are externally used adhesive materials.

They contain;

- Natural or synthetic rubber, Pleksigum or Apponal as adhesive substances,
- Vaseline, lanolin, beeswax or castor oil as plasticizers,
- Zinc oxide or titanium dioxide as filling materials,
- Iodoform or salicylic acid as active substances

Types of Plasters

Epidermic plasters

They contain antiseptic drugs.

Diadermic plasters

They contain astringent or sedative drugs.

Salicylic acid plasters

They are used for treatment of callus because of their keratolytic effect.

Sterile adhesive plasters

They are used for fixing the dressing materials to skin.

Capsicum plasters

They contain methyl salicylate.

They are used for treatment of rheumatism.

SURGICAL SUTURES

Sutures

They are used to sew, connect or assemble the cuts, slashes or surgical incisions at different body regions.

An ideal suture;

- * Should be easy to use
- * Should not cause a tissue reaction
- * Should not cause a bacterial proliferation
- * Should have strong tensile strength
- * Should be easily sterilized
- * Should not cause allergic reactions
- * Should not be carcinogenic

Classification of Sutures

- **Natural**
- **Synthetic**

- **Monofilament**
- **Multifilament ("Braid")**

- **Absorbable**
- **Non-absorbable**

Absorbable

- Natural Catgut
- Synthetic Synthetic polymers

Non-absorbable

- Natural Silk, Cotton, Linen
- Synthetic Nylon, Polyester
- Metal Silver, Stainless steel

Absorbable surgical sutures

- They are prepared with the materials which are degraded and absorbed in body after a certain period.
- It is not required to remove the sutures.

Catgut

- It is the most used absorbable surgical thread material.
- It is also referred to as a surgical bowel.
- It is obtained from the submucosal porous tissue of the sheep bowel or from the bovine serous membrane.

- **Plain catgut;** it is untreated catgut and it is absorbed in 7-10 days.
- **Kromik catgut;** it is catgut which is treated with chromic salts and it is absorbed approximately in 20 days.

Post-operative complications caused by catgut

- Tetanus
- Infection
- Allergic reaction
- Hematom

Polyglactic acid - Poliglactin (Vicryl)

Lactic acid - glycolic acid copolymer

Polyglycolic acid (PGA)

It is a homopolymer of glycolic acid

Polydioxanone (PDS)

Polymethylene carbonate

Poliglecaprone 25 (Monocryl)

Non-absorbable surgical sutures

- They efficiently resist to enzymatically degradation in living tissues.
- They remain intact in body without mass loss. They only loose some of their physical properties.
- Suture is encapsulated and scar tissue occurs around the suture.
- If it is used for suturing of skin, it should be removed after healing.

Silk

It is the most common use natural non-absorbable surgical thread.

It is obtained from silkworm cocoon.

Polyamide

- Ethilon
- Nurolon
- Surgilon
- Dermalon

Polypropylene

- Prolene
- Surgilene

Polyester

- Ethibond
- Dacron
- Ti-cron

Stainless steel suture

It has a difficulty of use and possibility of cutting tissue.

It has a low flexibility.

Numbering of Surgical Sutures

- USP and EP standards are used.
- The suture diameter is represented by special size codes for both of standards.

- **USP standard** is more widely used and codes are represented as **2/0, 3/0...**

When the first number is increased, it expresses a decrease in the diameter of suture.

- **In EP standard**, code numbers change **from 0.1 to 10.**

The minimum diameter can be calculated by dividing the code number into 10.

Coating of sutures

- Coating is made especially for braiding sutures.
- It provides ease of use and also decrease the destruction occurred in tissue.

Coloring of sutures

Sutures are colored for ease of appearance during surgery.

FDA approved dyes should be used.

Examples;

- Logwood extract
- Chromium-cobalt-aluminum oxide
- Iron ammonium citrate
- Progallo
- D&C Blue No. 9
- D&C Blue No. 6
- D&C Green No. 5
- D&C Green No. 6

Packaging of surgical sutures

- Sterile special packaging

Package includes;

- Type of suture
- Color of suture
- Monofilament or multifilament
- Producer company
- Date of production
- The thickness and length of the suture
- The type of needle
- The length of needle

SURGICAL NEEDLES

Surgical needles can be made of steel, iron, chromium, nickel, manganese and molybdenum.

The needle consists of three parts;

Needle tip / needle point

Needle body

The junction region of needle and suture

An ideal surgical needle;

- * Should be resistant to corrosion (stainless steel)
- * Should be strong enough to penetrate into tissue
- * Should be shape-retaining
- * Should not cause an abrasion in the tissue
- * Should be easy to use
- * Should not be traumatic
- * Should not be separated easily from the suture at connection site

Alternative surgical materials

-Staples

-Skin tapes

Steri-Strips™ ; 3M™

-Topical tissue adhesives

Dermabond®

OTHER SURGICAL MATERIALS

Agrafe

It is used to sew superficial wounds.

Catheter

It provides the collection of urine from bladder. It is made of rubber.

Sponge

It is used due to its adsorbent feature in surgery.

It can not be sterilized by heat. It should be prepared aseptically.

Gelatine sponge

It is anticoagulant.

It is prepared by emitting air / gase into the gelatine solution.

Drain

It is a tubular surgical material which is made of glass, metal or rubber and in various widths and lengths.

Drain should be placed in operating area before the skin and subcutaneous tissue is sewed, if there is a risk of leakage or effusion in the post-operative period.