


SUTURE MATERIALS AND BASIC SUTURE PATTERNS

Suture materials are classified as absorbable or nonabsorbable, natural or synthetic, and monofilament or multifilament, based on composition and structure



Suture Materials
Post Operative Care,
Dressing materials
Drain Drain
Antibiotic Selection

Dr. Murat ÇALIŞKAN



Materials that lose tensile strength within 60 days of implantation are classified as absorbable; whereas most suture materials will eventually be absorbed.

The truly nonabsorbable sutures are polypropylene and stainless steel.

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, set against a blue background.

Table 14.1 Properties of some common absorbable suture materials

Name	Approximate loss of tensile strength at 14 days (%)	Complete absorption (days)	Strength ^a	Handling ^a	Reactivity (rank) ^b	Knot security
Chromic gut	50	90	+	++	6	+
Polyglactin 910	30	56–70	+++	+++	5	+++
Polyglycolic acid	35	90	+++	+++	3	+++
Poliglecaprone	60–80	90–110	+++	++++	4 ^c	++++
Polydioxanone	20	180–240	++++	+++	2	++
Polyglyconate	25	180	++++	++++	1	++++
Glycomer 631	25	90–180	NA	NA	2	NA
Glycolide/lactide copolymer	20	56–70	NA	NA	NA	NA


^aWorst = +; best = + + + +.

^bLowest reactivity = 1; highest reactivity = 6. [Note: While the tissue reactivity of gut is significant, the relative reactivity of the synthetic absorbable suture materials does not seem to be of noticeable clinical importance.]

^cStudies in rats show poliglecaprone to be less reactive than polydioxanone.

ABSORBABLE SUTURE MATERIALS

Surgical gut (catgut) is a natural multifilament suture made from either intestinal submucosa (ovine) or serosa (bovine). It consists of 90% collagen. When cured with chromic salts, surgical gut has increased strength, less inflammatory reaction, and slower absorption. Surgical gut is absorbed by enzymatic digestion and phagocytosis by macrophages. Inflammation, infection, and catabolic states increase the rate of absorption.



Polyglactin 910 is a braided multifilament synthetic suture material made of 90% glycolide and 10% L-lactide.

Polyglycolic acid is a multifilament braided synthetic suture material with greater initial strength than surgical gut. Also, in comparison to surgical gut, polyglycolic acid incites less inflammatory reaction.

Polyglycolic acid is absorbed by hydrolysis and has a pattern of loss of strength similar to polyglactin 910

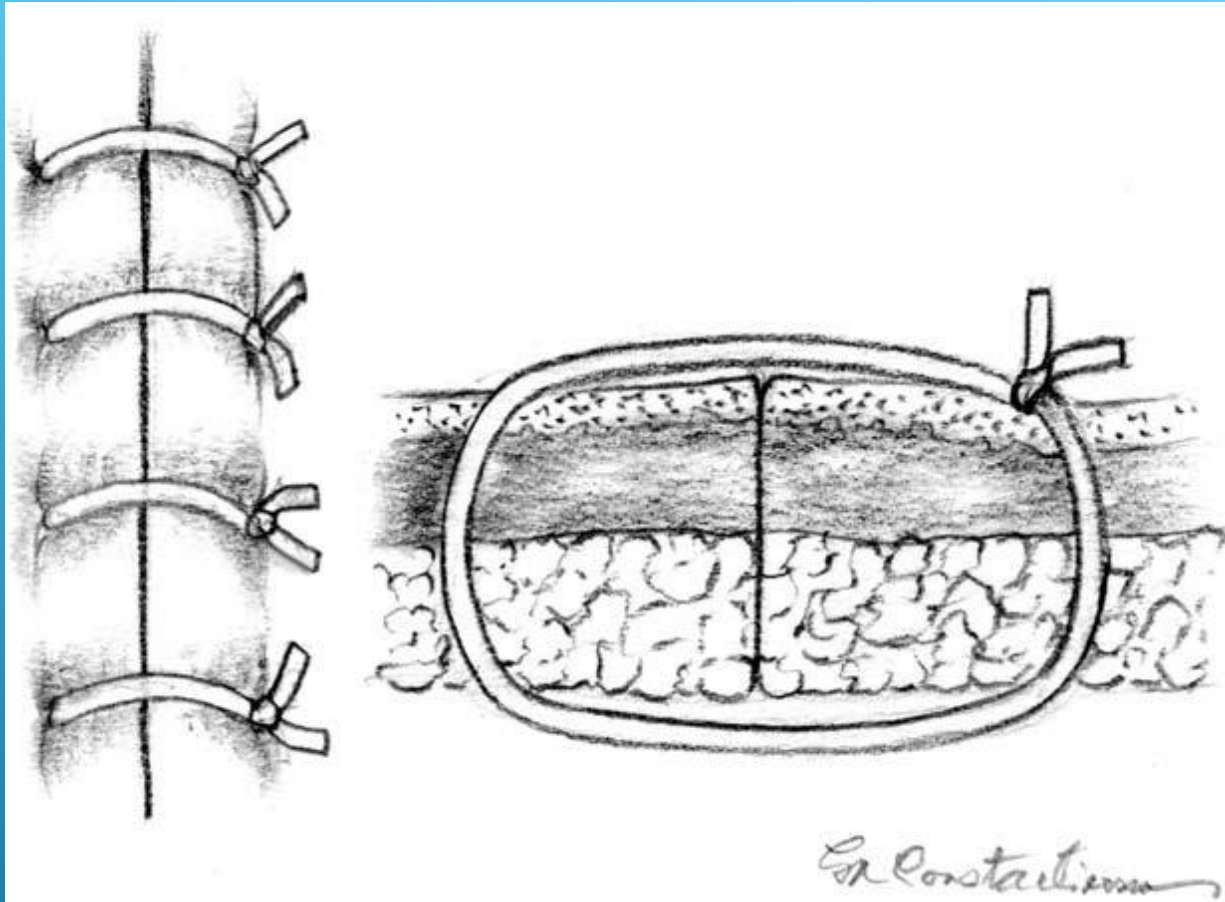
NONABSORBABLE SUTURE MATERIALS

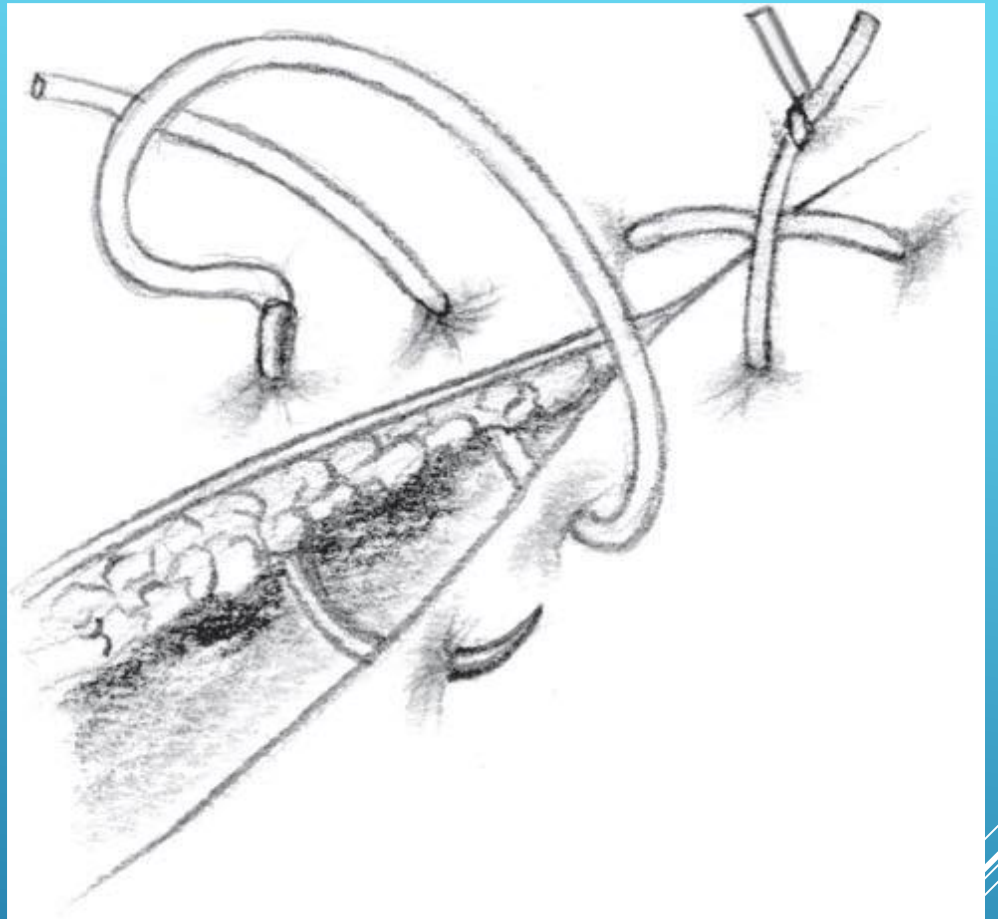
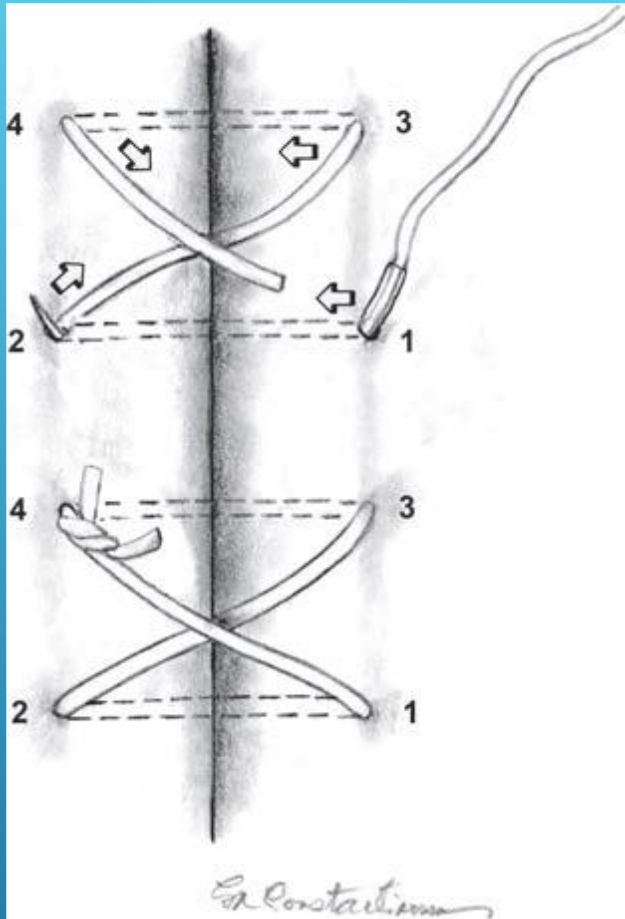
Silk is the only natural nonabsorbable suture material in common use today. Silk is a braided multifilament suture made from the cocoon of the silk worm. Silk elicits intense inflammatory reaction and has marked capillarity. It is inexpensive, has excellent handling characteristics, and has excellent knot security. Coating (wax or silicone) decreases suture capillarity and the tissue's inflammatory response at the expense of knot security. Silk must not be applied in infected tissues since it will decrease the number of bacteria necessary to cause a wound infection.

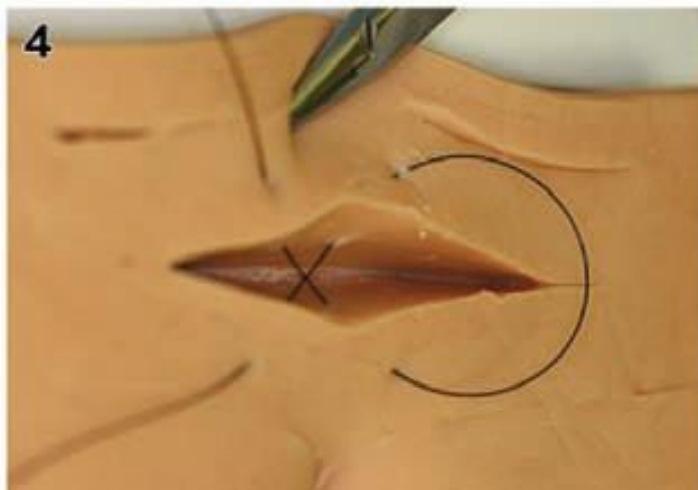
SURGICAL KNOT TYING

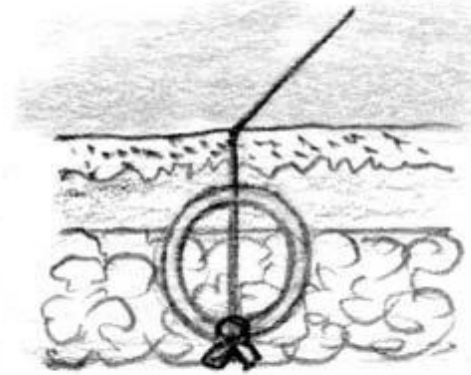
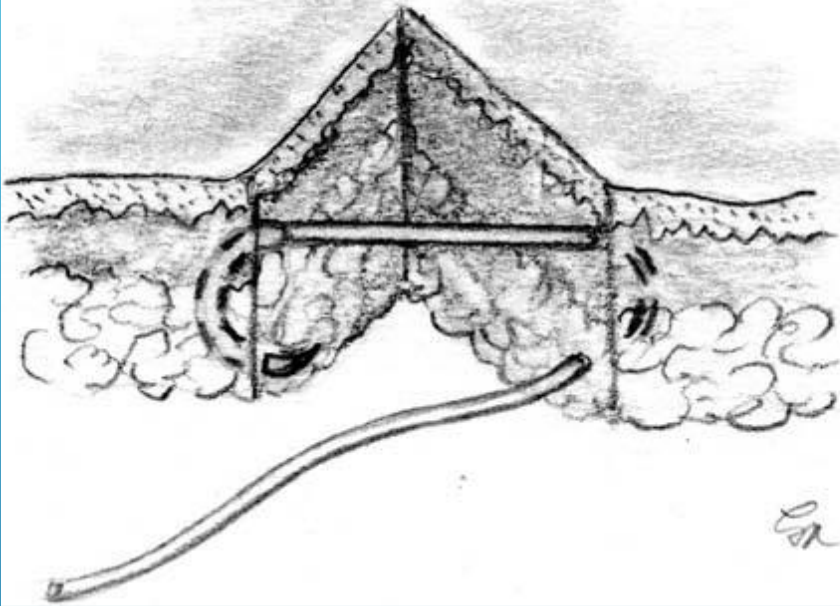




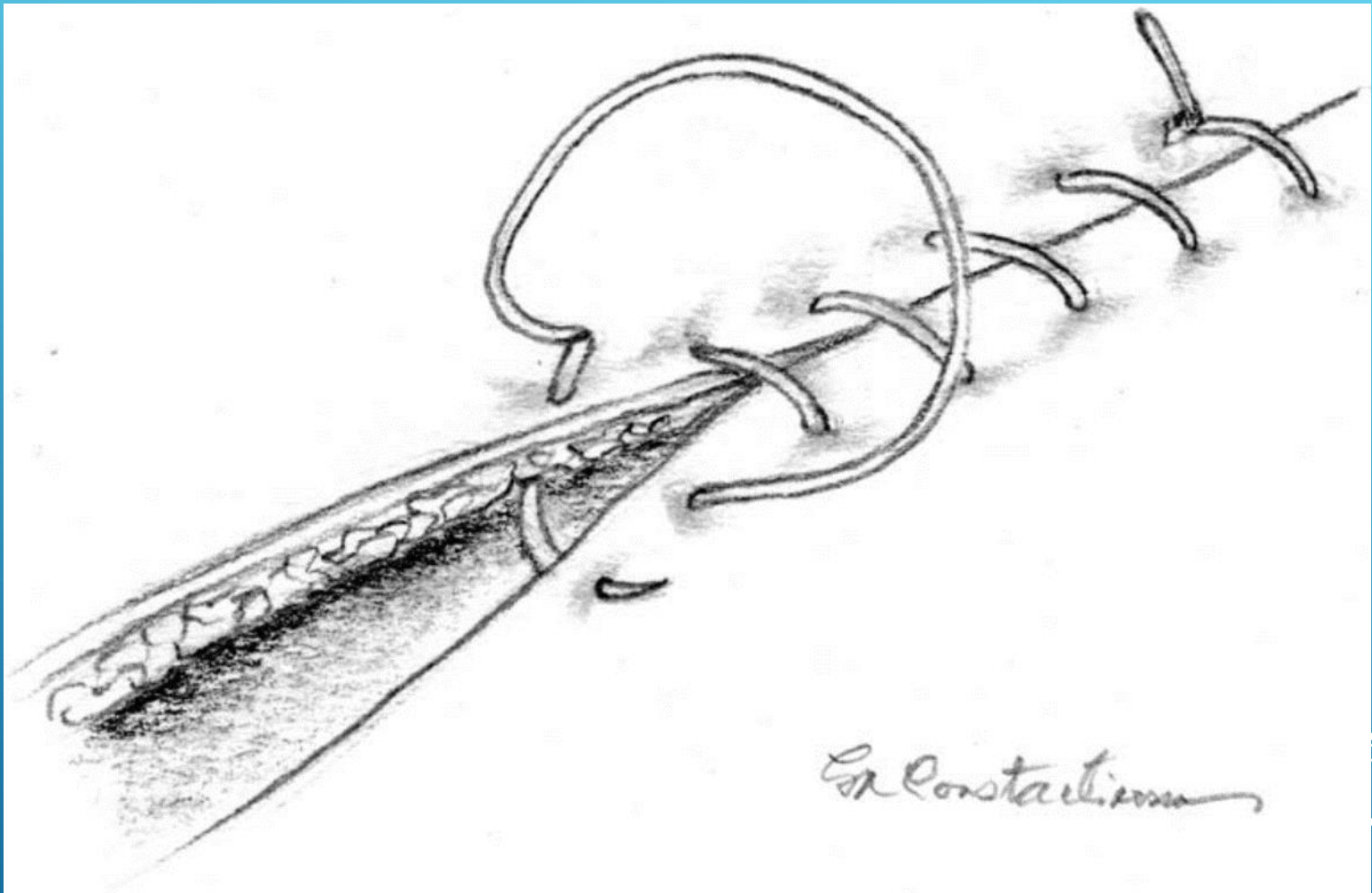


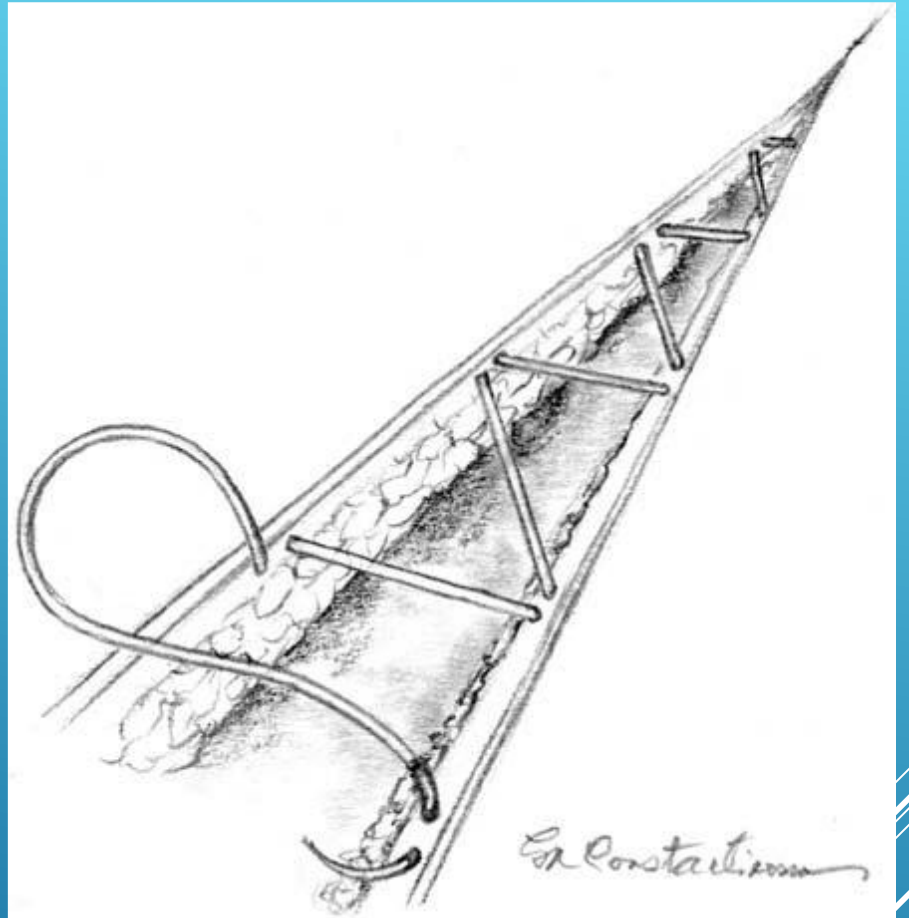
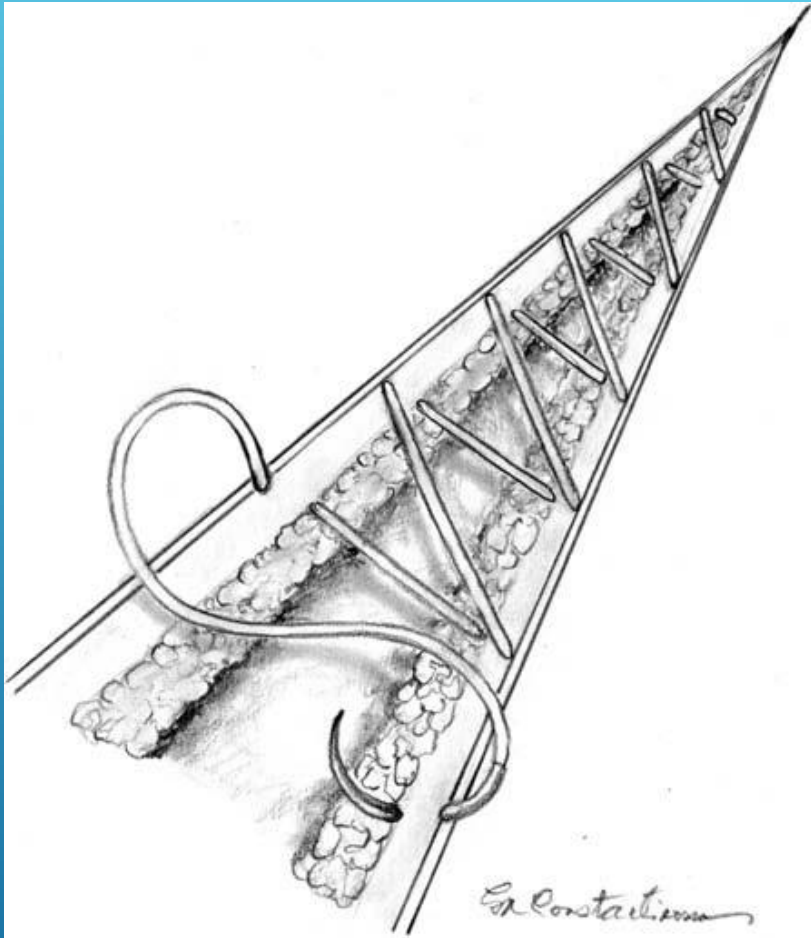


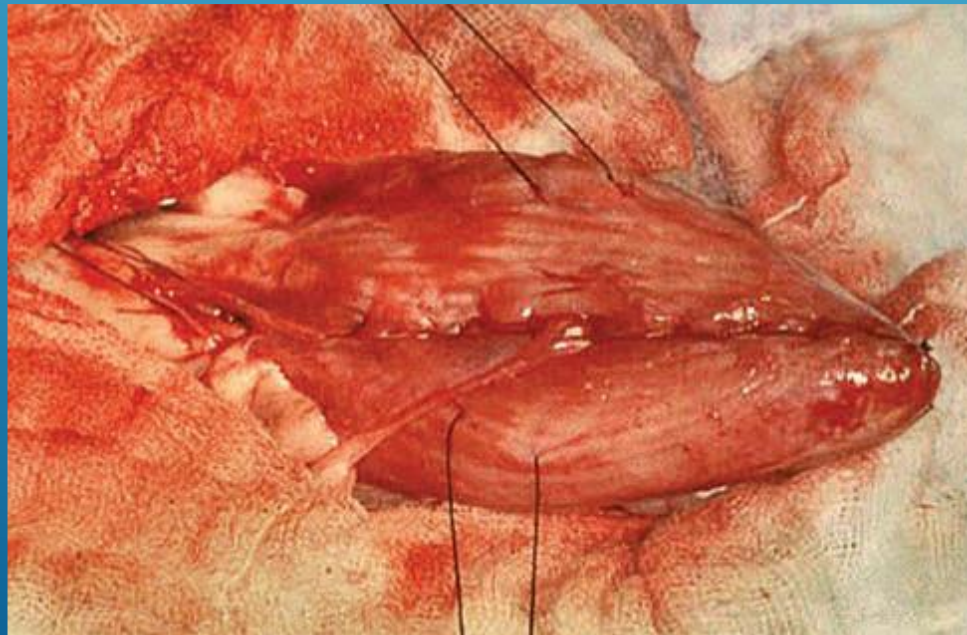
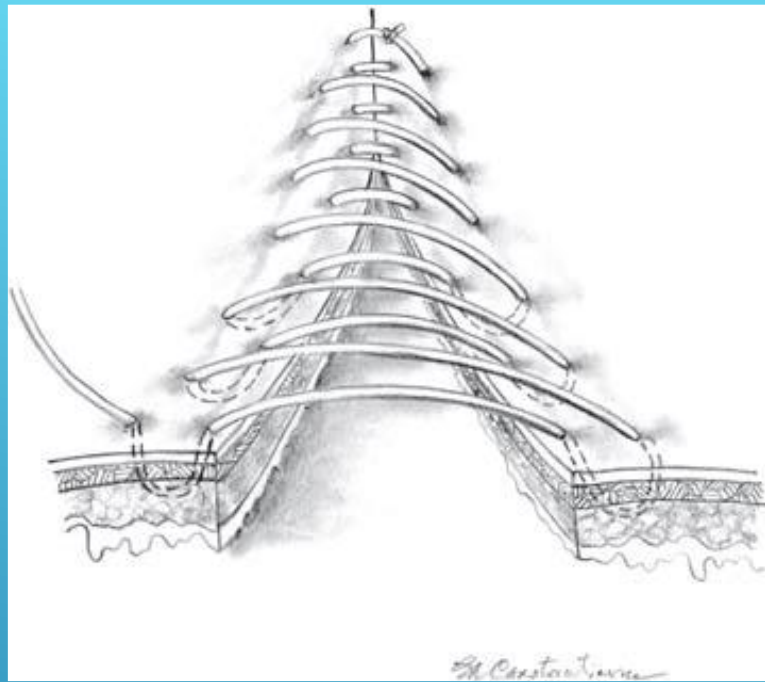
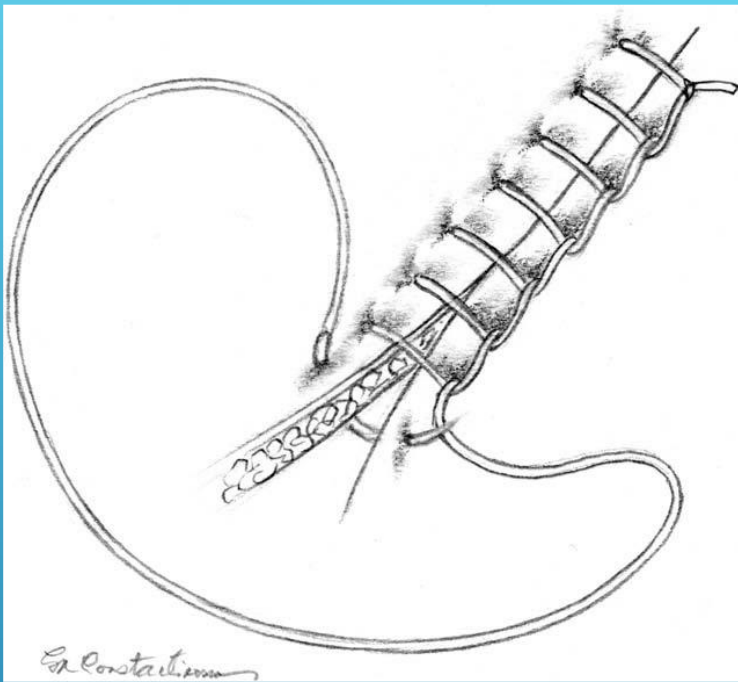


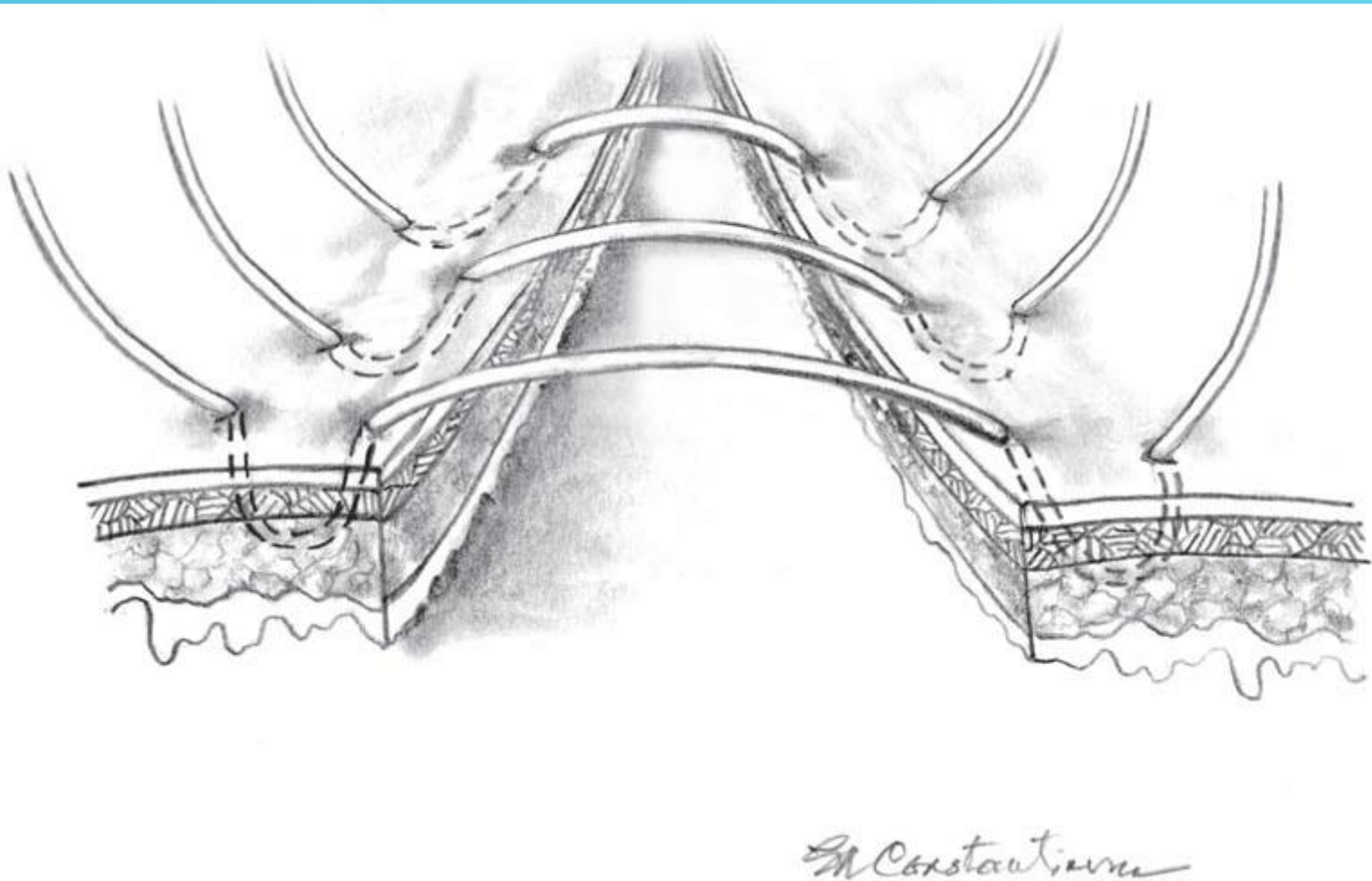


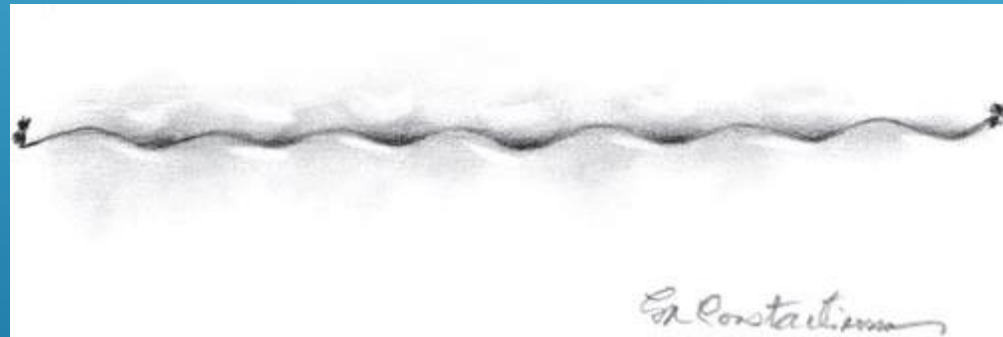
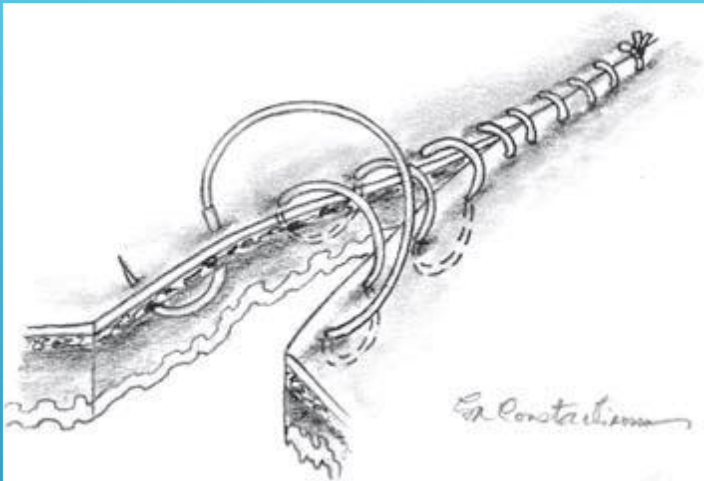
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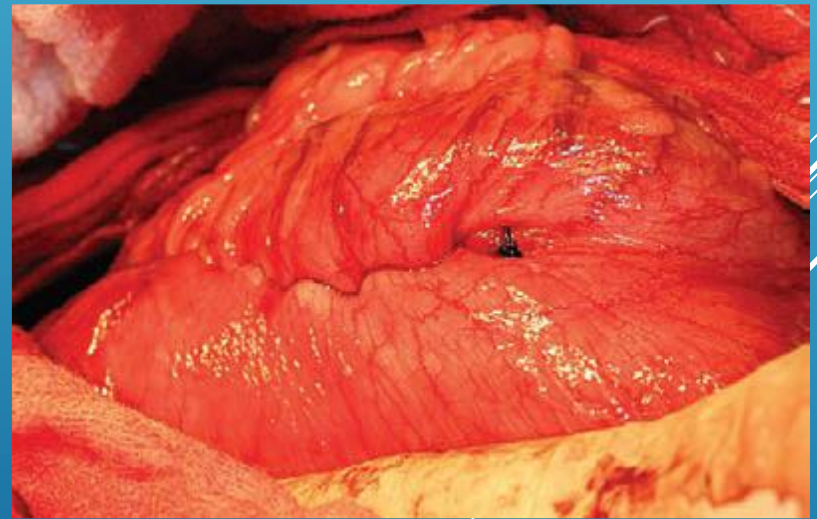
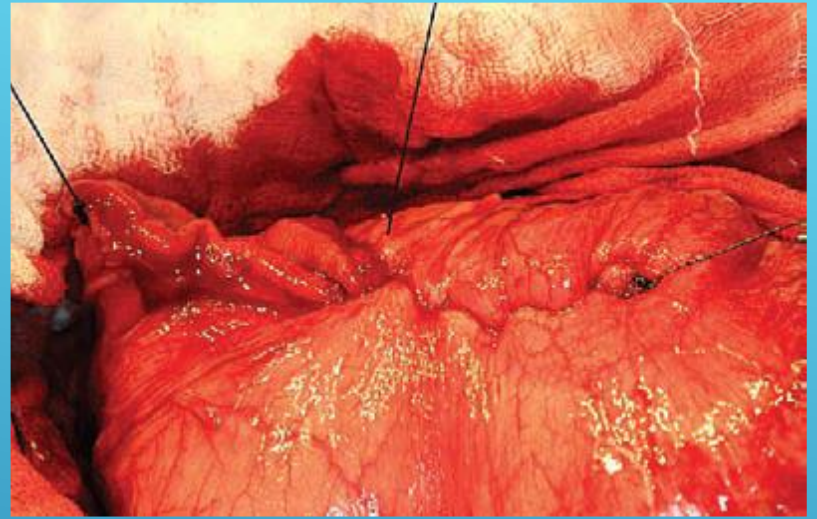
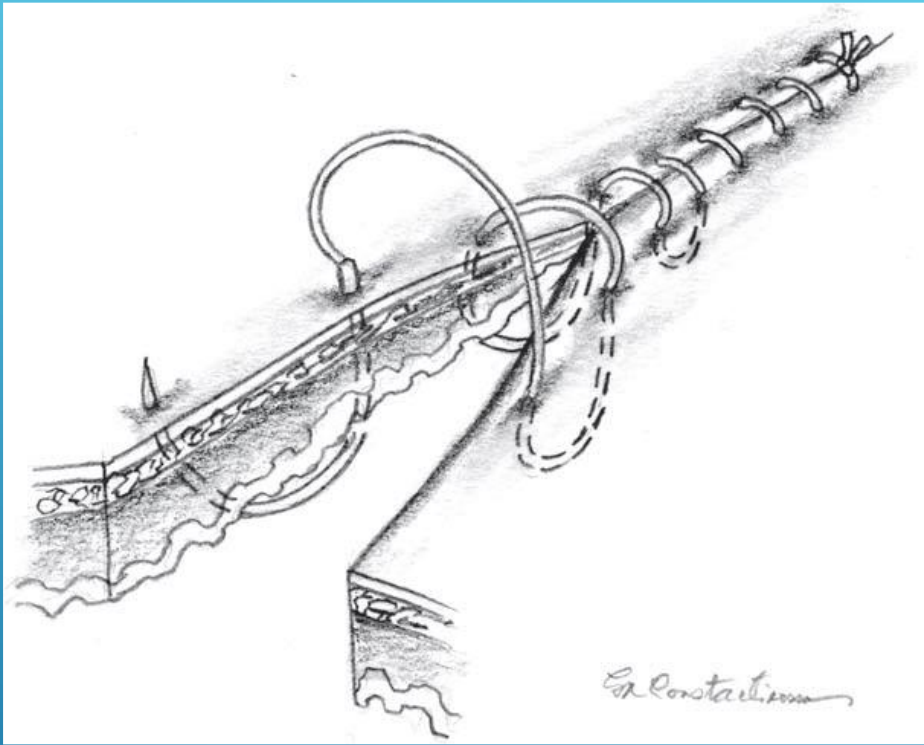


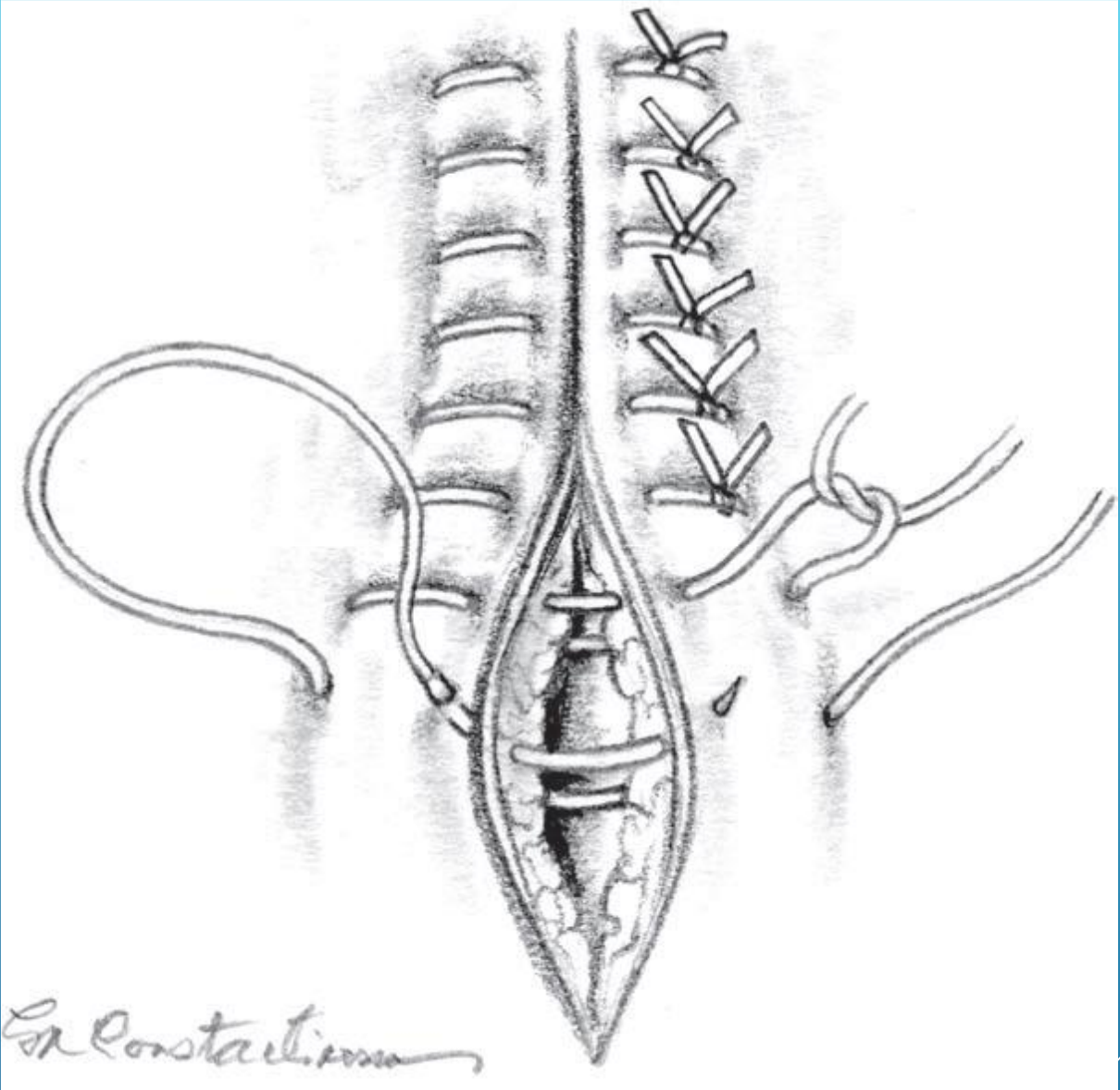


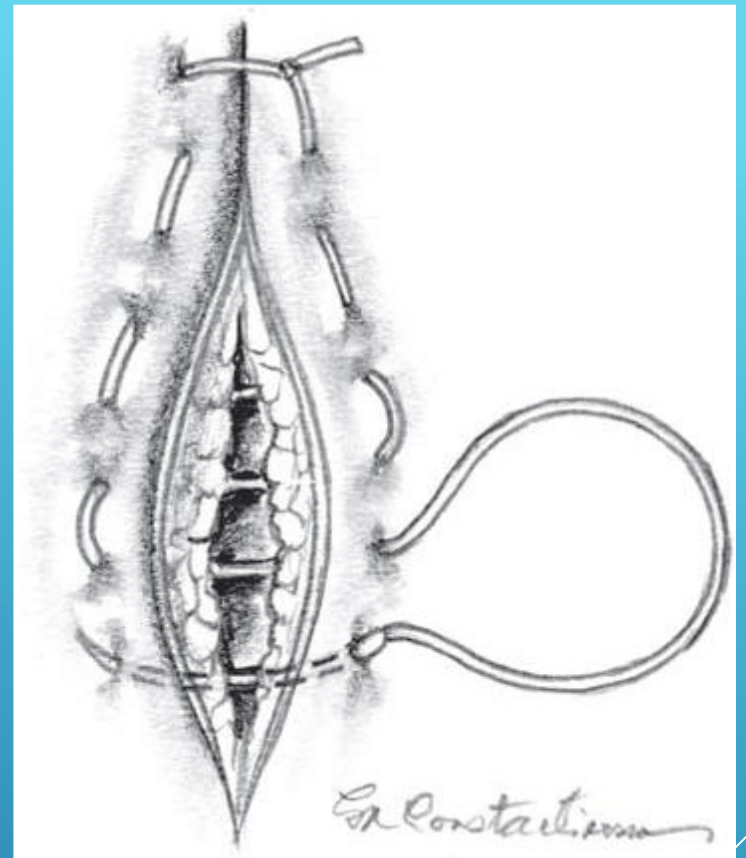
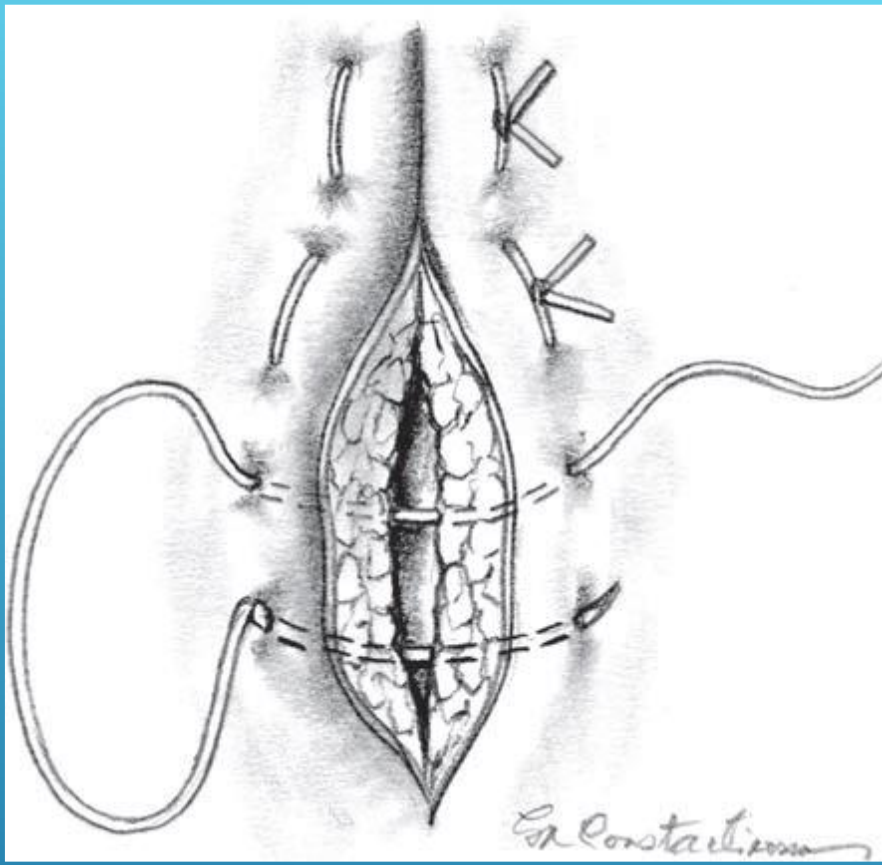






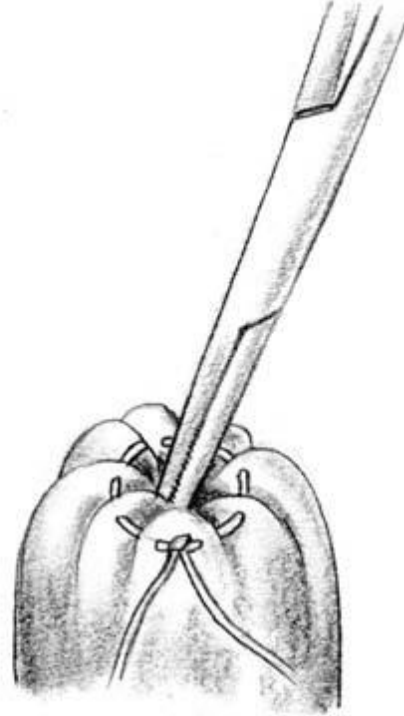








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G. Constantine

Table 14.2 Appositional suture patterns

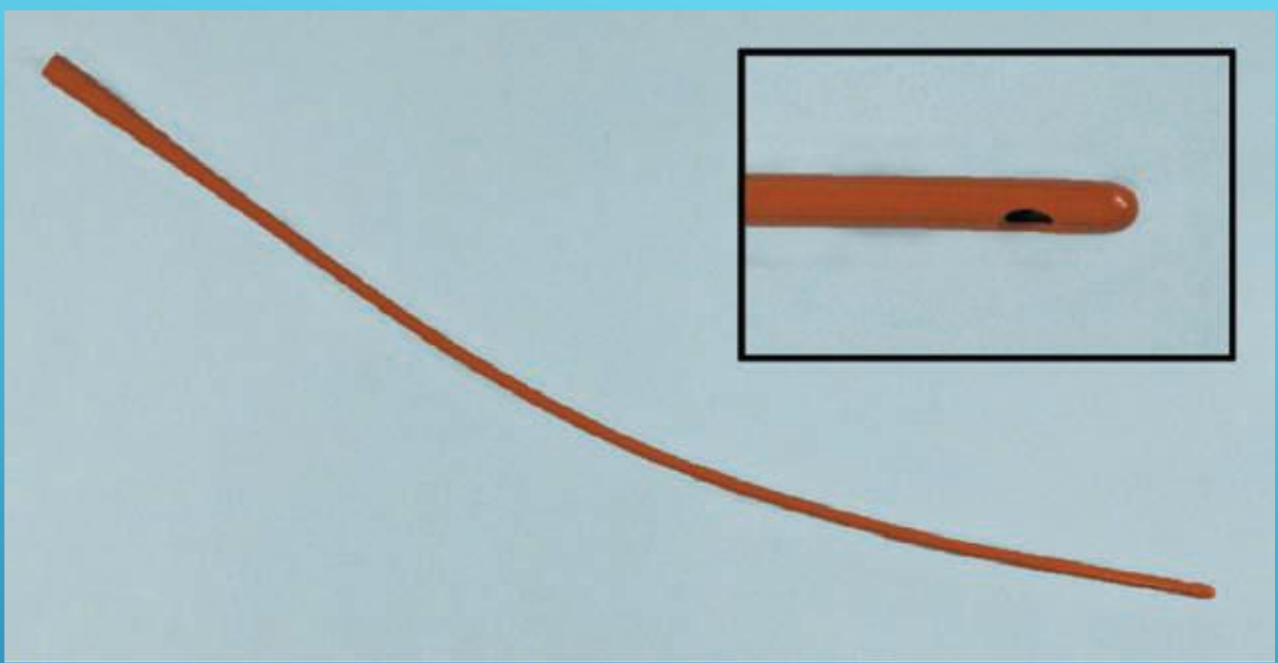
Pattern	Features	Uses
Simple interrupted (Figure 14.2)	Easy to perform. Provides secure closure. Equal tension throughout the wound. Can cause eversion of edges if excessive knot tightening is applied.	Skin, muscle fascia, gastrointestinal tract
Interrupted cruciate and figure-of-eight sutures (Figures 14.3 and 14.4)	Stronger closure compared to simple interrupted. Less skin eversion compared to simple interrupted.	Skin, muscle fascia
Interrupted intradermal (subcuticular) (Figure 14.5)	Deep superficial-superficial deep pattern.	Skin apposition (with buried knots)
Simple continuous (Figure 14.6)	Fast and economical pattern. Leads to air/water tight seals. Knot/suture failure may lead to complete dehiscence.	Subcutis, linea alba, stomach, and small intestine
Continuous intradermal (subcuticular) (Figures 14.7 and 14.8)	Horizontal or vertical pattern. Results in excellent apposition and aesthetics if carefully and correctly applied.	Meticulous skin apposition, especially when skin sutures are not performed
Ford interlocking (Figure 14.9)	Greater security in case of a broken suture (dehiscence usually incomplete).	Skin
Gambie (Figure 14.17)	Modified simple interrupted. Prevents mucosal eversion.	Small intestinal apposition

Table 14.3 Inverting suture patterns

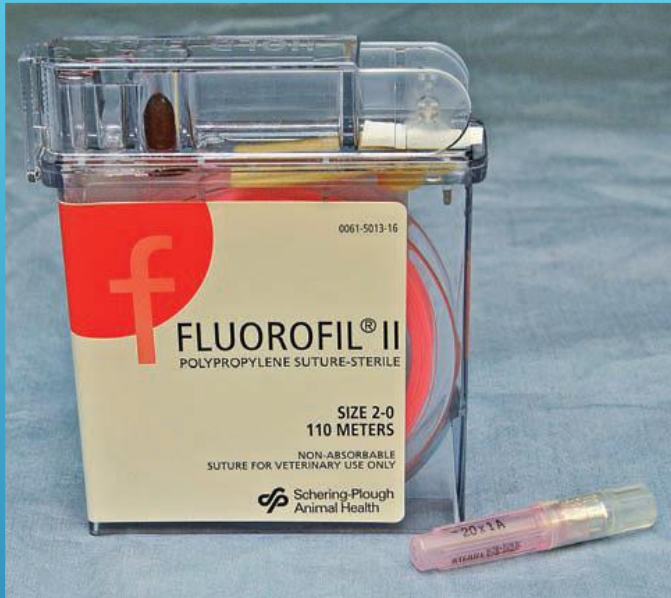
Pattern	Features	Uses
Lembert (Figure 14.10)	Similar to a vertical mattress except it inverts tissue. Interrupted or continuous.	Closure of hollow viscera. Imbrication of fascia.
Cushing (Figure 14.11)	Suture bites parallel to incision. Does not penetrate mucosa.	Closure of hollow viscera.
Connell (Figure 14.12)	Same as Cushing pattern, but penetrates the mucosa.	Closure of hollow viscera.
Halsted (Figure 14.13)	Variation of interrupted Lembert (looks like a combination of Lembert and horizontal mattress that results in tissue inversion).	Fascia imbrication.
Purse-string (Figure 14.18)	Variation of Lembert. Suture bites progress in a circle.	Closure around ostomy tubes. Temporary anal closure to prevent fecal contamination during surgery and to treat rectal prolapse.

Table 14.4 Tension-relieving suture patterns

Type	Features	Uses
Interrupted vertical mattress (Figure 14.14)	Everting, but can be appositional if carefully placed.	Skin, oral mucosa, and fascia
Horizontal mattress (Figure 14.15)	Everting. Can potentially cause decrease blood supply of the incorporated tissue. Usually interrupted, but can be continuous.	Skin, subcutis, and fascia
Mayo mattress (vest over pants) (Figure 14.16)	Overlaps one tissue edge over the other.	Herniorrhaphy, such as repair of linea alba dehiscence
Near and far variations (Figure 14.19)	May cause eversion. Diminish tension on the wound edges.	Skin and fascia
Walking sutures (Figure 14.20)	Placed in staggered rows. Advance skin edges toward each other.	Closure of large skin defects







Fundamentals of Small Animal Surgery



Fred Anthony Mann,
Gheorghe M. Constantinescu
and Hun-Young Yoon

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