Micro-Surgery Sutures

Johnson & Johnson MEDICAL

Cordis DePuy ETHICON ETHICON ENDO-SURGERY

Wound Closure through history

- Cautery
- Cotton
- Flax
- Silver
- Kangaroo Tendons
- Driver Ants
- Bark Fibre
- Linen
- Gold
- Animal Intestinal Tissue
- Synthetic material

What is a Suture?

strand of material used to ligate (tie) blood vessels or approximate (bring close together) tissues.

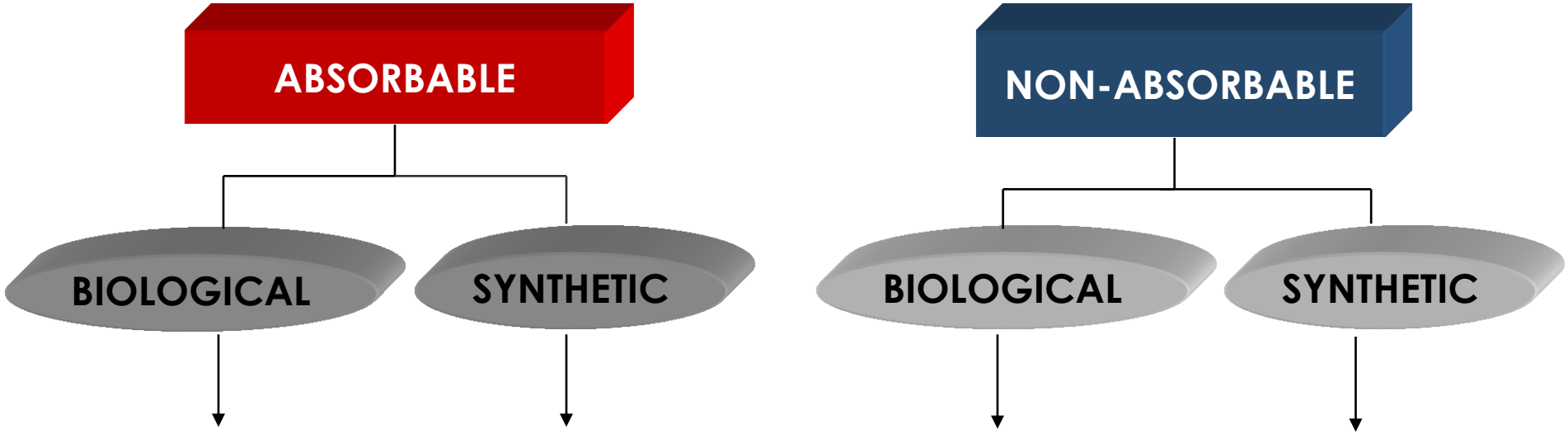
Optimal Suture characteristics:

- High uniform tensile strength
- Consistent uniform diameter
- Sterile
- Pliable for ease of handling and knot security
- Inert - minimal tissue reaction
- Predictable performance and easy to handle
- Predictable absorption

3 ways to classify sutures

Absorbable	Non Absorbable
Monofilament	Multifilament
Synthetic	Biological/Natural

Common Sutures used in **Plastic Surgery**



Chromic Gut

Plain Gut

VICRYL® *RAPIDE*

MONOCRYL ®

MONOCRYL ® PLUS

Coated VICRYL ®

Coated VICRYL® PLUS

PDS II

Silk

PROLENE®

ETHILON®

NUROLON®

ETHIBOND® EXCEL

Stainless Steel Wire

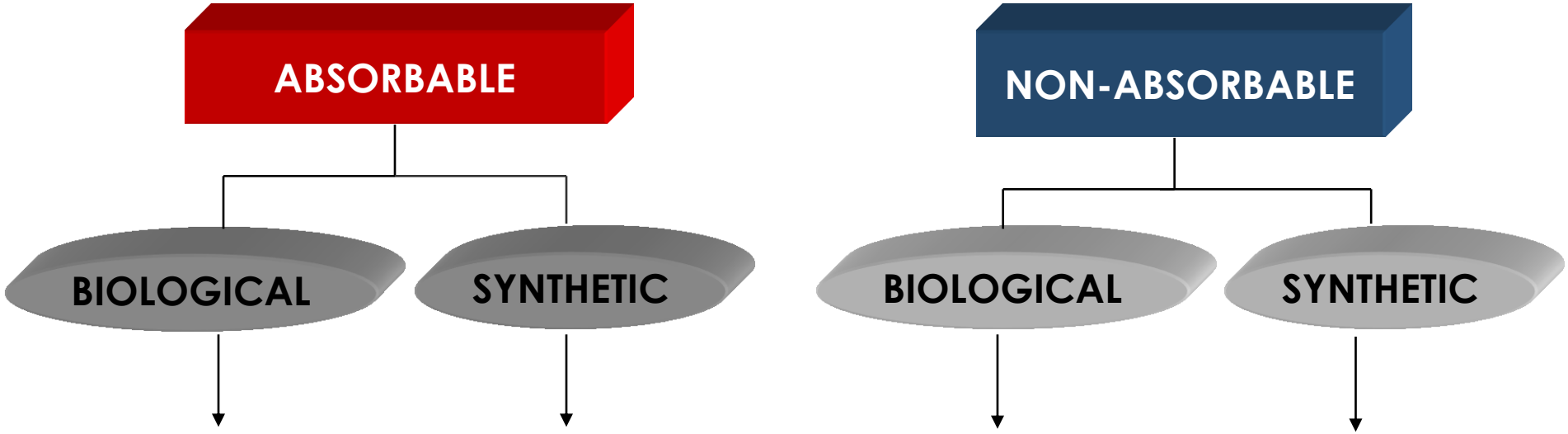
Micro-Surgery Sutures

- ETHICON's micro-surgery sutures commonly used in:
  - Hand surgery (*tendons, nerves, vessels*)
  - Peripheral nerve surgery (*suturing, glueing*)
  - Replantation surgery
  - Reconstructive operation / intervention (*Nerve graft, Local or stemmed flap grafts)*

- Suture material is usually required to be small, strong, easy to handle, and non-absorbable

- Needle required to be strong, ductile, consistently sharp, and able to penetrate small vessels

Common Sutures used in **Micro-Surgery**



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Stainless Steel Wire

ETHILON®
Nylon Suture

Non- Absorbable

Synthetic

Monofilament

- Available in small gauges
  (ie. 8/0; 9/0; 10/0; 11/0 or comparable metric gauges would be 0.4 metric, 0.3 metric, 0.2 metric & 0.1 metric)

- Monofilament Structure
  - No capillarity
  - Low tissue trauma - No sawing effect
  - Good cosmesis
  - Excellent handling, easy to knot

- High Tensile Strength
  - Medical grade nylon is strongest available for sutures
  - High resistance to snapping, even in the thinnest strands
  - Less risk of wound dehiscence

- Deep dyed black makes it easily visible under the microscope

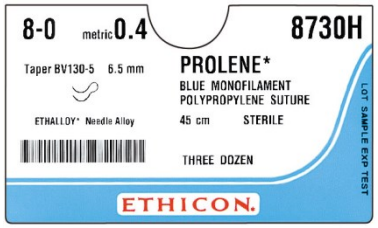
- Degrades at a rate of 10-15% strength per year

PROLENE®
Polypropylene Suture

Non- Absorbable

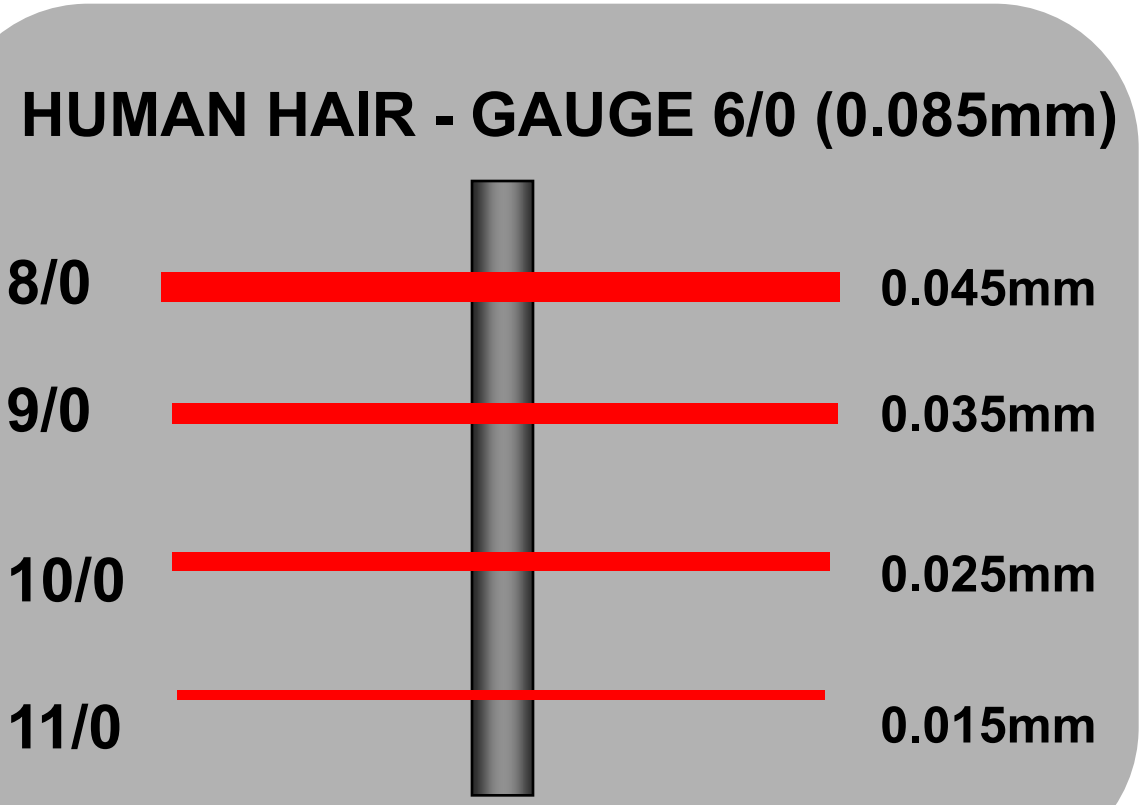
Synthetic

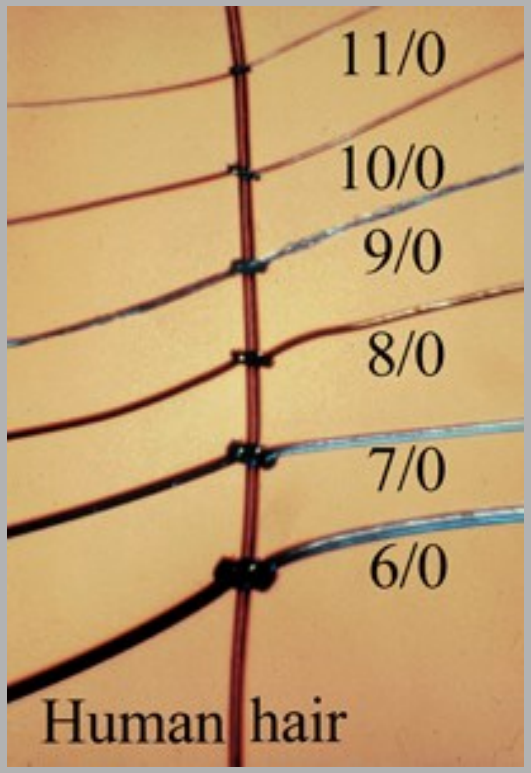
Monofilament



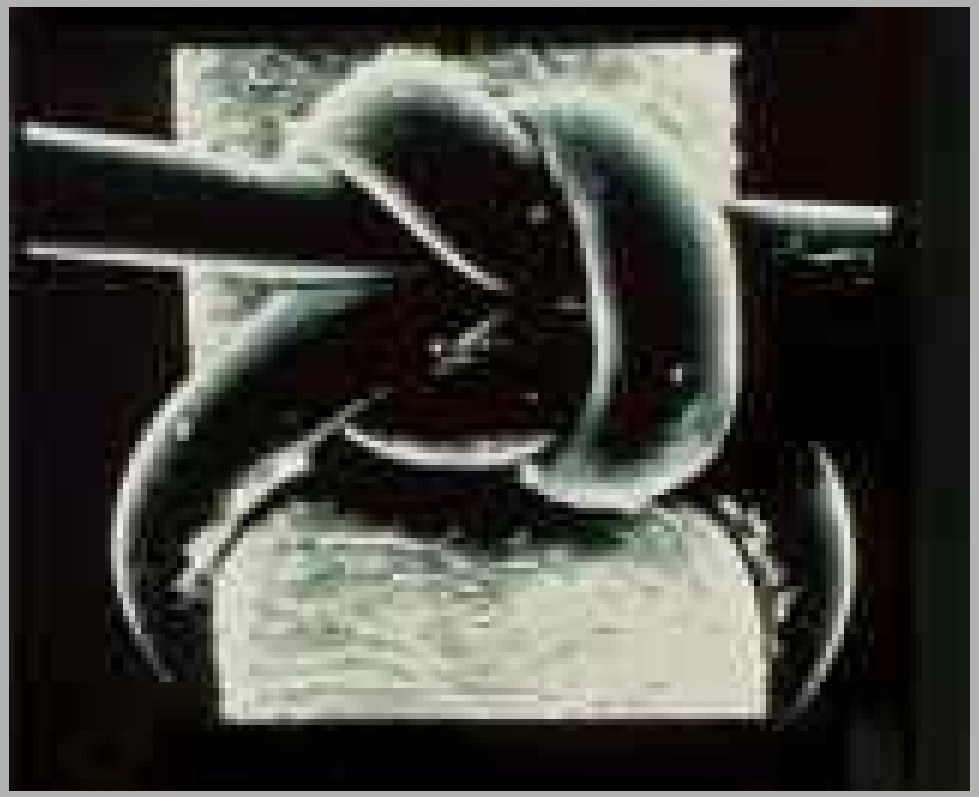
- Available in small gauges (ie. 8/0; 9/0; 10/0)
- Monofilament Smoothness - Passes easily through delicate tissue because of its extremely smooth surface finish
- Inert suture with minimal tissue reactions even in the presence of infection
- Controlled Linear Elongation gives the surgeon a 'built-in' indicator of appropriate knot tension when tying
- Plastic Knot Deformity - Prolene suture deforms and flattens when knotting to provide excellent knot security
- Special care is needed when handling PROLENE® Sutures to avoid damaging the material with surgical instruments.

Suture Gauges
in Micro-Surgery





Suture Gauges
in Micro-Surgery



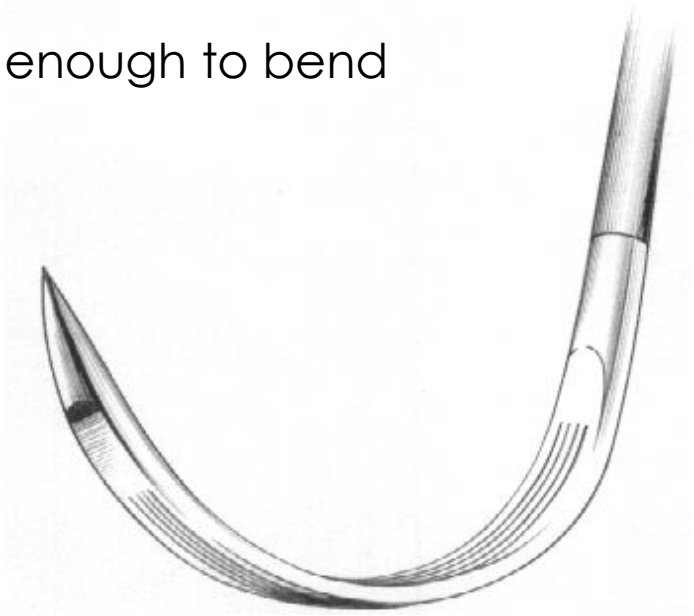
Monofilament thread (USP 10-0) knotted onto human hair

The Ideal **Needle**

Surgical needles must be designed to carry suture material through tissues with minimal trauma.

They must be:

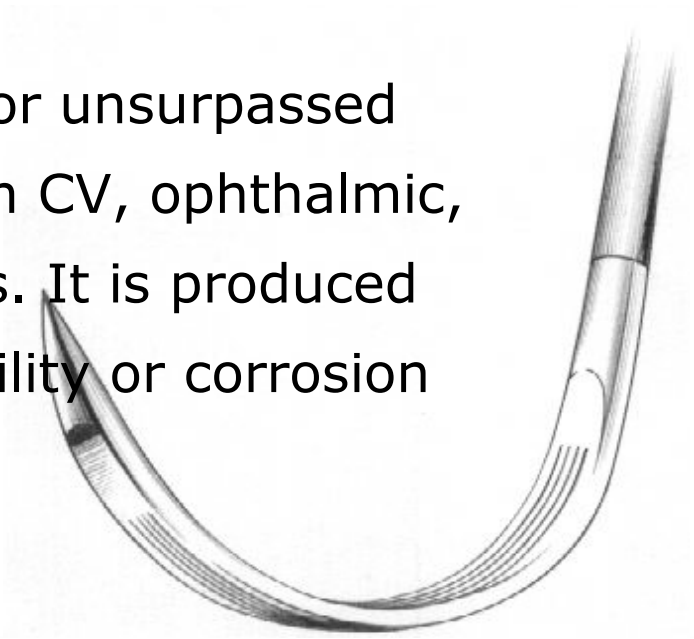
- **Sharp** enough to penetrate tissues with minimal resistance
- Rigid enough to **resist bending**, yet flexible enough to bend before breaking.
- **Sterile and corrosion resistant** to prevent introduction of microorganisms or foreign bodies into the wound.



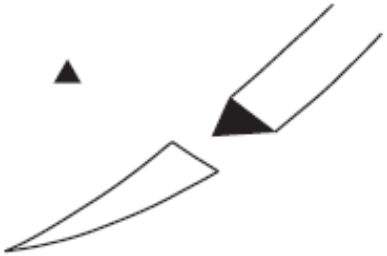
Needle **Strength**

- **ETHICON stainless steel alloy:**
  needles are heat treated to give them the maximum possible strength and ductility.

- **ETHALLOY needle alloy:**
  exclusive patented alloy developed for unsurpassed strength in precision needles. Used in CV, ophthalmic, plastic, and microsurgical procedures. It is produced economically without sacrificing ductility or corrosion resistance.

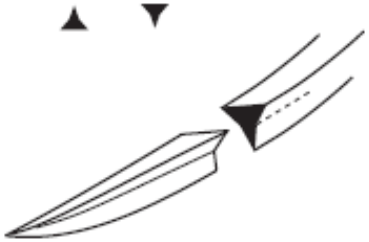


Common needles used in **Plastic Surgery**



Conventional Cutting Needle

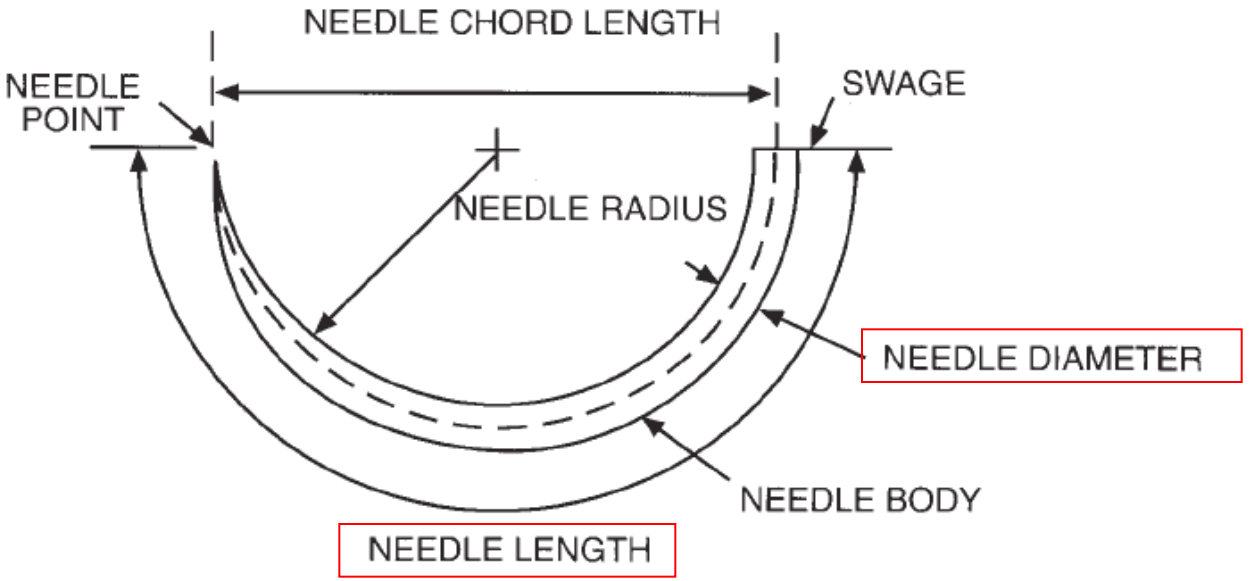
Reverse Cutting Needle



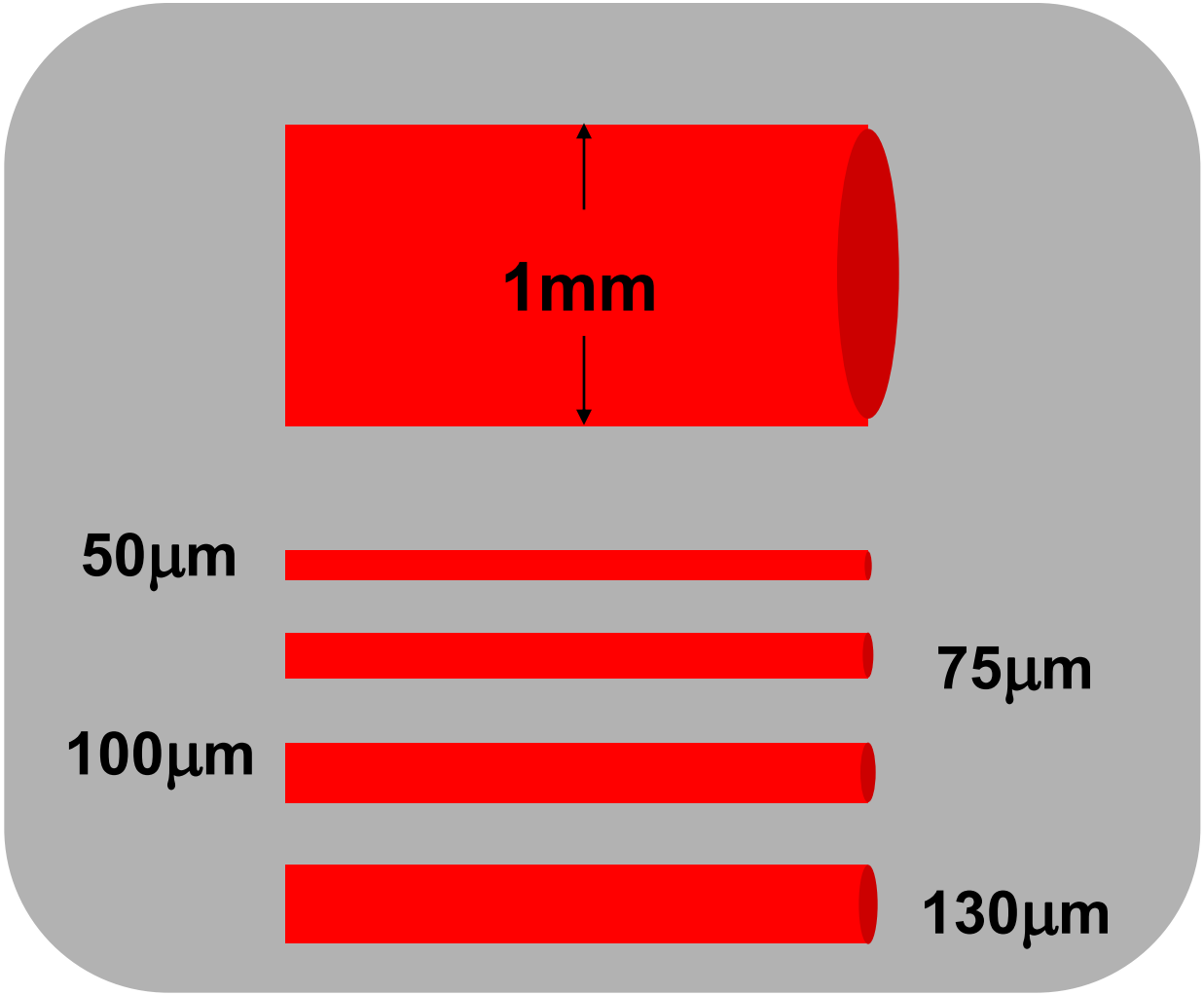
PRIME Needle

Micro-Surgical **Needles**

- Needle profile
- Needle length
- Needle diameter

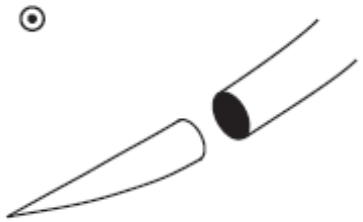


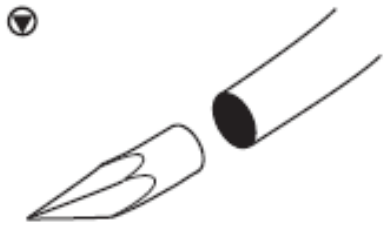
Micro-Surgical **Needles**

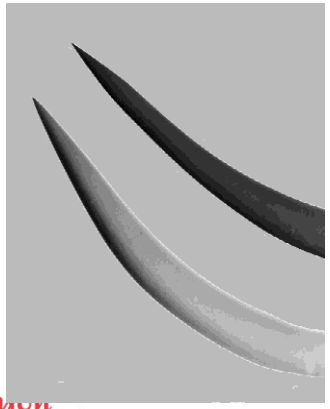


This ‘to scale drawing’ shows the relative thicknesses of ETHICON’s ultra fine needles when compared to needle wire which is 1mm in diameter

Common needles used in **Micro-Surgery**







- Taperpoint Needle
- Tapercut Needle
- BV Needles
- VISIBLACK Needle

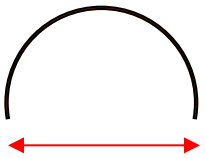
BV Needles in Micro-Surgery

- Taper point geometry
- 12:1 ratio
- I-BEAM Technology
- Multipass Coating (except VISIBLACK)
- VISIBLACK & SILVER

Needle	Alloy	Body Geometry	Swage Type	Chord Length	Wire Diameter
BV130-5	Ethalloy	Round Cornered I-Beam	Channel	5	0.0057
BV175-6	Ethalloy	Round Cornered I-Beam	Channel	6	0.0075
BV175-7	Ethalloy	Round Cornered I-Beam	Channel	6	0.0075
BV175-8	Ethalloy	Round Cornered I-Beam	Channel	7	0.0075
BV-1	Ethalloy	Round Cornered I-Beam	Laser	7	0.0097

BV Needles in Micro-Surgery

- BV = Blood Vessel
- BV-1
  - Chord length 7 mm
  - wire diameter = 197 microns
- BV Fine Wire needles (BV175 and BV130)
  - "175" & "130" = Wire Diameter (microns)
  - 175 microns = 8 mil
  - 130 microns = 6 mil



- "-8, -7, -6, -5" = Chord Length (mm) ⇒

BV Needles in Micro-Surgery

Comparing the size of a
BV needle and strand of human hair

Summary

- Sutures in Micro-Surgery
  - ETHILON and PROLENE
  - Fine gauges
  - Excellent Handling
- Needles in Micro-Surgery
  - Taperpoint, Tapercut
  - VISIBLACK and BV Needles
  - Strong ETHALLOY with special coating
  - Fine gauges

Thank You

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