INTRODUCTION

TO

MICROVASCULAR SURGERY

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“Microsurgery refers to the surgical coaptation of vessels (arteries, veins, nerves and lymphatics) usually less than 3mm in diameter “

Instrumentation:

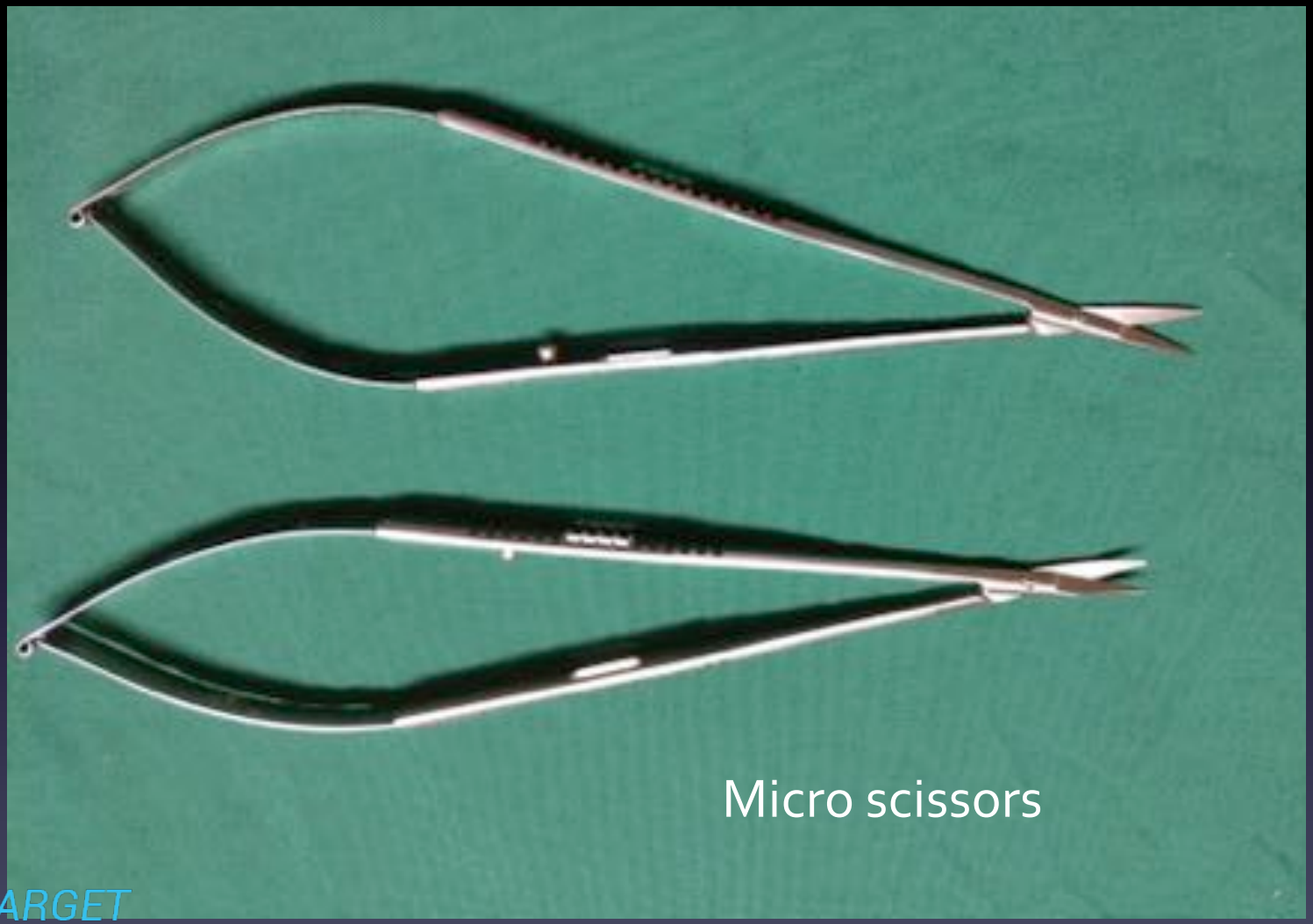
Loupes 2.5x to 8x

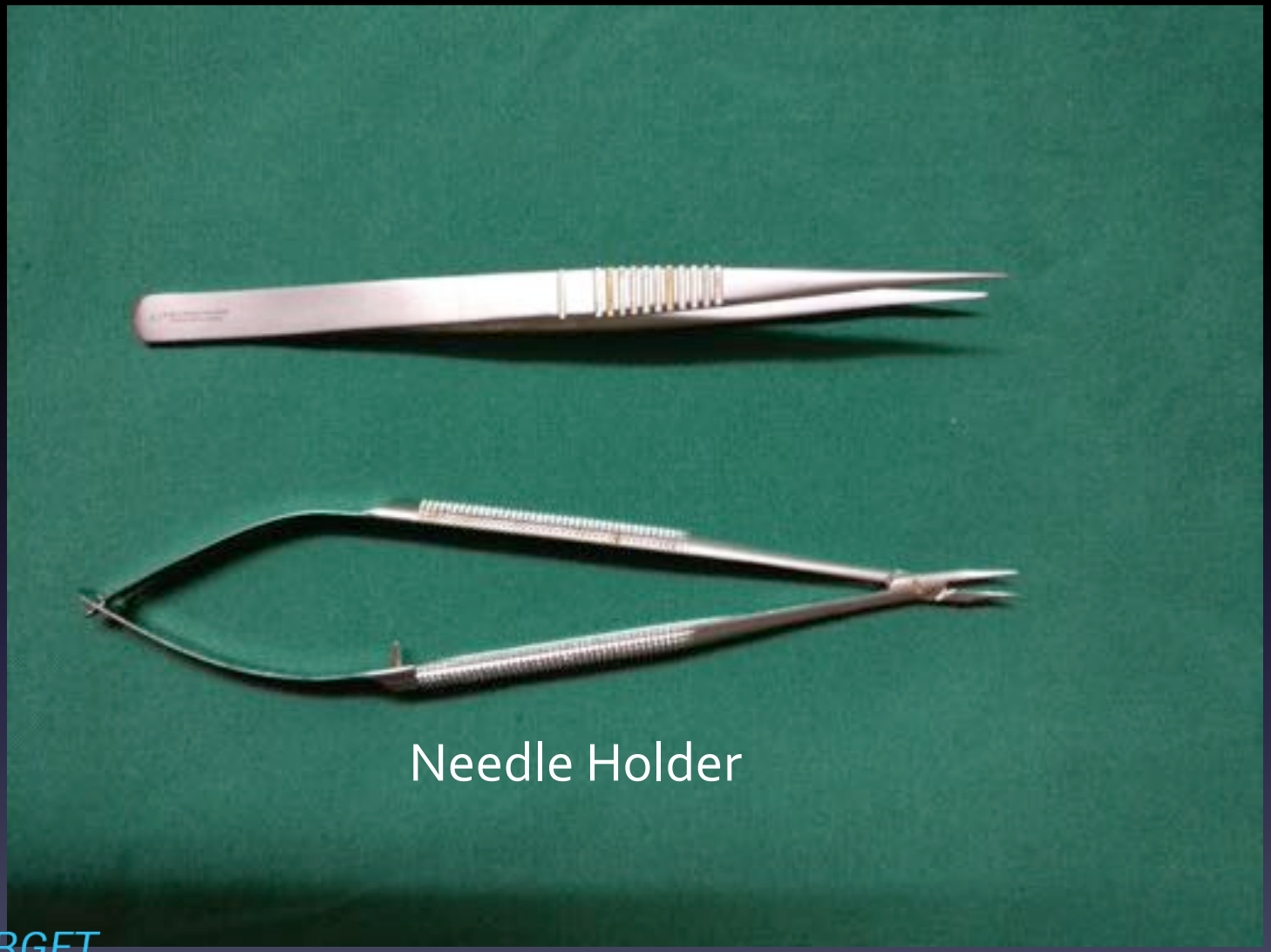
Microscope upto 40x

- Jeweler’s forceps
- Micro scissors
- Micro needleholder
- Vessel dilator
- Acland Vascular clamps
  Single/double and Arterial/venous

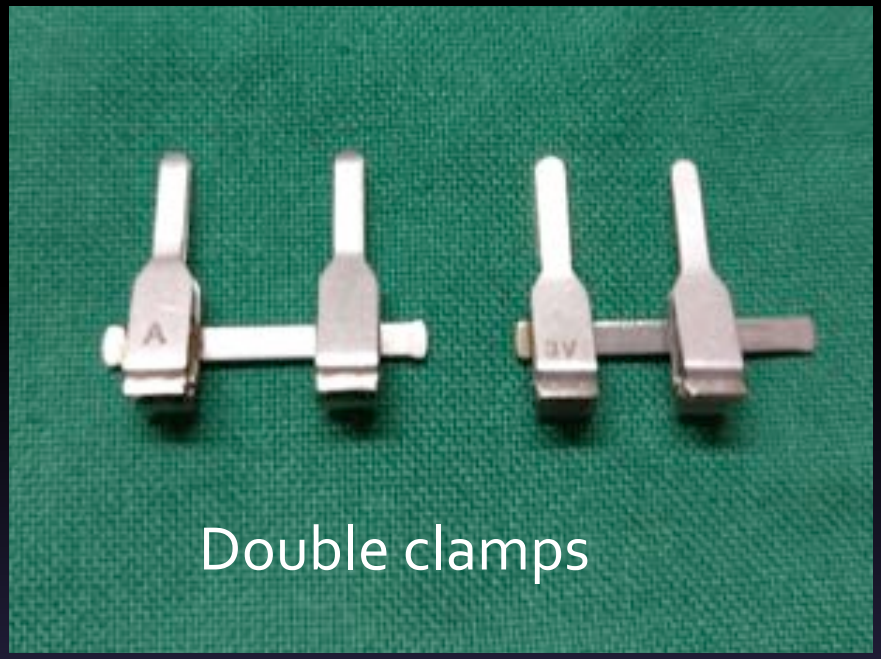
Jeweler's forceps

Vessel dilator





Needle Holder



Double clamps

Bull dog

Single clamp

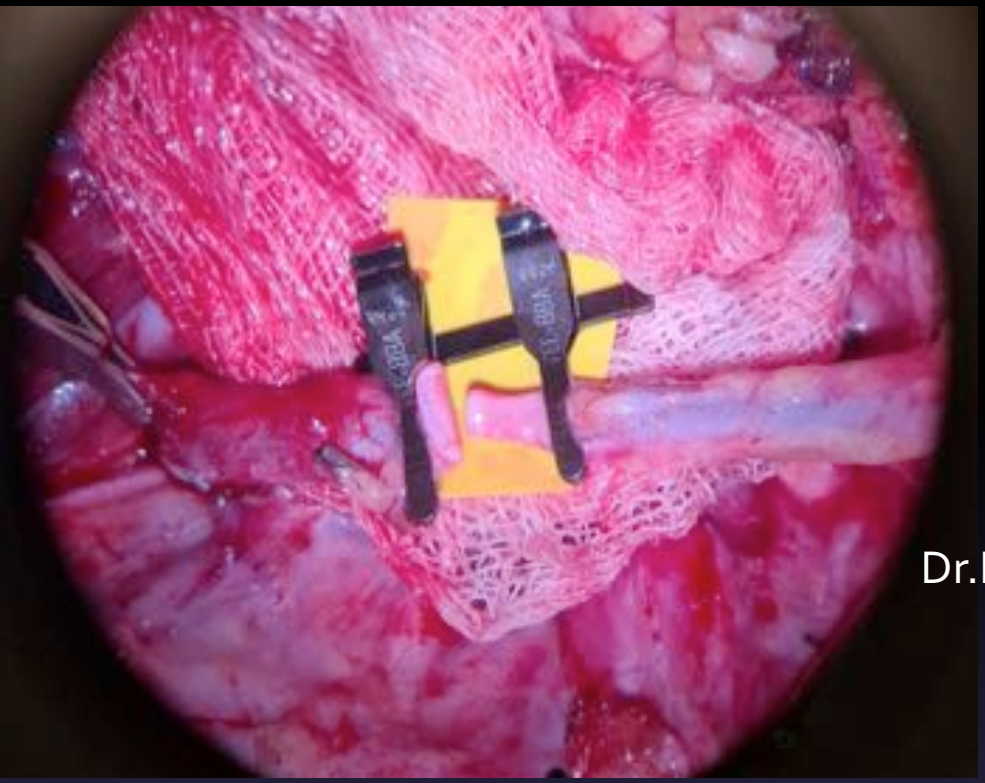
Clamp holding forceps

Anastomotic devices:

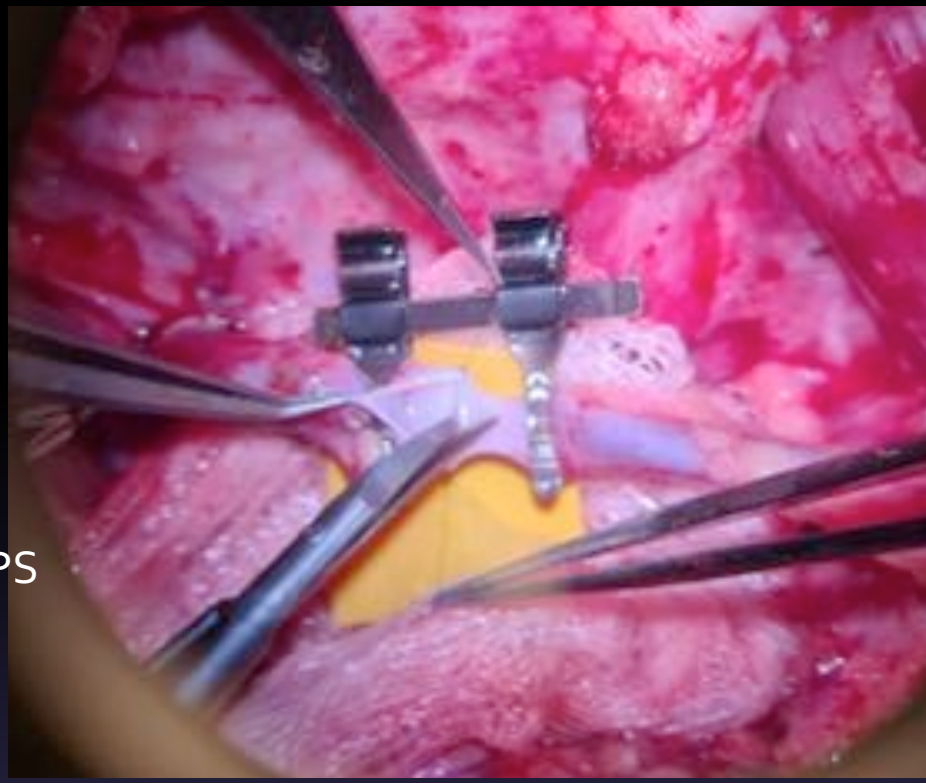
- Micro sutures: Nylon 9-0 to 12-0
- Nakayama venous couplers

- Fibrin glue for nerve coaptation (Tissel/ Evicel)

Posture and technique:



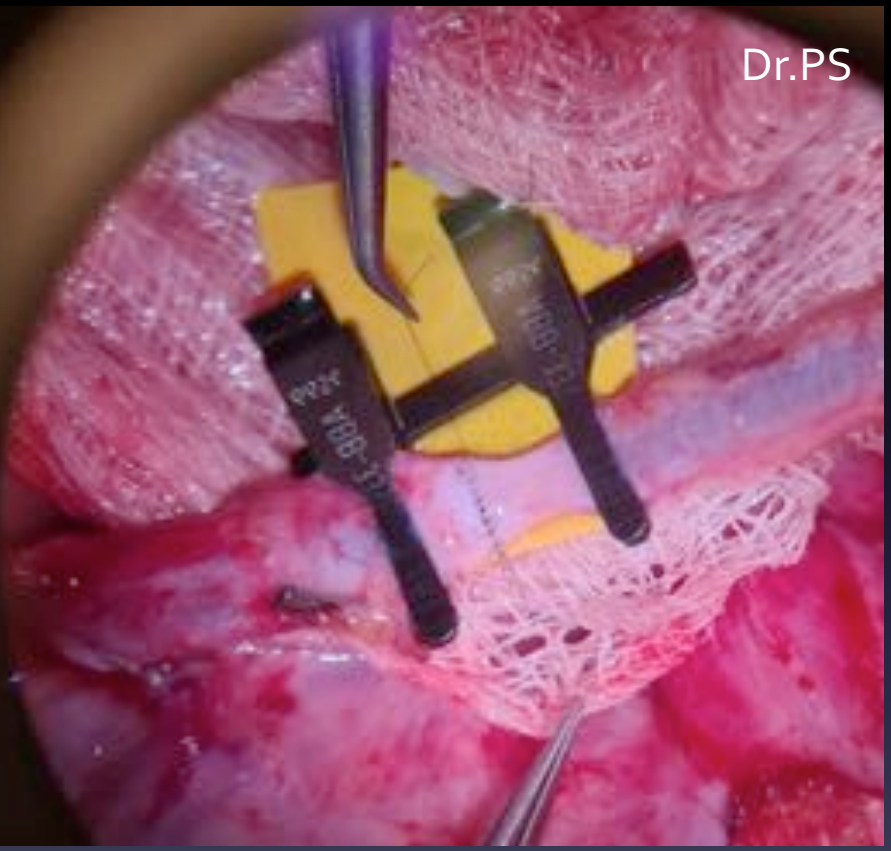
Dr.PS



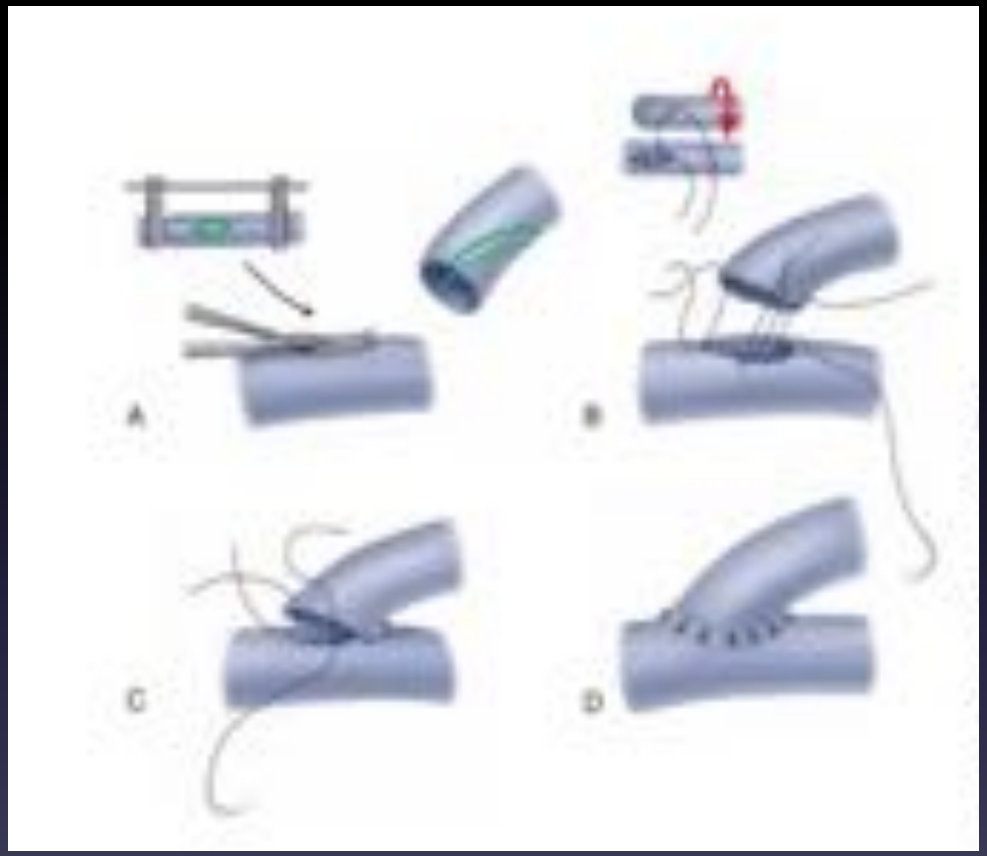
- Vessel preparation
- Dissection of tissue
- Check flow
- Clamp application

- ADVENTIECTOMY
- Dilatation
- Irrigation Heparin + saline
- Approximation
- Anastomosis
- Xylocard and papaverine

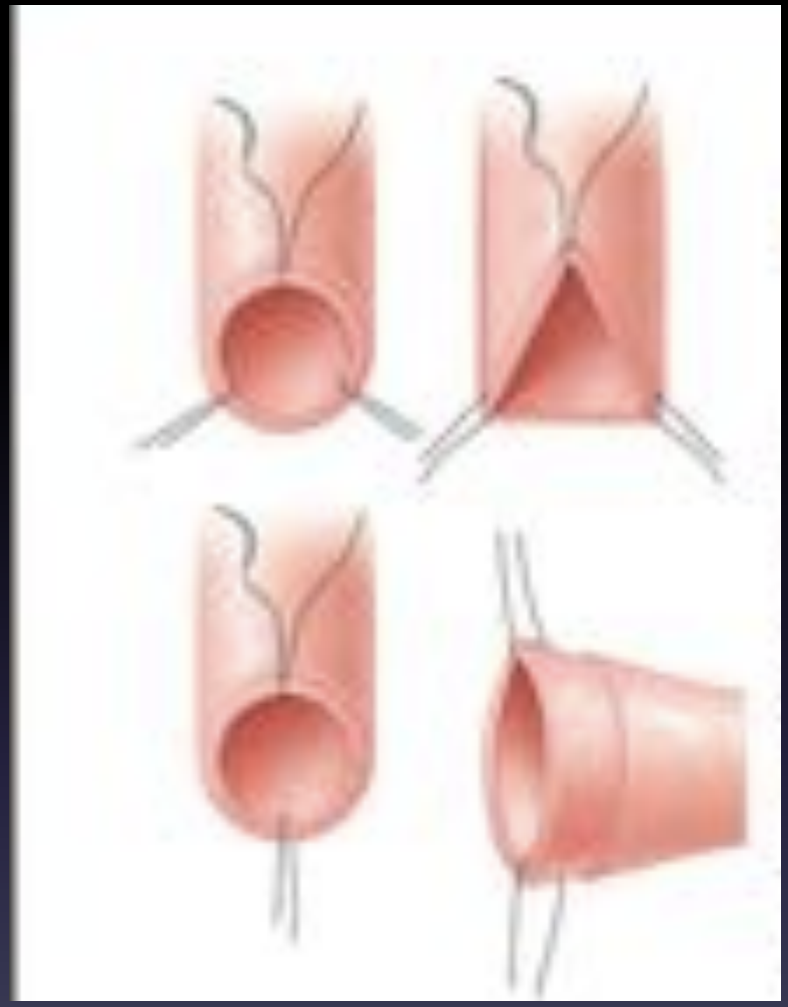
Techniques



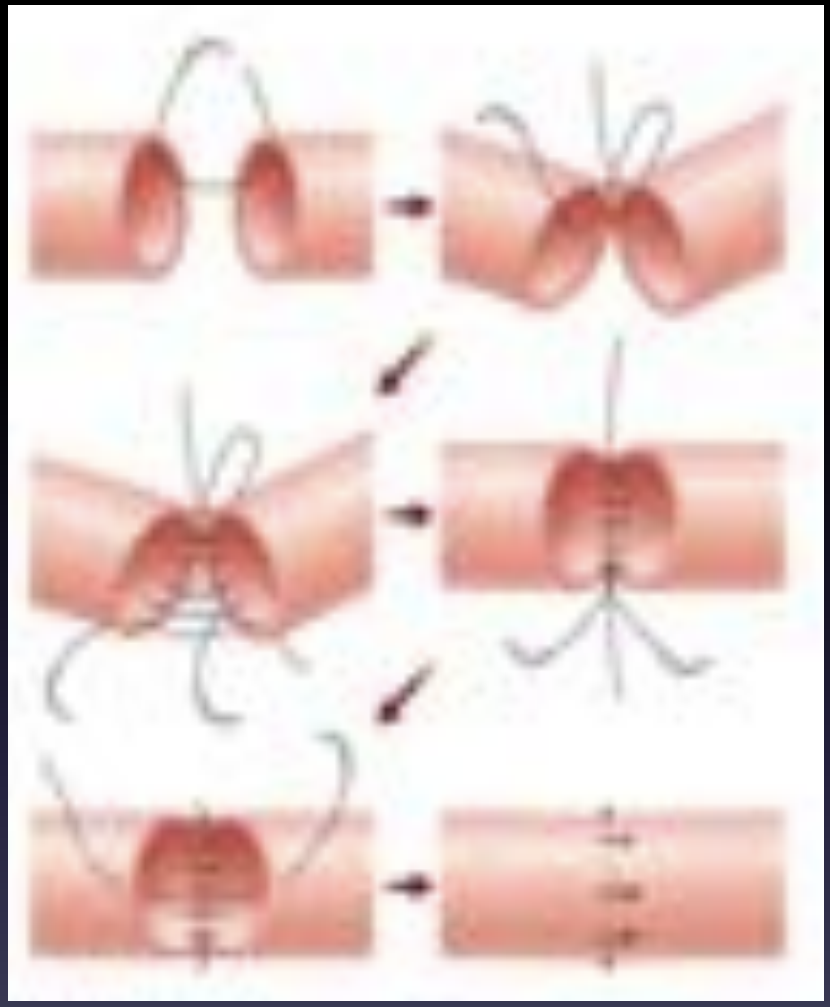
End to end



End to side



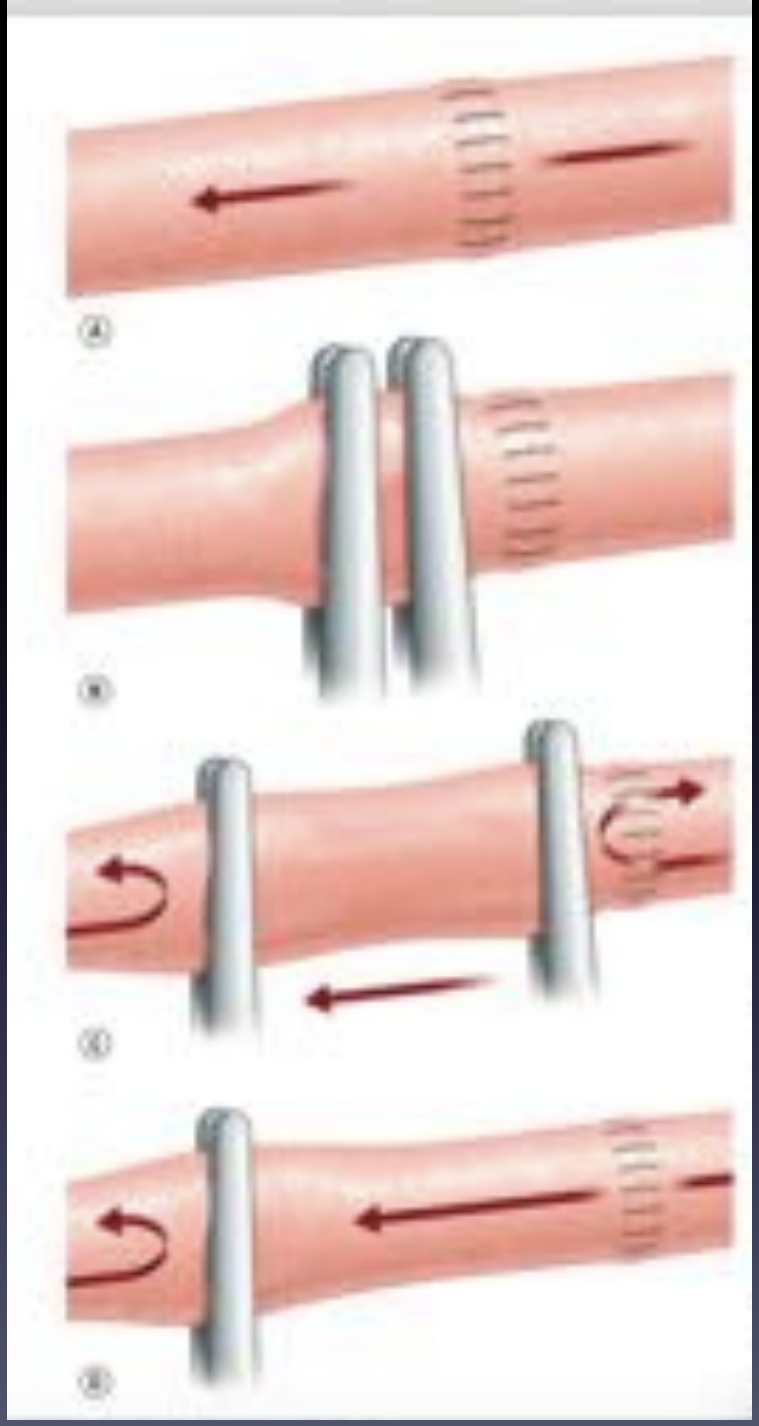
CARREL'S triangulation



Posterior wall technique

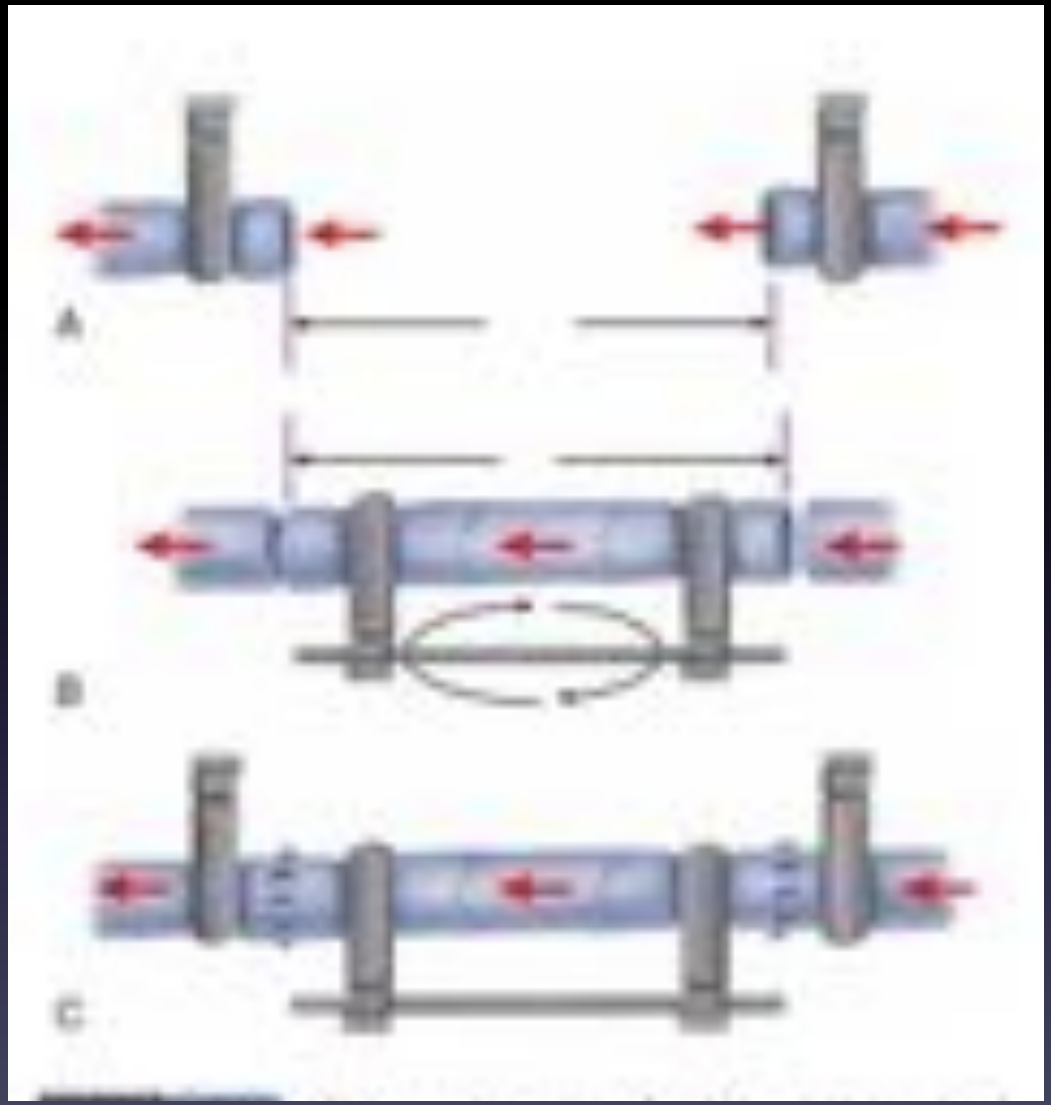
Ackland's patency test:

- DISTAL to the anastomosis
- 2 atraumatic forceps
- Milk away distally
- Release PROXIMAL forceps
- Immediate filling of vessel



Vein grafts:

- Superficial
- Expendable
- Length
- Valves
- REVERSAL for arteries
- NO REVERSAL for veins

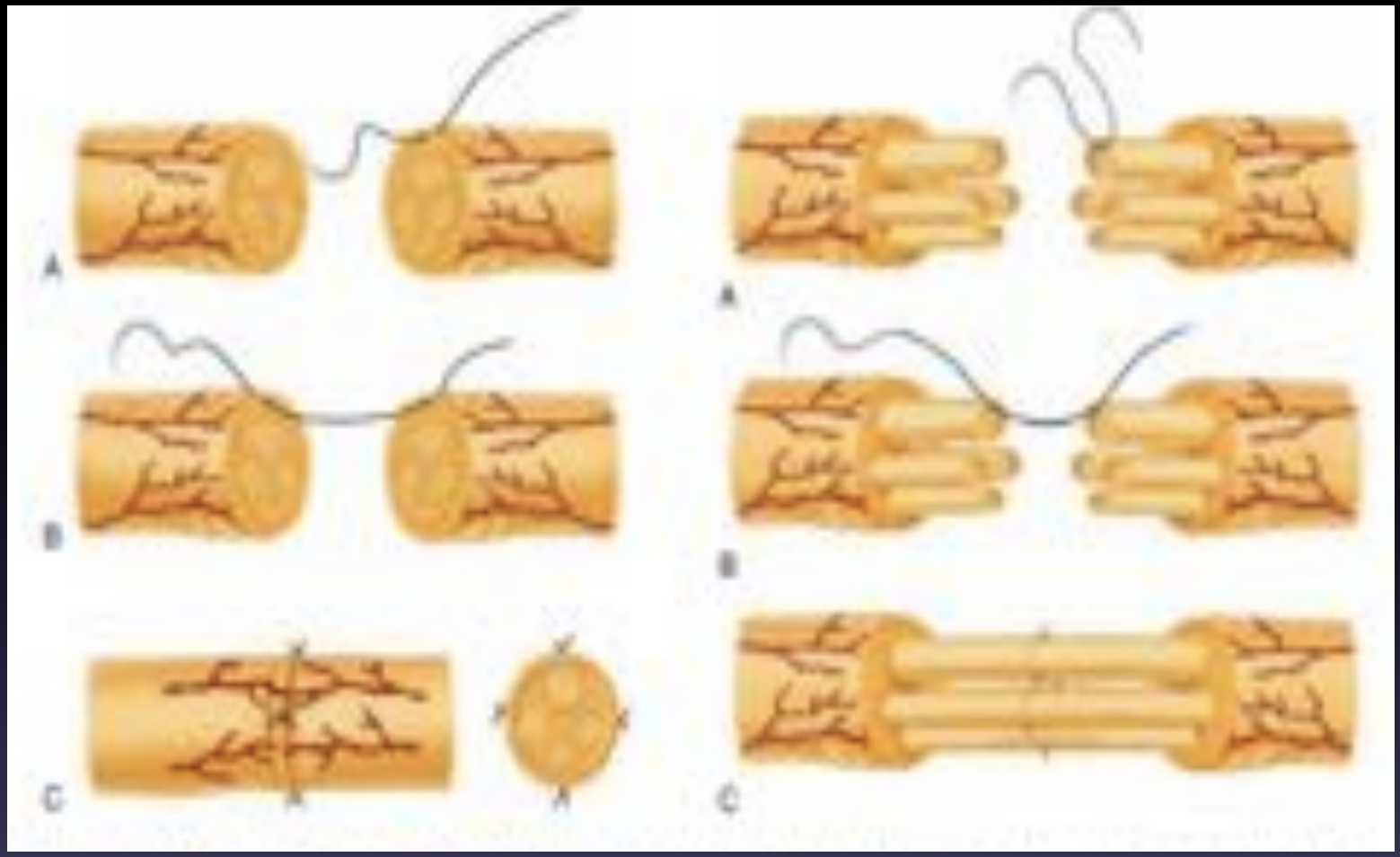


NERVE COAPTATION:

- Nerve injury : Sunderland(6) and Seddon(3) classification
- Wallerian degeneration
- Distal neuroma and proximal glioma
- Primary vs delayed repair
- Direct vs nerve grafts
- Neurorrhapy : epineural vs perineural repair

PRINCIPLES OF REPAIR:

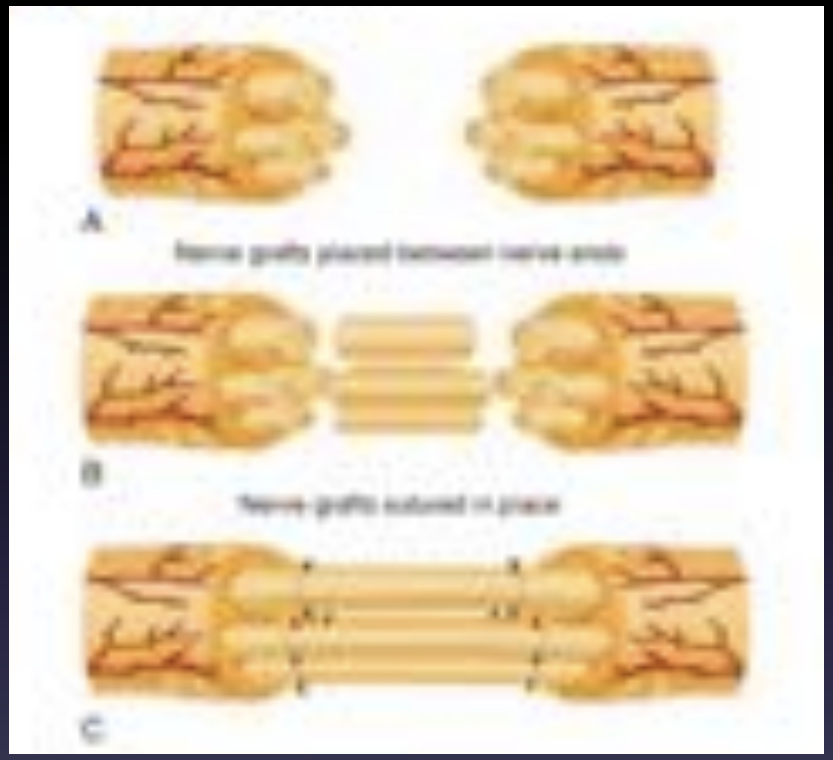
- TENSION FREE repair
- Sprouting of nerve fascicles
- Orientation of nerve
- Immbolisation
- Tinels sign



EPINEURAL

FASCICULAR

SURAL NERVE HARVEST



REVERSAL AND CABLE GRAFTS

REIMPLANTION: The technique of reattaching a completely severed part of an extremity

REVASCULARISATON: The technique of augmenting or reparing a partially severed part of an extremity.

FACTORS:

- Age
- Severity of injury
- Level of amputation
- Part amputated
- Interval between amputation and time of replantation
- Multiple or bilateral amputations
- Segmental injuries to the amputated part
- Patient's general condition and systemic illness
- Rehabilitation potential of patient (occupation and intelligence)
- Economic factors

ABSOLUTE

INDICATIONS:

- Young, dominant hand, THUMB, bilateral, guillotine , ischemia time <6hours, amputation distal to muscular belly

CONTRAINDICATIONS:

- Severely crushed
- Multiple injuries to patient : "Life before limb"
- Reperfusion injury
- Warm ischemia >6hours
- Myonecrosis
- Mentally challenged

ISCHEMIA TIME:

WARM	COLD
- 20 to 25'C	- 4'C
- 6 hours (muscle)	- 12hours
- 8 hours (tendon)	- Upto 30hours!

TRANSPORTATION OF PATIENT:

- Vitals
- Shock
- Pain (axillary/SC catheter)
- Elevation of limb
- Compression dressing

- AVOID TOURNIQUET
- DO NOT PUT ARTERY FORCEPS

" Keep patient warm and part cold"

2 team approach:

PATIENT CARE

AMPUTATED PART:

- Wash with warm saline
- Examine under microscope

- Identify structures
- RIBBON SIGN

- Possibility of reimplant
- Bone shortening?

SEQUENCE OF REPAIR:

1. Shorten and internally fix bone.

2. Repair extensor tendons.

3. Repair flexor tendons (2 and 3 may be reversed, or flexor tendon repair may be delayed).

4. Repair veins 1st or arteries?

5. Repair nerves.

6. Close or cover wound.

Reimplant?

Which hand?

Which finger?

SPARE PARTS?

POSTOP CARE:

- Splintage and immbolisation
- Hand elevation
- Fluid resuscitation
- Pain management
- Axillary or supraclavicular blocks
- Heparin?
- Aspirin?

Monitoring EVERY HOUR for first 24hours:

- Colour
- Temperature
- Prick?
- Blanching
- SPO2 probe
- Other techniques

ARTERIAL	VENOUS
PALE	BLUISH
EMPTY	TURGID
ELEVATION AT HEART	ABOVE HEART LEVEL
IMMEDIATE EXPLORATION	LOOSEN DRESSING LEECH THERAPY?

REHABILITATION:

- Complete immoblisation 3 weeks
- Guided passive activity in splint 3 weeks
- Guided active mobilisation in splint 3 weeks

- K wire removal after 8 to 10 weeks
- Light activities
- Pinch and pincer
- Grip and grasp
- Routine work
- Weight training

CHEN Criteria for Evaluation of Function after Extremity Replantation

GRADE	FUNCTION
I	Able to resume original work; ROM > 60% of normal; complete or nearly complete recovery of sensibility; muscle power grade 4-5
II	Able to resume some suitable work; ROM > 40% of normal; nearly complete sensibility; muscle power grade 3 to 4
III	Able to carry out activities of daily living; ROM > 30% of normal; partial recovery of sensibility; muscle power grade 3
IV	Almost no usable function of survived limb

TOE TRANSFER

COMPOSITE GRAFT

(Pocket technique?)

THANK YOU!

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Instagram – drps_plastics

Youtube – DrPS