

Presentation-Discussion on a Case of SKIN AND SOFT TISSUE TRAUMA

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Patient Data

- 49/M
 - Married
 - From Pandacan, Manila
 - First hospitalization
-
- Chief Complaint- swelling of finger

History of Present Illness

- 3 wks PTA → Minor puncture sustained on ring finger of right hand with subsequent progressive swelling of the finger, eventually with some bleeding.
- Progression of symptoms with pain prompted consult and admission.
- No fever, chills, consultations or medications taken.

Past Medical History

- No known illnesses like HPN, DM, asthma
- No previous hospitalizations
- No known allergies

Family History

- No relatives with HPN, DM, asthma

Personal Social History

- 30 pack-year smoker
- Moderate to heavy drinker (2 bottles of beer daily)

Physical Examination

- Conscious, coherent, NICRD
- BP 120/80 HR 80 RR 17 Temp 37
- Pink palpebral conjunctivae, anicteric sclerae, no cervical lymphadenopathy
- Symmetric chest expansion, no retractions, clear breath sounds
- Adynamic precordium, PMI 5th ICS, normal heart rate and regular rhythm, no murmurs

Physical Examination

- Flabby abdomen, normoactive bowel sounds, soft, nontender, no masses
- Full and equal extremity pulses, no cyanosis, no edema of limbs, both hands have rings on the ring fingers, left hand ring finger with swelling distal to ring but no wound, while right hand shows...

Physical Examination



- Swollen ring finger, minimal bleeding with macerated tissues, encrustations around circumferential wound, with metallic foreign body (band), proximal phalange area, right hand

Salient Features

- 49/M, married, from Manila
- 3wk history of minor trauma to right ring finger
- Progressive swelling and wounding of right ring finger
- Nondiabetic, normal mentation
- Afebrile
- Full and equal extremity pulses, no cyanosis or gangrene, no edema of limbs, both hands have rings on the ring fingers, left hand ring finger with swelling distal to ring but no wound, while right hand ring finger with swelling, minimal bleeding with macerated tissues, encrustations around circumferential wound underneath and around metallic foreign body (ring), proximal phalange area

Clinical Diagnosis

	Impression-	° of certainty
	Swollen ring finger, L with ring entrapment; Chronic wound with embedded ring, ring finger, R, with...	
1°	With superficial secondary infection	90%
2°	With osteomyelitis	10%

Clinical Diagnosis

	Impression-	Treatment-
	Swollen ring finger, L with ring entrapment; Chronic wound with embedded ring, ring finger, R, with...	Destructive ring removal
1°	With superficial secondary infection	Medical
2°	With osteomyelitis	Medical

Paraclinical Diagnostics

Is a paraclinical procedure needed?

- No
- There is reasonable degree of certainty and treatment modality would be the same. Clinical response to treatment is sufficient.

Paraclinicals

Exam	Benefit	Risk	Cost	Avail
X-ray	+	/	(50)	+
Bone scan	+++	////	1000	-
CT scan	++	//	3000	-
PET scan	++++		50000	-

Pre-treatment Diagnosis

- Chronic wound with embedded ring, ring finger, R, with superficial secondary infection
- Swollen ring finger, L with ring entrapment

Treatment Objectives

1. Remove ring
2. Prevent further injury
3. Preserve ring

Treatment Selection

Algorithm

circumferential foreign body

inciting event ↓

constricting effect

If expected to be self-limiting, need not insist on destructive ring removal if patient prefers not to.

Algorithm

circumferential foreign body

inciting event ↓

constricting effect

└─┬─┐
↓
lymphatic obstruction

↓
venous obstruction

Various ring-preserving
removal techniques that
compress the soft tissue
swelling on the ring's path out.

+

Adjunctive cold-soaks, limb
elevation or exanguination.

±

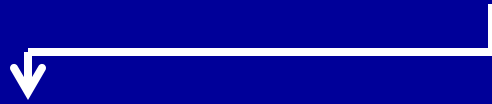
Anesthesia e.g. digital block

Algorithm

circumferential foreign body

inciting event ↓

constricting effect



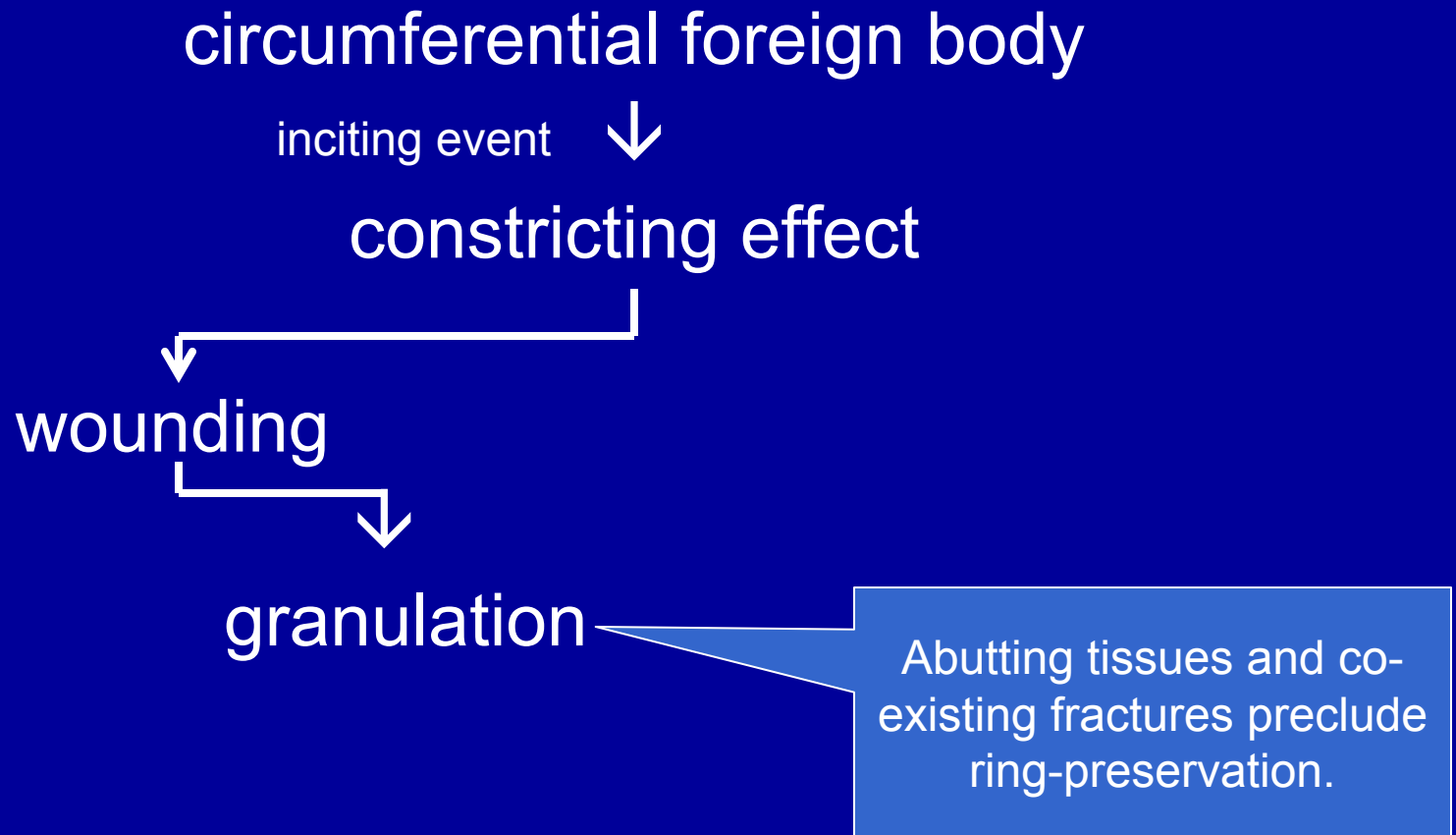
wounding



infection

Infection and tetanus
prophylaxis or
treatment.

Algorithm



Algorithm

circumferential foreign body

inciting event ↓

constricting effect

wounding

lymphatic obstruction



infection

granulation

venous obstruction



arterial compromise

Frank gangrene is the only
absolute indication for amputation
of the finger

Treatment Option Classes

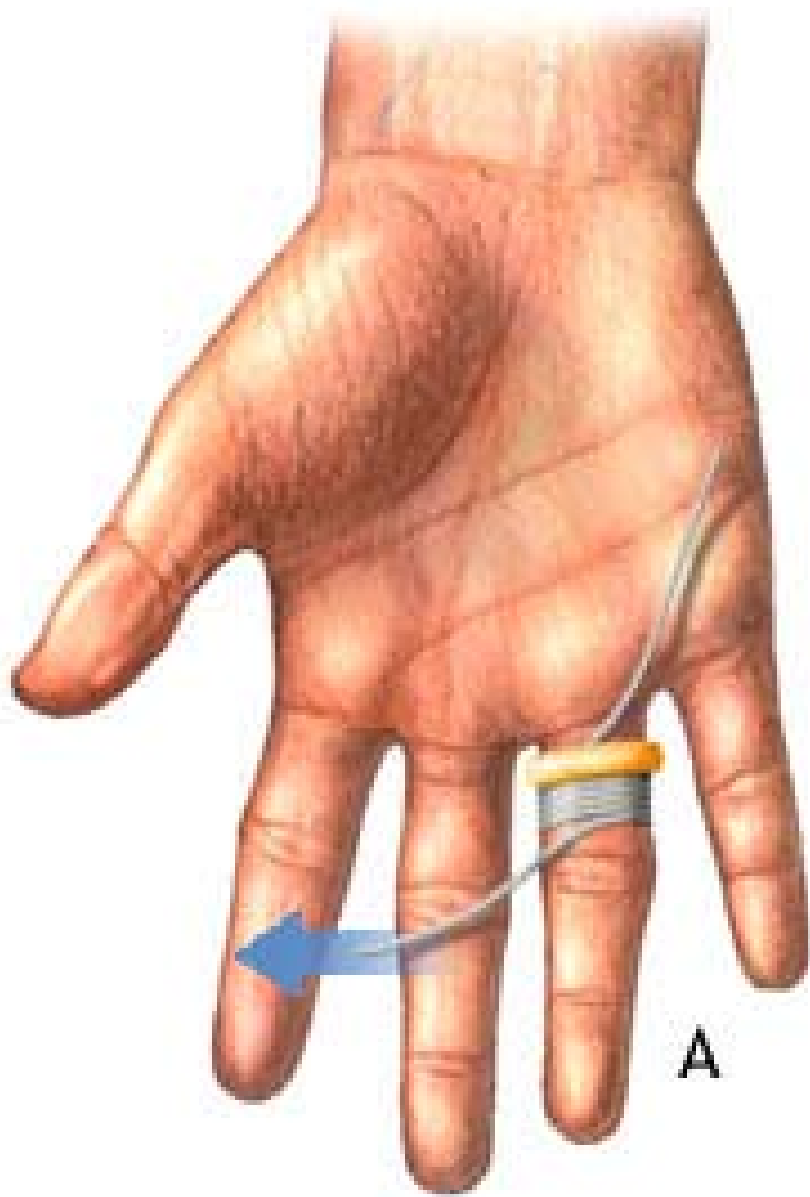
Modality	Benefit			Risk	Cost	Avail
Conservative vigilance	+/-	++++	+	progression to vascular	0	++
Ring sparing (layperson)	+	+	+	worsen edema; not if fx/granulate	0	++
Ring sparing (specialist)	++	++	+	worsen edema; not if fx/granulate	0- 100	+
Ring destroying	+++	+++	-	thermal injury	Rent	+/-
Amputation	++++	-	+		3000	+

Ring Sparing Treatment Options

Modality	Benefit		Risk	Cost	Avail
Conservative vigilance	+/-	+++	Progression to vascular	0	++
Simple lubrication	+	++		0	++
+ Cold soaks & elevation	++			0	++
String-wrap	+++	+		50	+
Gloved finger	++++	++		25	++
+ Wrapping exanguination	+++++			100	+

Destructive Treatment Options

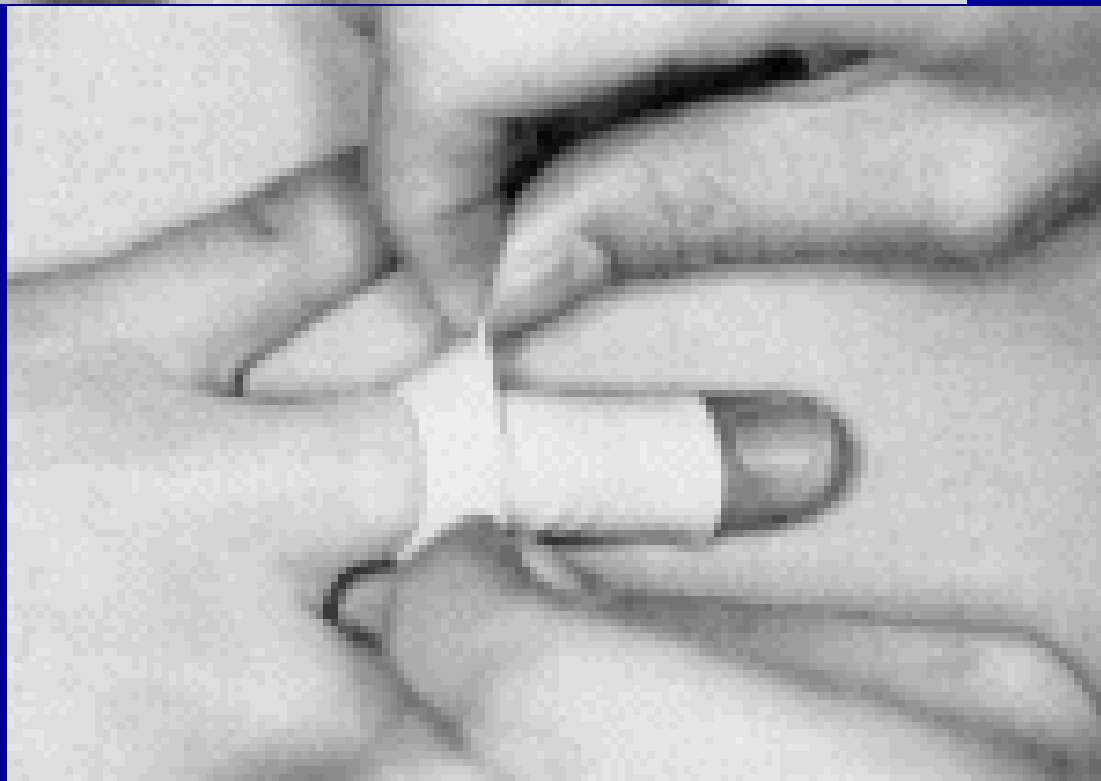
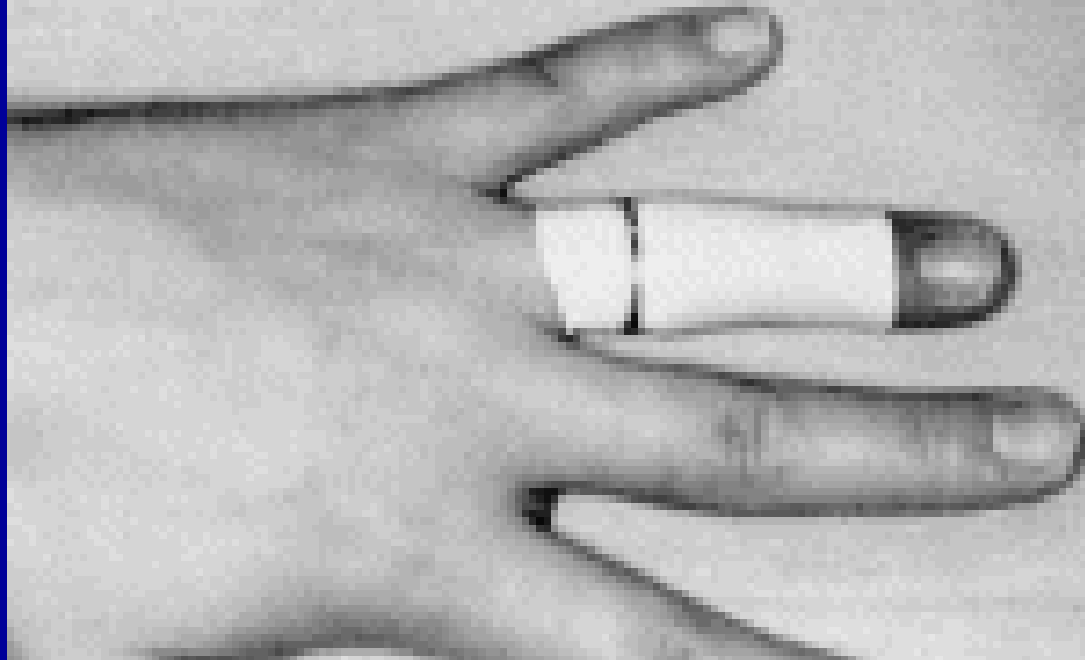
Modality	Benefit-Risk			Cost	Avail
Ring cutter	+	++++	soft metal	+	-
Pin cutter	++	+++	hard metal	++	+
Metal saw	+++	+		+	++
Power cutter	++++	++	wide ring of hard metal	+++	-
Amputation	+++++	-	gangrenous	3000	+

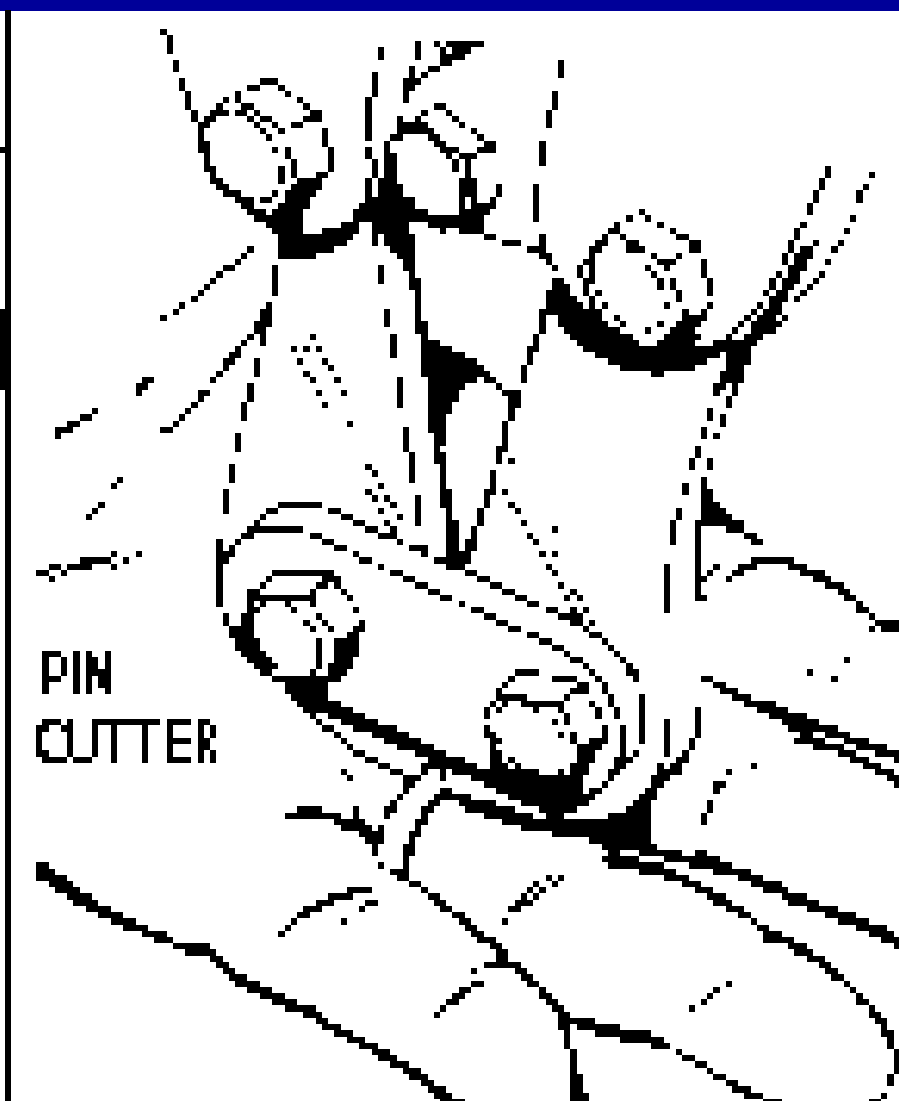
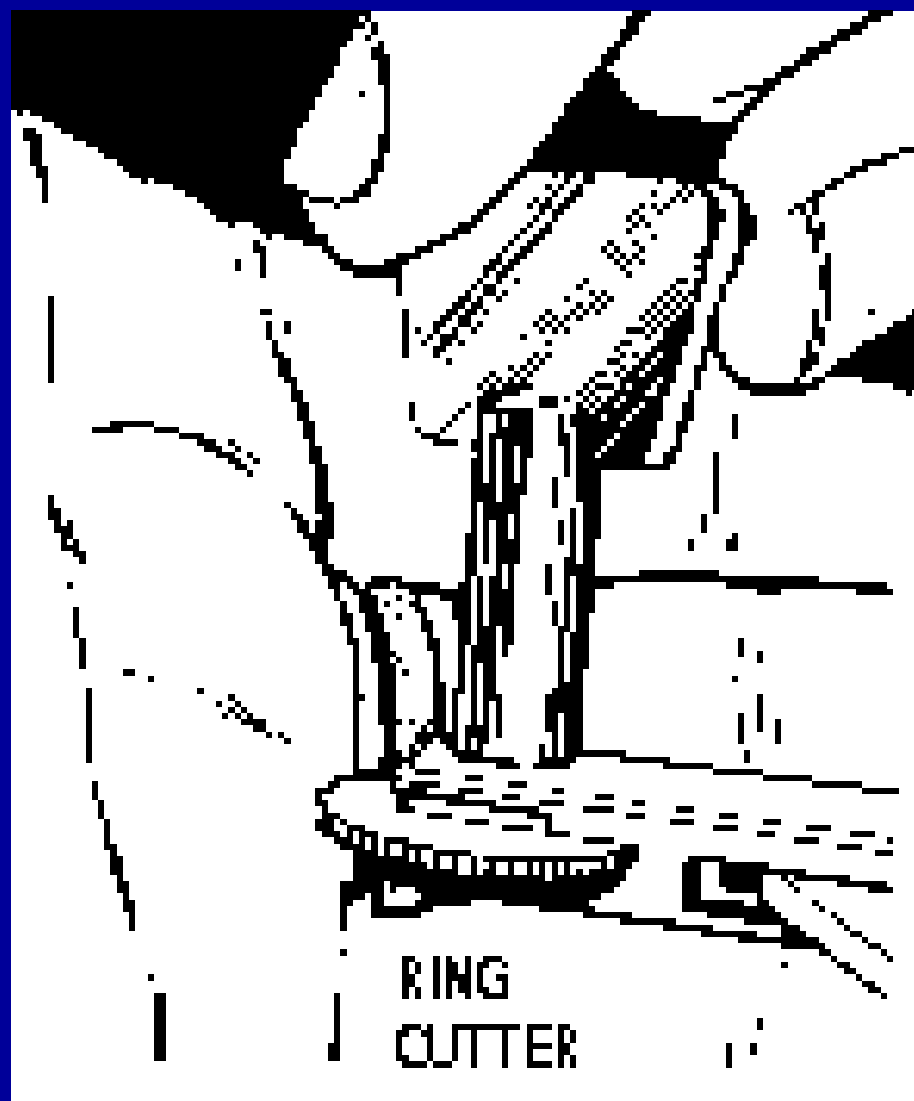


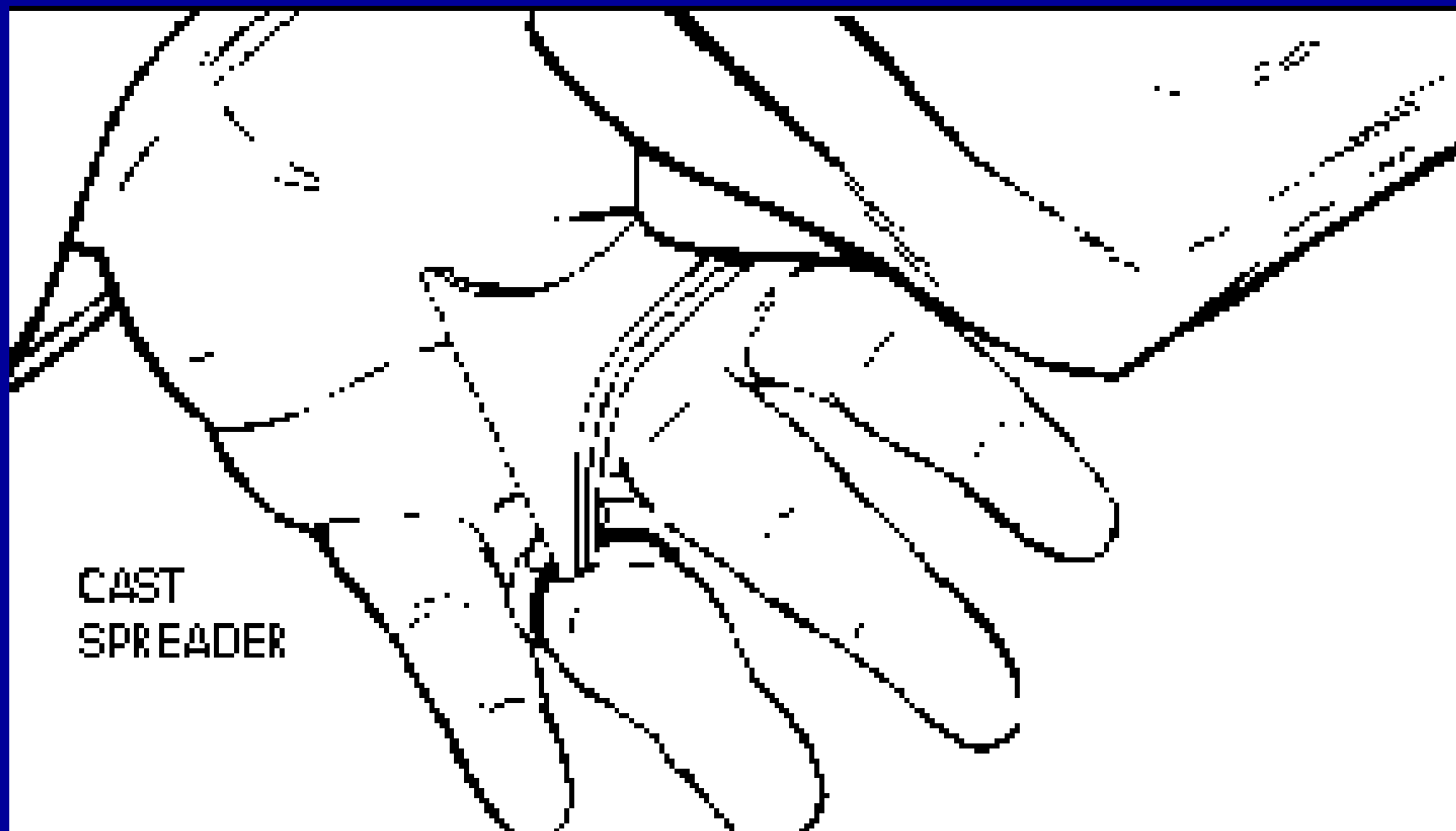
A



B







Pretreatment Preparation

- Tetanus prophylaxis
- Oxacillin 500mg IVT
- Options presented to patient
- Informed consent obtained, including that for left hand rings
- Psychosocial support provided
- Digital nerve block performed on the right

Treatment Technique

- Asepsis and antisepsis
- Metal saw used to cut through multiple soft metal bands stabilized by forceps
- Cut rings pried off finger
- Debridement of soft tissues, R
- Dressing
- Cutting repeated on L hand finger



Final Diagnosis

- Chronic wound with embedded ring, ring finger, R, with superficial secondary infection
- Swollen ring finger, L with ring entrapment

Outcome evaluation

- ✓ 1 Live patient
- ✓ 2 No complication
- ✓ 3 No disability
- ✓ 4 Satisfied patient
- ✓ 5 No medicolegal suit

Follow-up Plans

- Avoid wearing rings
- Poor compliance to Oxacillin, shifted to Cloxacillin 500mg PO q6^o on 5th HD
- Metronidazole IV ordered on 3rd HD, noncompliant
- Daily wound care
- Nimesulide 100mg PO q12^o prn started on 5th HD with plans for discharge
- Patient absconded on 5th HD

DISCUSSION

Etiology

- Injuries caused by embedded rings are extremely rare
- Causes include sprains of PIP, pregnancy, having never taken a ring off in many years (becomes tight-fitting), fractures & crush injuries, burns, stings, and bites
- Skin changes can become chronic, as on patients with decreased mentation or sensation

Indications

- A ring should be removed if swelling of a finger underneath will cause the ring to become an inadvertent tourniquet
- Home & field techniques for rings caught on uncomplicated swollen fingers
- Jewelers have special tools to cut off rings and repair them
- Complicated embedding of rings should be removed by medical personnel

Pathophysiology

circumferential foreign body

inciting event



constricting effect

wounding

lymphatic obstruction



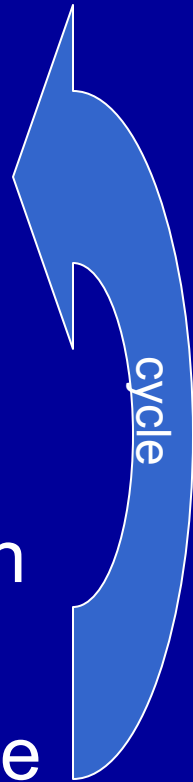
infection

granulation

venous obstruction



arterial compromise



Conservative vigilance

- When expected transient swelling & no evidence of vascular compromise, & px requests that ring not be removed, do not be insistent
- If patient is responsible, he can be warned of pallor, cyanosis, or pain
- Keep hand elevated & apply cool compresses
- Document patient's request & your directions

Home lubricant treatment

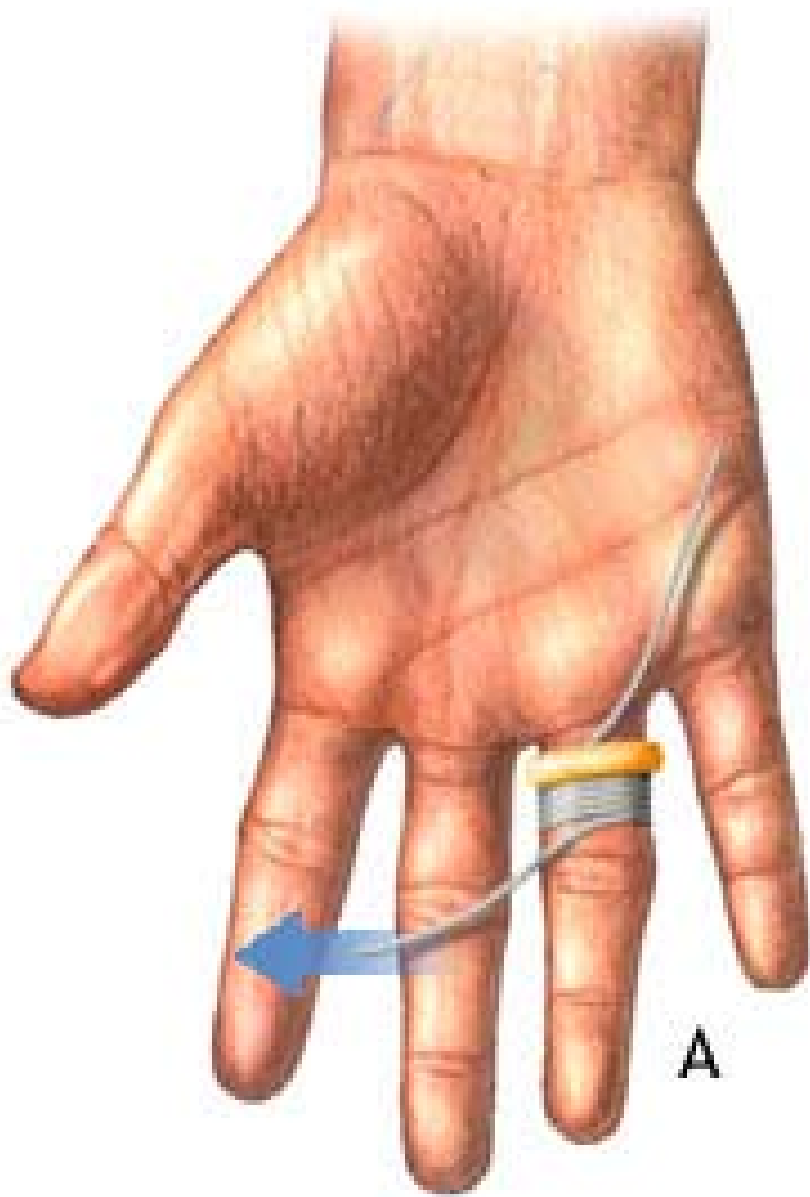
- Lubricate skin with soap, ointment, or something greasy
- Apply a circular motion with traction on the ring and proximal counter-traction on skin beneath the ring

Adjunctive soak treatment

- 5-minute intervals, alternate soaking hand in cold water and holding it (with all the fingers straightened) high in the air
- At 30 minutes (3 cycles), put oil on finger
- While hand remains elevated, push ring with steady upward pressure until it slides off

String-wrap technique

- Half meter string passed under ring with 5cm short portion left on palm side of ring
- Wrap long portion around finger in a spiral, starting next to ring toward fingertip
- Keep loops close together but without overlaps
- No tissue should bulge through between loops
- String unwrapped by pulling short end towards fingertip, unwinding loops, pushing ring little by little off finger
- Repeated until ring forced over swollen joint(s)



A



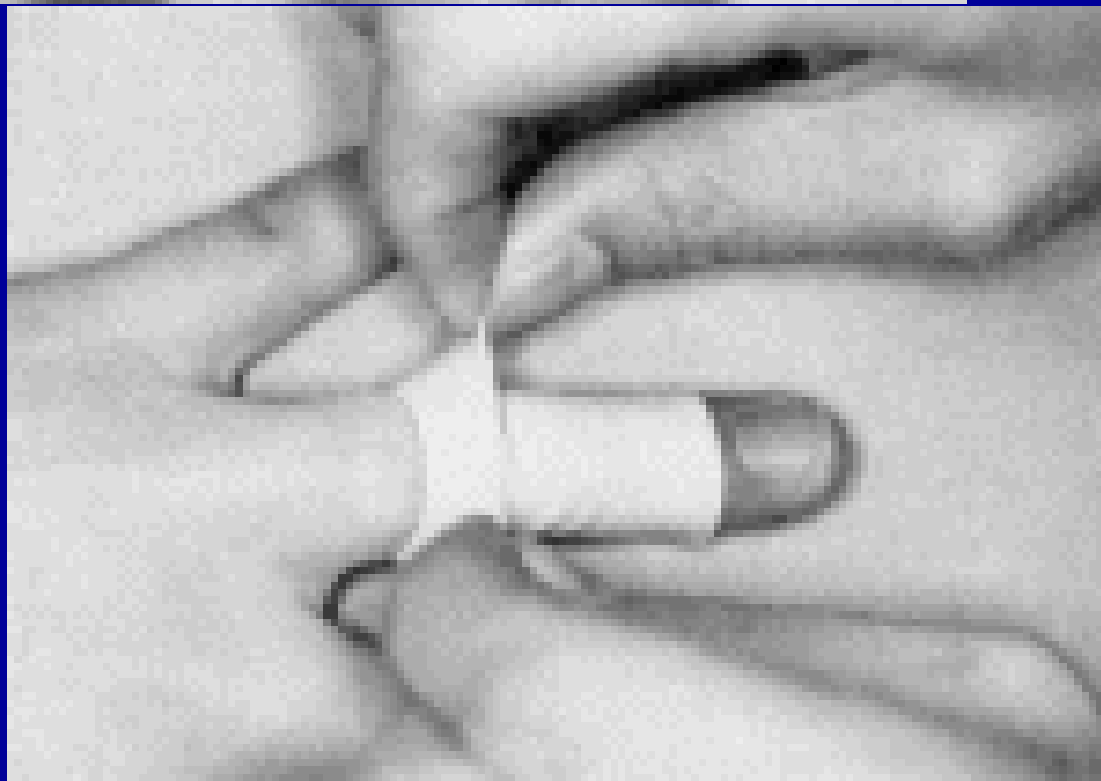
B

Another string technique

- Pull a length of string under the ring and tie it into a large loop that you can place around your own wrist
- This will allow you to apply traction and slide the string around the circumference of the ring (allowing skin to slip beneath the ring) while you pull the ring off using lubricant as above.

Glove technique

- A finger part of a surgical glove cut off cylindrically is passed between the ring and the finger using small forceps
- The segment of the rubber beyond the ring is turned inside out and is pulled toward the fingertip with a twisting motion

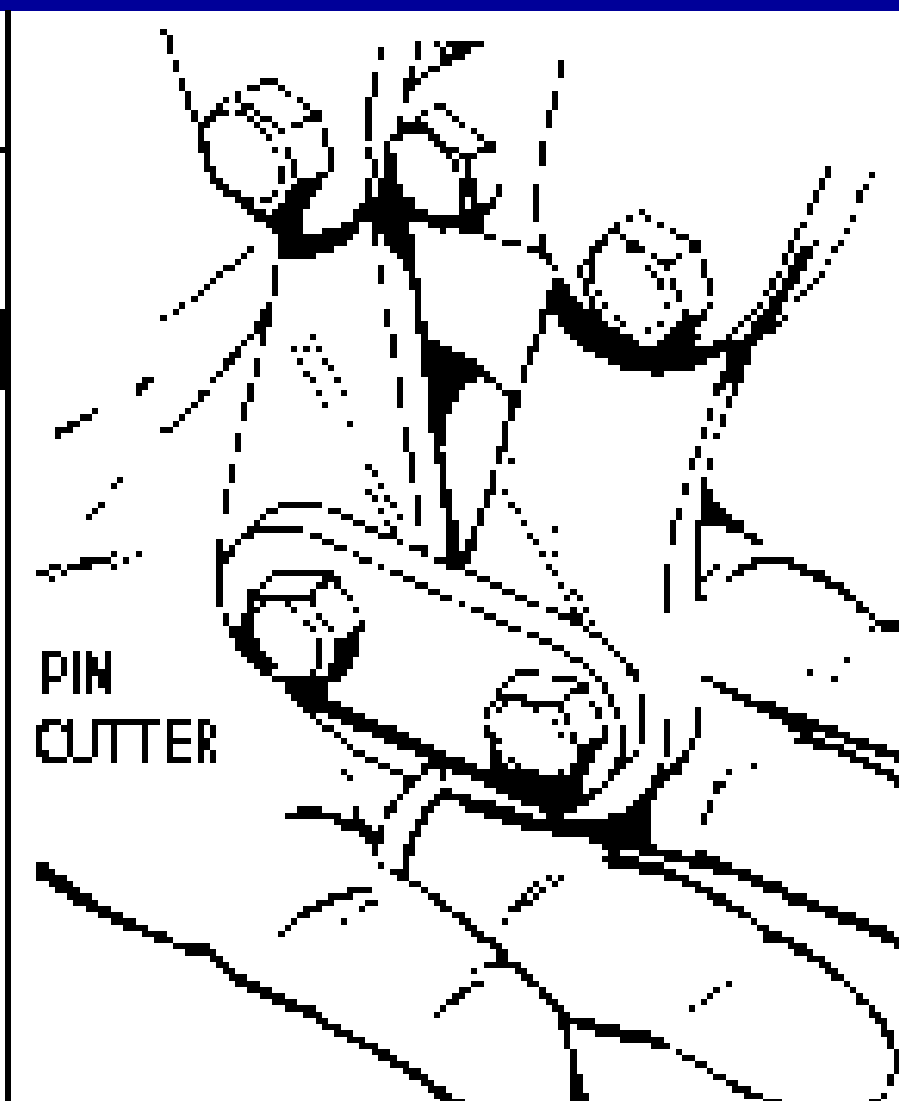
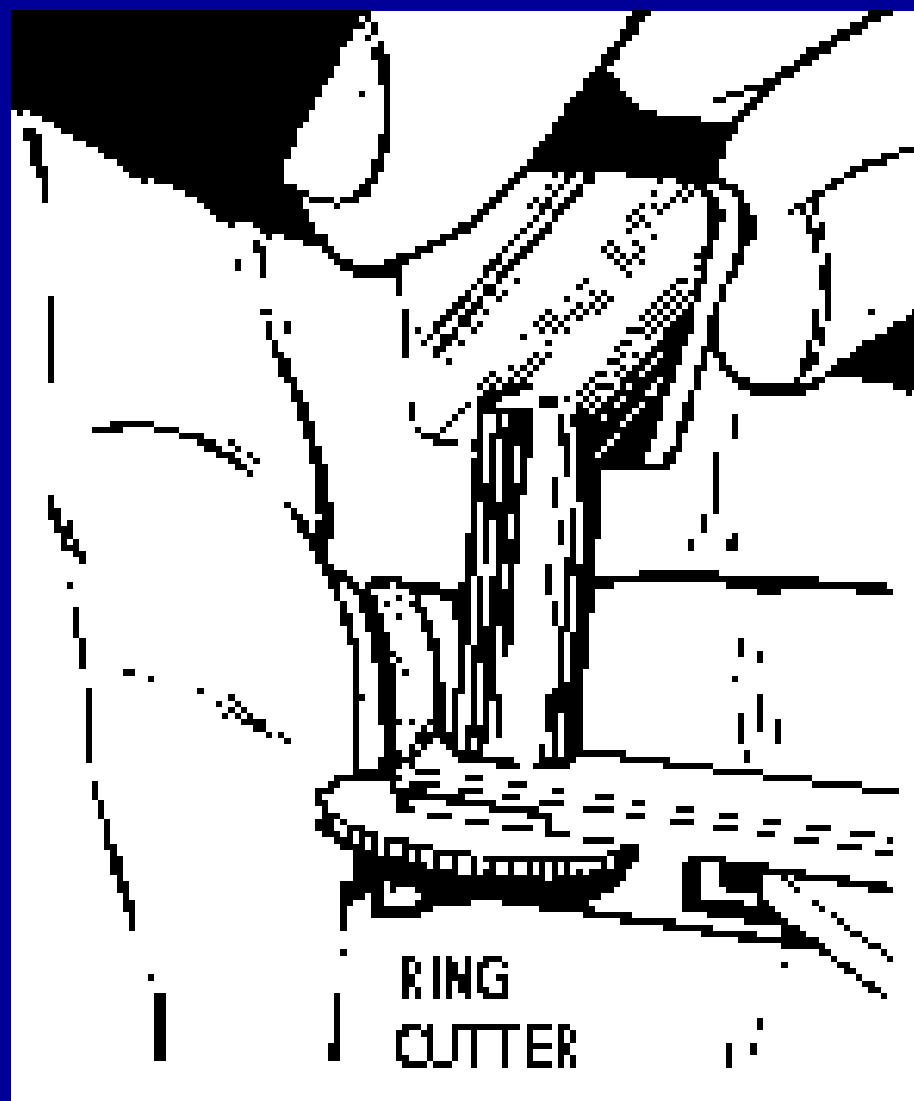


Adjunctive wrapping exanguination

- Wrap tight spiral of Penrose or flat rubber phlebotomy tourniquet tape around exposed portion of finger
- Elevate hand above head for 5 min
- Apply BP cuff 200-280 mmHg around upper arm. Keep the Velcro connection from separating under high pressure, and clamp tubing to prevent any slow air leak
- Remove finger wrapping, leaving tourniquet in place
- Again attempt to twist the ring off

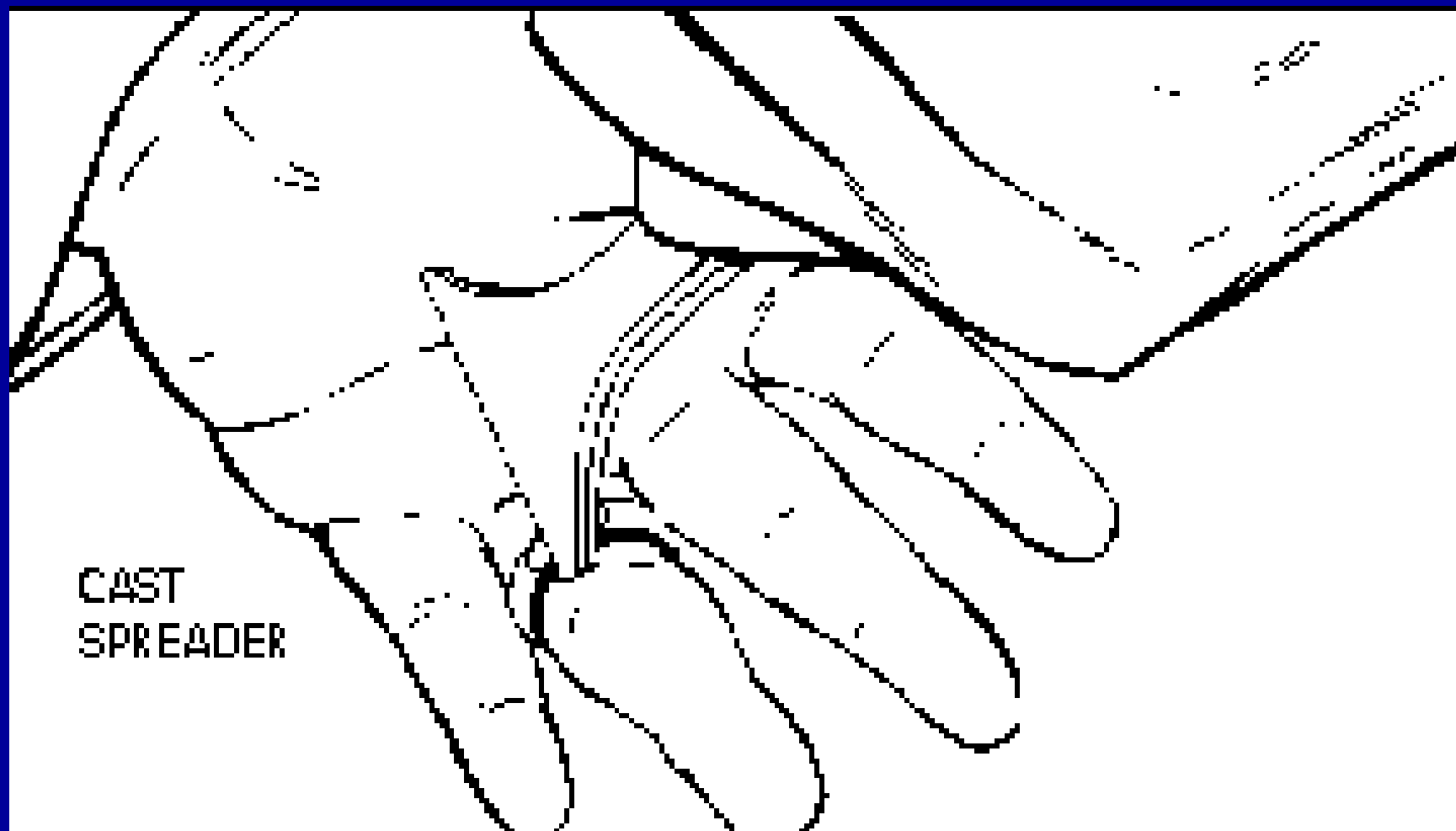
Ring cutter

- Used for failure of ring-sparing techniques or presence of associated fractures, chronic granulating wounds, or other associated injuries
- Cuts through narrow ring bands
- Have px grasp a rolled elastic bandage to stabilize hand
- Elevate the dorsal side of ring, insert cutter
- Cut completely through the ring
- Bend the ring apart with pliers placed on either side of this break



Orthopedic pin cutter

- For wide bands or hard metal rings
- Cut out a 5mm wedge
- Place cast spreader in the slot and spread ring open
- Alternatively, two cuts may be made on opposite sides of the ring



Metal saw

- For bands too wide to be cut or inaccessible by other available cutters
- More difficult to stabilize and prevent iatrogenic injuries

Motorized cutting equipment

- For bands too wide and metals too hard to be cut by orthopedic pin cutter
- Expensive equipment
- Protect underlying soft tissues from iatrogenic injury, both mechanical and thermal

Amputation

- Used only for frank gangrene of digit
- In select cases, recalcitrant osteomyelitis, necrotizing soft tissue infection or avulsion injuries with resulting insufficient soft tissue coverage or no remaining function of digit may warrant amputation, especially of the lesser digits

The End

Thanks to Dr. M. Cabahug for his
Medical Anecdotal Report on this case.

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Question #1 MCQ

- A patient with a ring is stung by an insect on the hand. After failing to remove the ring, you advise cutting the ring off. There is no evidence of vascular compromise at the time. He requests that the ring not be cut or removed. What should you do?
- A. Insist to cut the ring off. Let him sign a waiver and sign him out as discharged against medical advise.
 - B. He can be warned of symptoms of vascular compromise and instructed on conservative measures. Document the patient's request and your instructions.
 - C. Instruct the patient to transfer to a different hospital.
 - D. Deem the patient incompetent and seek authority to override his wishes.

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Question #2 MCQ

A patient is for elective operation with use of electrocautery. She has a ring that she could not remove even with lubricants. What is the best option?

- A. Repeatedly attempt string-wrap removal prior to wheeling the patient into the operating room.
- B. Insert and leave the finger part of a surgical glove cut off cylindrically under the ring.
- C. After induction of general anesthesia, attempt string-wrap removal until bleeding stops you.
- D. After induction of general anesthesia, cut the ring off with an orthopedic pin cutter.

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Question #3 MCR

A 30-y/o male seeks consult with a ring embedded on his finger. The wound underneath the ring has been infected for the past 3 months. He claims to have had complete primary immunizations and anti-tetanus shots ten years ago after a plantar puncture wound. What should you prescribe for the patient?

1. Tetanus toxoid
2. Anti-tetanus serum
3. Oral antibiotics
4. Povidone iodine

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Question #4 MCR

You want the swelling to subside to be able to more easily remove a ring. What do you advise the patient to do?

1. Cold compress
2. Alternate with warm compress
3. Apply compress for up to 15 minutes, repeat after 2hrs
4. Continue compress until swelling reduced or as long as it doesn't cause pain

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Question #5 MCR

What is/ are true regarding injuries caused by ring entrapment?

1. Rings should be removed if swelling of finger underneath will cause the ring to become an inadvertent tourniquet
2. Injuries caused by embedded rings are common
3. Common causes include pregnancy, having never taken a ring off in many years and burns
4. Patients must seek physicians instead of jewelers for the removal of entrapped rings

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