

# EXTERNAL FIXATION

by

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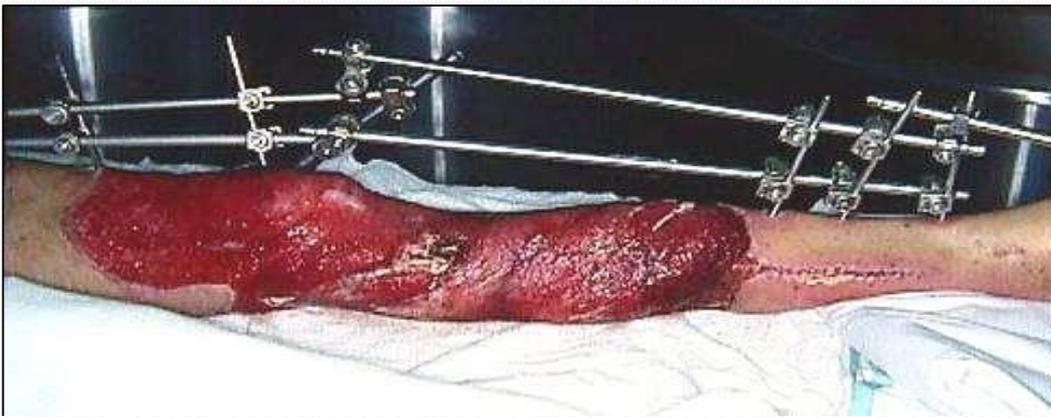
- Definition
- Indication
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- Components of external fixation
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# External fixation

## DEFINITION:

An External Fixation is the method of fixing the fracture with a cluster of pins connected to external environment.

An external fixator is a device placed outside the skin that stabilizes bone fragments with pins or wires connected to bars.



# Indications

- Stabilization of severe open fractures
- Stabilization of infected non unions
- Correction of extremity mal alignments and length discrepancies
- Closed fracture with associated severe soft tissue injuries

- Arthrodesis
- Open fractures that have significant soft tissue disruption
- Acetabular and pelvic fractures
- Severely comminuted and unstable fractures
- Fractures that are associated with bony deficits
- Fractures associated with infection

# Contraindications

- Patient with compromised immune system
- Non compliant patient who would not be able to ensure proper wire and pin care
- Pre-existing internal fixation that prohibits proper wire or pin placement
- Bone pathology precluding pin fixation

# Advantages

- Less damage to blood supply of bone
- Minimal interference with soft-tissue
- Useful for stabilizing open fractures
- Rigidity of fixation adjustable without surgery
- Good option in situations with risk of infection
- Requires less experience and surgical skill than standard ORIF
- Quite safe to use in cases of bone infection

# External Fixation Disadvantages

- Restricted joint motion
- Pin tract infection
- Cumbersome
- Inadequate stability for certain fractures

# COMPONENTS OF EXTERNAL FIXATORS

❖ PIN

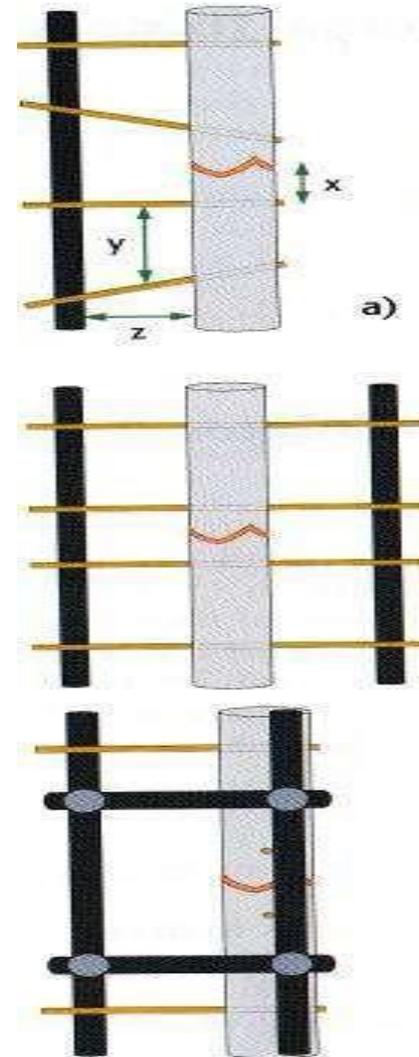
❖ screw

❖ CLAMPS

❖ EXTERNAL RODS

# TYPES OF EXTERNAL FIXATORS

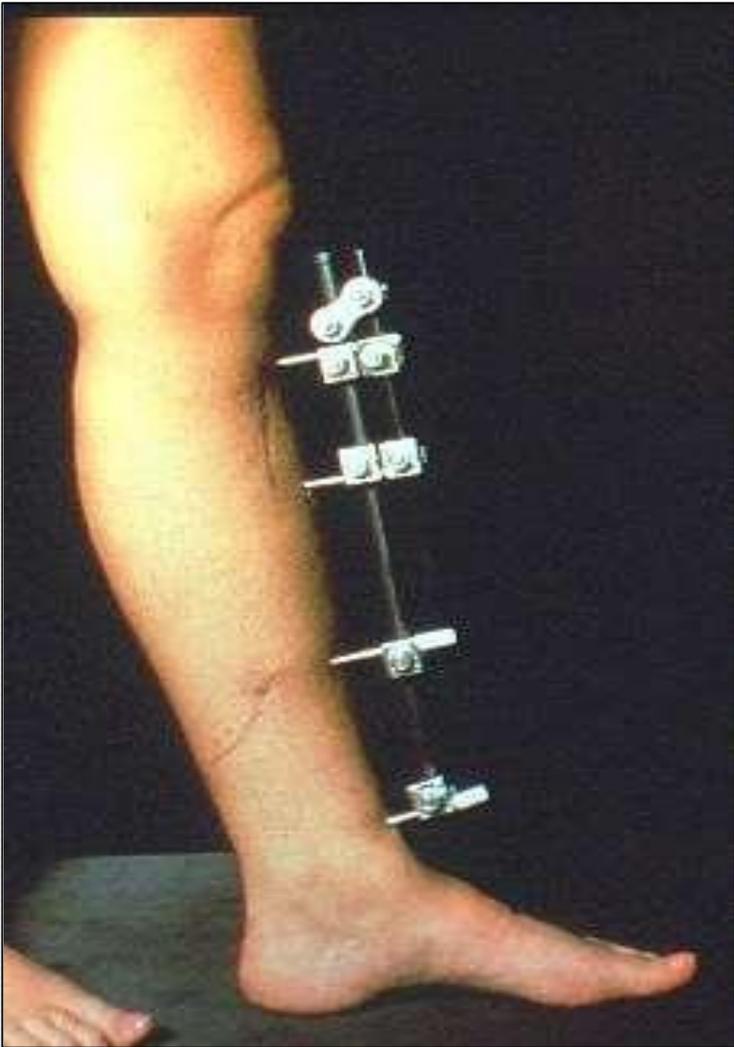
- UNILATERAL FRAME
- BILATERAL FRAME
- MULTIPLANE FIXATORS
- RING FIXATORS
- ORTHOFIX FIXATOR
- HAFFMAN FIXATOR



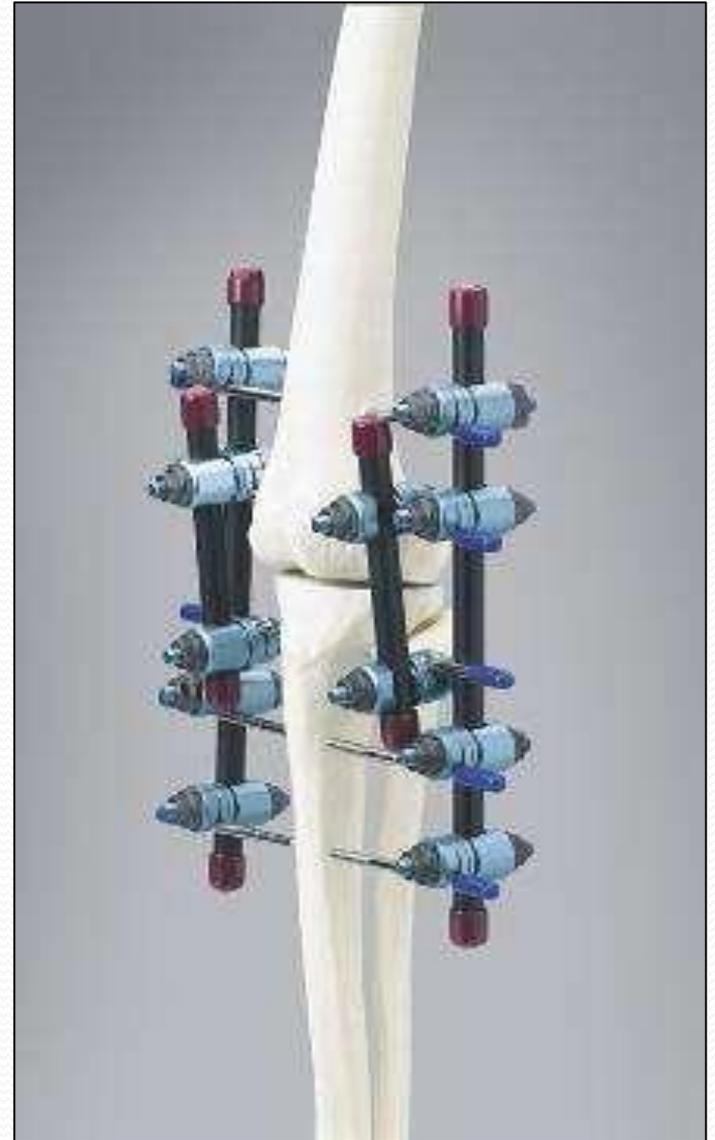
# *UNILATERAL FIXATOR 'Z FRAME'*



# *UNILATERAL FIXATOR SINGLE BAR*



# *BILATERAL FIXATOR*

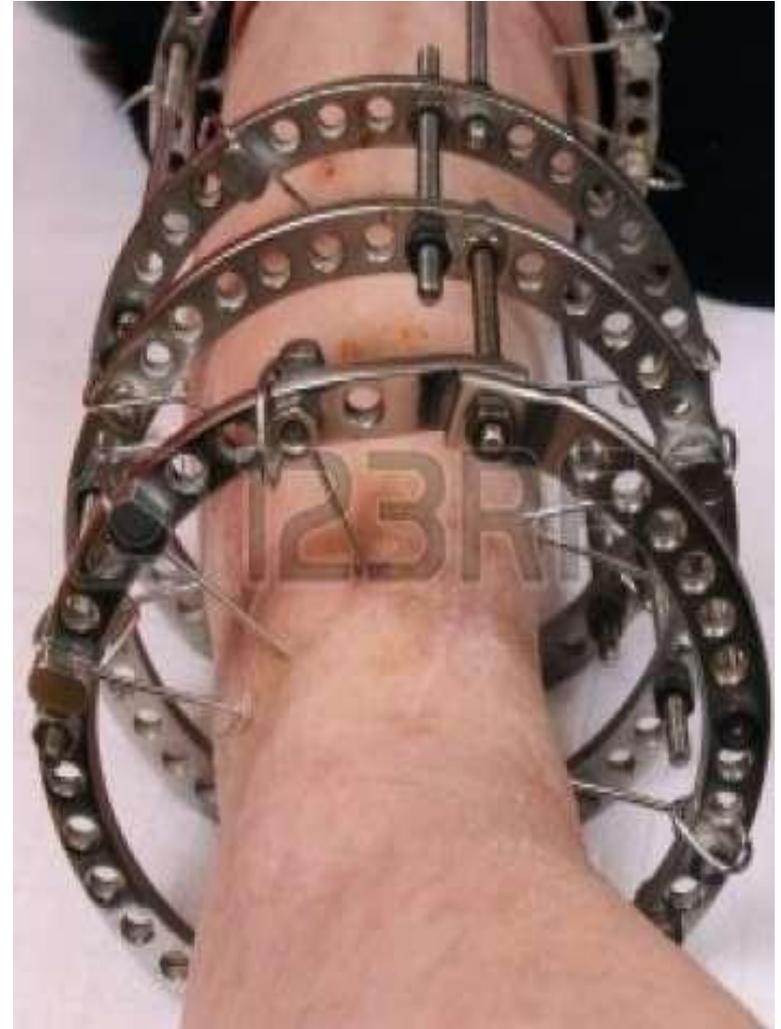


# *MULTI-PLANE FIXATOR*



# RING FIXATOR

External  
fixation



External fixator Orthofix

Bone  
lengthening  
External  
Fixator



T shape  
types  
external  
fixator







Pelvic Fragment External Fixator



Straight  
type  
external  
fixator



Mini  
external  
fixator





Wrist  
external  
fixator





Elbow  
external  
fixator



Knee joint  
external  
fixator



# HAFFMAN FIXATOR

Ankle  
Joint  
External  
Fixator



Femoral  
External  
Fixator



# Humeral Shaft External Fixator



# Wrist fixator



# Wrist fixator



# PRINCIPLES OF EXTERNAL FIXATION

- PIN SIZE
- PIN NUMBER
- PIN PLACEMENT
- ROD PLACEMENT
- CLAMPS

# COMPLICATIONS

❖ PIN TRACT INFECTION

❖ PIN LOOSENING

❖ PIN MIGRATION or PIN BREAKAGE.

❖ CHRONIC OSTEOMYELITIS

❖ SOFT TISSUE CONTACTURES