

EXTERNAL FIXATION

by

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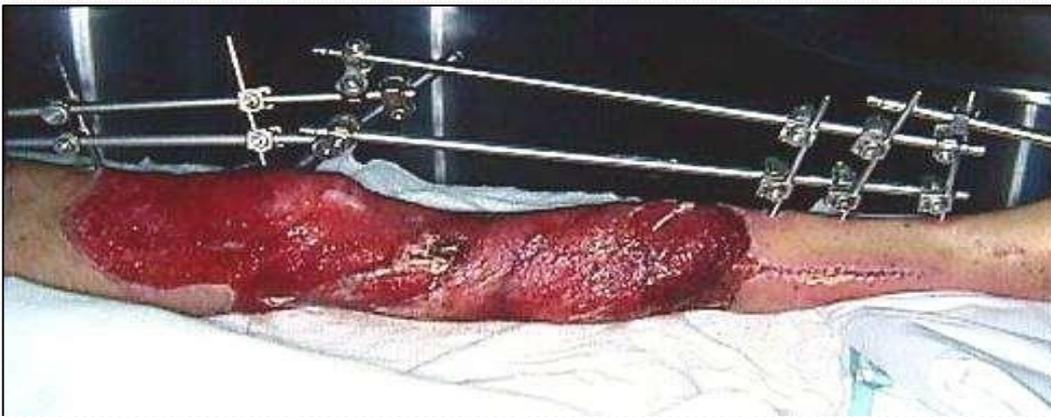
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External fixation

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

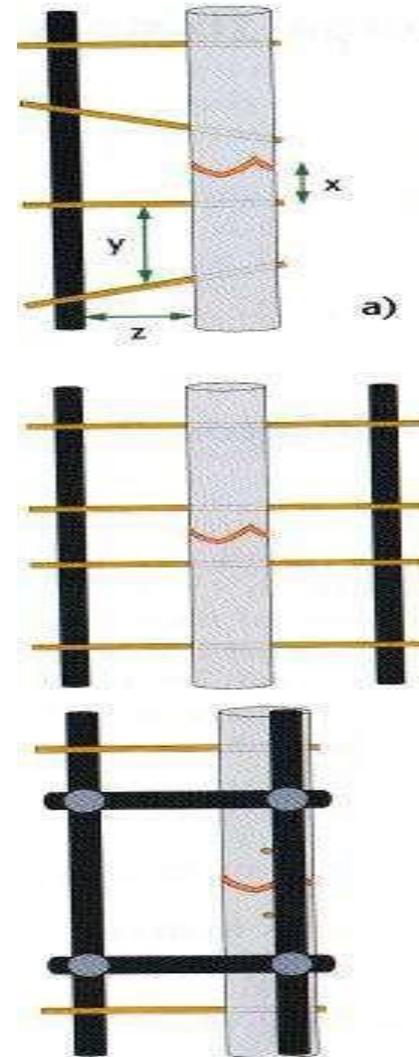
❖ screw

❖ CLAMPS

❖ EXTERNAL RODS

TYPES OF EXTERNAL FIXATORS

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

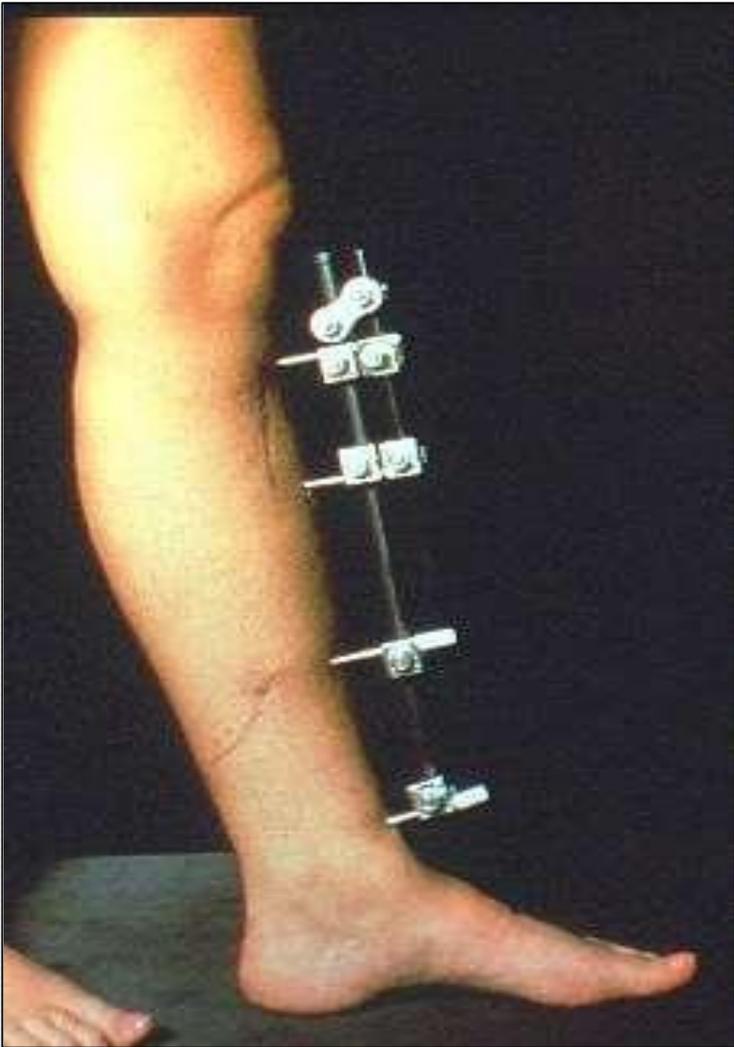


UNILATERAL FIXATOR

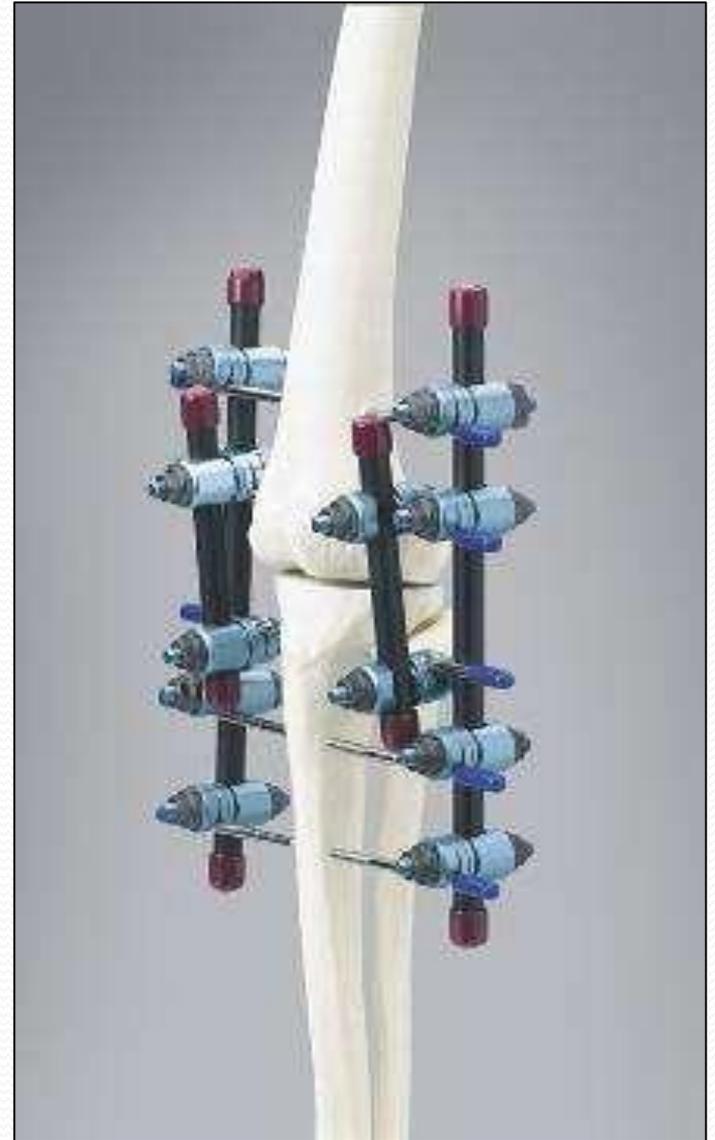
'Z FRAME'



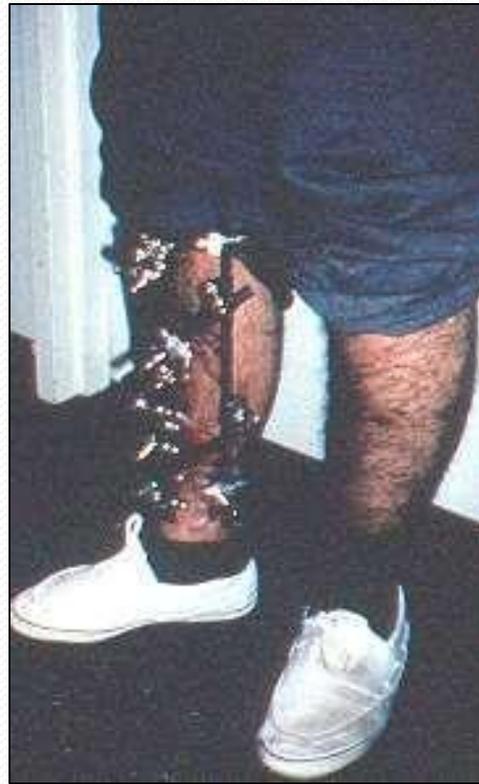
UNILATERAL FIXATOR SINGLE BAR



BILATERAL FIXATOR

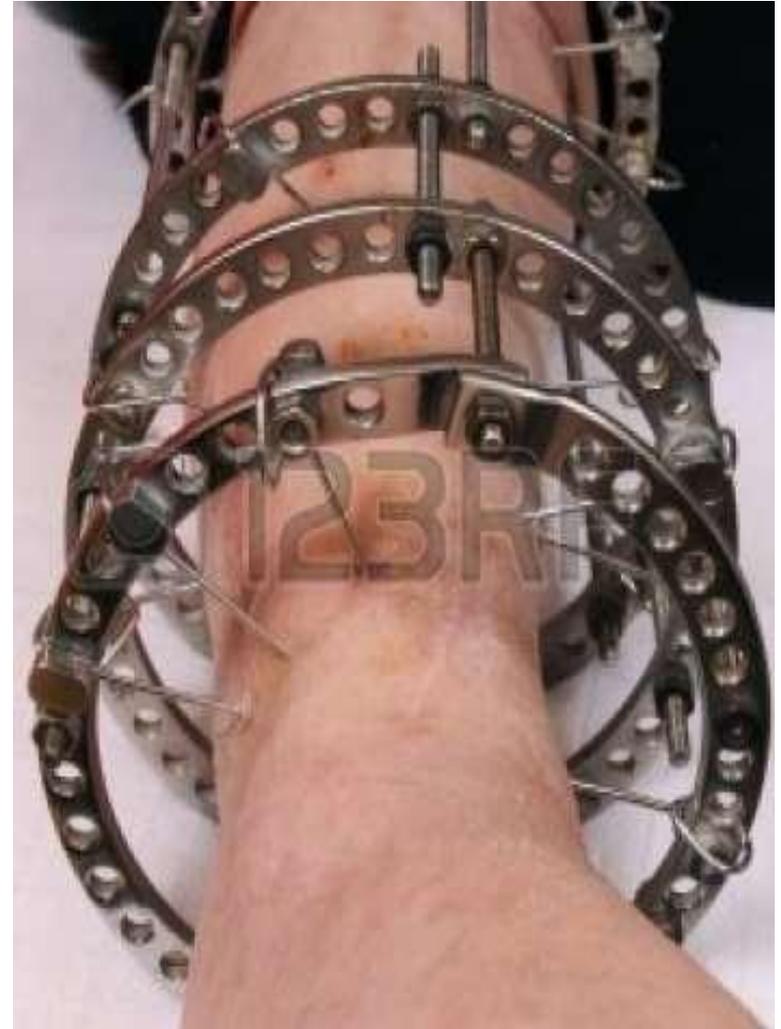


MULTI-PLANE FIXATOR



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