AO TRAUMA

# External Fixation Terminology

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**AO Trauma External Fixation Education Working Group**

**AO TEC**
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# What is external fixation?

A method for stabilization and/or manipulation of bone, joint, and soft tissue using bone components that traverse the soft-tissue envelope and are linked by external frame and connecting components

External fixation can be used for:

- Temporary treatment
- Definitive treatment
- Integrated external/internal treatment
  - Consecutive external and internal fixation
  - Simultaneous external and internal fixation

# External fixators

- Monolateral fixators
  - Pin based
- Ring fixators
  - Pin and/or wire/cable based (potentially using a tensioned wire or cable)
    - Note: The term “ring” is preferred over “circular”
  - Note: A hexapod fixator is a ring-based system with 6 connecting struts, requiring software to plan and adjust ring-to-ring positions
- Combination fixation: any combination of monolateral and ring fixators in the same construct
  - Note: The term “combination fixation” replaces “hybrid fixation”

# Components of external fixators

- Bone components
  - Wire/cable (traverses the bone and requires tensioning)
  - Threaded pin (also known as Schanz pin or Schanz screw/screwed into the bone)
- Frame components
  - Rod/bar/tube
  - Ring
  - Hinge
  - Strut (an adjustable telescoping component)
- Connecting components
  - Wire clamp
  - Cable connector
  - Pin clamp

# Rigidity (stiffness) types

- Frame stiffness
  - The mechanical characteristics of the frame alone

- Frame-bone “construct” stiffness
  - In vivo biomechanical characteristics of the frame and bone in combination

Note: construct = frame and bone in combination

# Optimal positions

The insertion of bone components in positions that are anatomically safe and minimize soft-tissue interference during movement of the adjacent joints