SUMMARY

Perfect anatomical reduction and rigid internal fixation are not the main target in management of all fractures as was thought. The blood Supply of an adult long bone comes from three sources; the nutrient artery, the rnetaphyseal arteries and the periosteal arteries, which represent a very important and effective factor in dealing with any fracture site.

With proper follow up and reassessment of cases managed surgically, it was found that anatomical reduction and rigid internal fixation were not the only factors affecting bone healing and rehabilitation of the patient.

Periosteal vascularity, soft tissue condition, and loading of bone at the proper time and in the proper way found to be very important in fracture healing.

Mechanics of fracture fixation must be understood to help in application of the devices putting the biological principles in our consideration, which represented in;

Repositioning and realigning of bone fragments by manipulation at distance from the fracture site, preserving soft tissue attachment, avoid stripping of the periosteum, comminution fragments out of the mechanical construct while preserving their blood supply, using biocompatible or biodegradable materials and decreasing contact between bone and the implant.

Application of any device on biological basis leads to early mobilization of the joints, less tissue devitalization, decrease blood loss and rapid healing and remodeling.

Many devices are applied biologically, to reach this target as intramedullary nailing, external fixator, and many types of new designed plates.

In any fracture fixation, minimal dissection, routine bone grafting if needed and preservation of soft tissues attachments leading to improvement of the results so in some fracture the application of the biological devices not available so we can use any devices But use the biological principles as much as possible.
An example for biological fixation of diaphseal

fracture is the closed interlocking medullary nail which help rapid fracture hearing by:

- Cyclic - compressive loading across the fracture site which has a stimulus effect on callus formation and remodeling.
- No damage for the periosteal vasculature.
- Marrow elements and cortical reaming extravasation into the fracture hematoma representing a stimulus for fracture healing.

The biomechanical properties of the interlocking nail allows for partial weight bearing, control of the length and rotation and the load - sharing of the interlocking nail, all this factors combine with the biological factors to create, an excellent conditions for rapid healing and remodeling of fracture of long bones.