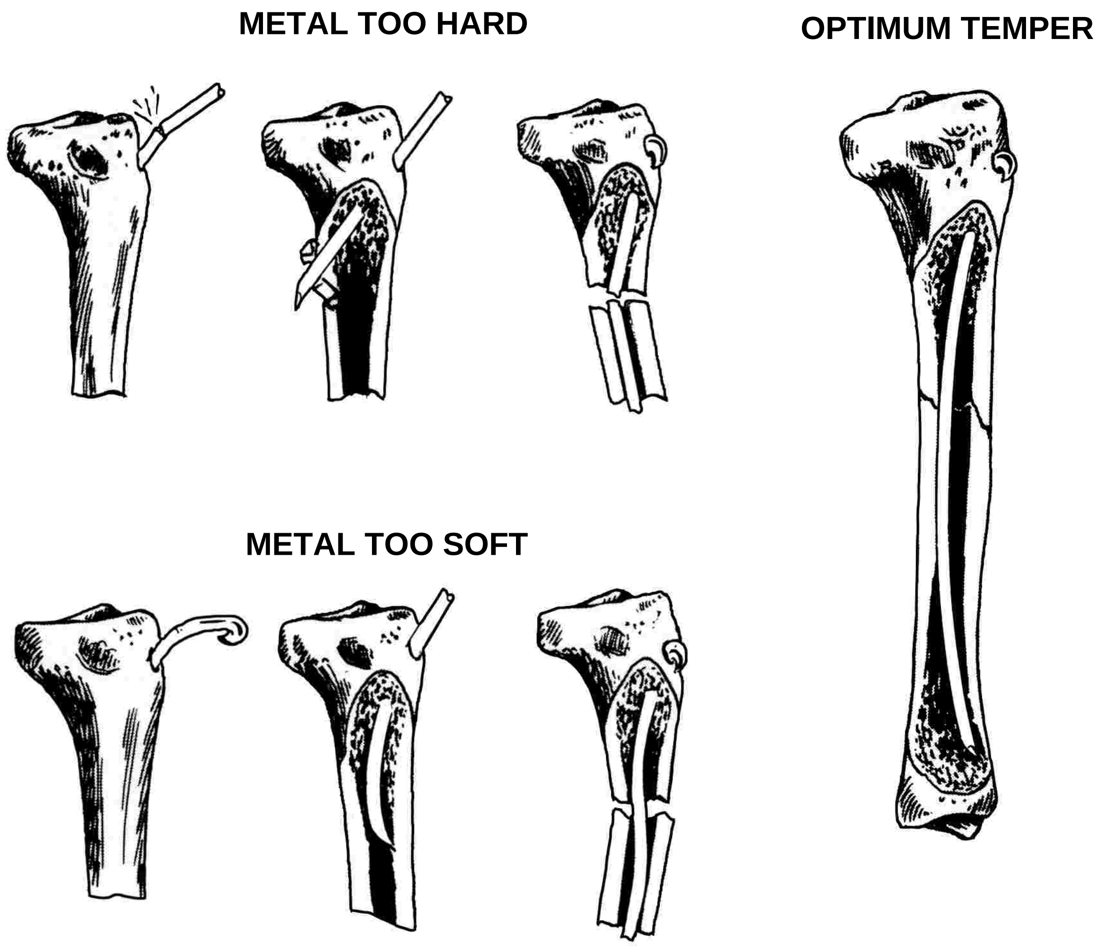
1
THE PIN STORY

TEMPER

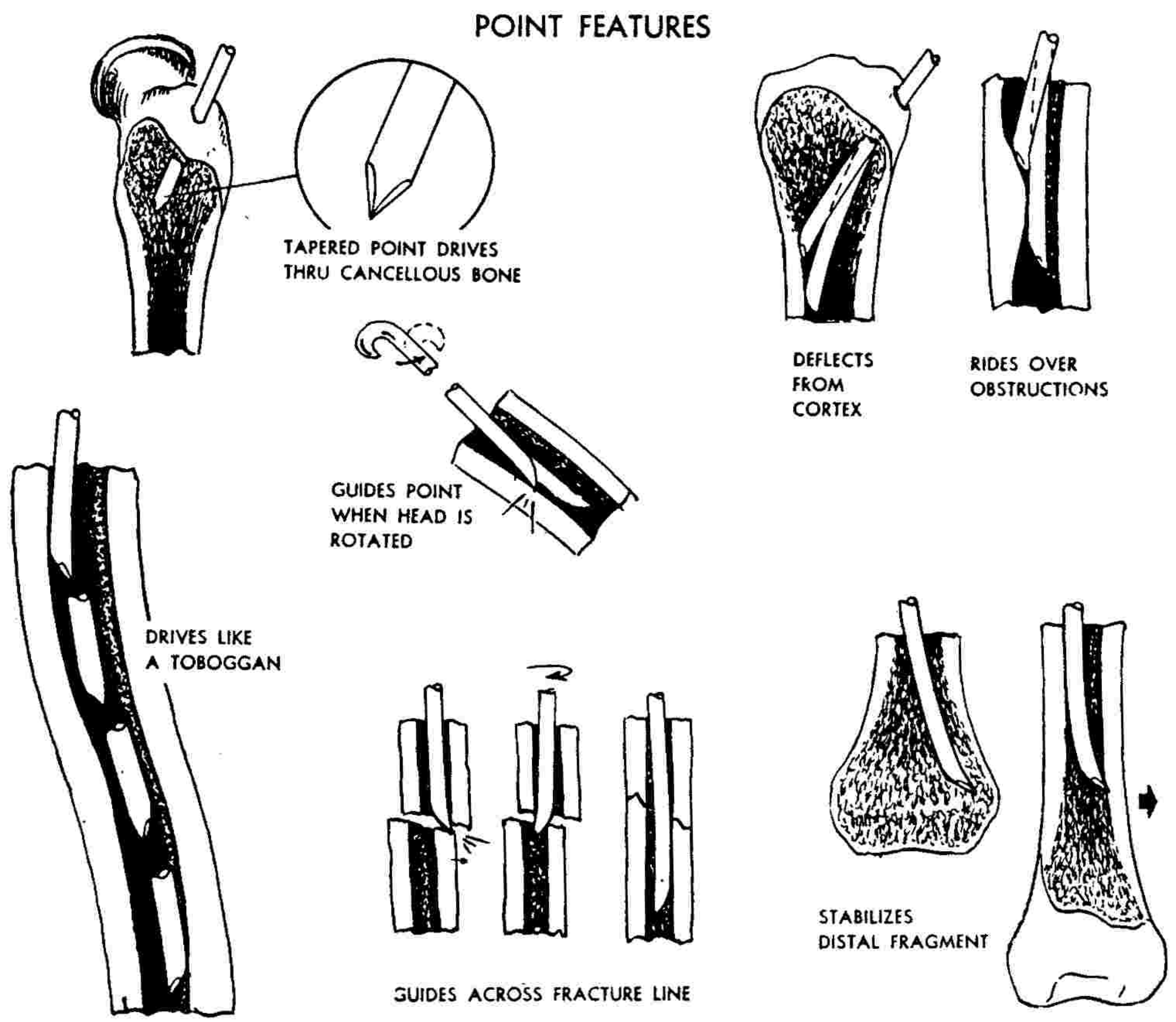


Influence of Temper

If the rod is too soft it will bend on driving or bend within the bone in such a fashion that it will not drive or give stable fixation.

If the rod is too hard it may fracture in driving, fracture within the bone at the fracture site, split the bone on driving, or penetrate the cortex and pass into the soft tissues instead of being deflected down the medullary cavity.

Optimum temper means the rod is rigid enough for driving and stability of fixation, that it is flexible enough to be deflected down the medullary cavity and to conform to the contour of the bone, yet resilient enough to realign itself within the bone. This will be more thoroughly covered in the chapter on dynamics.



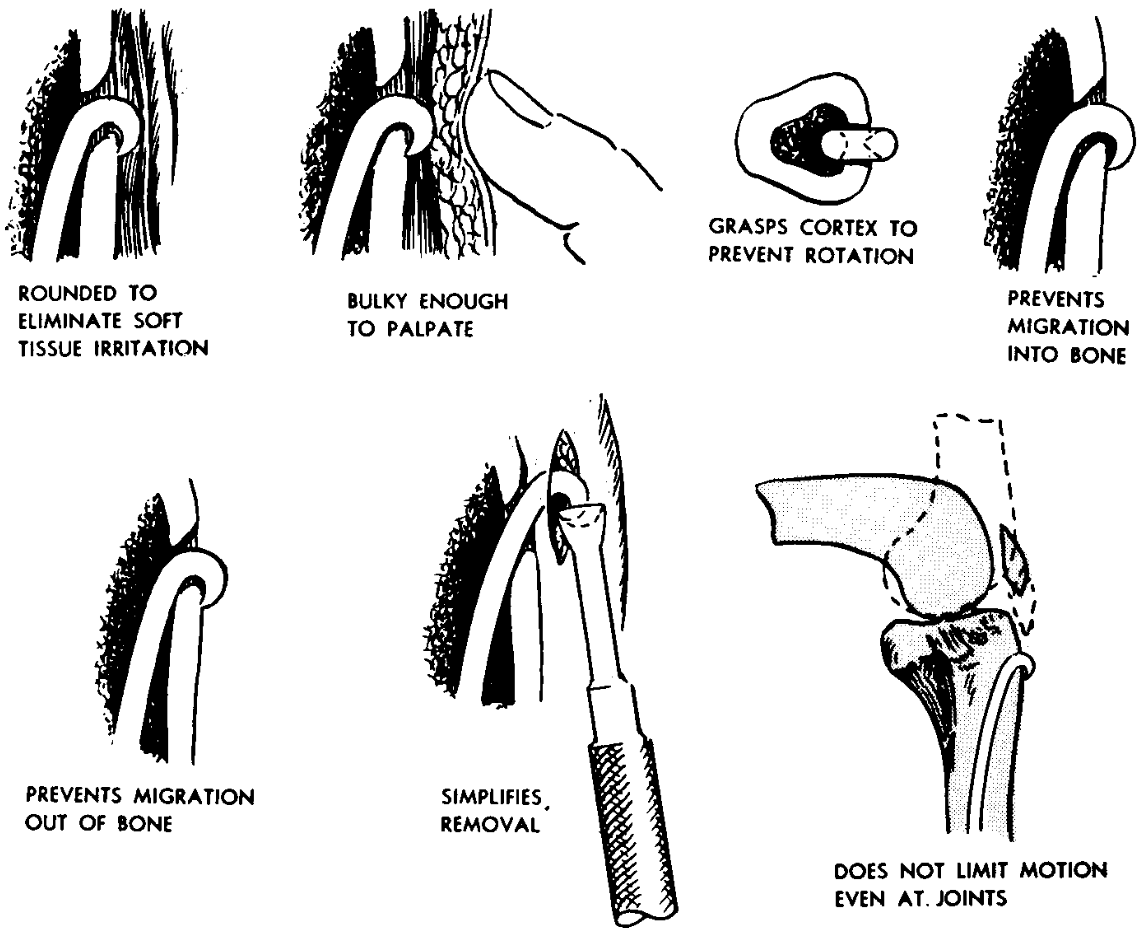
Designing the Point

Many shapes were tried and abandoned. The diamond point would hang up or penetrate the cortex rather than be deflected into the marrow cavity. Blunt or rounded points acted similarly and would not drive through cancellous bone in young adults.

The sled-runner point met the requirements well. The single gliding surface deflected the point from the far cortex of the bone into the medullary cavity. It rode over obstructions in the canal which would impinge points of other types. The flat surface would be observed to ride the inner contour of the bone like a toboggan on a runway, the deflection of the point causing the pin to rotate as it was driven in such fashion that the pin tended to guide itself by rotating in this manner. It was further learned that if the point showed a tendency to impinge, simple rotation of the pin with pliers would free it and start it on its proper way, and that it could be guided into an offset distal fragment in this manner.

By tapering the point on each side it drove better through cancellous bone. And the point could be driven obliquely into the distal cancellous bone or set against the cortex in such manner as to control or limit rotation.

THE HOOKED HEAD



Designing the Head

In fixing the supracondylar femoral fracture a hooked head was constructed to grasp the cortex, primarily to prevent migration of the pin into the bone. Since it was placed superficially just beneath the skin the hook was rounded and smoothed to prevent irritation of the soft tissues.

It was later observed that the pin should always be introduced through the side of a bone and almost never through the bone end. By so doing the pin secured a stable hold on the condylar fragment because entering the bone obliquely and being deflected, it was locked by three-point pressure; and as the hook grasped the cortex the pin could not rotate in this fragment. Furthermore, migration of the pin outward was limited by the hook in the lateral cortex. The hook proved of inestimable value in removing the pin.

Then came a large series of operative experiments to determine the proper lengths and diameters for the pins for the various bones of the body. These clinical experiences revealed many dynamic forces previously unrecognized by us, which contributed greatly to the utilization of the principle. It was found that most fractures in all regions of the long bones could be happily fixed in this manner.