LISS DF and LISS PLT. Less Invasive Stabilization Systems for Distal Femur and Proximal Lateral Tibia.
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Unique benefits of the LISS

An optimal fixation of complex fractures
- The pre-shaped, low profile plate reduces soft tissue problems and eliminates the need for plate contouring.
- The unique design of the self-drilling, self-tapping screws allows for a perfect screw to bone interface and shortens surgical time.
- The threaded connection between the screw head and the LISS plate prevents toggling of the screws and the resulting loss of reduction.
- The specific angulation and the axial stability of the screws ensure an optimal anchorage, even in osteoporotic bone.

Case example: Male, 20 y, polytrauma, AO 33C3

Pre-operative 6 weeks follow-up 5 months follow-up
More about the LISS concept

Bone fractures lead to a complex tissue injury involving both the bone and the surrounding soft tissues. Combined with the AO/ASIF principles of internal fixation, osteosynthesis with plates and screws has been a very successful technique for the treatment of fractures. However, additional vascular trauma resulting from extensive surgical exposure was usually caused by the necessity of achieving precise reduction as well as for implant placement and fixation. Fracture fragments were also often stripped of their soft tissue envelope. As a result, bone healing was impaired and infection risk increased.

The combination of two requirements, i.e. anatomical reduction of articular fractures and obtaining correct length, axis and rotation with minimal additional vascular trauma in the diaphyseal region, has led to the development of a new concept of implants and instruments for the treatment of metaphyseal fractures of long bones. This is called the Less Invasive Stabilization Systems (LISS). The implant consists of a plate-like device and locking screws, which together act as an internal fixator. For optimal stability and preservation of soft tissue reasons, the internal fixator will be placed very close to the bone. The plates are therefore pre-shaped. Special instruments allow the plate to be slid under the muscle and the screws to be inserted percutaneously through small stab incisions. Fracture reduction and fixation proceed in two distinct steps. First, the reduction has to be performed – anatomical reduction is mandatory in articular fractures, in the shaft, the indirect reduction must ensure that length, rotation and axial alignment of the main fragments are correct. The reduction must then be securely held to allow the fragments to be bridged with the LISS fixator.

Case example: Male, 76 y, isolated fracture, AO 33B2

Pre-operative | Postoperative | 4 months follow-up
The concept of the internal fixator

The basic principles of an internal fixation procedure using a conventional plate and screw system are anatomical reduction and stable internal fixation of the fracture. Wide exposure of the bone is usually necessary to allow reduction and plate fixation to be performed. The screws are tightened to compress the plate onto the bone. The actual stability results from the friction between the plate and the bone (Fig. A). Since the screw head is free to tilt within the plate hole, stability requires a bicortical purchase of the screws.

An internal fixator is a construct where the screws (pins) are locked in the plate (frame) (Fig. B). The forces are transferred from the bone to the fixator across the screw-fixator threaded connection and unicortical purchase of the screws is sufficient. No compression of the fixator onto the bone is therefore required to achieve stability. Locking the screw in the plate increases stability. This reduces the risk of loss of reduction as toggling of the screw is eliminated. Furthermore, the blood supply of the bone under the fixator is preserved as no contact between the plate and the bone is needed.

References

- Prospective Clinical Trial of the Less Invasive Stabilization System (L.I.S.S.) for Proximal Tibia Fractures; P.A. Cole, et al.; OTA 2000, Poster #90.
Unique benefits of the LISS

A less invasive procedure facilitated by
- The radiolucent handle, which facilitates the insertion of the plate as well as accurate and hassle-free percutaneous placement of the screws.
- Additional instrumentation to help performing indirect reduction.
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