TECHNIQUE GUIDE FOR TITANIUM ORLOS-II LOCKING PLATE SYSTEM

ORTHOMEDICAL
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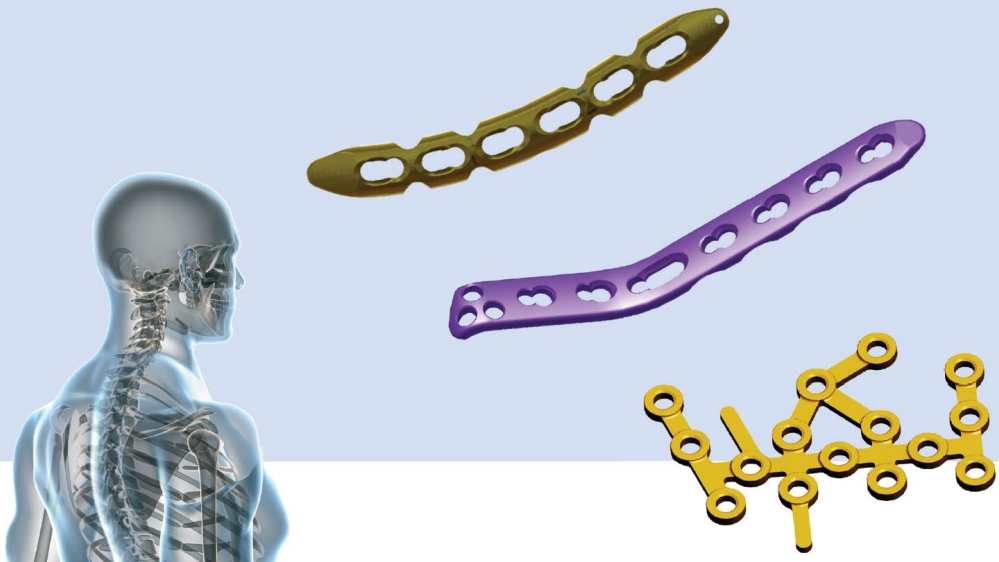

ORLOS II
Ortho-Medical Locking Plate System

SMALL FRAGMENT SYSTEM

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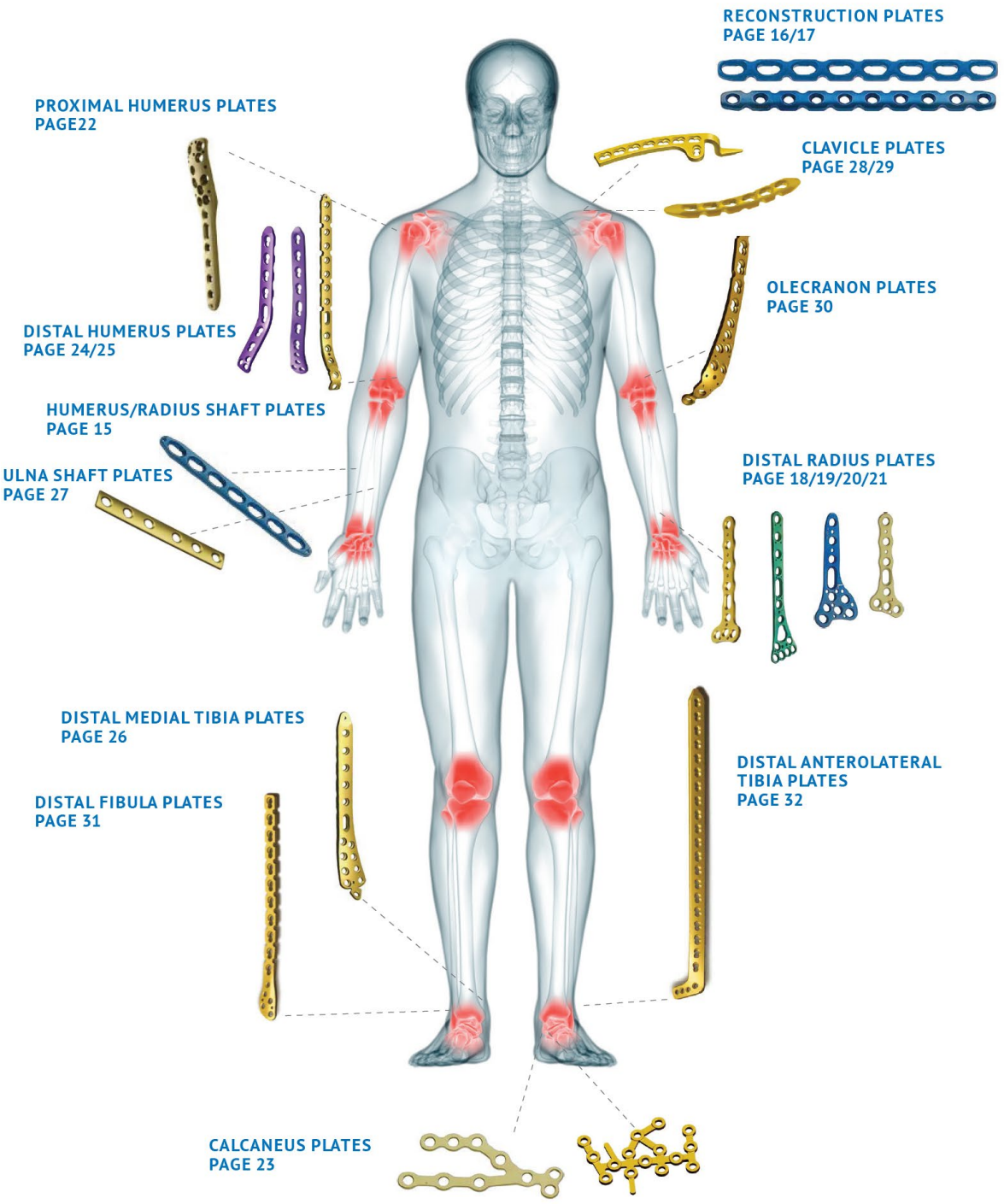

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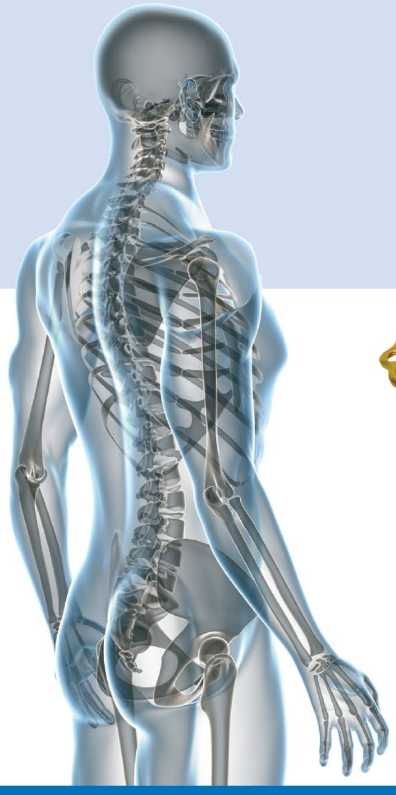

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LARGE FRAGMENT SYSTEM

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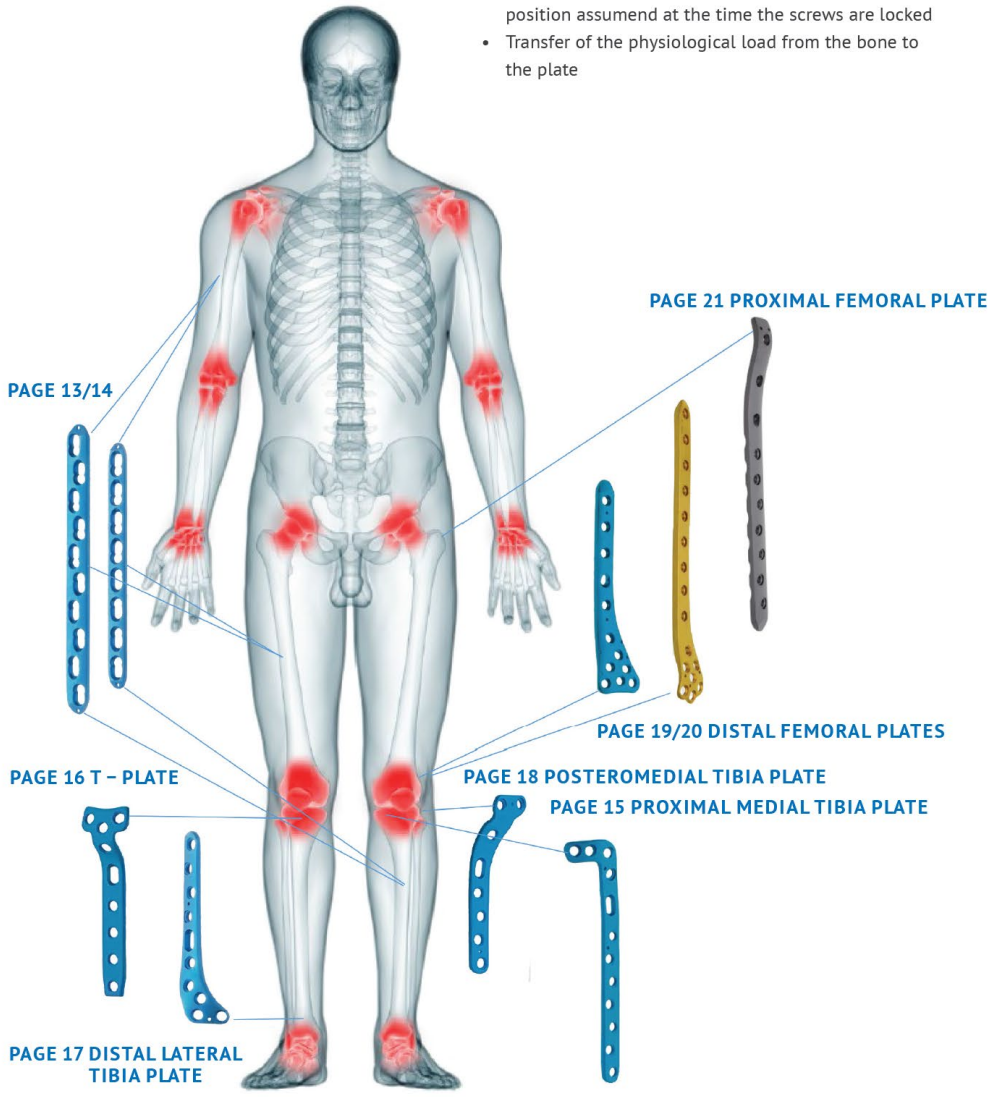
ORLOS II
Ortho-Medical Locking Plate System

ORLOS_II LOCKING PLATE SYSTEM 4,5 - 5.0 MM

- Angular stable
- Locking or compression
- Support biological osteosynthesis in case of osteoporotic bone and multiple fractures
- Excessive torque is not applied to the cortical bone
- Self-tapping locking screws
- The bonefragments are are reliably fixed in the position assumend at the time the screws are locked
- Transfer of the physiological load from the bone to the plate



ADVANTAGE!

ALL ILLUSTRATED LOCKING PLATES ARE TO COMBINE WITH STANDARD DIA. 4.5 MM CORTICAL SCREWS

INTRODUCTION

The aim of any surgical fracture treatment is to reconstruct the anatomy and restore its function.

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According to the **AO/ASIF,** international fixation is distinguished by precise reduction, stable fix – ation preservation periosteal injuries and of blood supply and early, functional mobilization.
Plate and screw osteosyntheses has been improved by using internal fixation with angular stability (internal fixators) in metaphyseal fractures and osteopenic bone.

The ORLOS_II Compression Low Contact Plate, is part of a titanium plate and screw system merges locking screw technology with conventional plating techniques. The locking compression plate system has many similarities to existing plate fixation methods, but with a few important improvements. Locking screws provide the ability to create a fixed-angle construct while utilizing familiar **AO/ASIF** plating techniques. A fixed-angle construct provides advantages in osteo – penic bone or multifragmentary fractures where traditional screw purchase is compromised. Lock – ing screws do not rely on plate/bone compression to maintain stability, but function similarly to multiple small angled blade plates.

INDICATIONS

ORLOS_II Small -and Large Fragment Locking Plate System , are intended for fixation of fractures, osteotomies and non-unions of olecranon, humerus, ulna, radius pelvis, clavicle, calcaneus, scapula, olecranon, proximal -and distal tibia, fibula, proximal -and distal femoral, metacarpal, forefoot and particularly in osteopenic bone.

The following points distinguish treatment using locking screw technology from conventional plat – ing techniques:

- It enables fracture treatment using compressing plating with conventional cortex or cancellous bone screws.
- An compression plate can also be used as an internal fixator and permits briding over shattered zones.
- The ORLOS_II locking plate system permits the combination of conventional and locking screws.
- Unicortical locking screw fixation permits better vascularity

IMPORTANT NOTES

The ORLOS_II Locking Plate system applies to many different plate types and is therefore suitable for huge number of fracture types, especially the two types of reconstruction plates. For that reason, the ORLOS_II Locking Plate Technique Guide does not deal with any specific fracture type. Please refer also To the AO/ASIF Principles of Fracture Management, and to the corresponding special literatures**.**

ORLOS_II LOCKING PLATE PRINCIPLES

Anatomic reduction, facilitates restoration of the articular surface by exact screw placement utilizing thread sleeves together with wire sleeves.
Stable fixation, the locking screws create a fixed-angle construct, providing angular stability
Preservation of blood supply, the tapered end for submuscular plate insertion, improving

TECHNIQUE GUIDE FOR TITANIUM ORLOS-II LOCKING PLATE SYSTEM

tissue viability. Low contact ORLOS_II plate design reduces plate to bone contact.

ORLOS_II LOCKING SCREW AND LOCKING PLATE FEATURES

Self-tapping locking screws, with Hexagonal -and StarBit recess, and cylindrical screw head mate with the threaded plate holes to form a fixed angle construct. Without a conical proximal head thread design the reason for a cold welding is solved. High stability for low distal shaft thread design and large core diameter.

EXAMPLE !

Advantage High Fixation Stability

- Uniform hole spacing for angulation 8° in longitudinal 50° and transverse used for standard cortical -and cancellous screws, special designed low contact, holes for K-wire fixation on both end of the plate, locking hole transverse angulation 4°

CAUTION

Holes in straight and reconstruction plates are oriented that the compression component of the hole is always directed toward the middle of the plate!

FEATURES FOR ORLOS_II LOCKING PLATES (CONTINUED)

Unicortical Screw Fixation

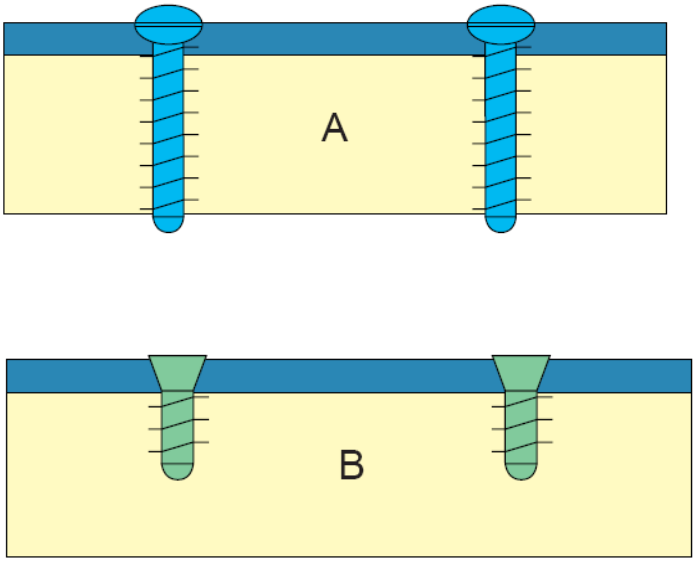
Biocortical screw fixation has long established been the traditional methods of compressing a plate to the bone where friction between the plate and the bone maintains stability. Screw

stability and load transfer are accomplished between at two points along the screw, near and far cortex.

Unicortical locking screw fixation, provide stability and load transfer only at the near cortex due to the threaded connection between the plate and the screw. Screw stability and load transfer are accomplished at two points along the screw, the screw head and near cortex. The locking screw is locked with the locking screw head to the plate, the fixation does not rely solely on the pullout strength of the screw or on maintaining friction between the plate and the bone.

■ **Fig. A** = Standard biocortical screws require two cortex to achieve stability

■ **Fig. B** = Locking unicortical screws utilized the locked screw and the near cortex to achieve stability



PLATING FIXATION PRINCIPLES

Following informations inform you for the biomechanical features of conventional plating techniques, locking plate or bridge plating techniques and a combination of both.

IMPORTAND INFORMATION, PLEASE NOTE!

Refer also the AO/ASIF principles of fracture management

CONVENTIONAL PLATING

TOTAL STABILITY

Tensile force originating from tightening the screws presses the plate onto the bone. The developing friction between the plate and the bone leads to stable plate fixation. To ensure absolute stability, the resistance must be higher than axial forces, arising during the rehabilitation.

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ANATOMIC CONTOURING OF THE PLATE

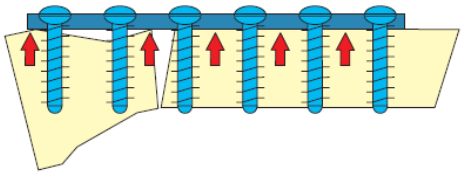
The aim of fixation is anatomic reduction, particularly in articular fractures. Therefore, the plate must be contoured to the shape of the bone.

LAG SCREW

Interfragmentary compression is accomplished by using a lag screw. This is particularly important in intra-articular fractures which require a precise reduction of the joint surfaces. Lag screws can angulate in the plate hole, allowing placement of the screw perpendicular to the fracture line.

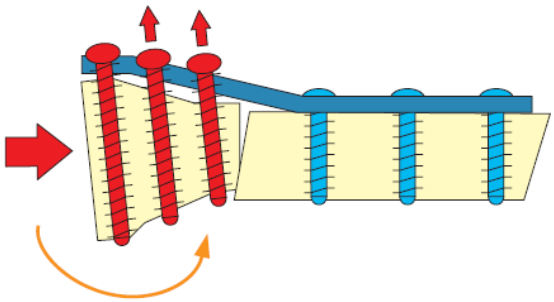
PRIMERY LOSS OF REDUCTION

In conventional plating, even though the bone fragments are correctly reduced prior to the plate application, Fracture dislocation will result if the plate does not fit the bone. In addition, if the lag screw is not seated perpendicular to the fracture line (e.g. spiral fracture of the distal tibia), shear forces will be introduced. These forces may cause of reduction.



SECONDARY LOSS OF REDUCTION

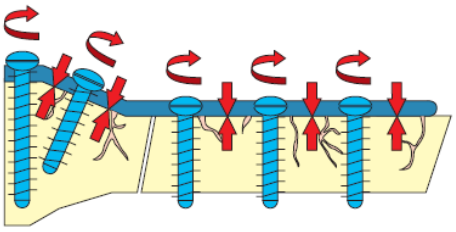
Under axial load, postoperative, secondary loss of reduction may occur by toggling of the screws. Since cortex screws do not lock in the plate, or be pushed axially through the plate holes



PLATING FIXATION PRINCIPLES (CONTINUED)

BLOOD SUPPLY TO THE BONE

The periosteum is compressed under the plate area, reducing or even interrupting blood supply to the bone. The result is delayed bone healing due to temporary osteoporosis underneath the plate.



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OSTEOPOROSIS

Due to compromised cortical structure, screws cannot be tightened sufficiently to obtain the com – pression needed for support the bone. This may cause loosening of the screws and loss of stability, and may jeopardize the reduction

STANDARD PLATING ACHIEVES GOOD RESULTS IN

- Good bone quality
- Fractures which are traditionally fixed with lag screws to achieve direct bone healing

SPECIAL ATTENTION MUST BE PAID TO

- Osteoporotic bone: during rehabilitation, the load should be kept to a minimum to pre – vent postoperative loss of reduction
- Multifragmentary fractures: the anatomic reduction may be accomplished at the expense of extensive soft tissue trauma and denudation

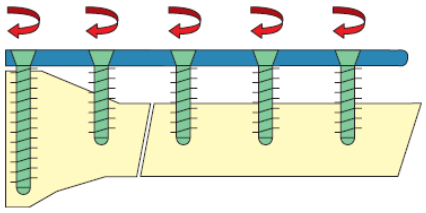
PLATING FIXATION PRINCIPLES (CONTINUED)

BRIDGE/LOCKED PLATING USING ORLOS_II LOCKING PLATES AND SCREWS

- Locking screws lock to the plate, forming a fixed-angle construct
- Bone healing is achieved indirectly by callus formation when using ORLOS_II Locking screws exclusively

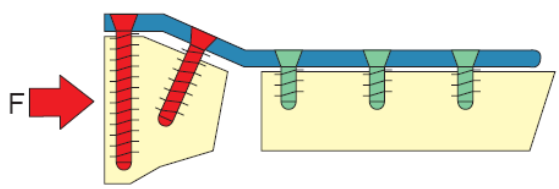
MAINTENANCE OF PRIMERY REDUCTION

Once the locking screws engage the plate, no further tightening is possible. Therefore, the implant locks bone segments in their relative positions regardless of degree of reduction.
Pre-contouring the plate minimizes the gap between the plate and the bone, but an exact fit is not necessary for implant stability. This feature is especially advantageous in minimally or less invasive plating techniques because these techniques do not exact contouring of the plate to the bone surface.



STABILITY UNDER LOAD

By locking the screws to the plate, the axial force is transmitted over the length of the plate. The risk of secondary loss of the intraoperative reduction is reduced.



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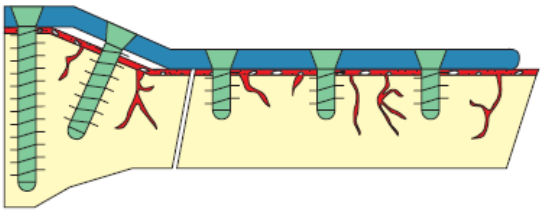
BLOOD SUPPLY TO THE BONE

Locking the screws into the plate does not generate additional compression. Therefore, the periosteum will be protected and the blood supply to the bone preserved.

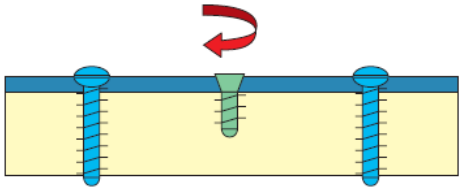


The combination of conventional compression plating and locked plating techniques enhances plate osteosynthesis. The result is a combination hole or extra hole for the standard screws in the plate that, depending on the indication, allows standard compression plating, or stand – ard fixation, locked/bridge plating or a combination of both.

INTERNAL FIXATION USING A COMBINATION OF LOCKING SCREWS AND STANDARD SCREWS

Note!

If a combination of cortex and locking screws is used, a cortex screw should be inserted fist to pull the plate to the bone for compression, this is required.



If locking screws (1) have been used to fix a plate to a fragment, subsequent insertion of a standard screw (2) in the same fragment without loosening and retightening the locking screw is NOT RECOMMENDED!

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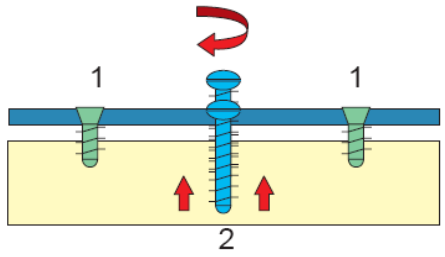
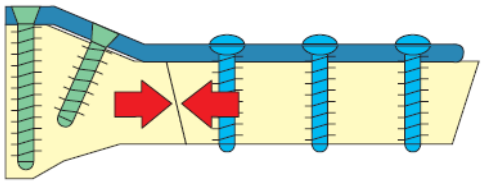
Note!

If a locking screws (1) is used first, care should be taken to ensure that the plate is held securely to the bone avoid spinning of the plate about the bone.



Once the metaphyseal fragment has been fixed with locking screws, the fracture can be dynamically compressed using standard screws in the recommended compression hole or hole section of the combination hole.



PLATING FIXATION PRINCIPLES (CONTINUED)

LOCKED AND STANARD PLATING TECHNIQUES

- First, use lag screws to anatomically reconstruct the joint surface
- The behavior of a locking screw is not the same as that of a lag screw. With the locked plating technique, the implant locks the bone segments in their relative positions regardless of how they are reduced.
- A plate used as a locked/bridge plate does not produce any additional compression between the plate and the bone.
- The unicortical insertion of a locking screw causes no loss of stability.

Screw insertion

Determine whether standard cortex screws, cancellous screw or 2.7mm/3.5mm locking screws will be used for fixation.
RECOMMENDED: the 2.7mm cortex screw are just used for low profile plates thickness 1.5mm, distal radius plates!
A combination of all may be used.
NOTE!
If a combination of cortex, cancellous and locking screws is used, a standard screw should be used first to pull the plate to the bone.
WARNING!
If a locking screw is used first, care should be taken to ensure that the plate is held securely to the bone to avoid spinning of plate about the bone.

Insertion of a cortex screw or cancellous bone screw

Use the universal drill guide for a eccentric (compression) or neutral (buttress) insertion of the cortex screw
NOTE!
Just the universal drill guide 3.5mm illustrated in the ORLOS_II brochure from MAT GmbH&Co.KG is suitable.

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Neutral insertion of a standard screw

When pressing the universal drill guide into the dynamic hole or round hole of the plate, it will center itself and it allow neutral pre-drilling.

Dynamic compression, eccentric insertion of cortex screw

To drill a hole for dynamic compression, place the universal drill guide eccentrically at the edge of the dynamic portion of the plate hole, without applying pressure. Tightening of cortex screws will result in dynamic compression corresponding to that of the standard dynamic compression plates.

NOTE! Since the direction of a locking screw is determinate by plate design, final screw position may be verified with the K-wire 1.6mm prior to insertion. This becomes especially important when the plate has been contoured or applied in metaphyseal regions ar – round joint surfaces.

PLATING FIXATION PRINCIPLES (CONTINUED)

1. Postoperative treatment

Postoperative treatment with locking compression plates does not differ from conventional internal fixation technique.

2. Implant removal

To remove locking screws, unlock all screws from the plate, then remove the screws completely from the bone. This prevents simultaneous rotation of the plate when removing the last locking screw.

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RECOMMENDED INSTRUMENT SETS FOR ORLOS_II SMALL AND LARGE FRAGMENT LOCKING PLATE SYSTEMS

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ORLOS_II SMALL FRAGMENT 2.7 / 3.5MM TITANIUM IMPLANT SYSTEM

SET - LISTING - CONTENT FOR SET: SET-011-0010-021

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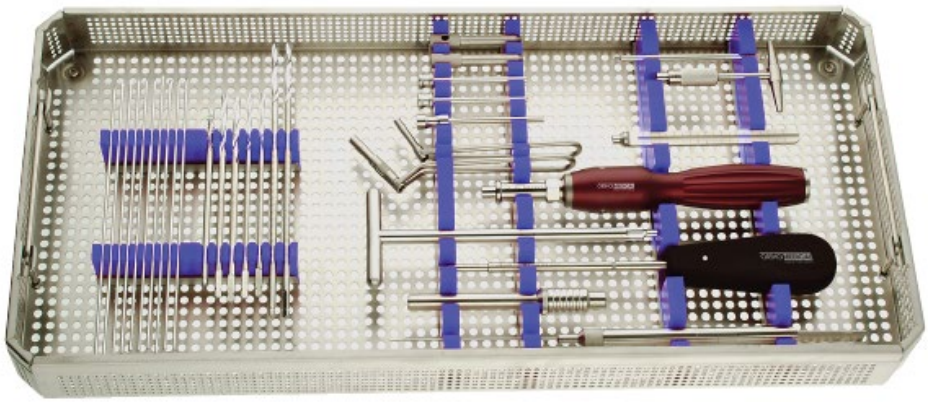
ORLOS_II LARGE FRAGMENT 4.5 / 5.0 MM TITANIUM IMPLANT SYSTEM

SET – LISTING – CONTENT FOR SET-011-0010-024



IMPORTANT INFORMATION!

ALL IMPLANTS AND INSTRUMENTS ARE ILLUSTRATED IN THE ORLOS_II SMALL -AND LARGE FRAGMENT PLATE SYSTEMS CORRESPONDING CATALOGUES WHICH CONTAINES THE TECHNICAL DETAILS AND DIMENSIONS

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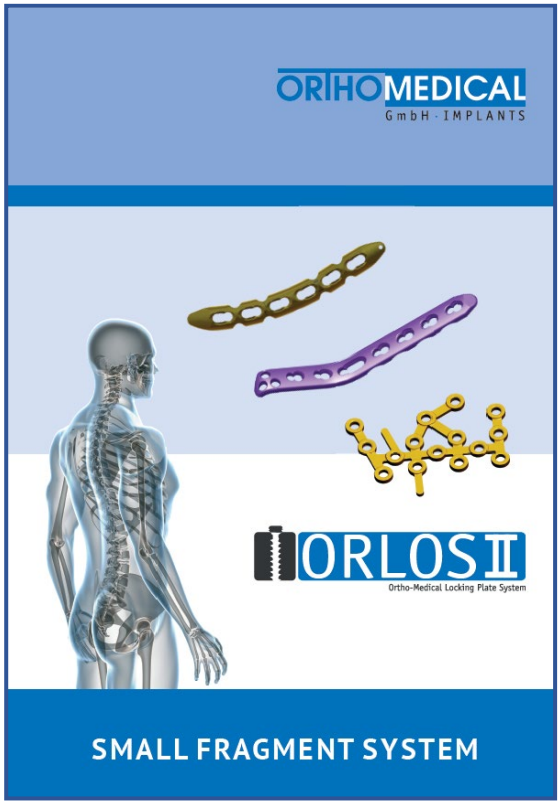

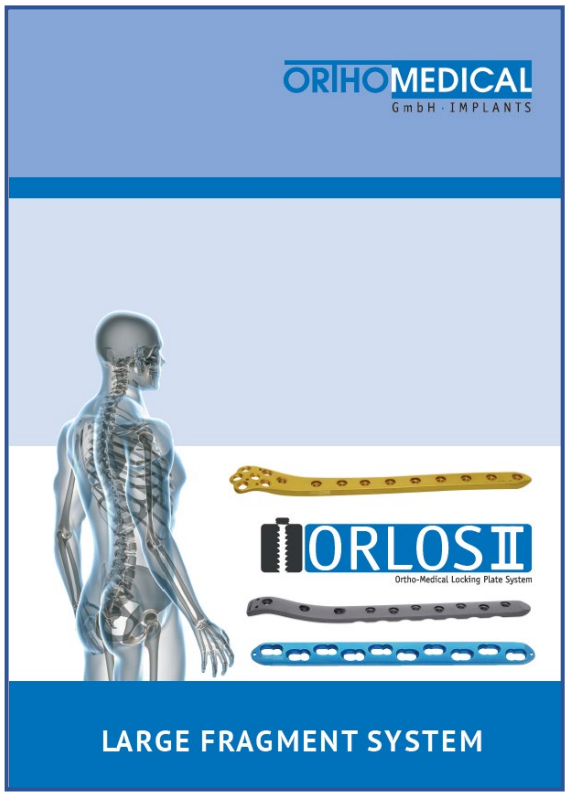

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