LCP Proximal Femoral Hook Plate 4.5/5.0. Part of the LCP Periarticular Plating System.

Surgical Technique
This description alone does not provide sufficient background for direct use of DePuy Synthes products. Instruction by a surgeon experienced in handling these products is highly recommended.

**Processing, Reprocessing, Care and Maintenance**
For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:
http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance
For general information about reprocessing, care and maintenance of Synthes reusable devices, instrument trays and cases, as well as processing of Synthes non-sterile implants, please consult the Important Information leaflet (SE_023827) or refer to:
http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance
The Synthes LCP Proximal Femoral Hook Plate 4.5/5.0 is part of the LCP Periarticular Plating System, which merges locking screw technology with conventional plating techniques.

### LCP Periarticular Plating System
The LCP Periarticular Plating System is capable of addressing:
- complex fractures of the distal femur with the LCP Condylar Plate 4.5/5.0.
- complex fractures of the proximal femur with the LCP Proximal Femoral Plate 4.5/5.0 or the LCP Proximal Femoral Hook Plate 4.5/5.0.
- complex fractures of the proximal tibia with the LCP Proximal Tibial Plate 4.5/5.0 or the LCP Medial Proximal Tibial Plate 4.5/5.0.

### Locking Compression Plate
The Locking Compression Plate (LCP) has combi-holes in the plate shaft that combine a dynamic compression unit (DCU) hole with a locking screw hole. The combi-hole provides the flexibility of axial compression and locking capability throughout the length of the plate shaft.

**Note:** More detailed information on conventional and locked plating principles can be found in the Synthes Locking Compression Plate (LCP) Technique Guide (Art. No. 036.000.019).
LCP Proximal Femoral Hook Plate System

The LCP Proximal Femoral Hook Plate System has many similarities to traditional plate fixation methods, with a few important improvements. The technical innovation of locking screws provides the ability to create a fixed-angle construct while using familiar AO plating techniques. Locking capability is important for a fixed-angle construct in osteopenic bone or multifragment fractures where screw purchase is compromised. These screws do not rely on plate-to-bone compression to resist patient load, but function similarly to multiple, small angled blade plates.

- Anatomically precontoured to approximate the lateral aspect of the proximal femur.
- Two proximal hooks engage the superior tip of the greater trochanter.
- Use of locking screws provides an angular stable construct independent of bone quality.
- The most proximal screw hole accepts a 7.3 mm cannulated locking or cannulated conical screw, oriented at 95° to the plate shaft.
- The second proximal screw hole accepts a 5.0 mm cannulated locking screw oriented at 110° to the plate shaft.
- The combi-holes in the plate shaft accept 5.0 mm locking screws in the threaded portion or 4.5 mm cortex screws in the DCU portion.
- Accepts the articulated tension device to tension the plate and create a load-sharing construct.
- Limited-contact stainless steel plate.
- Manufactured of implant quality 316L stainless steel.
AO Principles

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation.¹ Those principles as applied to the LCP Proximal Femoral Hook Plate 4.5/5.0 are:

**Anatomic reduction**
Proximal hooks and anatomic plate profile assist reduction of metaphysis to diaphysis and facilitate restoration of the neck-shaft angle by proper screw placement.

**Stable fixation**
The combination of conventional and locking plate fixation offers optimum fixation irrespective of bone density.

**Preservation of blood supply**
A limited-contact design reduces plate-to-bone contact and helps to preserve the periosteal blood supply.

**Early mobilization**
Plate features combined with AO technique create an environment for bone healing, expediting return to function.

Indications

The LCP Proximal Femoral Hook Plate 4.5/5.0 is intended for fractures of the femur including:

- Fractures of the trochanteric region, trochanteric simple, cervicotrochanteric, trochanterodiaphyseal, multifragmentary pertrochanteric, intertrochanteric, reversed or transverse fractures of the trochanteric region or with additional fracture of the medial cortex
- Fractures of the proximal end of the femur combined with ipsilateral shaft fractures
- Metastatic fracture of the proximal femur
- Osteotomies of the proximal femur
- Also for use in fixation of osteopenic bone and fixation of nonunions or malunions
- Periprosthetic Fractures

Postoperative AP and lateral views
1
Preparation

Required sets

LCP Proximal Femoral Hook Plate Set 4.5/5.0 (stainless steel)
Periarticular LCP Plating System Instrument Set
Cannulated Locking and Cannulated Conical Screw Ø 5.0
and 7.3 mm Set
LCP Large Fragment Instrument Set
LCP Large Fragment Screw Set

Complete the preoperative radiographic assessment and prepare the preoperative plan. AP and lateral radiographs of the entire femur are necessary for complete evaluation. Traction radiographs and views of the contralateral femur are useful adjuncts in the planning process.

When considering use of the LCP Proximal Femoral Hook Plate 4.5/5.0, identify proper placement of the two proximal screws.

Use the x-ray template for LCP Proximal Femoral Hook Plate 4.5/5.0 to aid in planning the procedure. Determine plate length, and approximate screw lengths and instruments to be used.

Position the patient supine on a radiolucent operating table or a fracture extension table for lower energy fractures. Fluoroscopic visualization of the femur in both AP and lateral views must be verified prior to patient draping.
2
Reduce fracture

Reduce the fracture using a fracture table, clamps, Schanz screws, or other conventional reduction techniques. Alternatively, provisional indirect fracture reduction may be facilitated by attaching the LCP Proximal Femoral Hook Plate 4.5/5.0 to the proximal segment with appropriately oriented screws, and then to the diaphysis with plate holding forceps or 4.5 mm cortex screws.

**Precaution:** The fracture has to be meticulously reduced in order to avoid implant failure.
3

**Insert guide wires**

**Instruments**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>310.243</td>
<td>Guide Wire Ø 2.5 mm, with drill tip, length 200 mm, Stainless Steel</td>
</tr>
<tr>
<td>324.174</td>
<td>Wire Guide 5.0, for Guide Wire Ø 2.5 mm</td>
</tr>
<tr>
<td>324.175</td>
<td>Wire Guide 7.3, for Guide Wire Ø 2.5 mm</td>
</tr>
</tbody>
</table>

**Alternative**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>332.210</td>
<td>Impactor</td>
</tr>
</tbody>
</table>

Before placing the plate on the bone, thread the wire guides into the plate holes for each of the proximal locking screws. Use the wire guide 7.3 in the proximal screw hole, and a wire guide 5.0 in the second locking screw hole. The wire guides can also be used as a manipulation aid for positioning the plate on the proximal femur.

Seat hooks using a 4.5 mm cortex screw aimed toward the lesser trochanter. Screw may be removed following insertion of 7.3 mm screw in the proximal fragment.

**Alternative:** The impactor may be used to seat the hooks in the proximal fragment.

**Precaution:** Avoid a collision between the 4.5 mm cortex screw and the 7.3 mm screw.
Using fluoroscopic image control (AP and lateral), insert a guide wire ⌀ 2.5 mm through the wire guide in each of the proximal locking holes. Guide wires should reach, but not penetrate, subchondral bone.

- Placement of the proximal guide wire in the AP view is into the midportion of the inferomedial quadrant of the femoral head along a path subtending a 50° angle relative to the calcar femorale. Guide wire placement in this manner will facilitate placement of the proximal locking screw at a 95° angle to the femoral shaft.
- The proximal guide wire is ideally placed central in the lateral view. Accurate positioning of the proximal guide wire (and ultimately the locking screw) assures frontal plane alignment.

Note:
- Before a guide wire is inserted into the second wire guide, verify correct sagittal plane alignment of the plate on the proximal femur. This usually requires both visual and fluoroscopic assessment and prevents an extension (apex anterior) deformity when the plate is attached to the diaphysis. When this alignment is satisfactory, insert the guide wire through the next (distal) wire guide, maintaining biplanar fluoroscopic control.
- It is more important to properly place guide wires in the proximal femur (considering the desired screw positions and trajectories) than it is to precisely match the contour of the plate to the anatomy of the femur. The ability to lock the screws to the plate obviates the need for precise plate contouring and compressing the plate to the bone.
4

Insert proximal 7.3 mm cannulated screw

**Instruments**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>314.050</td>
<td>Screwdriver, hexagonal, cannulated</td>
</tr>
<tr>
<td>319.701</td>
<td>Measuring Device</td>
</tr>
<tr>
<td>314.230</td>
<td>Screwdriver Shaft, hexagonal, cannulated</td>
</tr>
<tr>
<td>338.490</td>
<td>Quick Coupling for Small Air Drill</td>
</tr>
<tr>
<td>511.771</td>
<td>Torque Limiter, 4 Nm, for Compact Air Drive and Power Drive</td>
</tr>
</tbody>
</table>

**For predrilling in dense bone**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>310.632</td>
<td>Drill Bit Ø 5.0 mm, cannulated</td>
</tr>
<tr>
<td>310.634</td>
<td>Drill Bit Ø 4.3 mm, cannulated</td>
</tr>
</tbody>
</table>

Use the measuring device over the guide wire to measure for screw length. Select the appropriate length 7.3 mm cannulated locking screw. Use the cannulated hexagonal screwdriver to remove the wire guide.

**Note:** The self-drilling, self-tapping flutes of the 7.3 mm and 5.0 mm screws make predrilling and pretapping unnecessary in most cases. In dense bone, the lateral cortex can be predrilled, if necessary.
- Use the 5.0 mm drill bit for 7.3 mm screws.
- Use the 4.3 mm drill bit for 5.0 mm screws.
Insert the locking screw using fluoroscopy with power equipment and the 4 Nm torque limiting attachment. However, final seating and tightening must be done manually. Once the screw has been locked to the plate, the guide wire may be removed.

**Note:** In cases where it is necessary to pull the plate to the bone, use a fully threaded 7.3 mm cannulated conical screw in the proximal screw hole. However, use caution to avoid changing the alignment of the guide wire with the conical screw. If misalignment occurs, it may preclude final exchange of the conical screw for a locking screw, and thereby weaken the overall strength of the plate construct.

**Note:** Angular stability cannot be achieved with cannulated conical screws. It is always recommended to replace conical screws with locking screws to ensure angular stability.

**Precaution:** Recheck each locking screw prior to closing to verify that the screws are securely locked to the plate. Screw heads must be flush with the plate in the locked position before they can be considered fully seated.
Surgical Technique

5
Insert 5.0 mm cannulated screw

Use the measuring device over the guide wire to measure for screw length. Select the appropriate length 5.0 mm cannulated locking screw. Use the cannulated hexagonal screwdriver to remove the wire guide.

Insert the screw, using fluoroscopy, with power equipment and the 4 Nm torque limiting attachment. However, final seating and tightening must be done manually, using the torque limiter. After one click, the optimum torque is reached. Once the screw has been locked to the plate, remove the guide wire.

Screw length considerations: The angled 5.0 mm cannulated locking screw is intended to converge with the 7.3 mm screw to create a buttress which will provide additional stability. This convergence should occur when using a 5.0 mm cannulated locking screw that is 85 mm in length.

Note: Always use a torque limiting attachment when using power to insert locking screws.

Precaution: Recheck each locking screw prior to closing to verify that the screws are securely locked to the plate. Screw heads must be flush with the plate in the locked position before they can be considered fully seated.

### Instruments

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>314.050</td>
<td>Screwdriver, hexagonal, cannulated</td>
</tr>
<tr>
<td>319.701</td>
<td>Measuring Device</td>
</tr>
<tr>
<td>314.230</td>
<td>Screwdriver Shaft, hexagonal, cannulated</td>
</tr>
<tr>
<td>338.490</td>
<td>Quick Coupling for Small Air Drill</td>
</tr>
<tr>
<td>511.771</td>
<td>Torque Limiter, 4 Nm, for Compact Air Drive and Power Drive</td>
</tr>
<tr>
<td>397.705</td>
<td>Handle for Torque Limiter Nos. 511.770 and 511.771</td>
</tr>
</tbody>
</table>

5.0 mm cannulated screw

### Surgical Technique

- 314.050 Screwdriver, hexagonal, cannulated
- 319.701 Measuring Device
- 314.230 Screwdriver Shaft, hexagonal, cannulated
- 338.490 Quick Coupling for Small Air Drill
- 511.771 Torque Limiter, 4 Nm, for Compact Air Drive and Power Drive
- 397.705 Handle for Torque Limiter Nos. 511.770 and 511.771

Note: Always use a torque limiting attachment when using power to insert locking screws.

Precaution: Recheck each locking screw prior to closing to verify that the screws are securely locked to the plate. Screw heads must be flush with the plate in the locked position before they can be considered fully seated.
Approximate plate to femoral diaphysis

**Instrument**

| 321.120 | Tension Device, articulated |

Secure the plate to the lateral femoral shaft with bone holding forceps, adjusting horizontal plane alignment (rotation) as appropriate. Length restoration and fracture reduction can be facilitated by a number of indirect means, including a fracture table, the articulated tension device, the large distractor, the large distractor/compressor, or a large external fixator. Judicious, soft tissue preserving, direct reduction techniques with clamps may also be appropriate in some cases.

A tensioning device should be applied to the end of the plate to tension the plate and compress the fracture.

**Note:** Using the tension device, tension the plate, and compress the fracture to create a load-sharing construct. Creating a load-sharing construct is required with the LCP Proximal Femoral Hook Plate 4.5/5.0.

**Alternative: fracture compression cannot be accomplished**

**Set**

LCP Proximal Femoral Plate 4.5/5.0 Set (Stainless steel)

If the fracture pattern includes segmental comminution where fracture compression cannot be accomplished and a bridging construct is necessary, use of the LCP Proximal Femoral Plate 4.5/5.0 (without hooks) may be preferable.
Insert 4.5 mm cortex screws

**Instruments**

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<tr>
<th>Code</th>
<th>Item</th>
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<tbody>
<tr>
<td>310.310</td>
<td>Drill Bit 3.2 mm</td>
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<tr>
<td>314.270</td>
<td>Screwdriver, hexagonal, large</td>
</tr>
<tr>
<td>319.100</td>
<td>Depth Gauge for Screws 4.5 to 6.5 mm</td>
</tr>
<tr>
<td>323.460</td>
<td>Universal Drill Guide 4.5/3.2, for neutral and load position</td>
</tr>
</tbody>
</table>

Use the drill bit through the universal drill guide to predrill the bone. For the neutral position, press the drill guide down in the non-threaded hole. To obtain compression, place the drill guide at the end of the non-threaded hole away from the fracture (do not apply downward pressure on the spring-loaded tip).

Measure for screw length using the depth gauge.
Select and insert the appropriate length 4.5 mm cortex screw using the hexagonal screwdriver. Insert as many cortex screws as necessary.

**Note:** All cortex screws must be inserted into the plate shaft before insertion of any locking screws in the plate shaft.

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### 8
Insert 5.0 mm locking screws

**Instruments**

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>323.042</td>
<td>LCP Drill Sleeve</td>
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<tr>
<td>310.430</td>
<td>LCP Drill Bit Ø 4.3 mm</td>
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<tr>
<td>319.100</td>
<td>Depth Gauge</td>
</tr>
<tr>
<td>511.771</td>
<td>Torque Limiter, 4.0 Nm</td>
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<tr>
<td>314.119</td>
<td>Stardrive Screwdriver Shaft T25, self-holding</td>
</tr>
<tr>
<td>314.150</td>
<td>Hexagonal Screwdriver Shaft or</td>
</tr>
<tr>
<td>314.152</td>
<td>Screwdriver Shaft, self-holding or</td>
</tr>
<tr>
<td>324.052</td>
<td>Torque-indicating Screwdriver 3.5</td>
</tr>
<tr>
<td>397.705</td>
<td>Handle for Torque Limiter Nos. 511.770 and 511.771</td>
</tr>
<tr>
<td>311.431</td>
<td>Handle with Quick Coupling for 511.115</td>
</tr>
</tbody>
</table>
Attach the drill sleeve to the threaded portion of the hole in the plate shaft.

**Note:** Use of the drill sleeve is required. It centers the drill bit in the threaded portion of the combi-hole to create a screw trajectory that ensures that the screw properly engages in the plate.

Carefully drill the screw hole using the drill bit. Read the drilled depth directly from the laser mark on the drill bit or determine the screw length with the depth gauge.

Insert the appropriate length 5.0 mm locking screw with a power tool and the torque limiter or manually with a handle and the torque limiter. The screw has to be tightened manually. After one click, the optimum torque is reached.

Repeat as necessary to insert additional locking screws. Recheck each locking screw before closing to verify that the screws are securely locked to the plate. Screw heads must be flush with the plate in the locked position before they can be considered fully seated.

**Notes**
- For detailed instructions please consult the Synthes Locking Compression Plate (LCP) Technique Guide (036.000.019).
- Holes for locking screws may be drilled unicortically or bicortically, depending on bone quality.

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**Implant Removal**

In case the physician decides to remove the implants, implants can be removed by using general surgical instruments. In case of difficult removal circumstances, a Screw Extraction Set is available with corresponding instructions (036.000.917).
LCP Proximal Femoral Hook Plate 4.5/5.0

<table>
<thead>
<tr>
<th>Stainless steel</th>
<th>Holes</th>
<th>Length (mm)</th>
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<tbody>
<tr>
<td>242.120</td>
<td>2</td>
<td>133</td>
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<td>242.121</td>
<td>4</td>
<td>169</td>
</tr>
<tr>
<td>242.122</td>
<td>6</td>
<td>205</td>
</tr>
<tr>
<td>242.123</td>
<td>8</td>
<td>241</td>
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<td>242.124</td>
<td>10</td>
<td>277</td>
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<td>242.125</td>
<td>12</td>
<td>313</td>
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<td>242.126</td>
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<td>349</td>
</tr>
<tr>
<td>242.127</td>
<td>16</td>
<td>385</td>
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</table>

Plates are available non-sterile and sterile packed. For sterile plates add suffix S to article number.

**Additionally available**

only sterile packed

<table>
<thead>
<tr>
<th>Stainless steel</th>
<th>Holes</th>
<th>Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>242.128S</td>
<td>18</td>
<td>421</td>
</tr>
</tbody>
</table>
Cannulated Locking Screw Ø 7.3 mm
(02.207.020–02.207.145)
Creates a locked, fixed-angle screw-plate construct
- Threaded conical head
- Fully threaded shaft
- Self-drilling, self-tapping tip

Cannulated Conical Screw Ø 7.3 mm
(02.207.250–02.207.295)
Compresses the plate to the bone
- Smooth conical head
- Fully threaded shaft
- Self-drilling, self-tapping tip

Cannulated Conical Screw Ø 7.3 mm, short thread
(02.207.450–02.207.545)
Compresses the plate to the bone and provides interfragmentary compression
- Smooth conical head
- Partially threaded shaft
- Self-drilling, self-tapping tip

Cannulated Locking Screw Ø 5.0 mm
(02.205.025–02.205.145)
Creates a locked, fixed-angle screw-plate construct
- Threaded conical head
- Fully threaded shaft
- Self-drilling, self-tapping tip

Cannulated Conical Screw Ø 5.0 mm
(02.205.240–02.205.295)
Compresses the plate to the bone and provides interfragmentary compression
- Smooth conical head
- Partially threaded shaft
- Self-drilling, self-tapping tip
Locking Screw Ø 5.0 mm
(Ø 213.314–213.390/Ø 212.201–212.227)
Creates a locked, fixed-angle screw-plate construct
– Threaded conical head
– Fully threaded shaft
– Self-tapping tip

Cortex Screw Ø 4.5 mm
(214.814–214.940)
– May be used in the DCU portion of the combi-holes in the plate shaft
– Compresses the plate to the bone or creates axial compression
## Selected instruments of the Periarticular LCP Plating System

<table>
<thead>
<tr>
<th>Instrument Code</th>
<th>Instrument Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>310.243</td>
<td>Guide Wire Ø 2.5 mm, with drill tip, length 200 mm, Stainless Steel</td>
</tr>
<tr>
<td>310.632</td>
<td>Drill Bit Ø 5.0 mm, cannulated, Length 200 mm, with Quick Coupling</td>
</tr>
<tr>
<td>310.634</td>
<td>Drill Bit Ø 4.3 mm, cannulated, Length 200 mm, with Quick Coupling</td>
</tr>
<tr>
<td>314.050</td>
<td>Screwdriver, hexagonal, cannulated, for Cannulated Screws Ø 6.5 and 7.3 mm</td>
</tr>
<tr>
<td>319.701</td>
<td>Measuring Device for Cannulated Screws Ø 5.0 and 7.3 mm</td>
</tr>
<tr>
<td>324.174</td>
<td>Wire Guide 5.0, for Guide Wire Ø 2.5 mm</td>
</tr>
<tr>
<td>324.175</td>
<td>Wire Guide 7.3, for Guide Wire Ø 2.5 mm</td>
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Sets

**01.120.327**  
LCP Proximal Femoral Hook Plates  
4.5/5.0 (stainless steel)

<table>
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<tr>
<th>Code</th>
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<tr>
<td>68.120.333</td>
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**01.120.021**  
Periarticular Instruments

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<th>Code</th>
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<tr>
<td>68.120.447</td>
<td>Vario Case</td>
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<tr>
<td>68.120.445</td>
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**01.120.022**  
Cannulated Conical and Cannulated Locking Screws Ø 5.0 and 7.3 mm (stainless steel)

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<tr>
<td>68.122.054</td>
<td>Modular Screw Rack, with Drawer, Measuring Block and Lid, length 200 mm,</td>
</tr>
<tr>
<td></td>
<td>height 115 mm, size 1/2, without Contents, Vario Case System</td>
</tr>
<tr>
<td>68.122.050</td>
<td>Modular Insert, for Modular Screw Rack, for Screws Ø 5.0 mm, size 1/3,</td>
</tr>
<tr>
<td></td>
<td>without Contents, Vario Case System</td>
</tr>
<tr>
<td>68.122.053</td>
<td>Modular Insert, for Modular Screw Rack, for Screws Ø 7.3 mm, size 1/3,</td>
</tr>
<tr>
<td></td>
<td>without Contents, Vario Case System</td>
</tr>
</tbody>
</table>

Additionally required

- LCP Large Fragment Instrument Set
- LCP Large Fragment Screw Set
MRI Information

Torque, Displacement and Image Artifacts according to ASTM F 2213-06, ASTM F 2052-06e1 and ASTM F2119-07
Non-clinical testing of worst case scenario in a 3 T MRI system did not reveal any relevant torque or displacement of the construct for an experimentally measured local spatial gradient of the magnetic field of 3.69 T/m. The largest image artifact extended approximately 169 mm from the construct when scanned using the Gradient Echo (GE). Testing was conducted on a 3 T MRI system.

Radio-Frequency-(RF-)induced heating according to ASTM F2182-11a
Non-clinical electromagnetic and thermal testing of worst case scenario lead to peak temperature rise of 9.5 °C with an average temperature rise of 6.6 °C (1.5 T) and a peak temperature rise of 5.9 °C (3 T) under MRI Conditions using RF Coils [whole body averaged specific absorption rate (SAR) of 2 W/kg for 6 minutes (1.5 T) and for 15 minutes (3 T)].

Precautions: The above mentioned test relies on non-clinical testing. The actual temperature rise in the patient will depend on a variety of factors beyond the SAR and time of RF application. Thus, it is recommended to pay particular attention to the following points:
- It is recommended to thoroughly monitor patients undergoing MR scanning for perceived temperature and/or pain sensations.
- Patients with impaired thermo regulation or temperature sensation should be excluded from MR scanning procedures.
- Generally it is recommended to use a MR system with low field strength in the presence of conductive implants. The employed specific absorption rate (SAR) should be reduced as far as possible.
- Using the ventilation system may further contribute to reduce temperature increase in the body.