Large Fragment Locking Compression Plate (LCP®)

TECHNIQUE GUIDE

SYNTHES® *Original Instruments and Implants of the Association for the Study of Internal Fixation — AO ASIF*

Introduction

The aim of any surgical fracture treatment is to reconstruct the anatomy and restore its function. According to the AO ASIF, internal fixation is distinguished by anatomic reduction, stable fixation, preservation of blood supply and early, functional mobilization. Plate and screw osteosynthesis has been established and clinically beneficial for quite some time. Clinical results have improved by using internal fixation with angular stability (internal fixators) in complicated fractures and in osteopenic bone.

The Synthes Locking Compression Plate (LCP) is part of a stainless steel and titanium plate and screw system that merges locking screw technology with conventional plating techniques.* The Locking Compression Plate System has many similarities to conventional plate fixation methods, but with a few important improvements. Locking screws provide the ability to create a fixed-angle construct while utilizing familiar AO plating techniques. A fixed-angle construct provides improved fixation in osteopenic bone or multifragment fractures where traditional screw purchase is compromised. LCP constructs do not rely on plate-to-bone compression to maintain stability, but function similarly to multiple small angled blade plates.

The following points distinguish treatment using Locking Compression Plate technology:

- Allows fracture treatment using conventional plating with conventional cortex or cancellous bone screws.
- Allows fracture treatment using locked plating with bicortical or unicortical locking screws.
- Permits the combination of conventional and locking screw techniques.

Important notes:
The LCP system applies to many different plate types and is therefore suitable for a large number of fracture types. For that reason, the Large Fragment Locking Compression Plate Technique Guide *does not deal with any specific fracture type. For more information please refer to* AO Principles of Fracture Management,[1] *to AO ASIF courses (www.ao-asif.ch), and to the corresponding special literature.*

Indications

The Synthes Locking Compression Plates—Narrow and Broad, are intended for fixation of various long bones, such as the humerus, femur and tibia. They are also for use in fixation of periprosthetic fractures, osteopenic bone, and nonunions or malunions.

The Synthes Locking Compression Plates—T-Plates are intended to buttress metaphyseal fractures of the proximal humerus, medial tibial plateau and distal tibia. They are also for use in fixation of osteopenic bone and fixation of nonunions and malunions.

The Synthes LCP Proximal Tibia Plate is intended for treatment of non-unions, malunions, and fractures of the proximal tibia, including simple, comminuted, lateral wedge, depression, medial wedge, bicondylar, combinations of lateral wedge and depression, periprosthetic, and fractures with associated shaft fractures.

1. Thomas P. Rüedi, et al, ed., *AO Principals of Fracture Management*, New York: Thieme, 2000.

AO Principles

Anatomic Reduction

Exact screw placement utilizing wire sleeves facilitates restoration of the articular surface.

Stable Fixation

Locking screws create a fixed-angle construct, providing angular stability.

Preservation of Blood Supply

Tapered end for submuscular plate insertion, improving tissue viability.

Limited-contact plate design reduces plate-to-bone contact, minimizing vascular trauma.

Early Mobilization

Plate features combined with AO technique create an environment for bone healing, expediting a return to optimal function.

Features

Locking Compression Plates

The Locking Compression Plates (LCP) have these LC-DCP features:

- 50° of longitudinal screw angulation
- 14° of transverse screw angulation
- Uniform hole spacing
- Load (compression) and neutral screw positions

224.591

The Locking Compression Plates have combination locking and compression (Combi™) holes.

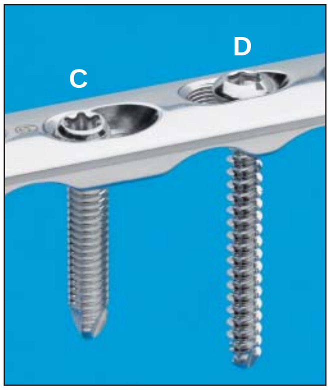
The Combi holes allow placement of conventional cortex and cancellous bone screws on one side or threaded conical locking screws on the opposite side of each hole.

A. Threaded hole section for locking screws

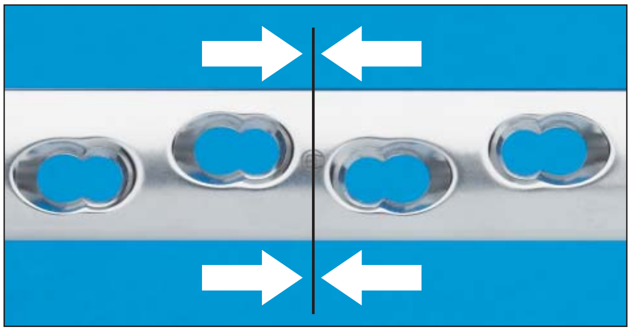
B. DCU hole section for conventional screws

C. Locking screw in threaded side of Combi hole

D. Cortex screw in compression side of Combi hole



Note: *Combi holes in straight plates are oriented with the conventional portion of each hole further from the middle of the plate. This facilitates utilization of LCP plates for dynamic compression using traditional AO techniques.*



4.0 mm and 5.0 mm Locking Screws, self-tapping, with StarDrive recess

The locking screws mate with the threaded portion of the Combi holes to form a fixed-angle construct.

Locking Screw Design

The screw design has been modified, from standard 4.5 mm cortex screw design, to enhance fixation and facilitate the surgical procedure.

New features include:

Conical screw head

The conical head facilitates alignment of the locking screw in the threaded plate hole to provide a fixed connection between the screw and the plate.

Large core diameter

The large core diameter improves bending and shear strength of the screw, and distributes the load over a larger area in the bone.

Thread profile

The shallow thread profile of the locking screws results from the larger core diameter, but is acceptable because locking screws do not rely solely on screw purchase in the bone to maintain stability.

Drive mechanism

The StarDrive recess provides improved torque transmission to the screw, while retaining the screw without the use of a holding sleeve.

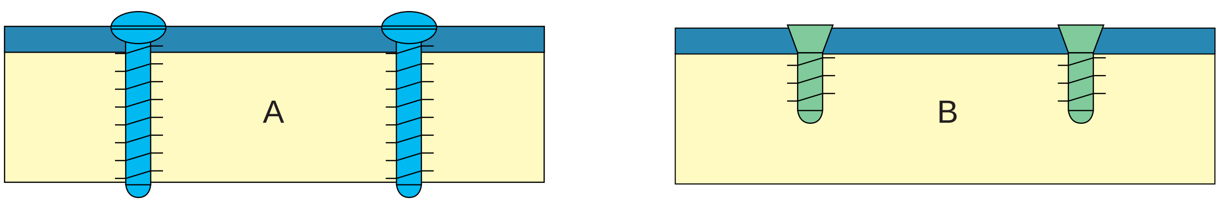
Features (continued)

Unicortical Screw Fixation

Bicortical screw fixation has long been the traditional method of compressing a plate to the bone where friction between the plate and the bone maintains stability. Screw stability and load transfer are accomplished at two points along the screw: the near and far cortices.

Unicortical locking screws 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. Because the screw is locked to the plate, fixation does not rely solely on the pullout strength of the screw or on maintaining friction between the plate and the bone.

A. Bicortical screws require two (2) cortices to achieve stability
B. Unicortical screws utilize the locked screw head and the near cortex to achieve stability



Implants for the Large Fragment LCP System

224.591

4.5 mm Narrow LCP Plates

- Available with 2–22 holes
- Available in stainless steel or titanium

226.591

4.5 mm Broad LCP Plates

- Available with 6–22 holes
- Available in stainless steel or titanium

240.039

4.5 mm LCP Proximal Tibia Plate*

- Available with 4, 6, 8, 10, 12 and 14 shaft holes
- Available in left and right configurations
- Available in stainless steel or titanium

226.622

4.5 mm Curved Broad LCP Plates*

- Available with 12–18 holes
- Available in stainless steel or titanium

4.0 mm Locking Screws, self-tapping

- Available in 14 mm–18 mm lengths (2 mm increments)
- Available in 22 mm–62 mm lengths (4 mm increments)
- Available in stainless steel or titanium alloy**

240.161

4.5 mm LCP T-Plates

- Available with 4, 6 and 8 shaft holes
- Available in stainless steel or titanium

5.0 mm Locking Screws, self-tapping

- Available in 14 mm–50 mm lengths (2 mm increments)
- Available in 55 mm–90 mm lengths (5 mm increments)
- Available in stainless steel or titanium alloy**

**Also Available*

*** Ti-6Al-7Nb*

Featured Instruments for the Large Fragment LCP System

3.2 mm Drill Bit [310.31]

Use a 3.2 mm Drill Bit to drill the pilot hole for self-tapping 4.0 mm locking screws.

4.3 mm Drill Bit [310.431]

Use a 4.3 mm Drill Bit to drill the pilot hole for self-tapping 5.0 mm locking screws.

3.2 mm Threaded Drill Guide [312.445]

Centers and permits perpendicular drilling with the 3.2 mm Drill Bit and protects the soft tissue. The use of the drill guide is critical to ensure proper mating of the locking screw in the threaded portion of the Combi hole. The drill guide also has internal threads so guides can be assembled in series to increase length for percutaneous use.

4.3 mm Threaded Drill Guide [312.449]

Centers and permits perpendicular drilling with the 4.3 mm Drill Bit and protects the soft tissue. The use of the drill guide is critical to ensure proper mating of the locking screw in the threaded portion of the Combi hole. The drill guide also has internal threads so guides can be assembled in series to increase length for percutaneous use.

StarDrive Screwdriver [314.118]

For manual insertion and removal of locking screws.

StarDrive Screwdriver Shaft [314.119]

Mates with the Torque Limiting Attachment (TLA) for insertion of locking screws.

Threaded Plate Holder [324.075]

Used as an aid to position the plate on the bone. In less invasive surgical procedures, the plate holder is also useful for plate insertion.

2.0 mm Wire Sleeve [323.046]

Mates with either threaded drill guide and is used to direct the insertion of a 2.0 mm guide wire.

Direct Measuring Device [323.021]

Used over the 2.0 mm guide wire (with either threaded drill guide and the wire sleeve) to measure for screw length.

Torque Limiting Attachment (TLA), 4.0 Nm [511.774] for AO Reaming Coupler

When inserting locking screws under power, the Torque Limiting Attachment controls the tightening torque to 4.0 Nm.

- Ensures that enough torque is used to minimize the risk of the locking screw backing out of the plate
- Avoids locking the screw to the plate at full speed and minimizes the risk of cold-welding the screw to the plate
- DO NOT fully insert the locking screws by power without using the TLA

Handle for AO Reaming Coupler connection [397.706]

For manual insertion of locking screws while using the TLA [511.774].

Also Available

Torque Limiting Attachment (TLA), 4.0 Nm [511.771] for use with the ComPact Air Drive/Power Drive

Handle, quick coupling, for ComPact Air Drive connection [397.705]

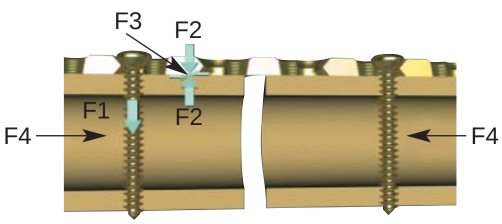
Important: *The TLA is a calibrated instrument. Annual service and recalibration of the TLA by Synthes is recommended.*

Fixation Principles

The following examples show the biomechanical features of conventional plating techniques, locked or bridge plating techniques, and a combination of both.

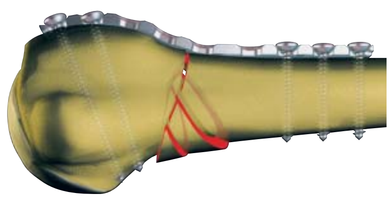
Important note:
Please refer also to the AO Principles of Fracture Management,[2] *to AO ASIF courses (www.ao-asif.ch), and to the corresponding special literature.*

Conventional Plating



Construct stability

The tensile force (F1) originating from tightening the screws compresses the plate onto the bone (F2). The developing frictional force (F3) between the plate and the bone leads to stable plate fixation. To ensure construct stability, the frictional force must be greater than the patient load (F4).

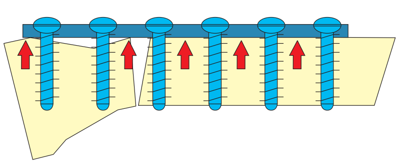


Anatomic contouring of the plate

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

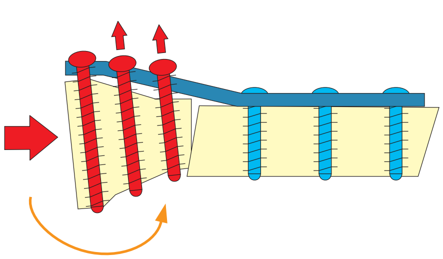
Lag screw

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



Primary loss of reduction

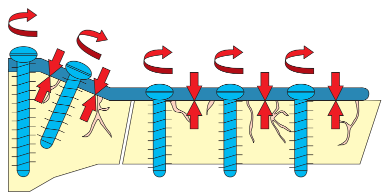
In conventional plating, even though the bone fragments are correctly reduced prior to plate application, fracture dislocation will result if the plate does not precisely fit the bone. In addition, if the lag screw is not placed perpendicular to the fracture line, shear forces will be introduced. These forces may also cause loss of reduction.



Secondary loss of reduction

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

2. Ibid.



Blood supply to the bone

Construct stability depends upon compressing the plate to the bone. Therefore, the periosteum is compressed under the plate, reducing or even interrupting blood supply to the bone. The result is delayed bone healing due to temporary osteoporosis underneath the plate.

Osteoporosis

Due to a compromised cortical structure, screws cannot be tightened sufficiently to obtain the compression needed for a stable construct. This may cause loosening of the screws and loss of stability, and may cause loss of reduction.

Conventional plating achieves good results in:

1. Good quality bone;
2. Fractures which are traditionally fixed with lag screws to achieve direct bone healing.

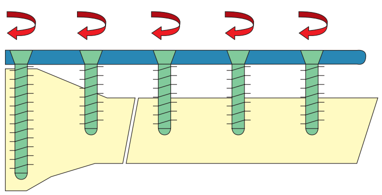
Special attention must be paid to:

1. Osteoporotic bone—during rehabilitation, the load should be kept to a minimum to prevent postoperative loss of reduction;
2. Multifragment fractures—the anatomic reduction may be accomplished at the expense of extensive soft tissue trauma and denudation.

Fixation Principles (continued)

Locked Plating

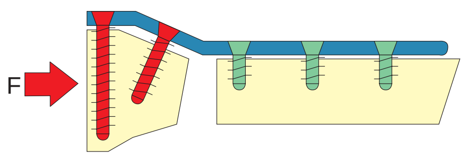
Screws lock to the plate, forming a fixed-angle construct.



Maintenance of primary reduction

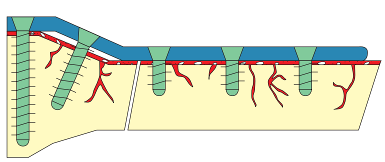
Once the locking screws engage the plate, no further tightening is possible. Therefore, the implant locks the bone segments in their relative positions regardless of degree of reduction.

Precontouring 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 allow 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 a secondary loss of reduction is reduced.



Blood supply to the bone

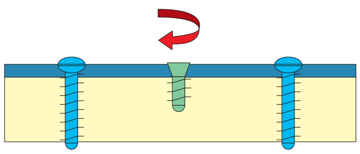
Locking the screw into the plate does not generate plate-to-bone compression. Therefore, the periosteum will be protected and the blood supply to the bone preserved.

The Locking Compression Plate (LCP)

Combining Conventional and Locked Plating Techniques

The combination of conventional compression plating and locked plating techniques enhances plate osteosynthesis. The result is a Combi hole that, depending on the indication, allows conventional compression plating, locked plating, or a combination of both.

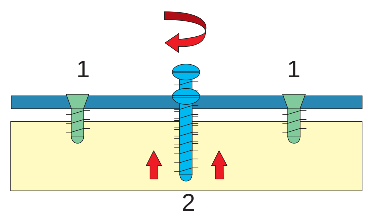
Internal fixation using a combination of locking screws and standard screws

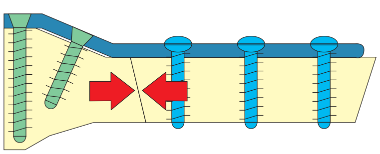


Note: *If a combination of cortex and locking screws is used, a cortex screw should be inserted first to pull the plate to the bone.*

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

Note: *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 the plate about the bone.*





Dynamic compression

In this example, once the metaphyseal fragment has been fixed with locking screws, the fracture can be dynamically compressed using a conventional screw in the DCU portion of the Combi hole.

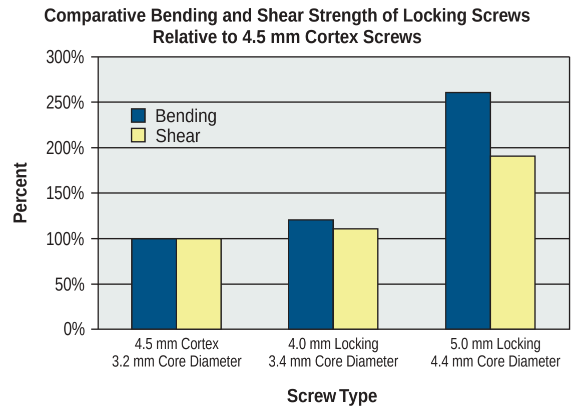
Locked and conventional plating techniques

- Lag screws can be used to anatomically reduce the fracture and promote absolute stability.
- 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. Therefore, anatomical reduction must be achieved prior to implanting any locking screws.
- A plate used as a locked plate does not produce any additional compression between the plate and the bone.
- The unicortical insertion of locking screws creates a construct that is at least as strong as a construct made with bicortical insertion of conventional screws.

Screw Selection Information

The 4.0 mm and 5.0 mm Locking Screws are both suitable for diaphyseal and metaphyseal indications. The 5.0 mm Locking Screw was designed as the principle screw for use with LCP. It provides greater bending and shear strength than 4.0 mm Locking Screws (Chart 1). The 4.0 mm Locking Screw, with a 3.4 mm core diameter versus the 4.4 mm core diameter of the 5.0 mm Locking Screw, was developed to provide the option of placing a smaller diameter screw in small statured patients or in cases where it is desirable to leave a smaller hole on explantation.

Chart 1*



Locking screw fixation provides the greatest advantage over conventional screw fixation in poor quality bone. Even though 5.0 mm Locking Screws are significantly stronger in bending and shear than 4.0 mm Locking Screws, the behavior of both locking screw constructs provides relatively similar results in mechanical tests using 15 lb/ft^3 foam, which simulates osteopenic bone, under axial load (Chart 2). Both bicortical locking screw constructs outperform a construct with conventional 4.5 mm Cortex Screws. When all constructs are tested in 40 lb/ft^3 foam simulating good quality cortical bone, both locking and conventional constructs yield similar results when loaded axially (Chart 3).

Test Setup

Chart 2*

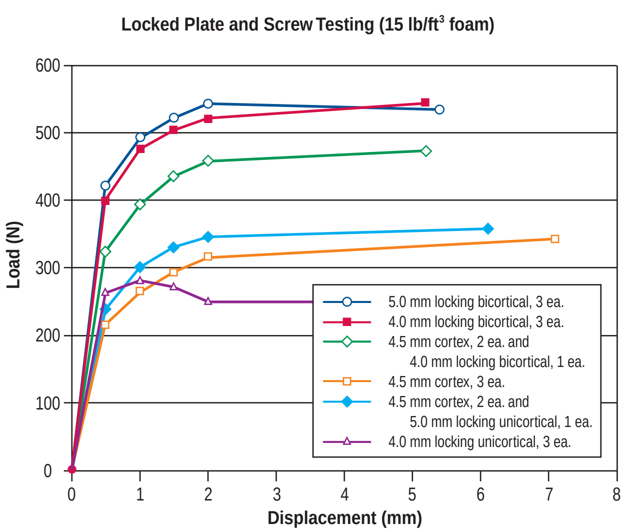
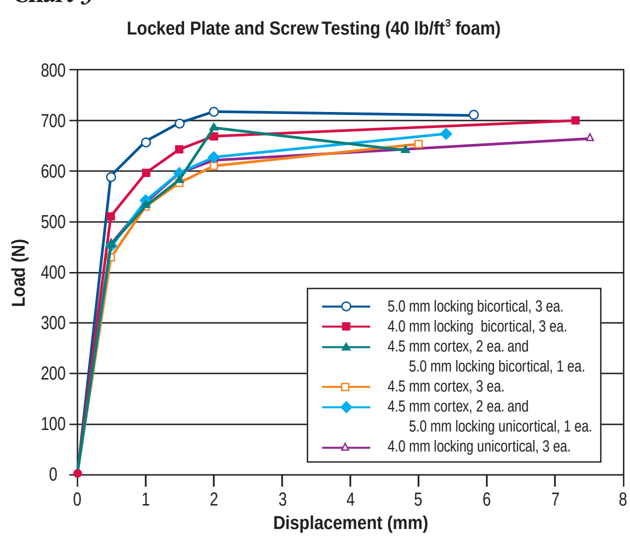


Chart 3*



****Note:** *Data represents test results from stainless steel implants only.*

Surgical Technique

1 Plate selection

The plates are available in various lengths and configurations similar to the Synthes Basic Plate Set. If necessary, use a bending template to determine plate length and configuration.

2 Contouring

Use the current bending instruments to contour the Locking Compression Plate to the anatomy.

Note: *The plate holes have been designed to accept some degree of deformation. When bending the plate, place the bending irons on two consecutive holes. This ensures that the threaded holes will not be distorted. Significant distortion of the locking holes will reduce locking effectiveness.*

Important: *Please refer also to the* AO Principles of Fracture Management, *(pgs. 181,182)*[3]

3 Reduction and temporary plate placement

The plate may be temporarily held in place with standard plate holding forceps or the Push-Pull Reduction Device [311.449].

Note: *The middle of the plate should be positioned over the fracture site if compression of the fracture fragments is desired.*

The Push-Pull Reduction Device is designed to temporarily hold the plate to the bone through a plate hole. The device is self-drilling and connects with the Synthes quick coupling for power insertion. Insert into the near cortex only. After power insertion, turn the collet clockwise until it pulls the plate securely to the bone.

Note: *Care should be taken to avoid inserting this device in a Combi hole that will be needed immediately for plate fixation. Also, if the chosen Combi hole is needed for placement of a locking screw, it is desirable to place the Push-Pull Reduction Device in the conventional portion of the Combi hole so that it does not interfere with the correct placement of the locking screw.*

Alternatively, the Threaded Plate Holder [324.075] can be used as an aid to position the plate on the bone. The plate holder may also function as an insertion handle for use with minimally invasive plating techniques.

3. Ibid.

Surgical Technique (continued)

4 Screw insertion

Determine whether conventional cortex screws, cancellous bone screws or locking screws will be used for fixation. A combination of all may be used.

Note: *If a combination of cortex, cancellous and locking screws is used, a conventional 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 the plate about the bone as the locking screw is tightened to the plate.*

Insertion of a cortex or cancellous bone screw

Use the 4.5 mm Universal Drill Guide [323.46] for an eccentric (compression) or neutral (buttress) insertion of cortex screws.

Note: *The 4.5 mm LC-DCP Drill Guide [323.45] and the 4.5 mm DCP Drill Guide [322.44] are NOT suitable for use with LCP plates.*

Neutral position

Neutral insertion of a conventional screw

When pressing the universal drill guide into the DCU portion of the Combi hole, it will center itself and allow neutral predrilling.

Dynamic compression

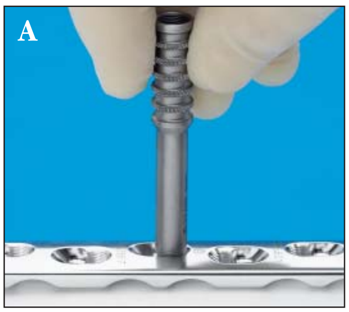
Dynamic compression, eccentric insertion of a cortex screw

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

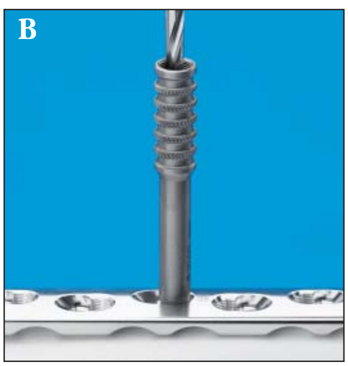
4 Screw insertion (continued)

Insertion of 4.0 mm and 5.0 mm Locking Screws

Reminder: *The locking screw is not a lag screw. Use nonlocking screws when requiring a precise anatomical reduction (e.g., joint surfaces) or interfragmentary compression. Before inserting the first locking screw, perform anatomical reduction and fix the fracture with lag screws, if necessary. After the insertion of locking screws, an anatomical reduction will no longer be possible without loosening the locking screw.*



A Screw the appropriate Threaded Drill Guide (312.445 for 4.0 mm screws and 312.449 for 5.0 mm screws) into an LCP plate hole until fully seated. ***(see Note 1)***



B Use the appropriate Drill Bit (3.2 mm for 4.0 mm screws and 4.3 mm for 5.0 mm screws) to drill to the desired depth.

C Remove the drill guide.

D Use the Depth Gauge [319.10] to determine screw length.

Warning: *Do not try to bend the plate using the Threaded Drill Guide because damage may occur to the threads.*

Note 1: *Since the direction of a locking screw is determined by plate design, final screw position may be verified with a guide wire prior to insertion. This becomes especially important when the plate has been contoured or applied in metaphyseal regions around joint surfaces. (Refer to "Screw placement verification" on p.17)*

Note 2: *5.0 mm cannulated locking screws and 5.0 mm cannulated conical screws for the Locking Periarticular Plating System are compatible with the Large Fragment LCP plates.*

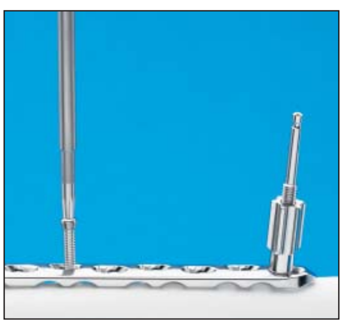
Surgical Technique (continued)

Insertion of 4.0 mm and 5.0 mm Locking Screws (continued)

E Insert the locking screw under power using the Torque Limiting Attachment [511.771 or 511.774] and StarDrive Screwdriver Shaft [314.119].

Note: *The screw is securely locked to the plate when a "click" is heard.*

Warning: *Locking Screws may be partially inserted using power equipment alone. However, never use power equipment to seat the locking screws into the plate without a Torque Limiting Attachment (TLA).*



Alternative Method of Locking Screw Insertion

Use the StarDrive Screwdriver [314.118] to manually insert the appropriate locking screw. Carefully tighten the locking screw, as excessive force is not necessary to produce effective screw-to-plate locking.

Screw placement verification

Since the direction of a locking screw is determined by plate design, final screw position may be verified with a guide wire prior to insertion. This becomes especially important when the plate has been contoured or applied in metaphyseal regions around joint surfaces.

A With the threaded drill guide in place, thread the 2.0 mm Wire Sleeve [323.046] into the threaded drill guide until fully seated.

B Insert a 2.0 mm Non-Threaded Guide Wire [292.656] through the wire sleeve to the desired depth.

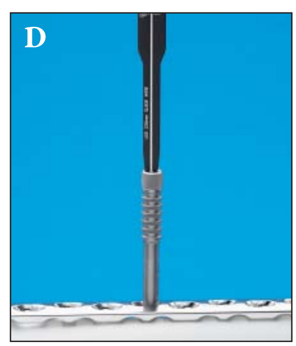
C Verify guide wire placement under image intensification to determine if final screw placement is acceptable.

Important: *The guide wire position represents the final position of the locking screw. Confirm that the guide wire does not enter the joint.*

D Measurement may be taken by sliding the tapered end of the Direct Measuring Device [323.021] over the guide wire down to the wire sleeve.

Remove the Direct Measuring Device, guide wire and wire sleeve, leaving the threaded drill guide intact.

Use the appropriate size drill bit to drill the near cortex. Remove the threaded drill guide. Insert the appropriate length locking screw.



Postoperative treatment

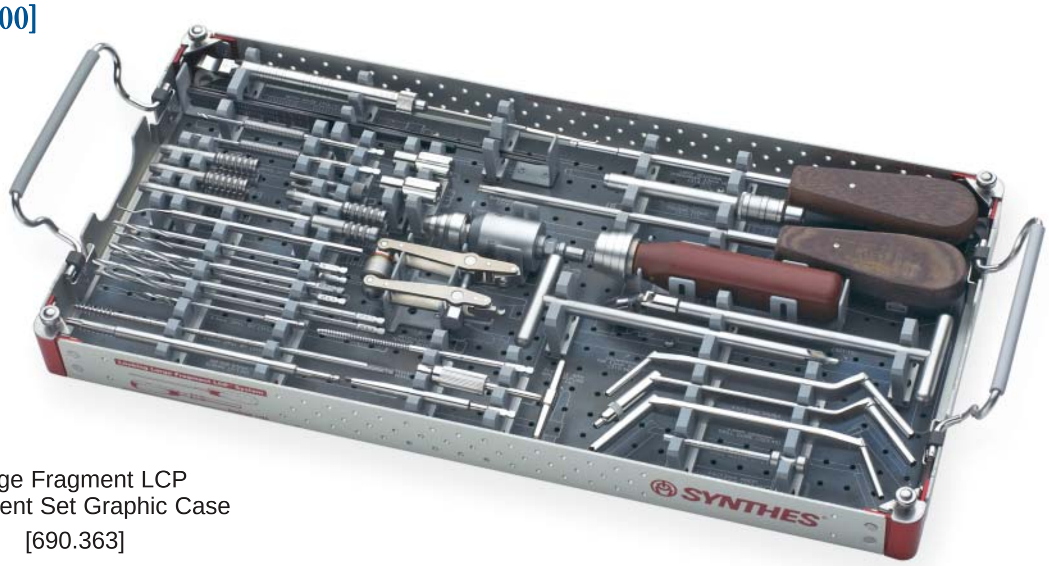
Postoperative treatment with locking compression plates does not differ from conventional internal fixation procedures.

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.

Large Fragment LCP Instrument and Implant Sets, with 4.0 mm and 5.0 mm Locking Screws

Stainless Steel [115.400]
Titanium [146.400]



Large Fragment LCP
Instrument Set Graphic Case
[690.363]

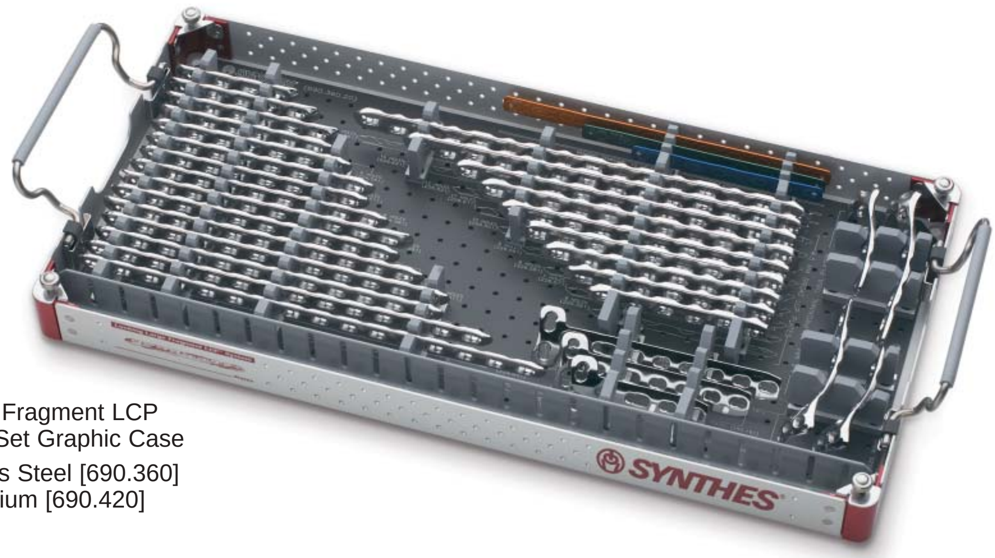
Instruments

292.656	2.0 mm Non-Threaded Guide Wire, 230 mm, spade point, 10 ea.
310.19	2.0 mm Drill Bit, 100 mm, quick coupling, 2 ea.
310.31	3.2 mm Drill Bit, 145 mm, quick coupling, 2 ea.
310.431*	4.3 mm Drill Bit, 180 mm, quick coupling, for 5.0 mm Locking Screws, 2 ea.
310.44	4.5 mm Drill Bit, 145 mm, quick coupling, 2 ea.
310.99	Countersink, for 4.5 mm and 6.5 mm screws
311.44	T-Handle with quick coupling
311.449*	Push-Pull Reduction Device, for use with 4.5 mm LCP plates, 2 ea.
311.46	Tap, for 4.5 mm screws, 2 ea.
311.66	Tap, for 6.5 mm Cancellous Bone Screws, 2 ea.
312.445*	3.2 mm Threaded Drill Guide, 2 ea.
312.449*	4.3 mm Threaded Drill Guide, 4 ea.
312.46	4.5 mm/3.2 mm Double Drill Sleeve
312.48	4.5 mm/3.2 mm Insert Drill Sleeve
312.67	6.5 mm/3.2 mm Double Drill Sleeve
314.11	Holding Sleeve
314.118*	StarDrive Screwdriver, T25, self-retaining, 245 mm
314.119*	StarDrive Screwdriver Shaft, T25, self-retaining, 165 mm, for use with Torque Limiting Attachment (511.771 or 511.774)
314.15	Large Hexagonal Screwdriver Shaft
314.27	Large Hexagonal Screwdriver
319.10	Depth Gauge, for 4.5 mm and 6.5 mm screws
319.39	Sharp Hook
321.12	Articulated Tensioning Device
321.15	Socket Wrench with universal joint, 11.0 mm width across flats
323.021*	Direct Measuring Device
323.046*	2.0 mm Wire Sleeve, 2 ea.
323.46	4.5 mm Universal Drill Guide
324.075*	Threaded Plate Holder
397.706*	Handle, for AO Reaming Coupler connection
511.774*	Torque Limiting Attachment, 4 Nm, for AO Reaming Coupler

Also Available

115.401	Large Fragment LCP Instrument Set
115.402	Large Fragment LCP Plate Set
146.402	Large Fragment Titanium LCP Plate Set
115.403	Large Fragment LCP Screw Set
146.403	Large Fragment Titanium LCP Screw Set
292.652	2.0 mm Threaded Guide Wire
397.705*	Handle, quick coupling, for ComPact Air Drive connection
511.771*	Torque Limiting Attachment, 4 Nm

* LCP-specific instruments



Large Fragment LCP
Implant Set Graphic Case

Stainless Steel [690.360]
Titanium [690.420]

Implants

4.5 mm Narrow LCP Plates

STAINLESS STEEL	TITANIUM	
224.541	424.541	4 holes, 80 mm
224.551	424.551	5 holes, 98 mm
224.561	424.561	6 holes, 116 mm, 2 ea.
224.571	424.571	7 holes, 134 mm
224.581	424.581	8 holes, 152 mm, 2 ea.
224.591	424.591	9 holes, 170 mm
224.601	424.601	10 holes, 188 mm, 2 ea.
224.611	424.611	11 holes, 206 mm
224.621	424.621	12 holes, 224 mm, 2 ea.
224.641	424.641	14 holes, 260 mm
224.661	424.661	16 holes, 296 mm

Also Available

224.521	424.521	2 holes, 44 mm
224.531	424.531	3 holes, 62 mm
224.631	424.631	13 holes, 242 mm
224.651	424.651	15 holes, 278 mm
224.681	424.681	18 holes, 332 mm
224.701	424.701	20 holes, 368 mm
224.721	424.721	22 holes, 404 mm

4.5 mm LCP T-Plates

240.141	440.141	4 holes, 83 mm
240.161	440.161	6 holes, 115 mm
240.181	440.181	8 holes, 147 mm

Templates

Bending Templates

329.92	12 holes
329.97	7 holes
329.99	9 holes

Implants (continued)

4.5 mm Broad LCP Plates

STAINLESS STEEL	TITANIUM	
226.561	426.561	6 holes, 116 mm
226.571	426.571	7 holes, 134 mm
226.581	426.581	8 holes, 152 mm
226.591	426.591	9 holes, 170 mm
226.601	426.601	10 holes, 188 mm
226.611	426.611	11 holes, 206 mm
226.621	426.621	12 holes, 224 mm
226.641	426.641	14 holes, 260 mm
226.661	426.661	16 holes, 296 mm

Also Available

226.681	426.681	18 holes, 332 mm
226.701	426.701	20 holes, 368 mm
226.721	426.721	22 holes, 404 mm

Also Available

4.5 mm LCP Proximal Tibia Plates

240.036	440.036	4 holes, 82 mm, right
240.037	440.037	4 holes, 82 mm, left
240.038	440.038	6 holes, 118 mm, right
240.039	440.039	6 holes, 118 mm, left

4.5 mm Curved Broad LCP Plates

226.622	426.622	12 holes, 229 mm
226.632	426.632	13 holes, 247 mm
226.642	426.642	14 holes, 256 mm
226.652	426.652	15 holes, 282 mm
226.662	426.662	16 holes, 300 mm
226.672	426.672	17 holes, 318 mm
226.682	426.682	18 holes, 336 mm

Large Fragment LCP Instrument and Implant Sets, with 4.0 mm and 5.0 mm Locking Screws

Stainless Steel [115.400]
Titanium [146.400] (continued)

Large Fragment LCP
Screw Set Graphic Case
Stainless Steel [690.362]
Titanium [690.425]

Instruments

319.97 Screw Forceps

Screws

STAINLESS STEEL	TITANIUM	
214.228 – 214.250	414.228 – 414.250	4.5 mm Shaft Screws, 28 mm – 50 mm,* 2 ea.

4.5 mm Cortex Screws, self-tapping

214.814 – 214.818	414.814 – 414.818	14 mm – 18 mm,* 4 ea.
214.820 – 214.824	414.820– 414.824	20 mm – 24 mm,* 6 ea.
214.826– 214.842	414.826– 414.842	26 mm – 42 mm,* 12 ea.
214.844– 214.870	414.844– 414.870	44 mm – 70 mm,* 4 ea.

4.5 mm Malleolar Screws

215.025 – 215.070	n/a	25 mm – 70 mm,*** 2 ea.

6.5 mm Cancellous Bone Screws

216.030 – 216.110	416.030 – 416.110	16 mm thread, 30 mm –110 mm,*** 3 ea.
217.045 – 217.110	417.045 – 417.110	32 mm thread, 45 mm – 110 mm,*** 3 ea.
218.025 – 218.060	418.025 – 418.060	fully threaded, 25 mm – 60 mm,*** 3 ea.

Locking Screws

4.0 mm Locking Screws, self-tapping, with T25 StarDrive recess

STAINLESS STEEL	TITANIUM	
222.670 – 222.672	422.670 – 422.672	14 mm – 18 mm,* 3 ea.
222.673 – 222.683	422.673 – 422.683	22 mm – 62 mm,** 3 ea.

5.0 mm Locking Screws, self-tapping, with T25 StarDrive recess

212.201 – 212.215	412.201 – 412.215	14 mm – 42 mm,* 5 ea.
212.216 – 212.219	412.216 – 412.219	44 mm – 50 mm,* 3 ea.
212.220 – 212.227	412.220 – 412.227	55 mm – 90 mm,*** 3 ea.

Other Implants

219.99	419.99	Washer, 13 mm, 6 ea.

* 2 mm increments
** 4 mm increments
*** 5 mm increments

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