zimed®

Locking
2.4mm
MINI PLATE SYSTEM
Surgical Technique

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2.4mm
MINI PLATE SYSTEM

Contents

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ISO 9001:2015
ISO 13485:2016
CE 1984

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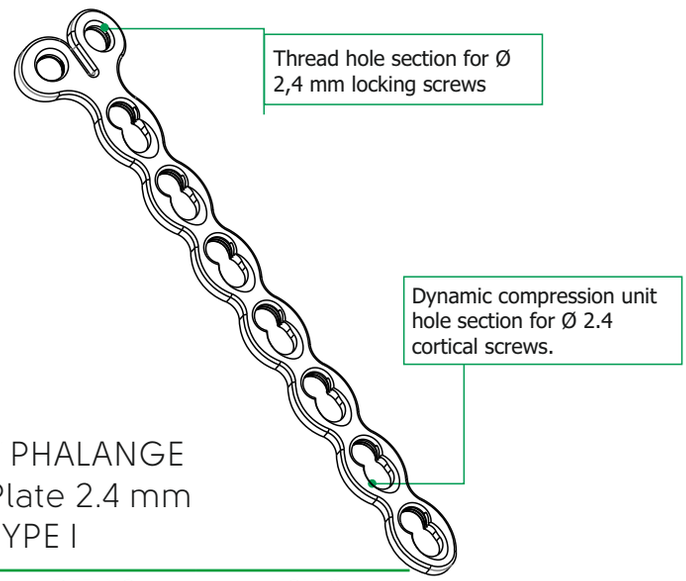
2.4mm Locking

1.1 MINI PLATE SYSTEM

1.1.1.Specifications

The mini plate system is designed to provide both standard and fracture-specific fixation for metacarpal and phalanx fractures, fusions and fixation for osteotomies.

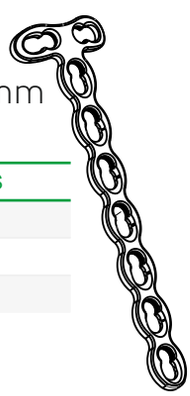
Mini plate system is designed to be used with Ø 2,4 cortical and Ø 2,4 locking screws. Mini plate system is produced in titanium alloy manufactured according to ISO 5832 2.



T PHALANGE Plate 2.4 mm TYPE I

REF. NO	HOLES
OP.1092-0023	2+3
OP.1092-0025	2+5
OP.1092-0027	2+7

LOCKING T PHALANGE Plate 2.4 mm TYPE II



REF. NO	HOLES
OP.1102-0023	2+3
OP.1102-0025	2+5
OP.1102-0027	2+7

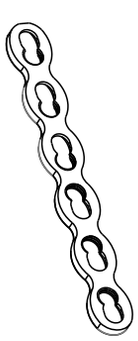
LOCKING LCP T Plate 2.4 mm

REF. NO	HOLES
OP.1112-0033	3+3
OP.1112-0035	3+5
OP.1112-0037	3+7

LOCKING LCP Y Plate 2.4 mm

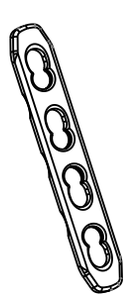
REF. NO	HOLES
OP.1122-0033	3+3
OP.1122-0035	3+5
OP.1122-0037	3+7

LOCKING RECONSTRUCTION Plate 2.4 mm



REF. NO	HOLES
OP.1082-0006	6
OP.1082-0012	12

LOCKING LCP STRAIGHT Plate 2.4 mm



REF. NO	HOLES
OP.1072-0004	4
OP.1072-0005	5
OP.1072-0006	6
OP.1072-0007	7
OP.1012-0008	8
OP.1072-0010	10

2.1.Metacarpal Fractures

Hand bones have a compact structure and are the small bones of the body. Movement is important for these bones. Therefore, early mobilization of functionally stable fractures should be targeted. There are methods specific to the fracture. In cases where closed reduction is not sufficient, plates, external fixator, screw, etc. are required

If the fracture can be reduced and fixed , a plate may be preferred.
If it is reducible and but can not be fixed, external fixator should be preferred.

Neck Fracture

It is the most common form of fracture

It is often caused by a direct axial force such as a punch, such as the term "boxer's fracture".(5.th Metacarpal neck fracture)

Shaft Fracture

Direct force can cause transverse fractures.

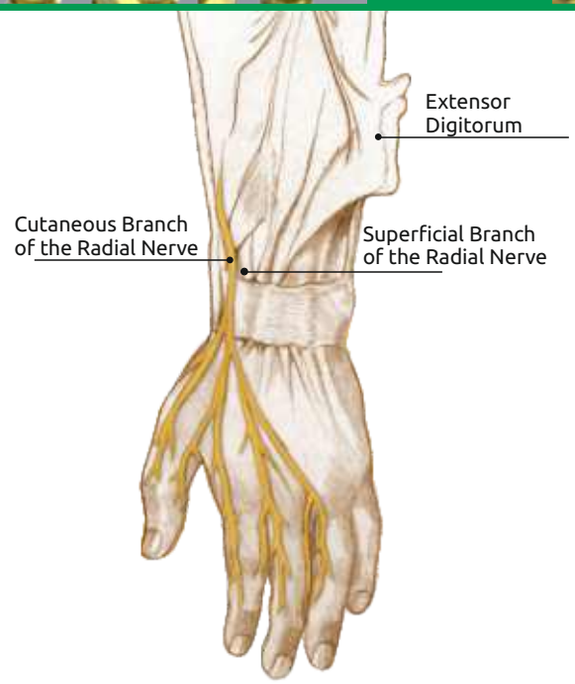
Bending forces lead to oblique or spiral fracture patterns

Base Fracture

Often caused by direct impact or bending force

Head Fracture

Often caused by injuries or a direct blow



Metacarpal Fractures

Metacarpal Head

Most of these fractures require anatomical reduction to restore joint compatibility and minimize post-traumatic arthrosis.

Metacarpal neck

Fractures cause by direct trauma with volar angulation and dorsal apex .

Metacarpal Shaft

Non-displaced or minimally displaced fractures can be reduced. Central metacarpal fractures (third and fourth) are generally more stable due to intermetacarpal ligaments.

Multifragmentary

Comminuted fractures are usually caused by crushing or high-energy injuries and may involve several metacarpals. These fractures tend to be very unstable.

2.2 Locking LCP Y Plate *Metacarpal Neck*

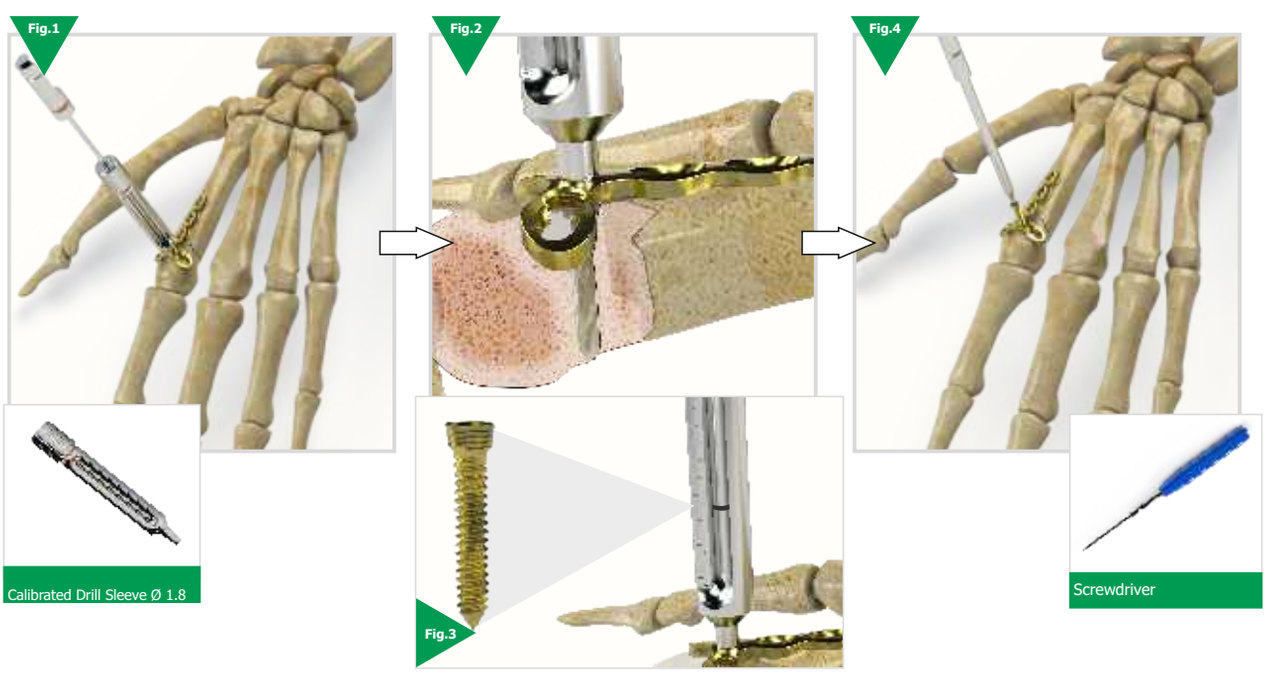
2.2.2 Plate Selection

T or Y plates can be used and the choice depends on the geometry of the fracture At least 2 screws should be placed in the diaphysis. Holes corresponding to the fracture line should be left empty

Metacarpal neck

2.2.2 Ø2,4 Locking Screw

Insert the drill guide *(Calibrated Drill Sleeve Ø 1.5)* into the holes designed for the Ø 2.4mm locking screw. Drill properly with a drill bit *(Ø 1.5)*. (Fig 1). You can determine the screw length during the drilling process, or depth guide(Fig 2-3). Attach the screw to be used on the plate with *(2.0 screwdriver)* (Fig.4)

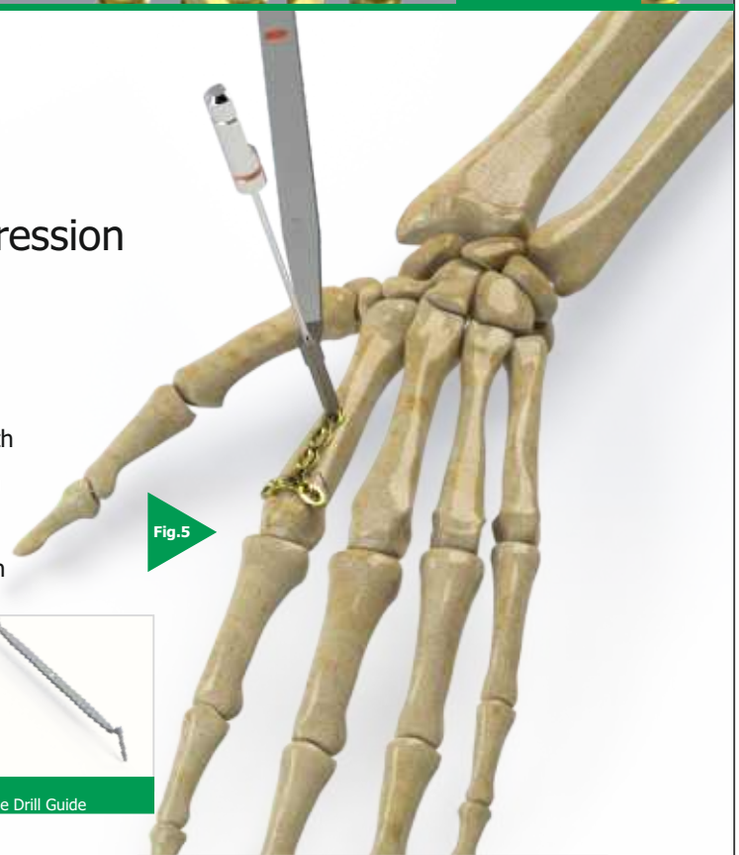


2.2 Locking LCP Y Plate *Metacarpal Neck*

2.2.3 Ø2,4 Cortical Screw and Compression

Place drill guide *(Drill Guide Ø 1.5-Ø 2.0)* in the compression zone of the holes designed for cortical screws.

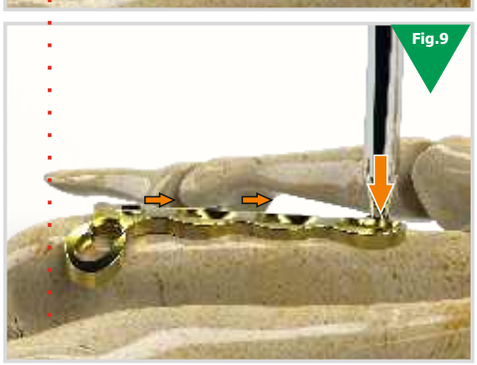
Drill properly with a drill bit *(Ø 1.5)*. (Fig. 5)Measuring the length of the screw to be applied with the depth guide (Fig. 6). Attach the screw to be used on the plate with a screwdriver *(2.0 screwdriver)*(Fig. 7) . Perform the compression (Fig. 8-9). It can be send another locking screws to the plate (Fig. 9-a)

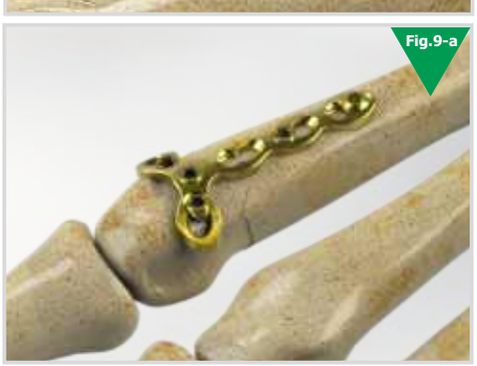



Double Drill Guide

Depth Guide

Screwdriver





2.3 Locking LCP Straight Plate *Metacarpal Shaft*

2.3.1 Plate Selection

It can be use at least four or five holes plate depending on configuration of the fracture.


Fig.10

if it used four holes plate, you must be sure screw position will not interfere fracture line (Fig.10) .


Fig.11

if it used five holes plate, middle hole of the plate is centered to fracture line (Fig.11).

2.3.2 Reduction.

Temporarly fixing

For direct reduction two point reduction clamp can be used (Fig.12).


Fig.12

It can used a Kirschner wire on fracture plane for the temporary fixing in unstable situation (Fig.13)


Fig.13

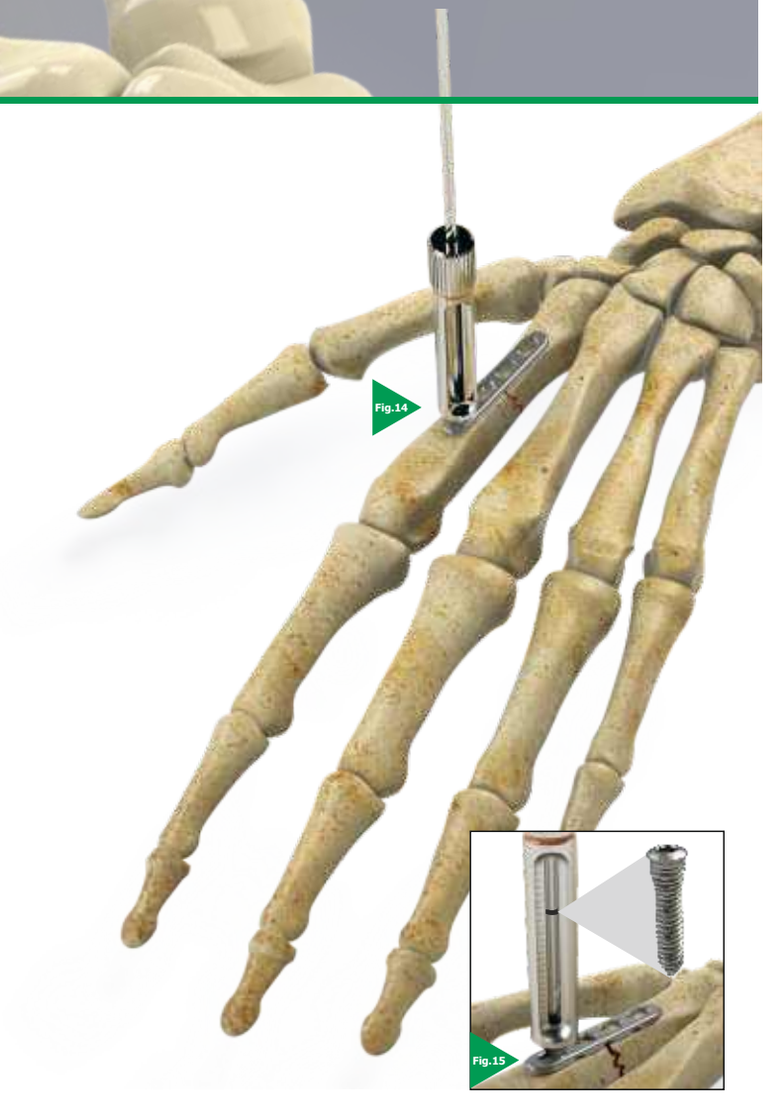


Fig.14
Fig.15

2.3.3 Ø 2,4 Locking Screw

Insert the drill guide *(Calibrated Drill Sleeve Ø 1.5)* into the holes designed for the Ø 2.4mm locking screw.
Drill properly with a drill bit *(Ø 1.5)*. (Fig 14). You can determine the screw length during the drilling process.(Fig 15). Attach the screw to be used on the plate with *(2.0 screwdriver)* (Fig.16)


Fig.16

Plate must be centered to dorsal plane of the metacarpal on suitable position.(Fig.17)


Fig.17

2.3 Locking LCP Straight Plate *Metacarpal Shaft*

2.2.3 Ø2,4 Cortical Screw and Compression

Place drill guide *(Drill Guide Ø 1.5-Ø 2.0)* in the compression zone of the holes designed for cortical screws.

Drill properly with a drill bit *(Ø 1.5)*. (Fig. 18)Measuring the length of the screw to be applied with the depth guide (Fig. 19).

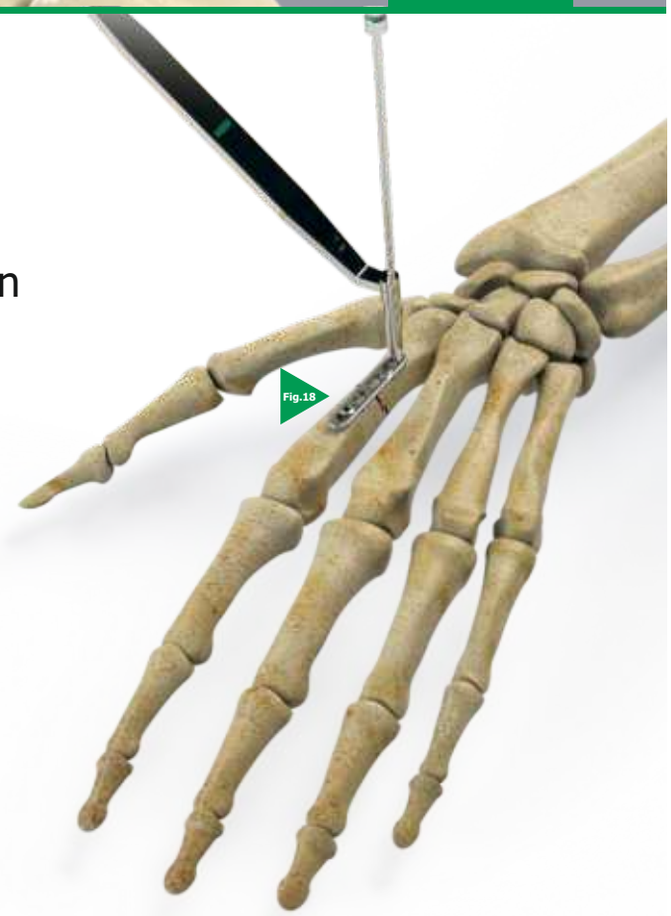


Fig.18


Fig.19


Fig.20

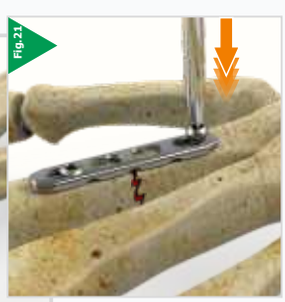


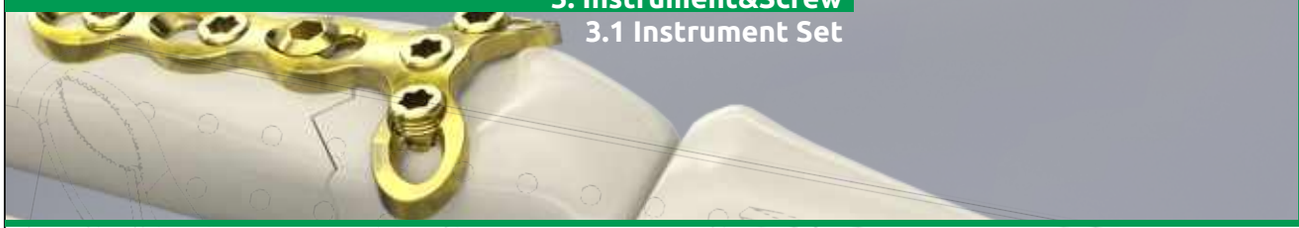
Fig.21


Fig.22

Attach the screw to be used on the plate with a screwdriver *(2.0 screwdriver)*(Fig. 20). Perform the compression (Fig. 21-22).

Attach the another screw to hole according you need (Fig. 23).

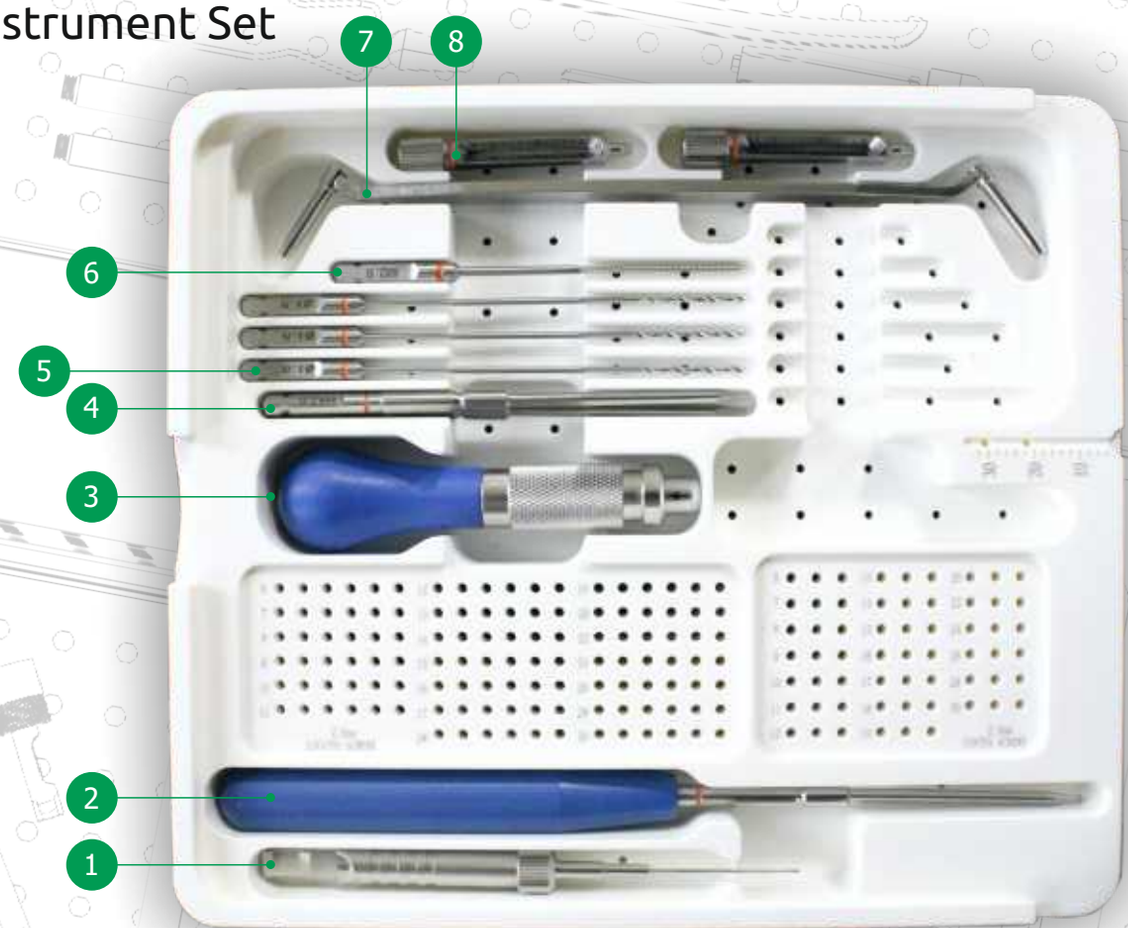

Fig.23



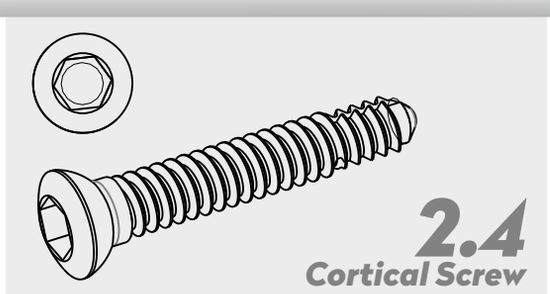
zimed®

Mini Plate System

Instrument Set



1	9803-0013	Depth Gauge 1.5/2.0
2	9803-0027	Screwdriver Ø 1.75
3	9803-0029	Handle
4	9803-0006	Screwdriver Ø 2.00
5	9803-0001	Drill Bit Ø 1.5 x 110 mm
6	9803-0005	Tap for Cortical Screw Ø 2.0
7	9803-0004	Drill Guide Ø 1.5-Ø 2.0
8	9803-0002	Calibrated Drill Sleeve Ø 1.5



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OS.2032-2408	2.4x8
OS.2032-2409	2.4x9
OS.2032-2410	2.4x10
OS.2032-2411	2.4x11
OS.2032-2412	2.4x12
OS.2032-2413	2.4x13
OS.2032-2414	2.4x14
OS.2032-2415	2.4x15
OS.2032-2416	2.4x16
OS.2032-2417	2.4x17
OS.2032-2418	2.4x18
OS.2032-2419	2.4x19
OS.2032-2420	2.4x20
OS.2032-2421	2.4x21
OS.2032-2422	2.4x22
OS.2032-2423	2.4x23
OS.2032-2424	2.4x24
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OS.2032-2426	2.4x26
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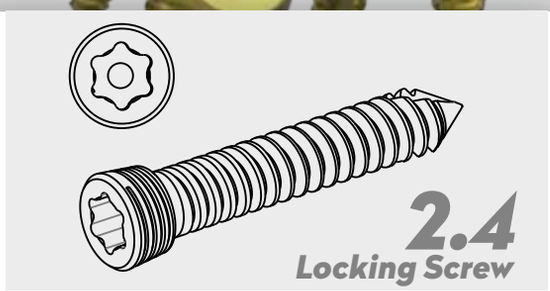
OS.2032-2428	2.4x28
OS.2032-2429	2.4x29
OS.2032-2430	2.4x30



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OS.2042-2410	2.4x10
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OS.2042-2415	2.4x15
OS.2042-2416	2.4x16
OS.2042-2417	2.4x17
OS.2042-2418	2.4x18
OS.2042-2419	2.4x19
OS.2042-2420	2.4x20
OS.2042-2421	2.4x21
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OS.2042-2426	2.4x26
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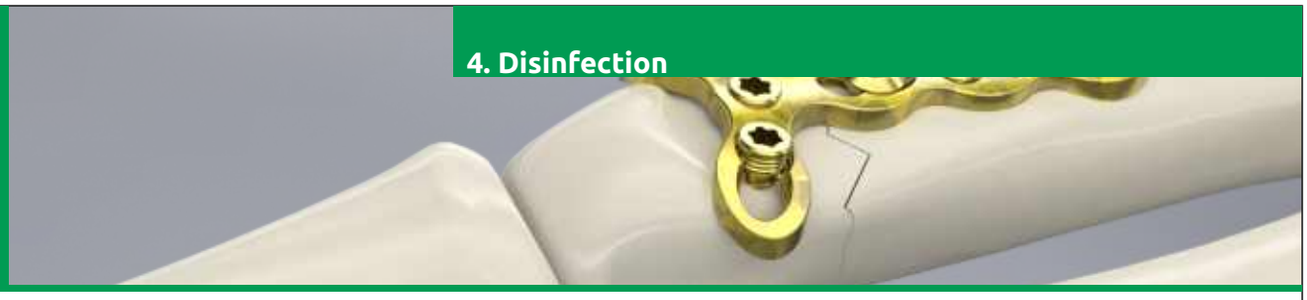
OS.2042-2430	2.4x30



4.1 DEVICE CLEANING CONDITIONS

Do not use metal brushes or rubbing pads during Decontamination of the tools should be performed immediately after the surgical procedure is completed. Contaminated tools must not be allowed to dry before reprocessing.

Excessive blood or debris must be removed in order to prevent the drying on the surface. All users must be qualified staff with documented evidence of training and competence. Training should include the current guidelines, standards and hospital policies. Even if they are made of high-grade stainless steel, the surgical tools must be thoroughly dried in order to prevent rust formation. Prior to sterilization, all the tools should be examined for the cleanliness of the lumens of the joints of the surfaces. manual cleaning process. Use cleaning agents with low-foam surfactant to be able to see the tools in the cleaning solution. Rinse the cleaning materials easily from the tool in order to prevent residue formation.

Mineral oil or silicon lubricants should not be used on Zimed tools. Neutral pH enzymatic and cleaning materials are recommended for cleaning the reusable instruments. It is very important to neutralize and rinse the alkaline cleaning materials thoroughly from the tools. Anodized aluminum should not contact with certain cleaning or disinfectant solutions. Avoid strong alkaline cleaners and disinfectants and solutions containing iodine, chlorine or certain metal salts.

4.1.1 Manual Cleaning/Disinfection

Prepare the enzymatic and cleaning materials at the dilution rates and temperatures as recommended by the manufacturer. New solutions should be prepared when the existing solutions are heavily contaminated. Place the tools in the enzymatic solution so that they are completely immersed. Operate all the movable parts so that the detergent contacts with all the surfaces.

Keep in the fluid for minimum 20 min. Use a nylon, soft-bristled brush to gently rub the tools until all visible debris is cleaned. Pay particular attention to the accessible areas and use a suitable bottle brush. In order to remove the dirt in the open springs, coils or flexible parts, wash the recesses with plenty of cleaning solution. Rub the surface with a scrubbing brush to remove all the visible dirt from the surface and the recesses. To ensure that all the recesses are cleaned, turn the component while rubbing. Remove the tools and rinse them for minimum 3 min. under running water. Pay particular attention to the cannulas and use a syringe to pass the fluid through the hard-to-reach areas. Place all the tools that are completely immersed in water, in an ultrasonic unit containing teh cleaning solution. Operate all the movable parts so that the detergent contacts with all the surfaces. Expose the tools to sonification process for minimum 10 min..

Remove the tools and rinse with deionized water for at least 3 minutes or unless all the blood or dirt traces are eliminated in the rinsing water. Examine the tools under normal light to verify that visible dirt is removed. If visible dirt is present, repeat the above mentioned sonification procedure and the rinsing steps. Remove the excessive moisture on the tool with a clean, absorbent, lint-free cloth.

4.1.2 *Combination Manual / Automated Cleaning and Disinfection*

Prepare the enzymatic and cleaning materials at the dilution rates and temperatures as recommended by the manufacturer. New solutions should be prepared when the existing solutions are heavily contaminated. Place the tools in the enzymatic solution so that they are completely immersed. Operate all the movable parts so that the detergent contacts with all the surfaces. Keep in the fluid for minimum 10 min. Use a nylon, soft-bristled brush to gently rub the tools until all visible debris is cleaned. Pay particular attention to the accessible areas and use a suitable bottle brush. A sonicator will help to clean the instruments thoroughly. The use of a syringe or a water fountain will facilitate passing of the liquid from the low-spaced areas and difficult-to-access areas. Remove the tools from the enzyme solution and rinse them for minimum 1 min. under deionized water. Place the tools in a suitable washer / disinfector basket and perform a standard washer / disinfector cycle. Specific minimum parameters are essential for a complete cleaning and disinfection. These parameters are given in a below mentioned table.

4.1.3 *Automated Cleaning and Disinfection*

Automated washing / drying systems are not recommended as the only cleaning method for surgical tools. An automated system can be used as a follow-up operation after manual cleaning. To ensure an effective cleaning, tools must be thoroughly examined before sterilization. For detailed information on Washing and Disinfection see

Specific minimum parameters used for a complete cleaning and disinfection:

	Definition
1	Pre-washing for 2 minutes with cold tap water
2	enzyme sprey for 20 seconds with hot tap water
3	Immersion in enzyme after 1 minute
4	rinsing for 15 seconds with cold tap water (Should be repeated twice)
5	Washing with detergent for 2 minutes with hot tap water
6	rinsing for 15 seconds with hot tap water
7	Rinsing with 10 seconds with optional lubricated purified water
8	Drying for 7 minutes with hot air

Note: Follow the isntruction of the washer/disinfector manufacturer

Zimed Medical, as the manufacturer of this device, and their surgical consultants do not recommend this or any other surgical technique for use on a specific patient. The surgeon who performs any implant procedure is responsible for determining and utilizing the appropriate techniques for implanting the device in each individual patient. Zimed and their surgical consultants are not responsible for selection of the appropriate surgical technique to be utilized for an individual patient.

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ISO 13485 CE 1984

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22.12.2020