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Introduction

3.1 p.d.

The Mikron Omicron Posterior Cervical System is a universal system designated to facilitate reconstruction of the cervical and upper thoracic spine and provides a comprehensive solution for a rigid posterior fixation of the Occipito-Cervico-Thoracic spine. Offering exceptional versatility and ease-of-use, Features:

- TOP-loading Multi-Axial Screws to simplify construct assembly
- Friction fit Screws to maintain seat alignment and facilitate Rod insertion
- 3,5mm titanium alloy Rods and cobalt chrome Rod to maximize strength
- Polyaxial screws angle of inclination from the vertical axis is at least 45° 3.3.1 p.d.
- Occipital Plates with sliding connectors to ease rod engagement

Implant Overview

The Mikron Omicron Posterior Cervical System includes polyaxial screw and half threaded polyaxial screw different diameters and lengths. The System also offers a variety of implant options including rod to rod transverse link, rod connectors, pre-cut and pre-bent Ø3.5mm Ti rods, Ø3.5mm to Ø6,0mm CoCr rods, Ø3.5/6.0mm transition rods, lateral connectors, hooks, occipital plates and occipital plate screws.

The Mikron Omicron Posterior Cervical System instrumentation allows the surgeon the flexibility to build a construct that meets anatomical challenges and handles the pathology being treated. All implants in the Mikron Omicron Posterior Cervical System (except the cobalt chrome rods) are manufactured from titanium alloy Ti 6Al-4V ELI. 3.2



Figure1: Mikron Omicron Posterior Cervical System



Implant Size

3.3.2 Posterior Cervical Polyaxial Screw

	Full Thread	Code	Size
3.3.3		MSFX-PCPS3510	3.5x10 mm
		MSFX-PCPS3512	3.5x12 mm
		MSFX-PCPS3514	3.5x14 mm
		MSFX-PCPS3516	3.5x16 mm
		MSFX-PCPS3518	3.5x18 mm
		MSFX-PCPS3520	3.5x20 mm
		MSFX-PCPS3522	3.5x22 mm
		MSFX-PCPS3524	3.5x24 mm
		MSFX-PCPS3526	3.5x26 mm
		MSFX-PCPS3528	3.5x28 mm
		MSFX-PCPS3530	3.5x30 mm
		MSFX-PCPS3532	3.5x32 mm
		3.3.3	
MSFX-PCPS4012	4.0x12 mm		
MSFX-PCPS4014	4.0x14 mm		
MSFX-PCPS4016	4.0x16 mm		
MSFX-PCPS4018	4.0x18 mm		
MSFX-PCPS4020	4.0x20 mm		
MSFX-PCPS4022	4.0x22 mm		
MSFX-PCPS4024	4.0x24 mm		
MSFX-PCPS4026	4.0x26 mm		
MSFX-PCPS4028	4.0x28 mm		
MSFX-PCPS4030	4.0x30 mm		
MSFX-PCPS4032	4.0x32 mm		
3.3.3			
		MSFX-PCPS4512	4.5x12 mm
		MSFX-PCPS4514	4.5x14 mm
		MSFX-PCPS4516	4.5x16 mm
		MSFX-PCPS4518	4.5x18 mm
		MSFX-PCPS4520	4.5x20 mm
		MSFX-PCPS4522	4.5x22 mm
		MSFX-PCPS4524	4.5x24 mm
		MSFX-PCPS4526	4.5x26 mm
		MSFX-PCPS4528	4.5x28 mm
		MSFX-PCPS4530	4.5x30 mm
		MSFX-PCPS4532	4.5x32 mm

3.3.2 Posterior Cervical Polyaxial Screw

	Half Thread	Code	Size
3.3.3		MSFX-PCPSC3510	3.5x10 mm
		MSFX-PCPSC3512	3.5x12 mm
		MSFX-PCPSC3514	3.5x14 mm
		MSFX-PCPSC3516	3.5x16 mm
		MSFX-PCPSC3518	3.5x18 mm
		MSFX-PCPSC3520	3.5x20 mm
		MSFX-PCPSC3522	3.5x22 mm
		MSFX-PCPSC3524	3.5x24 mm
		MSFX-PCPSC3526	3.5x26 mm
		MSFX-PCPSC3528	3.5x28 mm
		MSFX-PCPSC3530	3.5x30 mm

3.3.5

3.6.1 p.d.

Occipital Plate

Code	Size
MSFX-CPOPL	L
MSFX-CPOPM	M
MSFX-CPOPS	S



Occipital Plate Screw

Code	Size
MSFX-CPOSS4	4.0x4 mm
MSFX-CPOSS5	4.0x5 mm
MSFX-CPOSS6	4.0x6 mm
MSFX-CPOSS8	4.0x8 mm
MSFX-CPOSS10	4.0x10 mm
MSFX-CPOSS12	4.0x12 mm
MSFX-CPOSL4	4.5x4 mm
MSFX-CPOSL5	4.5x5 mm
MSFX-CPOSL6	4.5x6 mm
MSFX-CPOSL8	4.5x8 mm
MSFX-CPOSL10	4.5x10 mm
MSFX-CPOSL12	4.5x12 mm



Cervical Rod

Code	Size
MSFX-SR1304	3.5x40 mm
MSFX-SR1308	3.5x80 mm
MSFX-SR1312	3.5x120 mm
MSFX-SR1320	3.5x200 mm
MSFX-SR1324	3.5x240 mm
MSFX-SR1345	3.5x(200-70) mm



Cervical Hook

Code	Size
MSFX-PCHS5	4.5x5 mm
MSFX-PCHM6	4.5x6 mm
MSFX-PCHL7	4.5x7 mm



Transverse Link Connector

3.5.3

Code	Size
MSFX-TLHC	Green
MSFX-TLRC 130	30 mm
MSFX-TLRC 135	35 mm
MSFX-TLRC 140	40 mm
MSFX-TLRC 145	45 mm



Transverse Connector

3.5.3

Code	Size	Open	Color
MSFX-TLC130	30 mm	35 mm	Pink
MSFX-TLC135	35 mm	40 mm	Blue
MSFX-TLC140	40 mm	45 mm	Yellow
MSFX-TLC145	45 mm	50 mm	Green
MSFX-TLC150	50 mm	55 mm	Grey
MSFX-TLC155	55 mm	60 mm	Torquise



Domino-Connector

Code	Size
MSFX-SDCN02	1 Rod
MSFX-SECN01	2 Rod



Lateral Connector

Code	Size
MSFX-LCNT12	10 mm
MSFX-LCNT18	18 mm





Surgical Technique

1. Preparation and Approach

Preoperative planning is critical in the preparation for spinal surgery. Place the patient on a radiolucent operating table in the prone position with the head and neck held securely in proper alignment. Proper patient position should be confirmed via direct visualization and by radiograph prior to draping. To complete a midline sub-periosteal incision and dissection down to the spinous processes of the appropriate vertebrae. Extend dissection laterally to expose the facets and transverse processes.

In general the entrance of the pedicle is located at the intersection of a horizontal line parallel to the upper 1/3 of the transverse process and a vertical line through the middle of the superior facet.



Figure:2 Patient Position

A. Cervico-Thoracic Fixation

The **Mikron Omicron Posterior Cervical System** offers a variety of stabilization options in the cervical and upper thoracic spine. The Polyaxial screws, Transverse link, Lateral Connectors and Hooks are available to meet the needs of the most challenging cases. The following Surgical Technique outlines the recommended placement and use of **Mikron Omicron Posterior Cervical System** components. Actual selection of system implants may vary from those described in this technique depending on procedural and anatomical considerations.



2. Screws Insertion

a. Polyaxial Screw Placement

The **Mikron Omicron Posterior Cervical System** features top-loading and top-tightening Polyaxial Screws. Preferred Angle Screws offer 45° in the preferred direction and 28° in the standard direction. Standard Polyaxial Screws offer 56° of conical angulation and have a friction-fit mechanism to maintain screw angulation during placement. Please note that polyaxial Screws are intended for use in the upper thoracic spine.

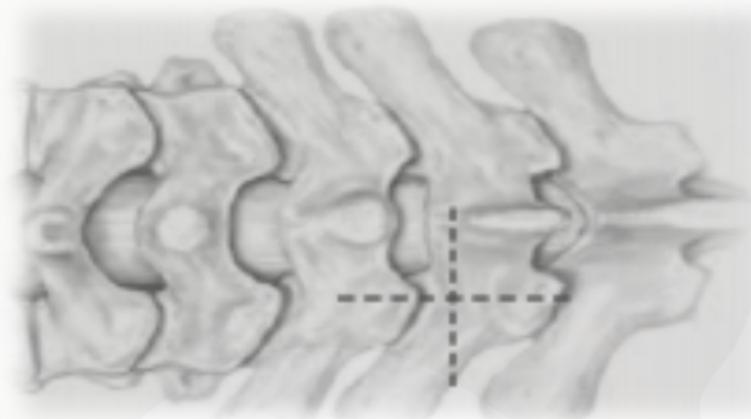


Figure:3 *Identified Screw placement*

Penetrate the cortex of the bone with the **MSPC01 Cervical Bone Awl**. It is determined the entry point and trajectory of the screw. The Awl contains a stop that limits insertion to 8.0mm. Creating a pilot hole with the Awl penetrates the cortical bone, which will help prevent movement of the Drill and Drill Guide during drilling.

Repeat for all screw placement sites Determine Drill or Probe penetration depth based on radiographic films or fluoroscopy.

Figure4: *MSPC01 Cervical Bone Awl*



Select the appropriate length and diameter of **MSPC04 Drill 2,2mm** and **MSPC05 Drill 2,7mm** and attach to the provided **MSPC13 Handle**. After attaching the appropriate Drill Shaft **MSPC13 Handle**, align the **MSPC08 Drill and Tap Guide** with the pilot hole and maintain the desired drill trajectory.

The appropriate depth is reached when the desired. Once the desired depth is reached, gently remove the shaft of the Drill from drill guide.

Insert the drill into the barrel of the Drill Guide and rotate clockwise while advancing the drill down the Drill Guide.



Figure5: MSPC04 Drill, MSPC13 Handle and MSPC08 Drill and Tap Guide

MSPC02 Cervical Probe Curved and **MSPC03 Cervical Probe Straight** may be used to confirm that the drill hole remains within the confines of the bone.

Figure 6: MSPC02 Cervical Probe Curved and MSPC03 Cervical Probe Straight





The depth of the drill hole can be confirmed using the **MSPC09 Feeler Curved** and **MSPC10 Feeler Straight** by inserting the tip of the Feeler into the drill hole until the tip contacts the bottom of the hole and evaluate the condition of the cortical wall of the pedicle. Apply the appropriate probe and externally or internally palpate the wall or canal of the pedicle to ensure the wall is not perforated. Repeat for all screw placement sites.

Figure 7: MSPC09 Feeler Curved and MSPC10 Feeler Straight

Note that Mikron Omicron Posterior Cervical System Polyaxial Screws are self-tapping and that manual tapping may not be necessary.



MSPC06 and **MSPAC07 Taps** are provided in 3.0mm, 3,5.mm diameters. After attaching the **MSPC06 Tap** to **MSPC13 Handle** tap to the appropriate depth by using **MSPC08 Drill and Tap Guide**. Repeat for all screw placement sites. (Figure:7)

Figure 8: MSPAC07 Taps, MSPC13 Handle and MSPC08 Drill and Tap Guide



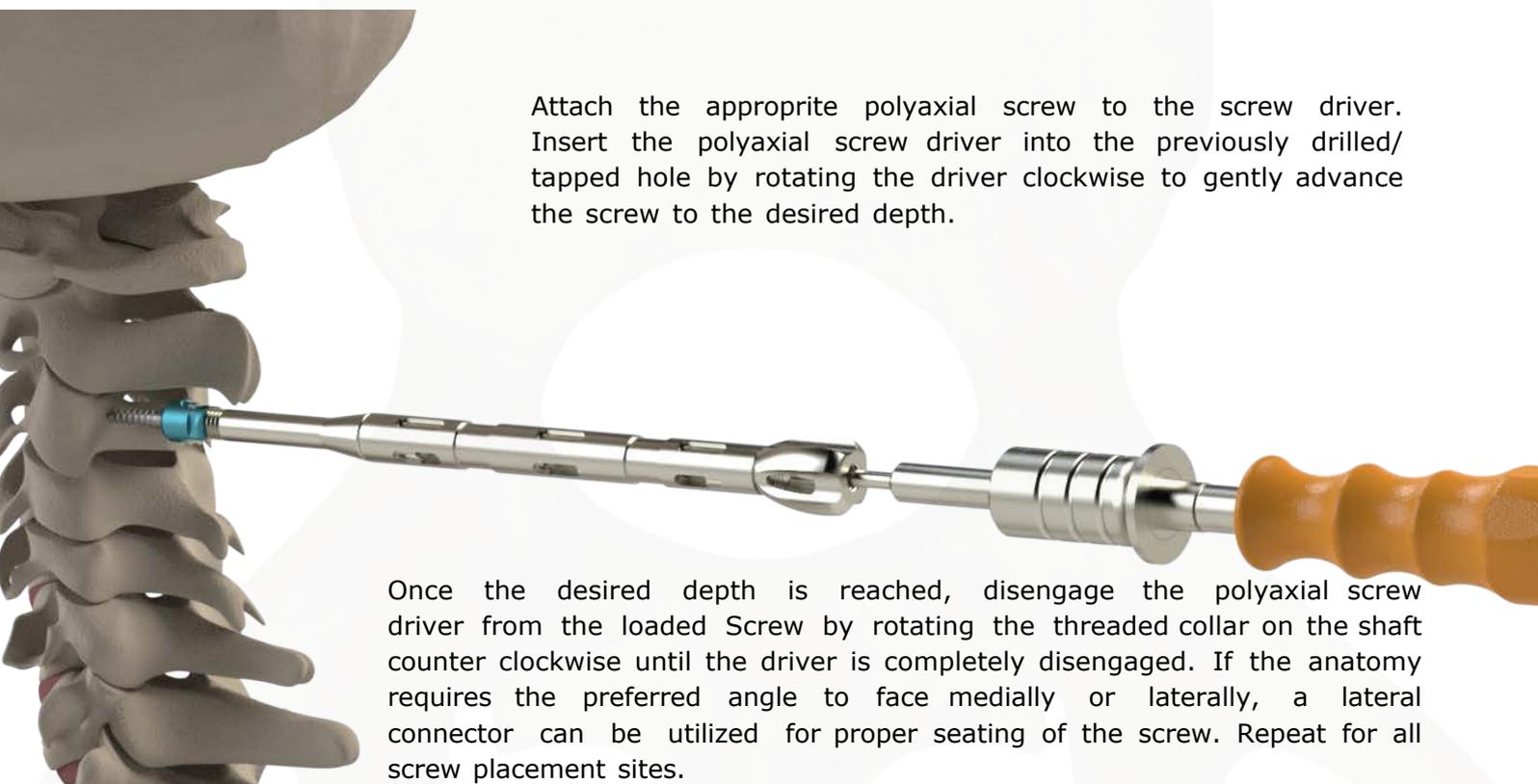
Polyaxial Screw Insertion

After drilling/tapping the hole, use the probe to confirm the length of polyaxial screw to be inserted. **MSPC11 Cervical Polyaxial Screw** Driver securely into the **MSPC13 Handle**.



Figure 9: MSPC11 Cervical Polyaxial Screw with MSPC13 Handle

Attach the appropriate polyaxial screw to the screw driver. Insert the polyaxial screw driver into the previously drilled/tapped hole by rotating the driver clockwise to gently advance the screw to the desired depth.



Once the desired depth is reached, disengage the polyaxial screw driver from the loaded Screw by rotating the threaded collar on the shaft counter clockwise until the driver is completely disengaged. If the anatomy requires the preferred angle to face medially or laterally, a lateral connector can be utilized for proper seating of the screw. Repeat for all screw placement sites.

Figure 10: Polyaxial Screw Insertion



The Rod may be used to determine the appropriate length and curvature of the Rod. Cut the Rod to the appropriate length using the **MSPC21 Rod Cutter** and contour the rod to the appropriate shape using the **MSPC20 Rod Bender**.

Note: Do not straighten the rod after bending.

Figure: 11: MSPC21 Rod Cutter and MSPC20 Rod Bender



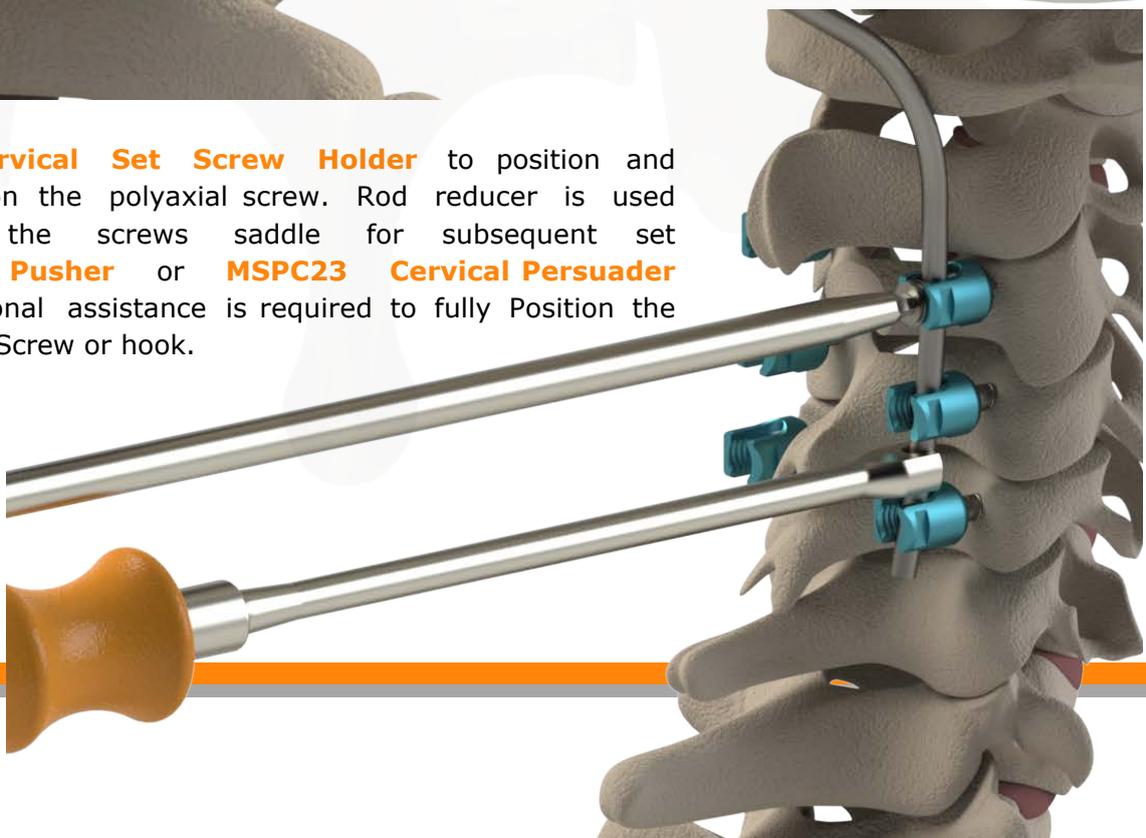
The rod insertion that Orient the screws so that screw saddles are in the longitudinal plane. Once positioning is achieved place the rod in the screw saddles by **MSPC18 Forcep Rod Holder**.

Figure 12: MSPC19 Rod Forcep Holder



Use the **MSPC12 Cervical Set Screw Holder** to position and tighten the set screw on the polyaxial screw. Rod reducer is used to seat the rod into the screws saddle for subsequent set screw. **MSPC19 Rod Pusher** or **MSPC23 Cervical Persuader** may be used if additional assistance is required to fully Position the rod into the seat of the Screw or hook.

Figure 13: MSPC12 Cervical Set Screw Holder MSPC23 Cervical Persuader MSPC19 Rod Pusher



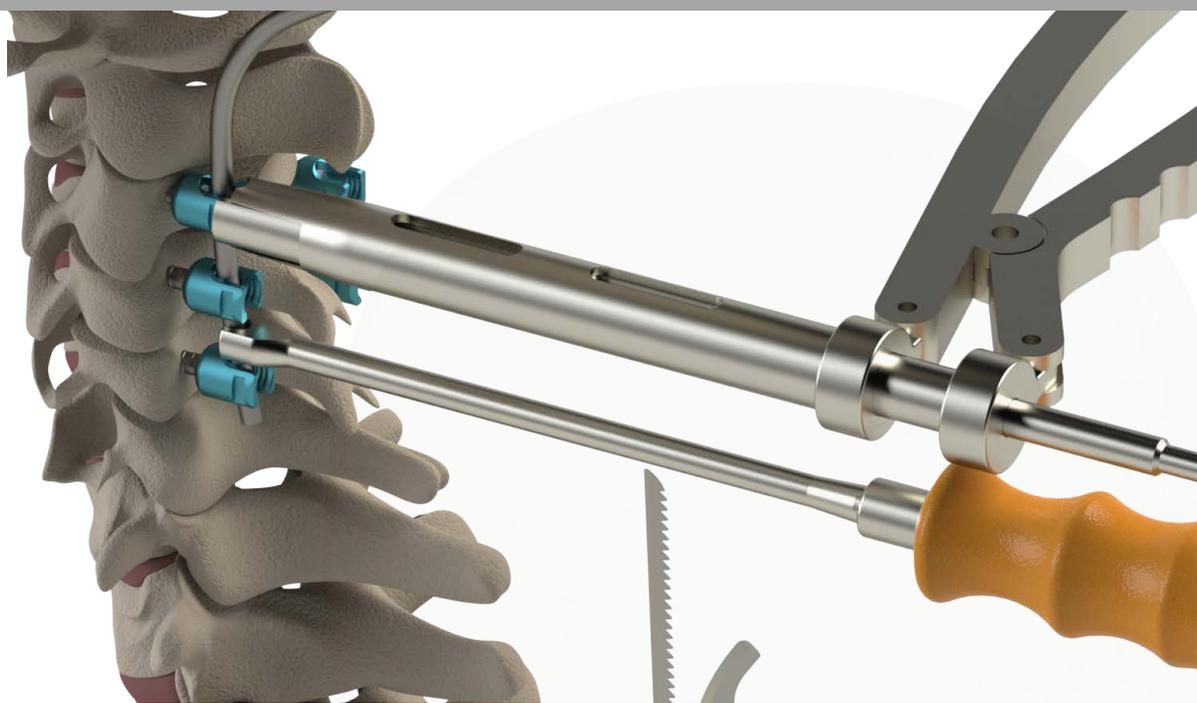


Figure 14: Pursuader

The **MSPC26 Compressor** and **MSPC27 Distractor** may be used to perform minor screw adjustments.

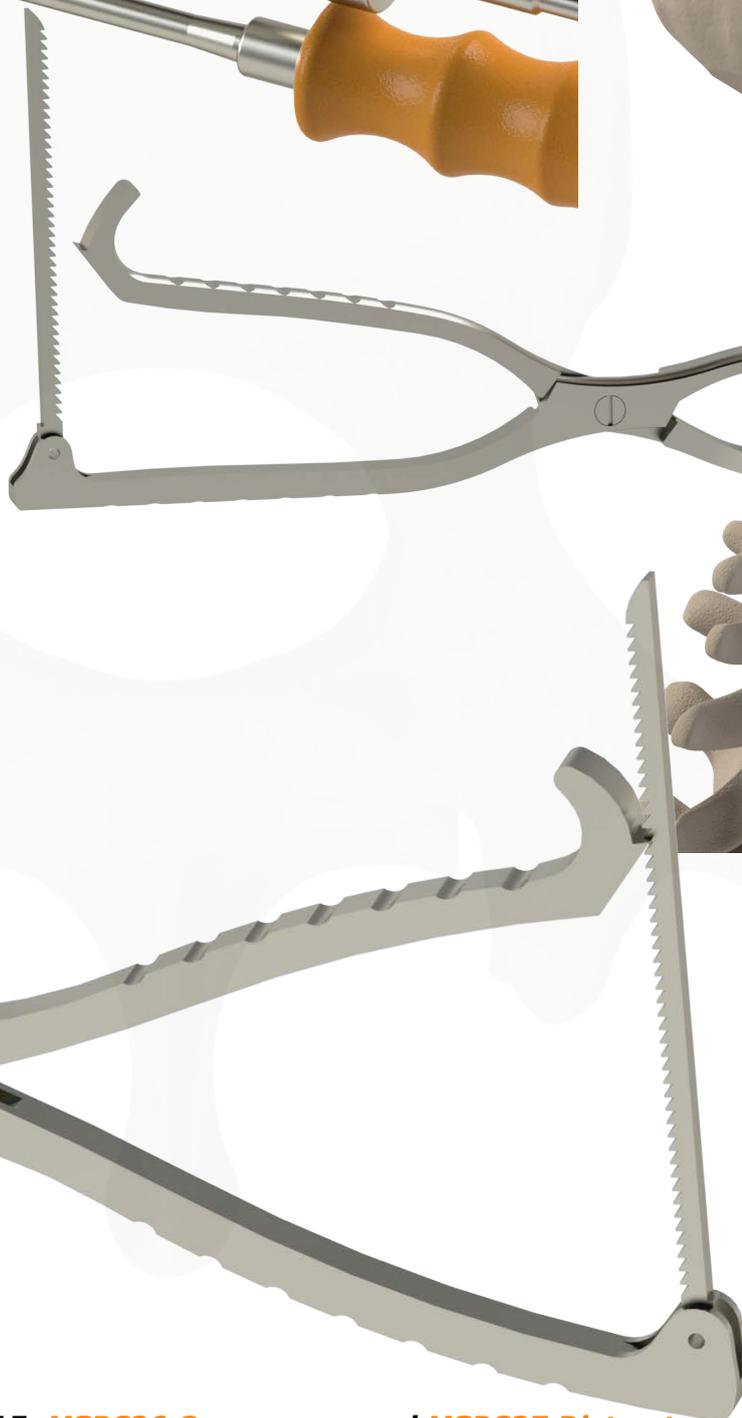
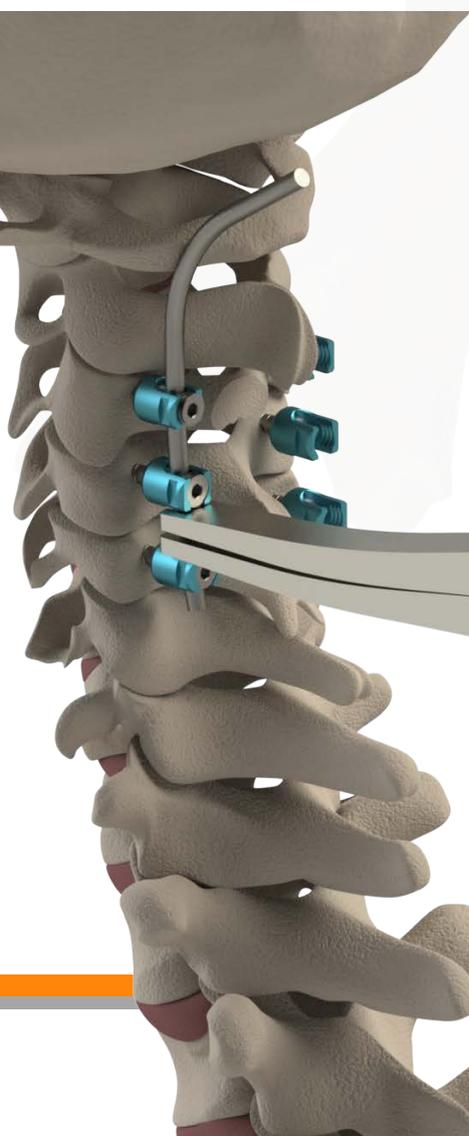
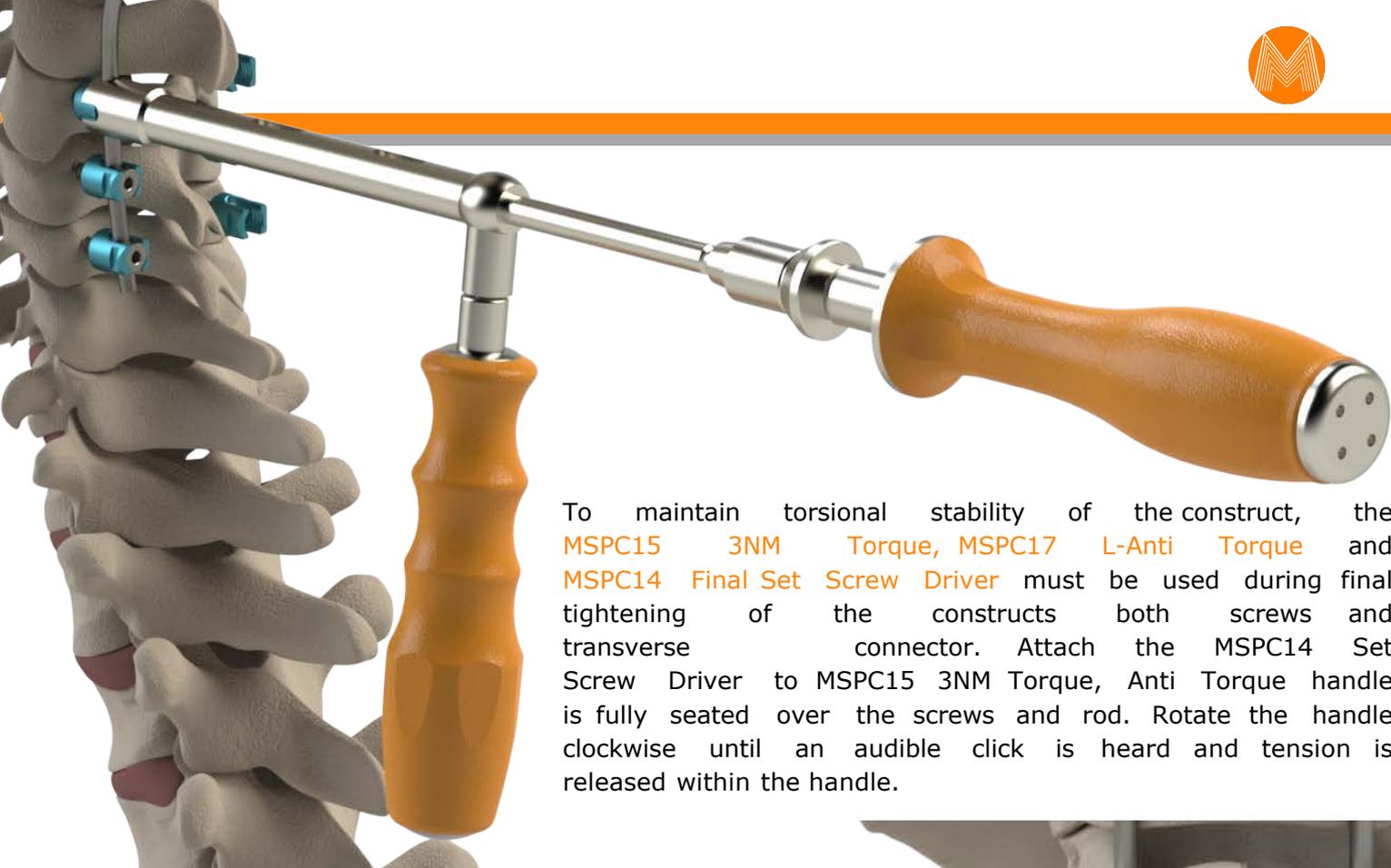


Figure 15: MSPC26 Compressor and MSPC27 Distractor
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To maintain torsional stability of the construct, the **MSPC15 3NM Torque**, **MSPC17 L-Anti Torque** and **MSPC14 Final Set Screw Driver** must be used during final tightening of the constructs both screws and transverse connector. Attach the **MSPC14 Set Screw Driver** to **MSPC15 3NM Torque**, **Anti Torque** handle is fully seated over the screws and rod. Rotate the handle clockwise until an audible click is heard and tension is released within the handle.

Figure 16: MSPC14 Final Set Screw Driver, MSPC15 3NM Torque and MSPC17 L-Anti Torque

1. Optional Techniques

1.1. Linkage to other MIKRON system

Transitional Rods and Rod domino connector are available to link the Mikron Posterior cervical System with other Mikron System. Transitional Rods and Rod Connectors are offered in 3.5mm/5,5mm and 3.5mm/6,0mm sizes. final tightening of the connector nut by **MSPC29 Connector Nut Driver** attach the torque **MSPC16 Torque 3 NM** round type. (Figure:15)



Figure 17: MSPC29 Connector Nut Driver , MSPC16 Torque 3nm

1.1. Cross Connector Placement



Select the appropriate transverse link and position on the rod by **MSPC18 Forcep Rod holder** and **Link holder**. Lock the transverse link connectors into position using the **MSPC29 Connector Nut Driver** attach the torque **MSPC16 Torque 3 NM** round type. (Figure:16)



Figure 18: MSPC29 Connector Nut Driver MSPC16 Torque 3 NM MSPC18 Forcep Rod holder and Link Holder



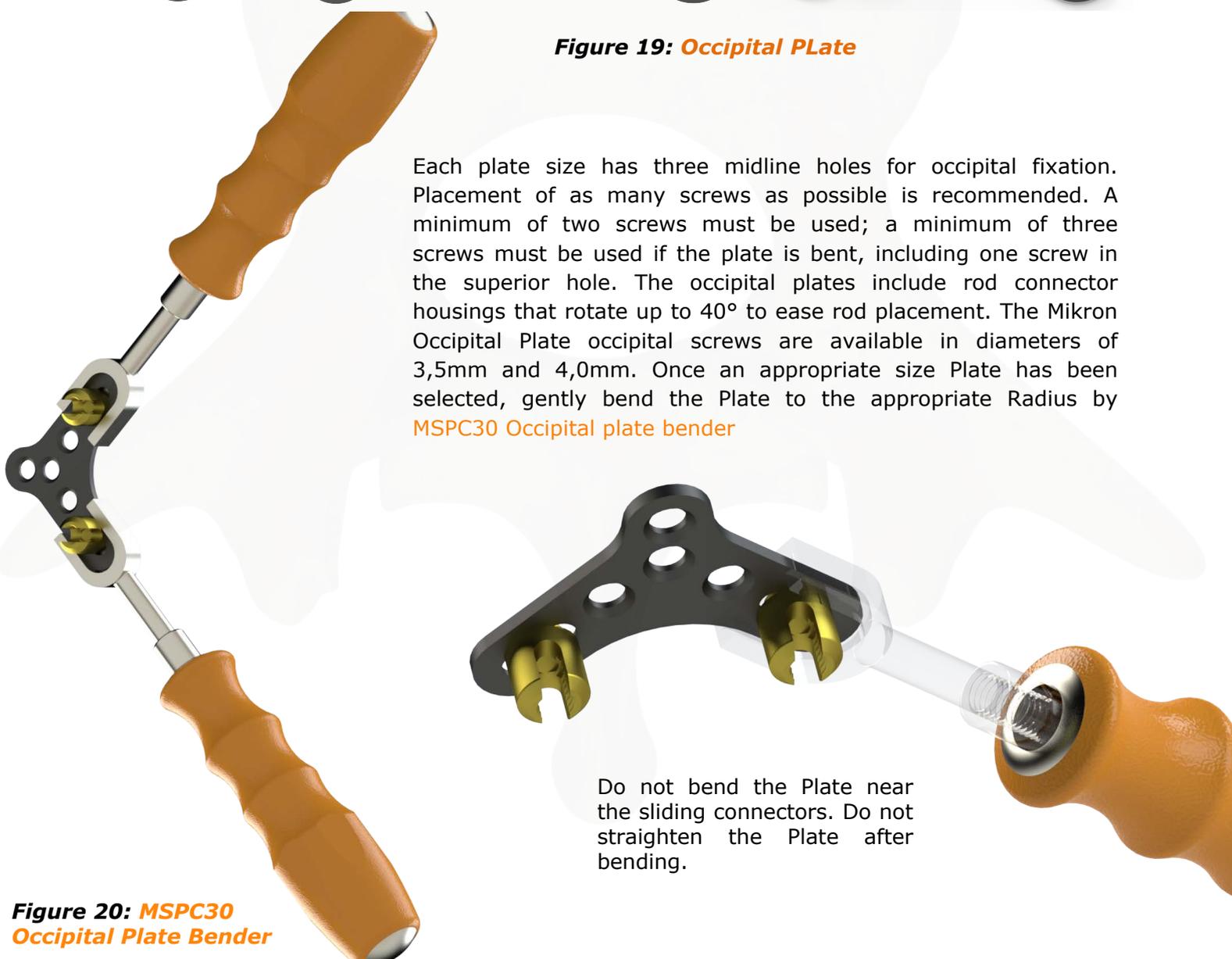
B. Occipito-Cervical Fixation

The Mikron Occipital Plate offers low-profile fixation along the midline of the occiput, where the most bone purchase can be obtained. When positioning the occipital plate, it should be centered on the midline between the External Occipital Protuberance (EOP) and the posterior border of the foramen magnum. The goal is to maximize bone purchase (closer to EOP) while achieving a low profile. The Mikron Posterior Occipital System offers three occipital plates to accommodate patient anatomy: 45-50-55mm



Figure 19: Occipital Plate

Each plate size has three midline holes for occipital fixation. Placement of as many screws as possible is recommended. A minimum of two screws must be used; a minimum of three screws must be used if the plate is bent, including one screw in the superior hole. The occipital plates include rod connector housings that rotate up to 40° to ease rod placement. The Mikron Occipital Plate occipital screws are available in diameters of 3,5mm and 4,0mm. Once an appropriate size Plate has been selected, gently bend the Plate to the appropriate Radius by **MSPC30 Occipital plate bender**



Do not bend the Plate near the sliding connectors. Do not straighten the Plate after bending.

Figure 20: MSPC30 Occipital Plate Bender



Mark the entry points where the Occipital Bone Screws will be inserted through the holes in the Occipital Plate by **MSPC01 Cervical Bone Awl**. The Occipital Plate should sit flush against the occiput.

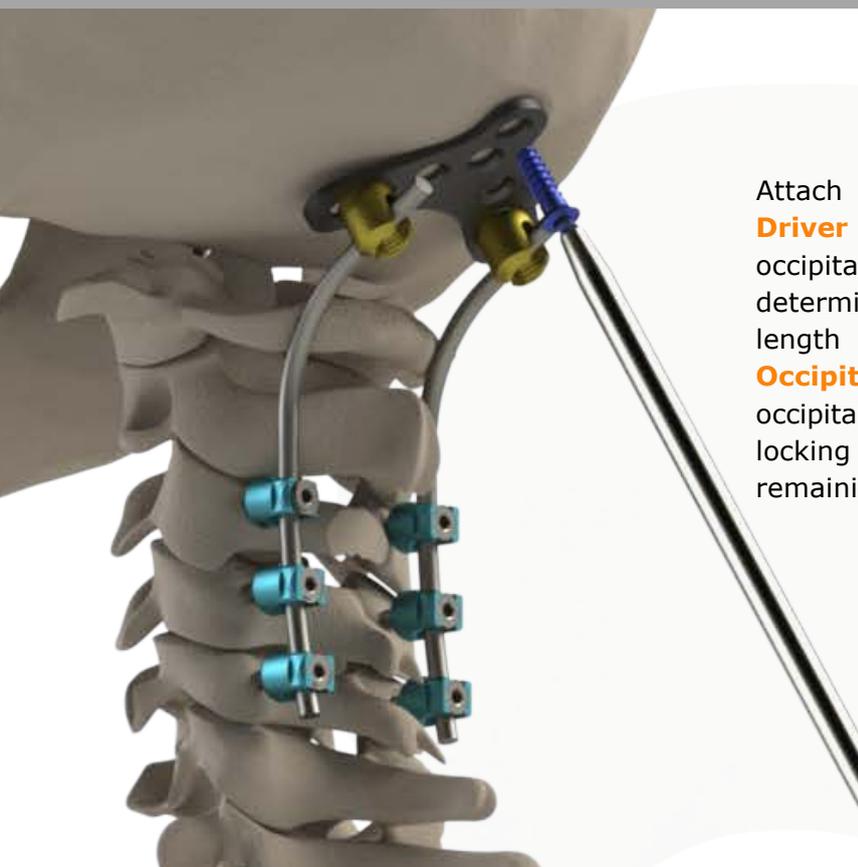
It may be necessary to remove small amounts of occipital bone to optimize the plate-to-bone interface. Do not remove bone near areas of screw placement. Determine the lengths of Occipital Bone Screws required via preoperative planning or fluoroscopy.

Figure 21: MSPC01 Cervical Bone Awl



Select the appropriate length and diameter of **MSPC032 Drill 2,2mm** and **MSPC33 Drill 2,7mm** and attach to the provided **MSPC13 Handle**. After attaching the appropriate Drill Shaft **MSPC13 Handle**, align the **MSPC36 Drill and Tap Guide** with the pilot hole and maintain the desired drill trajectory. Insert the Drill into the barrel of the Drill Guide and rotate clockwise while advancing the drill down the Drill Guide. The appropriate depth is reached when the desired. Once the desired depth is reached, gently remove the shaft of the Drill from drill guide.

Figure 22: MSPC032 Drill MSPC13 Handle MSPC36 Drill and Tap Guide for occipital plate.



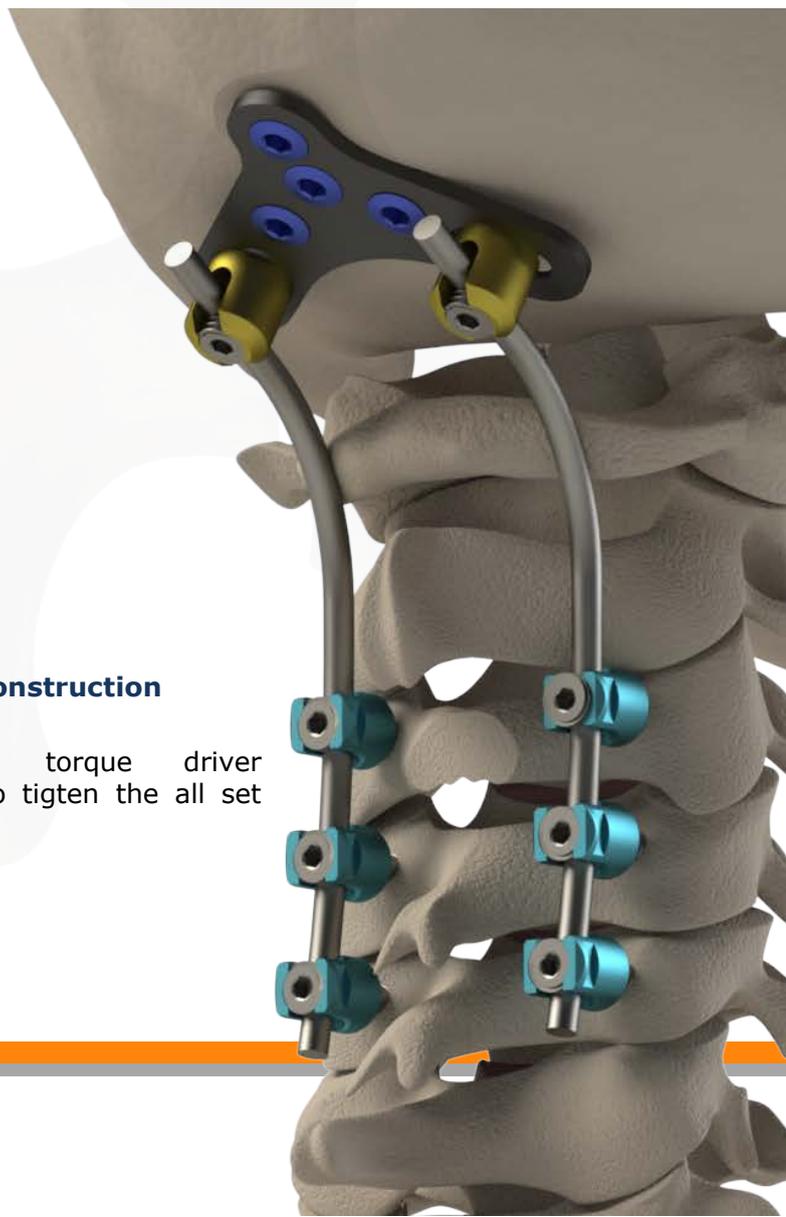
a. Plate And Screw Insertion

Attach the **MSPC31 Occipital Plate Screw Driver** to a **MSPC16 I-Handle** and place the occipital plate into its previously determined position. Attach the appropriate length occipital bone screws to the **MSPC37 Occipital Bone Screws Holder**. Insert the occipital bone screw into the prepared hole locking the occipital plate into position. Place the remaining screws using the same way.

Figure 23: MSPC31 Occipital Plate Screw

b. Set Screws Insertion

Insert the Set Screws into the seat(s) by using **MSPC29 Connector Nut Driver** **MSPC16 Torque 3mm Round** and respectively, and tighten. Repeat for the contralateral side.



C. Final Construction

Turn the torque driver clockwise to tighten the all set screws.



Instrument Overview



MSPC01

Cervical Bone Awl



MSPC02

**Cervical Probe
Curved**



MSPC03

**Cervical Probe
Straight**



MSPC04

Drill 2,2x200 mm



MSPC05

Drill 2,7x200 mm



MSPC06

Tap 3,0 mm



MSPC07

Tap 3,5 mm



MSPC08

**Drill Guide Tap
Guide**



MSPC09

**Cervical Feeler
Curved**



MSPC10

**Cervical Feeler
Straight**



MSPC11

***Cervical Polyaxial
Screw Driver***



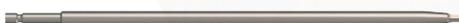
MSPC12

***Cervical Set
Screw Holder***



MSPC13

Handle Straight



MSPC14

***Final Set Screw
Driver Shaft***



MSPC15

***Torque 3 Nm I
type***



MSPC17

***Cervical Anti
Torque***



MSPC18

***Forcep Rod Holder
3,0mm***



MSPC19

Rod Pusher 3,0mm



MSPC20

**Rod Bender
3,0mm**



MSPC21

**Rod Cutter 3,0
mm**



MSPC23

**Cervical
Persuader**



MSPC24

**Small In-Situ
Bender Left**



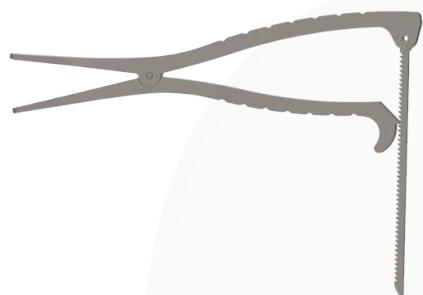
MSPC25

**Small In-Situ
Bender Right**



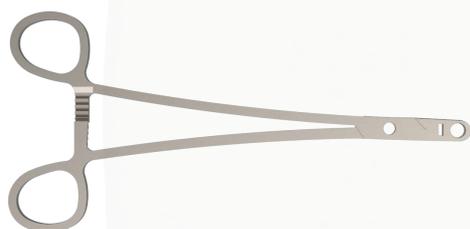
MSPC26

**Cervical
Compressor**



MSPC27

**Cervical
Distractor**



MSPC28

**Cervical
Transverse
Link Holder
Forcep**



MSPC29

**Connector Nut
Driver 2,5**



MSPC30

**Occipital Plate
Bender**



MSPC32

**Drill 2,2x150
mm Occipital**



MSPC33

**Drill 2,7x150
mm Occipital**



MSPC34

**Tap 3,0 mm
Occipital**



MSPC35

**Tap 3,5 mm
Occipital**



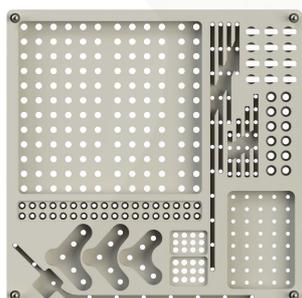
MSPC36

***Drill And Tap
Guide
Occipital***



MSPC37

***Cervical Nut
Driver***



MSPC38

***Implant Case
For Cervical
Screw***



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