

# SPINE OCCIPITOCERVICAL FIXATION SYSTEM

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Surgical Technique - 93.30

## Materials

Titanium Alloy Ti 6Al 4V ELI

ASTM F 136

## Indications

The Spine Occipitocervical Fixation System indication is for cases of correction, stabilization and temporary or permanent fixation of occipital/ cervical area and posterior cervical segment of vertebral column, resulting from diseases, such as:

- Traumatology (including fractures);
- Deformities;
- Degenerative and traumatic pathologies;
- Tumors;
- Sequela from inappropriate or not succeeded treatments of described pathologies.



## Introduction

The Spine Occipitocervical Fixation System is compound by a sequence of implants, such as: Occipitocervical Rod of 3 and 4 holes, Total and Partial Threaded Articulated Screws (Poliaxial), Cancellous Screw, Support of Screw, Long and Short Angled Hook, Longitudinal and Transversal Rod, Occipital Screw and Nut, Superior Nut, Connectors, and others. It aims mainly to align, stabilize, correct and fixate the segments of occipital/ cervical area and posterior cervical of vertebral column. The Total and Partial Threaded Articulated Screws (Poliaxial) have cancellous screw of  $\text{Ø}3.5$  mm, which enables better anchorage to the bone tissue. The poliaxial screw head provides angled positioning fitting, which offers the surgeon a range of options for a more appropriate screw fitting. All screws are self-cutting, eliminating the use of tap. Occipitocervical Rods with 3 and 4 holes offer the choice of the most appropriate model for patient's profile and fixation needs. The orifices are ovals offering choices for Screws placement and fine adjustment at final assembly. The Longitudinal Rods are available at  $\text{Ø}3.5$  mm with lengths from 30 mm to 160 mm. Transversal Rods can be fixated through connectors, after final set assembly, and give stability and roughness to the system. Short and Long Angled Hooks, right and left side, are available for fixation and anchorage to the Atlas. The connectors allow the assembly connection of occipital to cervical segment, being able to extend the assembly to the thoracic segment of vertebral column, with appropriate complement of Pedicle Fixation Lock-1. The fixation at occipital area can be done by reverse occipital Screw/ occipital Nut or by Cancellous Screw of  $\text{Ø}3.5$  mm. The instrumental for implant handling and insertion is simple, compact and allows a safe positioning of the devices. The complete implant set comes with its own instrumental kit.

## Advantages

- Total and Partial Threaded Articulated Screws (Poliaxial) provide angled positioning fitting, which offers the surgeon a range of options for a more appropriate screw placement.
- Self-cutting screws, eliminating the use of tap;
- Occipitocervical Rods with 3 and 4 holes offer the choice of the most appropriate model for patient's profile and fixation needs;
- The orifices of Occipitocervical Rods are ovals offering choices for Screws placement and fine adjustment at assembly regulation;
- Transversal Rods can be fixated after set assembly, and give stability and roughness to the system.
- Short and Long Angled Hooks, right and left side, are available for fixation and anchorage to the Atlas;
- The connectors allow the assembly connection of occipital to cervical segment, being able to extend the assembly to the thoracic segment of vertebral column, with appropriate complement of Pedicle Fixation Lock-1;
- Reverse Occipital Screw/ Occipital Nut and Cancellous Screws of Ø3.5 mm offer safety and efficient fixation of occipital area;
- Support of Screw allows Cancellous Screws fitting of Ø3.5 mm on lateral mass, at neutral position (zero degree), 15° and 35°;
- A single drawer is enough for the whole kit of instrumental and implants.

## 1. Access Route

Place the patient in prone position, perform a midline incision.

The occipital bone portion must be exposed, as well as the rim of the foramen and posterior arch C1, avoiding vertebral artery damage. The paravertebral muscles must be carefully dissected and retracted to expose spinal apophyses and blades. The location of the articulated screw input portal varies according to the surgeon's technique choice.



## 2. Initial Drilling

After identifying the portal, perform the initial drilling with initiator IP.64, where the articulated screw with 3.5 mm diameter is intended to be placed. After initial drilling, use drill with stop BR.20.10/12/14/16/18 with the assistance of the drill guide CH.68.A, to make an orifice in the vertebral body corresponding to the articulated screw length that will be implanted.

Make orifices on the vertebral body where the screws are intended to be placed.



### 3. Depth Gauge

After drilling, check if the orifice is appropriate for respective articulate screw placement. Use depth gauge ME.17 to gauge.

### 4. Articulated Screw Insertion

Fit the pre-determined articulate screw 861.REF or 861.A.REF in the tip of the introducer wrench CH.100, and rotate the blocker clockwise to tap in the screw and fix it to the wrench. Insert the screws in the portals. To remove the wrench fixed in the screw, rotate the blocker counter-clockwise. Detail of articulated screws fixed.

## 5. Screw and Support Placement for Lateral Mass

Fit screw 860.REF in the introducer wrench Ch.56.A and fix it with forceps. Then fit the support of screw 860.0.15.35.REF with angulation of 0°, 15° and 35° in the thread wrench CH.100.B. Fit the guide wrench CH.100.A in the support orifice and perform the set final tightening. Next, place the support on the vertebra (lateral mass), and insert the screw in the portal.



Detail of articulated screw fixed and support of screw for lateral mass.





## 6. Longitudinal Rod Molding

Insert templates TT.32.8/16/25 in the articulate screws and support of screw fixed to obtain a pre-mold of longitudinal rod. The longitudinal rod 863. REF molding must be done with molder IP.66 or molder IP.65, using the molded template as a guide.

## 7. Longitudinal Rod Placement

After pre-molding the longitudinal rod, place it in the articulated screws and support of screw with the assistance of the rod forceps CH.103.B.

## 8. Locking Screw Placement

Fit the lock screw 864 in the wrench CH.56.A. To ease the lock screw fitting in the articulated screws and support of screws, the wrench must be rotated counter-clockwise until you notice the screw fits the thread. A "CLICK" sound is heard and, then, rotate the wrench clockwise to start the placement. At this stage it is not necessary to perform the final tightening, only ensure that the lock screw was placed correctly (check alignment) and the longitudinal rod is duly fixed. Detail of the lock screws fixed.

## Occipitocervical Fixation

### 9. Rod Molding

Insert templates TT.32.8/16/25 in the articulate screws and support of screw fixed to obtain a pre-mold of the rod. The occipitocervical rod 863.3/4. REF molding must be done with molder IP.66 or molder IP.65, using the molded template as a guide.



### 10. Occipitocervical Rod Placement / Marking

After pre-molding the occipitocervical rod, place it in the articulated screws and support of screw with the assistance of the rods forceps CH.103.B. leaving it well supported and aligned in the occipital area. Mark the bone where the reverse occipital screw will be placed, remove the rod and complete orifice mark. This mark will work as a guide for final drilling in occipital area.







## 11. Drilling for Occipital Fixation

After marking, perform the orifice that will allow the reverse occipital screw head 865.REF. pass through. Then, perform an orifice big enough to support only the central axis of the screw; the reverse occipital screw must find some resistance when fitted in the orifice.

**Note:** The rod/plate fixation in the occipital can also be done with screw 3.5 mm 860.REF. Perform the initial orifice using the drilling with stop BR.20.10/12/14/16/18 with the assistance of the drilling guide CH.68.A resting on occipitocervical rod. Then, insert the screw 3.5 mm to lock it. This fixation is less aggressive and more than 02 screws can be placed in each occipitocervical rod.



## 12. Reverse Occipital Screw Placement

Select the reverse occipital screw 865.REF more appropriated to the bone structure. Fit the screw in the stem guide CH.101. Then, insert the screw head in the occipital orifice. Performing a lateral movement, make the screw pass through the orifice until it rests on the lateral base of the orifice. Check if the screw is secured in the orifice and if the bone structure which is in contact with the screw head is enough to sustain a good fixation with occipitocervical rod.

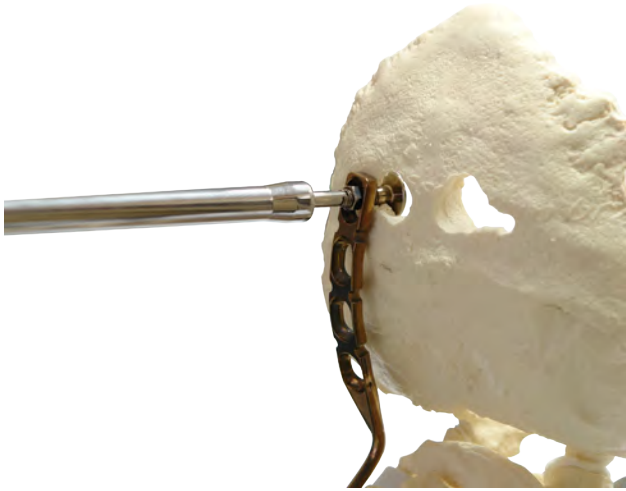
### 13. Occipitocervical Rod Placement in Reverse Occipital Screw

At this stage, the reverse occipital screw is still fixed in the stem guide and positioned in the occipital. Place the occipitocervical over the stem guide. Afterwards, assemble lock nut 865 in the introducer wrench CH.101.C. Place the wrench with the nut over the stem guide which is threaded in the screw, and start tightening the assembly compound of: reverse occipitocervical screw / occipitocervical rod / nut.



## 14. Occipitocervical Rod Final Tightening in Reverse Occipital Screw

Remove the introducer wrench and the stem guide which is threaded in the reverse occipital screw. Assemble final tightening wrench CH.101.B over the anti-torque wrench CH.101.A. Fit the anti-torque wrench in the orifice of reverse occipital screw to prevent the occipital screw rotate at the final tightening. Perform the final tightening by rotating the tight wrench clockwise until the set is fixed. Detail of occipitocervical rod fixed in the occipital area and posterior cervical area. To fix the rod on the other side, follow the same sequence previously described.



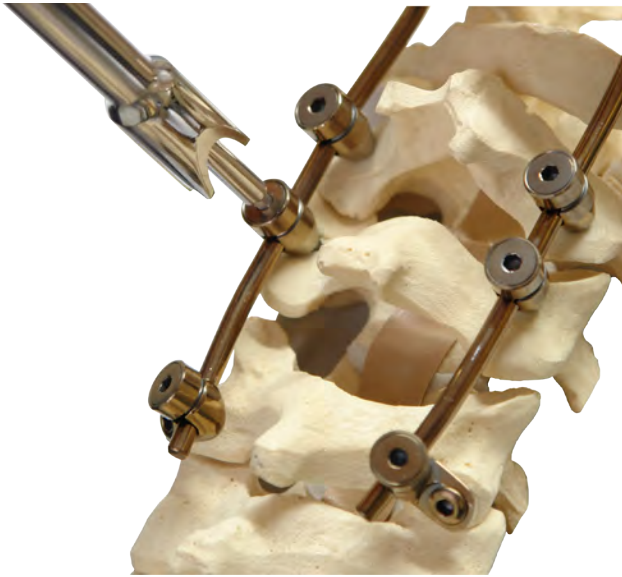
## 15. Angled Hook Placement – Complementary Fixation

Some assemblies require a complementary fixation. In these cases, the short and long hooks can be used for right and left side.

After selecting hook 862.A/B/C/D, assemble it on the thread wrench CH.100.B. Fit the guide wrench CH.100.A in the angled hook orifice and perform the set final tightening.

Then, place the angled hook on the posterior arch of vertebra C1 and fix it, and next place the lock nut to fix the angled hook to the occipitocervical rod.





## FINAL Fixation

### 16. Distraction and Compression System

Distraction and compression movements are achieved with forceps CH.103 and CH.103.A.

**Note:** To obtain these movements, one of the articulated screws, angled hooks or support of screw must be tightened while the other is only placed, but not fixed. After distraction or compression, the locking screw is tightened to fix the set.

### 17. Final Tightening

Assemble anti-torque wrench CH.102.A over the final tightening wrench CH.102 and fit the final tightening wrench in the lock screw hex. Then, fit the anti-torque wrench in the rod to perform the final tightening in all lock screws.



## 18. Cross-Link Placement

Use connector rod/rod 866 with transversal rod 866.  
REF to assemble and lock cross-link.



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