C1-C2 Surgical Technique Guide
Acknowledgment

We would like to recognise and thank Prof. J. Harms and Dr. R. Melcher for the elaboration of this surgical technique.
The description for C1-C2 fixation using individual bi-lateral fixation of the C1 articular mass and the C2 pedicle with minipolyaxial screws is designed to demonstrate the correct use of the MOUNTAINEER® OCT Spinal Fixation System instrumentation only. It is not intended to be a definitive guide to the correct surgical steps to achieve direct C1-C2 fixation.


### C1 Screw Positioning

- The entry point for the C1 screw is above the C2 nerve root, at the junction of the posterior arch of C1 and the lateral mass of C1, and at the highest point of the C1 mass. The drilling angle is dictated by the arch of C1, and so cannot be angled any more superiorly. A dissector should be used to move the C2 nerve root away from the intended entry point.

- Using a high speed burr with 1 or 2 mm diamond paste drill tip, perforate the cortex to allow access for drilling. Drill the pilot hole using the 2.4 mm diameter drill and guide. Bi-cortical fixation provides secure screw placement.

**NOTE:** The C1 screw incorporates a 10 mm unthreaded portion which stays above the bony surface of the lateral mass, minimising the potential for damage to the C2 nerve root and allowing the polyaxial position of the screw to lie above the posterior arch of C1.
A 3.5 mm long shank screw of an appropriate length is inserted bi-cortically into the lateral mass of C1. The position of the screw is verified using an image intensifier.

NOTE: Measure the depth for the Long Shank Screw (the total length indicated on the long shank screw includes the 10 mm unthreaded portion which is not inserted into the bone). The shank of the screw has to start just above the arch of C1.
PLACEMENT OF C2 PEDICLE OR PARS INTRA-ARTICULARIS FAVORED ANGLE SCREW

- Delineate the medial border of the C2 pedicle and mark the entry point for placement of the C2 pedicle screw with a high speed burr. The pilot hole is prepared with the 2.4 mm drill bit and just perforating the opposing cortex. The direction of the drill is angled approximately 20-30° in a convergent and cephalad direction, guided directly by the superior and medial surface of the C2 isthmus, respecting individual anatomic variations.

- The hole is then tapped and a 3.5 mm polyaxial screw of the appropriate length is inserted bi-cortically.

Inferior and lateral views of C1 screw placement demonstrating the smooth polyaxial screw shank sitting proud of the bone.
ROD INSERTION AND FINAL TIGHTENING

- Turn and align the screw heads using the minipolyaxial head adjuster.
- Take a section of 3.5 mm rod and cut to shape using the rod cutters. Place the rod into position with the rod holders.
- If necessary, further reduction maneuvers should be performed at this stage.
- Insert set screws and perform final tightening as described in the standard MOUNTAINEER Surgical Technique.

Lateral radiograph showing placement of C1-C2 screws (courtesy of Prof. J Harms).
Indications

When intended to promote fusion of the cervical spine and occipito-cervico-thoracic junction (occiput-T3), the MOUNTAINEER OCT Spinal System is intended for:

- Degenerative Disc Disease (DDD),
- spondylolisthesis,
- spinal stenosis,
- fracture/dislocation,
- atlanto/axial fracture with instability,
- occipitocervical dislocation,
- revision of previous cervical spine surgery,
- and tumours.

The occipital bone screws are limited to occipital fixation only. The use of the minipolyaxial screws is limited to placement in the cervical and upper thoracic spine (C1-T3). The Songer Cable System, to be used with the MOUNTAINEER OCT Spinal System, allows for wire/cable attachment to the posterior cervical spine. The MOUNTAINEER OCT Spinal System can also be linked to the ISOLA, TIMX, MONARCH, MOSS MIAMI, and EXPEDIENTUM Systems using the dual wedding band and axial connectors, and via dual diameter rods. The surgeon must be thoroughly knowledgeable not only in the medical and surgical aspects of the implant, but must also be aware of the mechanical and metallurgical limitations of metallic surgical implants. Postoperative care is extremely important. The patient must be instructed in the limitations of the metallic implant and be warned regarding weight bearing and body stresses on the appliance prior to firm bone healing. The patient should be warned that noncompliance with postoperative instructions could lead to failure of the implant and possible need thereafter for additional surgery to remove the device.

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