The Slim-loc™ anterior cervical plate is a semi-rigid plate system for anterior intervertebral body fixation. It is indicated for stabilization of the cervical spine from C2 to C7 employing the option of either uni-cortical or bi-cortical screw fixation at the anterior face of the vertebral bodies.
The Slim-loc™ Plate is a semi-rigid plate system intended for anterior cervical intervertebral body fixation. The design principles of the Slim-loc™ Plate are built upon the clinical heritage of the comprehensive Codman ACP plate system, but have been modified in order to offer a lower and slimmer plate profile, as well as offer additional implant options. The Slim-loc™ System offers maximum implant versatility and integrated instrumentation. The Slim-loc™ Anterior Cervical Plate System is indicated for stabilisation of the cervical spine from C2 to C7 employing unicortical screw fixation at the anterior face of the vertebral bodies. Specific clinical indications for anterior cervical plating include:

- Instability caused by trauma
- Instability associated with correction of cervical lordosis and kyphotic deformity
- Instability associated with pseudarthrosis as a result of previously failed cervical spine surgery
- Instability associated with major reconstructive surgery for primary tumours or metastatic malignant tumours of the cervical spine
- Instability associated with single or multiple level corpectomy in advanced degenerative disc disease, spinal canal stenosis and cervical myelopathy

Note: The described technique presents only one of many approaches to the stabilisation of the anterior cervical spine.

The surgeon is encouraged to utilize the Slim-loc™ Anterior Cervical Plating System with those techniques most familiar to the operating surgeon.

Introduction

Slim-loc™ Anterior Cervical Plates are available in 1-5 level configuration with a length ranging from 22-111 mm. When handling plates, use caution to avoid scratching or notching the plate surface as this can weaken and compromise the mechanical integrity of the device. Following anterior bone graft placement, use the forceps to select the appropriate plate size and place it on the vertebral column. Confirm that the length is appropriate. The plate should span the entire fusion segment; preferably using the shortest plate possible, therefore avoiding the adjacent disc space. Fluoroscopy may be utilized to optimize plate selection and screw placement.

Step 1: Choosing Plate Size
Surgical Technique

Step 2: Adjusting Plate Curvature

The Slimloc™ Plate has a precontoured lordotic curvature, anatomically appropriate in the majority of procedures. If desired, the Plate Bender may be utilised to optimally contour the sagittal plane to ensure maximum bone / plate interface.

It is critical to bend the plate in the specified Bend Zone(s), which has a smooth under-surface and reduced cross-sectional thickness. It is critical to bend the plate in the specified Bend Zone(s), which has a smooth under-surface and reduced cross-sectional thickness. If required to achieve additional plate lordosis, the plate is placed between the lobes (Camloc™ facing up) of the Plate Bender. The Bend Zone must be centrally located on the lower lobe of the Plate Bender. Plate bending should be evenly distributed along the length of the plate. Contouring titanium plates can weaken and compromise the mechanical integrity of the device. The fatigue life of the contoured implant in vivo cannot be precisely predicted. Do not bend the plates repeatedly, excessively, or any more than absolutely necessary.

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Step 3: Placing Temporary Fixation Pins

After selecting the appropriate plate, use the Temporary Fixation Pins (TFPs) to hold the plate in place while drilling and placing the screws. Using one of the plate holders described in step 5, hold and lay the plate evenly on the anterior cervical spine. Place the TFP through the pinhole on the plate using the TFP Holder. The TFP Holder has a tamping platform at the proximal end for when it is necessary to strike the TFP to drive it into place. After placing the two TFPs, fluoroscopy can be used to confirm optimal screw placement and trajectory. Any necessary adjustments may be done at this time and reconfirmed with fluoroscopy. Removing soft tissue and large osteophytes may improve bone-plate interface.

Note: Temporary Fixation Pins are designed for single use. Please ensure that all Temporary Fixation Pins have been removed and are not placed back in the set for re-sterilisation and re-use.
Step 4: Preparing Screw Hole

Before drilling it may be necessary to prepare the screw hole with an awl. To use the Slim-loc™ Awl, place the tip of the awl shaft against the screw hole on the plate and press it in the direction of the screw angle desired. The awl will protrude into the desired hole (the awl also has a striking plate on the handle).

Step 5: Drilling Holes

The screw angle may be selected and the plate stabilised during the drilling procedure. The Slim-loc™ System has two styles of plate holder / drill guides. They both achieve the same results.

A. Plate Holder / Drill Guide

The Plate Holder / Drill Guide may be attached to the plate by placing the expandable end into a lateral screw hole and turning the knurled knob clockwise.

B. Pistol Grip Plate Holder / Drill Guide

The Pistol Grip Plate Holder / Drill Guide may be attached to the plate by placing the expandable end into a lateral screw hole and compressing the pistol grip handle.

Note: Before using the Drill Guides, inspect the prongs for any cracks or abnormality. Do not activate the plate holding feature of the Drill Guide when the expandable end is not fully seated in a screw hole.
The Slim-loc™ Anterior Cervical Plate System offers the ability to select various angles of screw placement to conform to individual patient anatomy. (Certain angles may direct the screws at vulnerable vascular and neural tissues). Use fluoroscopy to confirm drill bit penetration depth and angular orientation to ensure that those structures are not at risk.

**Step 6: Selecting and Using Drill Bits**

**Note:** Avoid severe angulation of the superior screw (greater than 16 degrees) which may prevent optimal locking of the screw with the cam.

The drill length should correspond to the depth of the bone purchase required, taking into consideration the size of the vertebra, the quality of the bone, diagnosis, etc. The Slim-loc™ System is available with 12 mm (blue), 14 mm (gold) and 16 mm (magenta) fixed length drill bits. The colours correspond to their respective screw size colours.

The Variable Depth Drill can be adjusted in 1 mm increments from 12 mm to 26 mm as desired. The precise length of the Variable Depth Drill Bit is determined by adjusting the release on the cylinder gauge at the end of the Variable Depth Drill. Ensure that the release button is locked in place at the desired length before using the Variable Depth Drill.

Utilising one of the Drill Guides described in step 5, select the angle of screw trajectory. Attach the selected drill bit into the Quick Couple Handle or a power drill. Insert the drill bit into the Drill Guide and drill the initial lateral hole into the vertebral body.

The drill depth and angular orientation of the screw must also be confirmed by fluoroscopy. Typical screw placement is 5-10 degree medial angulation with the screw directed 7.5 degrees rostral & caudal to correspond with the superior and inferior disc spaces respectively.

The drill length should correspond to the depth of the bone purchase required, taking into consideration the size of the vertebra, the quality of the bone, diagnosis, etc. The Slim-loc™ System is available with 12 mm (blue), 14 mm (gold) and 16 mm (magenta) fixed length drill bits. The colours correspond to their respective screw size colours.

The Variable Depth Drill can be adjusted in 1 mm increments from 12 mm to 26 mm as desired. The precise length of the Variable Depth Drill Bit is determined by adjusting the release on the cylinder gauge at the end of the Variable Depth Drill. Ensure that the release button is locked in place at the desired length before using the Variable Depth Drill.

Utilising one of the Drill Guides described in step 5, select the angle of screw trajectory. Attach the selected drill bit into the Quick Couple Handle or a power drill. Insert the drill bit into the Drill Guide and drill the initial lateral hole into the vertebral body.
The length of the Tap that will extend beyond the soft tissue protection sleeve is set by turning the cylinder gauge mounted near the handle of the Tap in either direction. Please ensure that the release button is locked in place at the desired length before using the Variable Depth Tap.

**Step 7: Using The Tap**

**Note:** The setting for both the Variable Depth Drill and the Tap can be approximated by pre-operative computed tomography measurements (CT or MRI) or by intra-operative measurement of the exposed vertebral endplates following decompression. The use of intra-operative fluoroscopy prior to drilling and tapping will further improve the accuracy of screw length selection.

**Step 8: Inserting Screws**

The Slim-loc™™ screws are available as self-drilling (4.5 mm major diameter) in lengths ranging from 12-18 mm or self-tapping (4.5 mm major diameter) in lengths ranging from 12-26 mm. Large diameter screws (4.8 mm major diameter) are available in 12, 14 and 16 mm lengths.

For identification purposes the 12-17 mm screws are colour coded for length and screw type. The most common lengths are colour-coded to correspond with the fixed drill shafts.

- For self-tapping screws, the entire screw is uniformly coloured.
- For self-drilling screws, only the heads are coloured.
- For large-diameter screws, only the threads are coloured. Length is denoted by the following colours and should always be confirmed with a screw gauge:
  - $12 \text{ mm} = \text{Blue}$
  - $13 \text{ mm} = \text{Purple}$
  - $14 \text{ mm} = \text{Gold}$
  - $15 \text{ mm} = \text{Light Blue}$
  - $16 \text{ mm} = \text{Magenta}$
  - $17 \text{ mm} = \text{Copper}$
  - $18 \text{ mm} - 26 \text{ mm} = \text{Silver}$

Select the appropriate screw length corresponding to the hole drilled. Using the Hex Driver, pick up the screw from the tray and insert it through the plate. Drill the first hole, tap if desired, and place screw without tightening completely. After confirming proper plate positioning, drill, tap if desired and place screws in all remaining screw holes. Begin with the lateral hole that is opposite and diagonal to the first prepared hole. Remove Temporary Fixation Pins and perform final tightening of all screws in the same sequence as mentioned above.
Surgical Technique

Locking all screws within the plate is the last step in the plating procedure. All screws should be secured to the vertebral bodies as previously described before beginning the cam locking procedure. To lock the screw, engage the Cam-loc™ mechanism by fully seating the Cam Tightener straight into the slot of the cam. It is important to maintain a relatively perpendicular orientation of the Cam Tightener to the cam slot during the entire locking procedure so as not to inadvertently tear or strip the cam slot. Additional exposure may be temporarily required to properly align the Cam Tightener with the cam. Rotate the Cam Tightener clockwise, resistance will be felt as the cam contacts the head of the screw. Ensure you do not rotate the cam beyond 270 degrees (vertical slot).

Note: Exact position of a locked cam is dependent on a number of factors and may vary within the typical locking zone. Do not turn the cam past 270°.

Bone Graft Solutions

“Shape memory” is retained in hydrated Healos® Bone Graft Replacement, resulting in excellent porosity within the site. Healos® Bone Graft Replacement, just prior to hydration with bone marrow aspirate. Hydrated, compacted Healos® Bone Graft Replacement.

• 3-Dimensional, osteoconductive matrix constructed of cross-linked type I collagen fibres, coated with non-crystal hydroxyapatite.
• Strong affinity for osteoprogenitor cell attachment and an ideal environment for the cellular proliferation needed in the bone formation process.

Conduit™ TCP Granules are made entirely of β-TriCalcium Phosphate, the porous, osteoconductive ceramic similar to the mineral constituents of natural bone (i.e. 70%).
• The partially connected pore structure of Conduit™ TCP Granules is well-suited for cell-in-cell interaction, nutrition and vascularisation. Its high degree of surface area provides a generous field for cellular attachment.
• 6-9 months resorption rate.
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