The **Snowmass™ Anterior Cervical Plate System** is intended for the surgical treatment and correction of traumatic and pathologic conditions of the cervical spine. It consists of titanium alloy plates and screws with comprehensive instrumentation.

Many important features were incorporated into the Snowmass Anterior Cervical Plate System:

1. **Low Profile Plate Thickness** (2.4mm).
2. **Large Graft Window** for increased visualization.
3. **Pre-contoured Plates** for levels 1, 2, 3 and 4.
4. **Fixed and Variable Screws** are available in self-drilling and self-tapping designs.
5. **Quick-locking Bushing** secures screw in a single step.
6. **Simple, intuitive instrumentation.**

**Consulting Surgeon:**
Christopher Kauffman, M.D.
University Medical Center
Lebanon, Tennessee
Surgical Approach

Prior to sterilization, review and inspect all instrumentation and implants. Replace or add any needed components for the planned surgery. The primary surgeon must be fully experienced with the required cervical instrumentation techniques.

Prep, position and drape the patient in the usual fashion. A standard anterior cervical approach is performed. The appropriate level discectomy and/or corpectomy is completed and bone graft is placed.

Plate Placement

1. Select an appropriate plate and place against the anterior cervical spine to determine the correct length and contour. If additional plate contouring is desired, the Plate Bender (4404-1008) is used. The removable Anvil (4404-1008-01) must be attached to the Plate Bender in the correct orientation. This allows the surgeon to either increase or decrease lordosis as needed.

   If Increasing the lordosis, insert the Anvil with + LORDOSIS towards the plate. Make sure the arrow on the Anvil is inserted towards the arrow on the Plate Bender. The Hammer is also moved so the + is towards the plate to be bent.

   To Decrease lordosis (flatten the plate), rotate the Hammer with the – towards the plate and place the Anvil with – LORDOSIS upward.

   The post on the Anvil is always positioned in the rear and used to properly align the plate between the Hammer and Anvil. Do not place the plate over the post.

2. Temporary Fixation Pins (4404-1109) are inserted using the Hex Driver and screwed into position. Single-Use Only.
**Preparing Screw Holes**

Self-Drilling and Self-Tapping Screws are available in the set. When using the Self-Tapping Screws, the Anterior Cortex may be penetrated with either an Awl or the Drill. There are two Awls available in the instrument tray, the **Variable Awl (4404-1002)** and the **Fixed Awl (4404-1202)**.

1. The Variable Awl has a spring-loaded distal tip that can protrude up to 10mm. The trajectory of the Variable Awl should be in line with the desired screw angle.

2. The Fixed Awl penetrates 8mm in depth and is used with the Fixed Drill Guides.

**Screw Trajectories**

Nominal Screw Trajectories are the screw angle built into the plate. All angles are in respect to perpendicular to the plate.

**Fixed Screws:**
- Fixed Screws go in the nominal trajectory ONLY.
  - **End Holes:** 8° Medial, 8° Caudal/Cephalad
  - **Middle Holes:** 8° Medial, 0° Caudal/Cephalad

**Variable Screw:**
- **Range of Motion:** 16° Cone of Angulation
  - **End Holes:** 0°–16° Medial
    - 0°–16° Caudal/Cephalad
  - **Middle Holes:** 0°–16° Medial
    - -8° to +8° Caudal/Cephalad
There are separate Fixed Angled Drill Guides for either the **END (4404-1205)** or the **MIDDLE (4404-1206)** holes in the plate. These guides can be used for drills, taps or screws.

1. The END Fixed Angle Drill Guide is used for drilling the caudal and cephalad screw holes. It can only be seated on the plate in one orientation. The END Fixed Angle Drill Guide is set at 8 degrees caudal/cephalad and 8 degrees medial.

2. The MIDDLE Fixed Angled Drill Guide is 0 degrees caudal/cephalad with an 8 degrees medial trajectory.

**Drilling for Variable Angle Screws**

A **Variable Angle Drill Guide (4404-1304)** is used when it is necessary to vary the screw angle at each hole. The Variable Angle Drill Guide allows for individual screw trajectory but should be directed no more than 8 degrees from nominal.

**Note:** The Fixed and Variable Drills are not interchangeable with the Drill Guides. Use only the labeled “Fixed” Drills with the Fixed Drill Guides and the “Variable” Drills with the Variable Drill Guide.
The Snowmass Anterior Cervical Plate System provides Self-Tapping and Self-Drilling Screws, which can be used at the discretion of the surgeon.

The instrument tray contains 2 taps, one for Variable Angle Screws and the other for Fixed Angle Screws.

The **Variable Tap (4404-1003)** will not penetrate beyond 10mm.

The **Fixed Tap (4404-1203)**, which fits down the Fixed Drill Guides, will not penetrate the cervical vertebrae beyond 11mm.
Inserting Screws

1. The **Hex Driver (4404-1101)** is used to insert the screws through the plate and into the vertebral body. The screw is held by a taper fit between the Hex Driver and the screw head.

2. Insert the screw into the previously-prepared screw hole, but do not tighten into the plate bushing. Screws should be inserted and lightly tightened, alternating proximally, distally and contralaterally until all screws have been placed.

3. Confirm correct alignment, placement and trajectory of the screw with radiographs before locking the screws into the plate.

**Tip:** If the Hex driver sticks in the screw head, gently "wiggle to disengage".

Locking the Screws

The screws are locked into the plate upon an **audible click, tactile feel** and/or **visual observation** that the laser-marked line on the side of screw head is recessed below the plate surface.
Removing the Screws

The **Screw Remover Tool (4404-1012)** comes assembled in the instrument tray and is made of five components: Instrument Body Handle, Drawrod, Counter-Torque Sleeve, Tab Release and Hex Driver Tip.

1. Align the tabs of the **Tab Release** with the slots on the screw head.

2. Turn the top wheel of the **Drawrod clockwise**. This captures the inner threads of the cervical screw and secures it to the **Screw Remover Tool**.
3. Turn the Counter-Torque Sleeve clockwise until it touches the plate.

4. While holding the Counter-Torque Sleeve stationary, turn the Instrument Body Handle counter-clockwise to remove the screw.

**The Tab Releases are single-surgery use. The Hex Driver Tips are replaceable.**

Important: Review the package insert for a comprehensive list of warnings, cautions, contraindications, risks and product description.
Instruments for the Snowmass Anterior Cervical Plate System

4404-1012, Screw Remover Tool

4404-1202, Fixed Awl

4404-1002, Variable Awl

4404-1203, Fixed Tap

4404-1003, Variable Tap

4404-1012, Screw Remover Tool

4404-1101, Hex Driver

4404-1007, Drill Handle

4404-1008, Cervical Plate Bender

4404-1012-004, Tab Release – Disposable

4404-1206, Fixed Drill Guide, MIDDLE

4404-1412, 12 mm
4404-1414, 14 mm
4404-1416, 16 mm

4404-1205, Fixed Drill Guide, END

4404-1304, Variable Angle Drill Guide

4404-1312, 12 mm
4404-1314, 14 mm
4404-1316, 16 mm

4404-1008-01, Anvil
Implants for the Snowmass Anterior Cervical Plate System

**Plates:**

- **One Level** – 6 sizes:
  - 2mm increments (20-30mm)

- **Two Level** – 9 sizes:
  - 2mm increments (32-38mm)
  - 3mm increments (38-53mm)

- **Three Level** – 9 sizes:
  - 3mm increments (53-77mm)

- **Four Level** – 9 sizes: (Special Order)
  - 4mm increments (68-92mm)

**Plate Measurements:**

- Plate Profile: 2.4mm
- Plates are sized by the overall length
- Caudal to Cephalad center of screw holes are the overall length minus 8mm

**Titanium Screws:**

Available in 2 Diameters:

- 4.0mm Primary
- 4.35mm Revision

Available in 3 Screw Lengths:

- 12, 14 and 16mm

Available in 2 Screw Tip Designs:

- Self-Drilling and Self-Tapping

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4.0mm Fixed, Self-Drilling

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4.0mm Variable, Self-Drilling

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4.0mm Variable, Self-Tapping

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4.35mm Fixed, Self-Tapping

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4.35mm Variable, Self-Tapping

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Screw length is measured from underside of plate to tip of the screw (Bone Purchase)
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