

RAVEN[®] LATERAL

Lumbar Lateral Plate System





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Lateral Lumbar Plate System



Introduction

The ChoiceSpine Raven® Lateral Lumbar Plate System is a two-screw plate for lateral lumbar spinal fusion. Raven Lateral is a two-screw plate with an integrated cam lock mechanism for screw blocking. The Raven Lateral Plate System has simple instrumentation that is compatible with the ChoiceSpine VEO® Lateral Access System.

System Features

- Compatibility with our VEO Lateral Access System
- Integrated cam locking mechanism that provides a visual, tactile and audible confirmation of screw blocking.
- 10 degrees of screw angulation
- Plate heights: 15mm – 23mm in 2mm increments
- Screw lengths: 35mm – 60mm in 5mm increments
- Screw diameters: \varnothing 5.0mm & \varnothing 5.5mm
- Streamlined instrumentation

Detailed Operative Technique

The patient is placed in the lateral decubitus position, then the operative site is prepared and draped in the usual fashion. The surgeon should follow the instructions provided with the preferred retractor system for exposure of the targeted fusion level in the lumbar spine. Fluoroscopy is used to confirm the appropriate disc level has been exposed. A thorough discectomy is performed, and the cartilaginous endplates are removed at the operative level. The size of the disc space is measured with sequential trials until the desired fit is achieved, and the matching interbody size is selected to restore the normal disc space height (Figure 1).

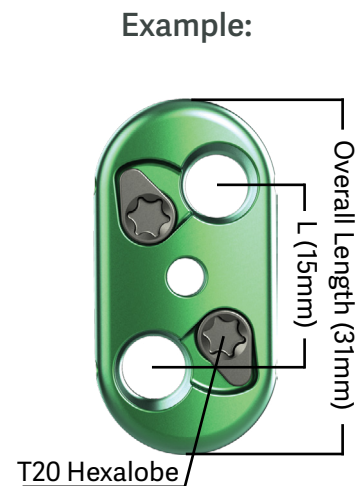


Figure 1
Interbody Placement

After exposure, disc preparation, trialing, and interbody placement has been completed, the Raven Lateral Plate may be implanted.

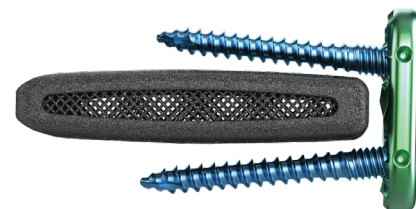
Plate Selection

Raven® Lateral Plate System Size Offerings	
Plate Size Measured Screw-to-Screw Length "L" (mm)	Overall Length (mm)
15	31
17	33
19	35
21	37
23	39



The Raven Lateral Lumbar Plates are designed to correspond with the VEO Lateral PEEK Interbody or TigerShark® Lateral Interbody. The suggested pairing is included in the table below.

Lateral Interbody Pairing Sizes	
Lateral Interbody Height (mm)	Raven Lateral Plate Screw-to-Screw Length "L" (mm)
9	15
11	17
13	19
15	21
17	23

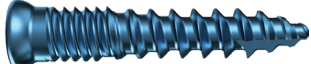
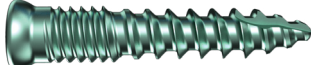


NOTE: The pairings in the table above depicts the closest possible screw insertion point to the lateral corners of the lumbar interbody/vertebral endplates without interference between the screws and interbody. A larger plate can be selected for a given interbody, if desired.

WARNING: Do not attempt to bend the Raven Lateral Plates. Bending the plate could cause unknown damage to the plate and possibly render it unusable.

Screw Selection and Preparation Options

The Raven® Lateral Lumbar Plate System has been designed with simplicity in mind and allows for direct screw placement after plate insertion. The system includes Ø5.0mm and Ø5.5mm variable angle screws in lengths from 35mm to 60mm by 5mm increments.

Screw Offerings		
Diameter (mm)	Length (mm)	
Ø5.0 Self-Tapping Screw	35, 40, 45, 50, 55, 60	Ø5.0 
Ø5.5 Rescue Self-Tapping Screw		Ø5.5 

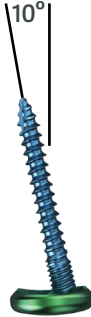
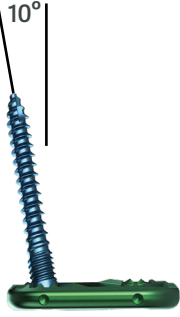
Angulation Range		
Neutral Screw Axis: 0° Cranial/Caudal 0° Anterior/Posterior		Maximum Screw Angles Shown (for Ø5.0 screws only)
Ø5.0 Screw	10° Cone Around Neutral Screw Axis	 
Ø5.5 Screw	5° Cone Around Neutral Screw Axis	

Plate and Screw Insertion Technique

Step 1: Plate Placement

The Lateral Plate and Screw Caddy (Y090-4100) provided with the Raven System is not only used to store the implants, but also designed for assistance loading the Lateral Plate to the Lateral Plate Inserter (Y070-1001). Align “SCREW” on the Inserter with “S” on the Caddy and “CAM” with “C”. Place the Inserter arms in the “S” and “C” slots to align the insertion features on the Inserter and plate (Figure 2a-c).

Push the outer sleeve of the inserter forward to retain the plate. Rotate the outer sleeve clockwise until the laser marked band on the inner shaft of the Inserter becomes visible (Figure 2d).

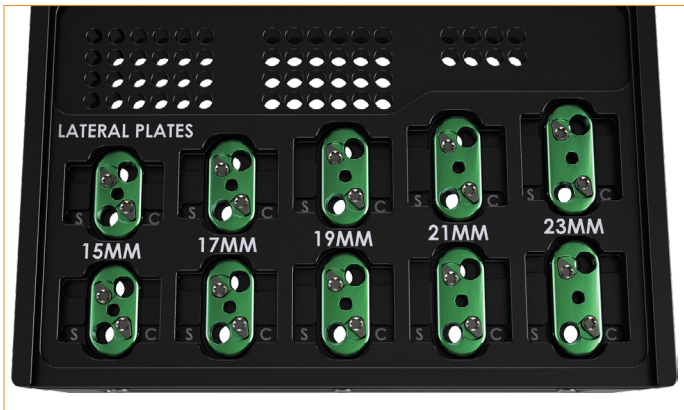


Figure 2a
Plate Caddy



Figure 2b
Inserter Attachment



Figure 2c
Inserter Alignment



Figure 2d
Inserter Tightening

WARNING: Do not rotate outer sleeve past laser marked band for proper insertion.

The Lateral Plate Inserter (Y070-1001) retains the plate at a 30° angle for insertion through the VEO® Lateral Access System. When the Lateral Plate reaches the vertebral bodies, the plate will rotate from 30° to 90° for proper plate placement (Figure 2e).



Figure 2e
Plate at 30°

Center the Lateral Plate over the interbody in the disc space (Figure 3).

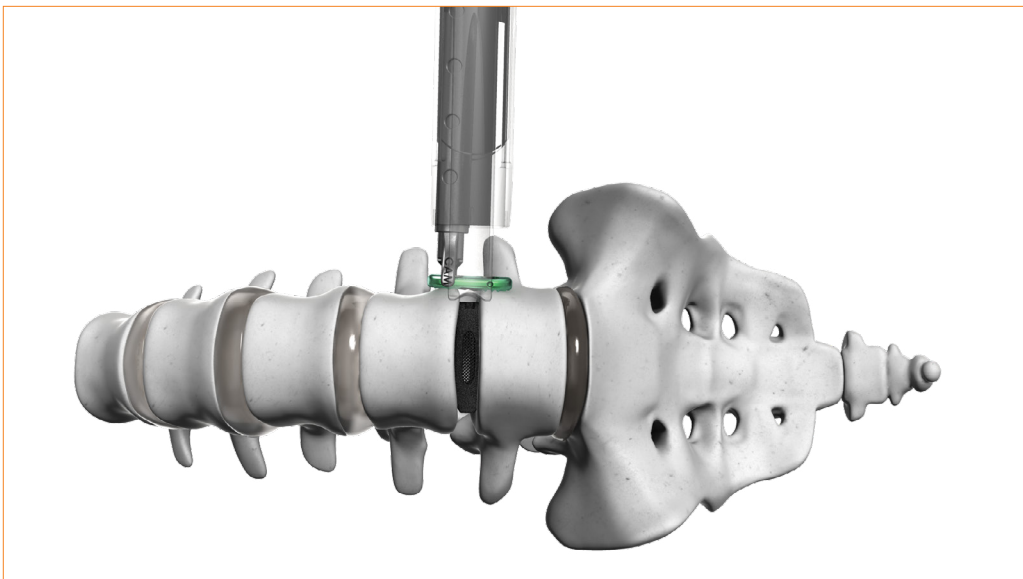
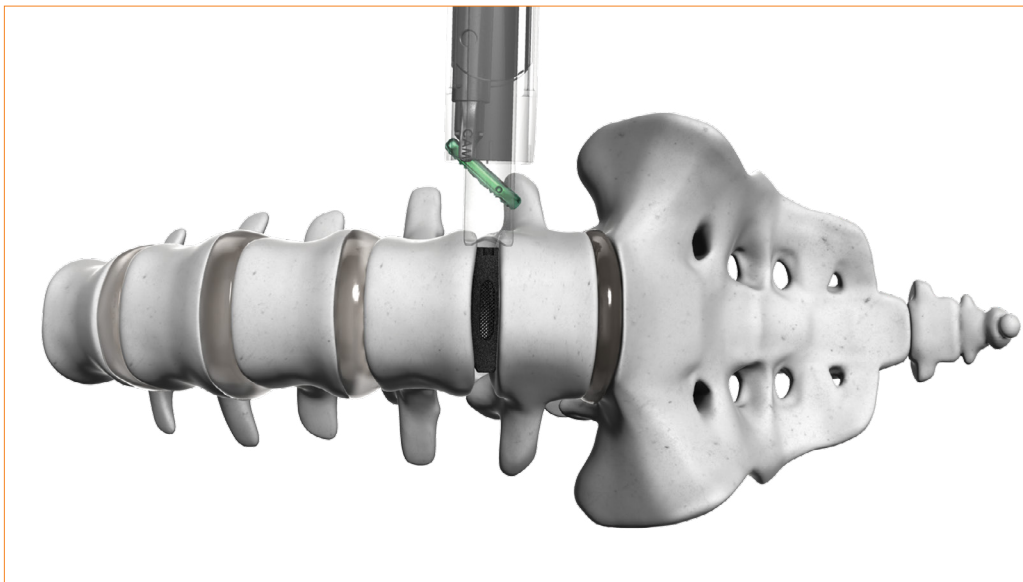


Figure 3
Plate Placement

Step 2: Screw Preparation

Method 1: Through Lateral Plate Inserter

The Lateral Plate Inserter acts as a Guide for the **Straight Awl (Y070-1007)**, **Straight Drill (Y070-1005)** and **Screwdriver (Y070-0043)**. Select the preferred screw preparation instrument, **Straight Drill** and/or **Straight Awl**, to prepare the screw hole (Figure 4). Hold the plate in the desired position over the interbody. Pivot the inserter up to 10° to achieve the desired screw angulation. Attach the **1/4" Ratcheting Quick Connect Handle (E070-0071)** to the selected Screw preparation instrument. Insert the instrument through the cannulation of the **Lateral Plate Inserter** into the screw pocket of the lateral plate and gently apply pressure or rotate to penetrate the vertebral body. Figure 4 below demonstrates the use of the awl which allows for up to 20mm of bone penetration, which is indicated by the laser marked bands on the proximal end of the **Straight Drill** and **Straight Awl**.

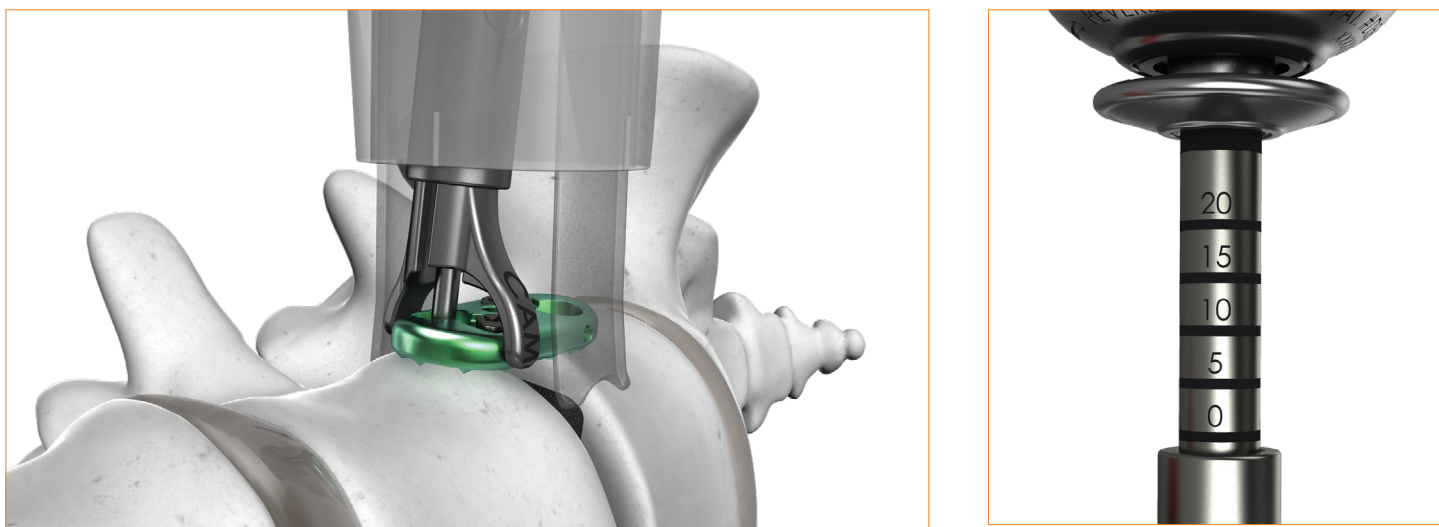


Figure 4
Drill Preparation

Method 2: Without Lateral Plate Inserter

For preparation of the screw not using the **Lateral Plate Inserter**, the following methods are available:

1. Using the **Straight Retractable Awl/Drill (Y070-1006)** with incorporated guide sleeve or
2. Using the **Variable Angle Guide (Y070-1004)** with the **Straight Drill** or **Straight Awl**.

NOTE: Take care to stay within the limits of screw angulation so the cam lock can be rotated over a portion of the screw heads and engage the locking features on the face of the plate.

NOTE: The marked bands on the proximal end of the **Straight Awl** and **Straight Drill** align with the proximal end of the **Lateral Plate Inserter** or **Variable Angle Guide** to indicate the penetration depth of the instrument.

Step 3: Screw Insertion

Select the appropriate diameter and screw length and load it onto the screwdriver. Attach the Axial Quick Connect Handle (M070-0003) on the Screwdriver and select the appropriate diameter screw and length and load it onto the Screwdriver.

WARNING: Do not engage the cam lock after the first screw is placed. Both screws must be implanted prior to engaging the cam lock to cover the screw heads.

Method 1: Through Lateral Plate Inserter

Guide the Screwdriver through the cannulation of the Lateral Plate Inserter (Y070-1001) and advance the screw until it is fully seated in the plate (Figure 6). Once both screws are inserted confirm the screws are fully seated. Remove Lateral Plate Inserter by rotating the outer sleeve counterclockwise and pulling sleeve proximally.

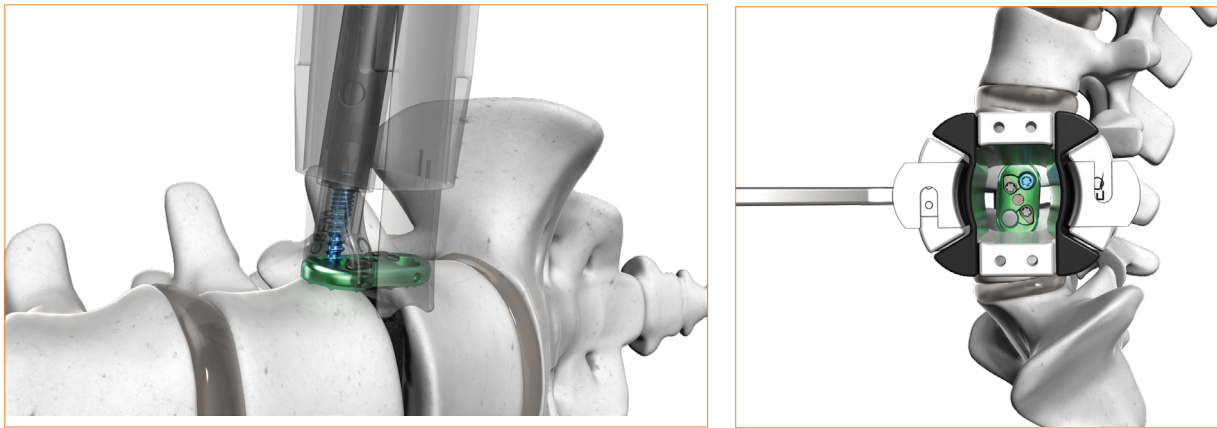
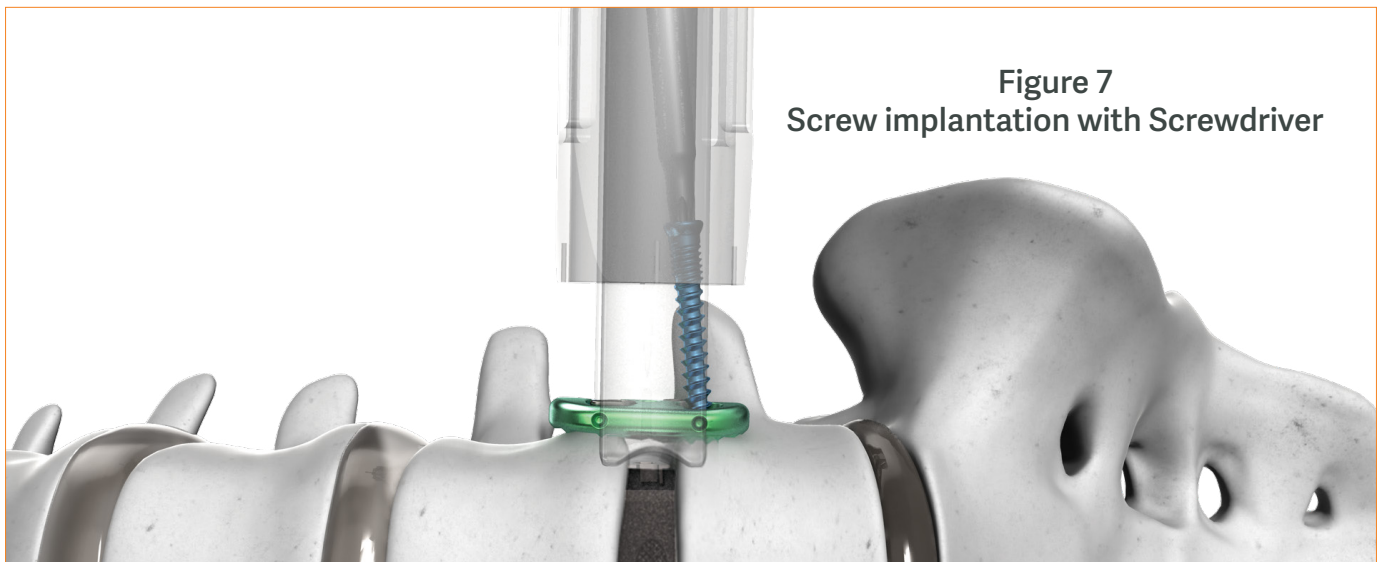


Figure 6
Screw implantation with Screwdriver (Y070-0043)

Method 2: Freehand

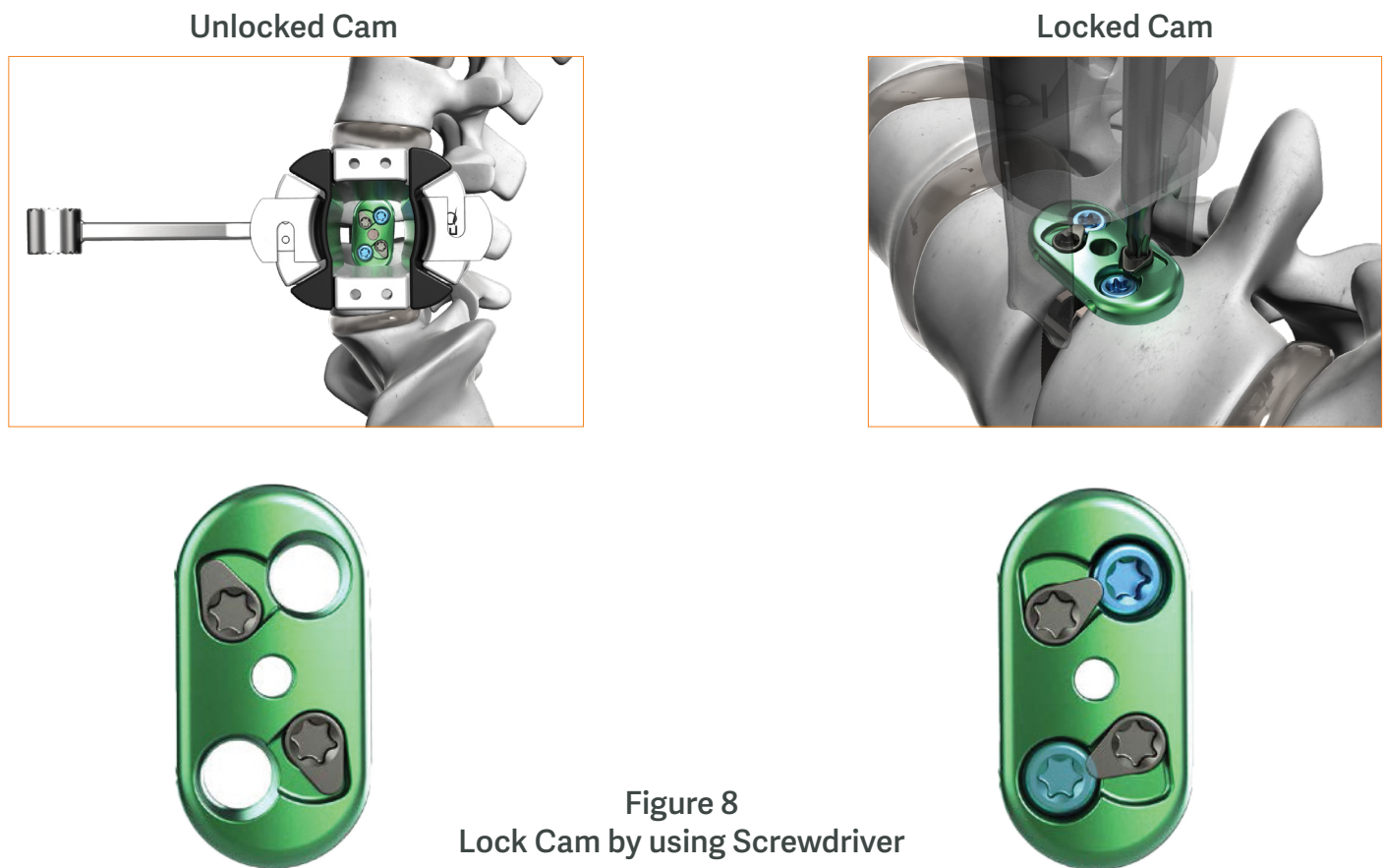
Guide the loaded Screwdriver through the VEO® Lateral Access Retractor into the prepared screw hole. Advance the screw until fully seated in the plate (Figure 7).



Step 4: Cam Lock Engagement

To lock the cam use the **Screwdriver** to engage the **T20 Hexalobe** at the center of the cam (Figure 8). Gently rotate the cam clockwise 90° until visual and tactile engagement confirms the cam is in the locked position. The cam requires approximately 15 in-lbs of torque to lock. Cam engagement is demonstrated in the Figure 8 below.

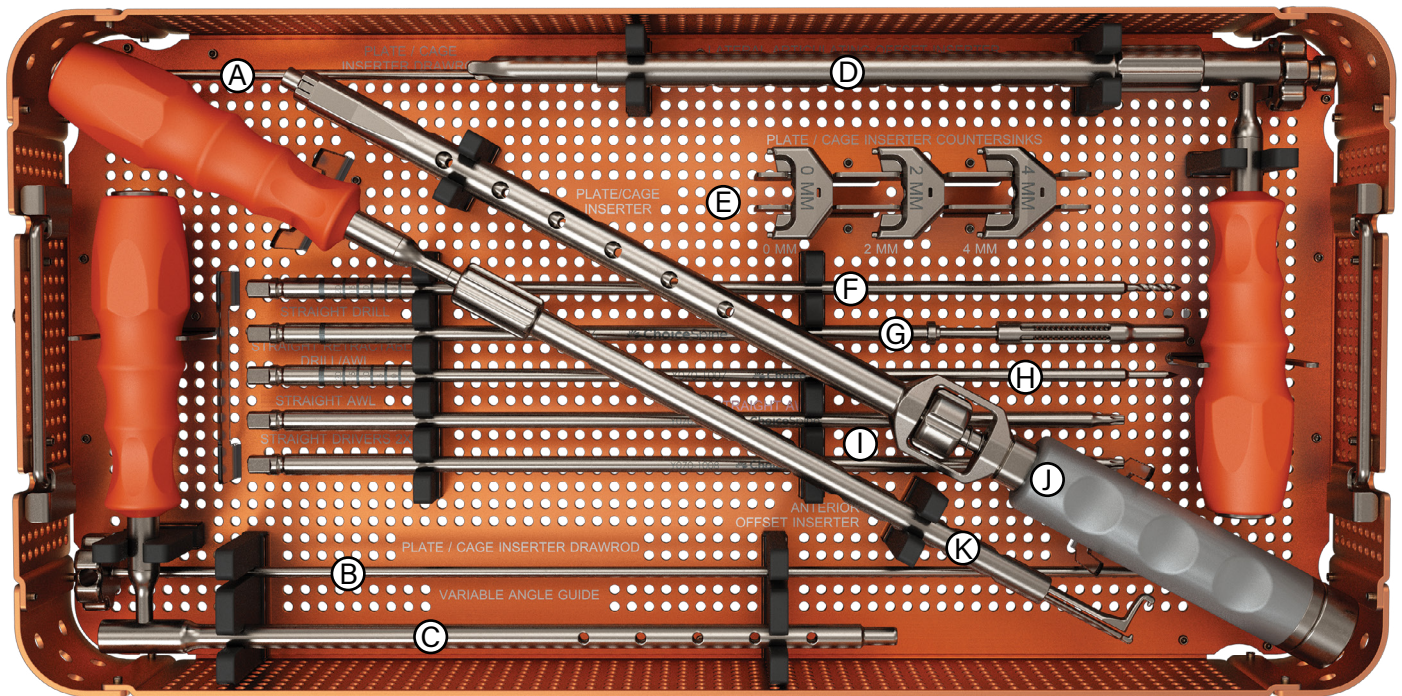
WARNING: Multiple rotations of the cam causes deformation of its locking feature. Do not repeatedly engage/disengage the cam lock from the locked and unlocked positions. The user should verify correct screw placement **BEFORE** engaging the cam lock. It should be noted that the cam lock is **NOT** required for securing the screws to the plate. It is a backup mechanism to prevent screws from backing out of the plate and potentially causing local tissue irritation if screws become loose. Do not attempt to over-rotate the cam once it has reached its "locked" position.



Implant Removal

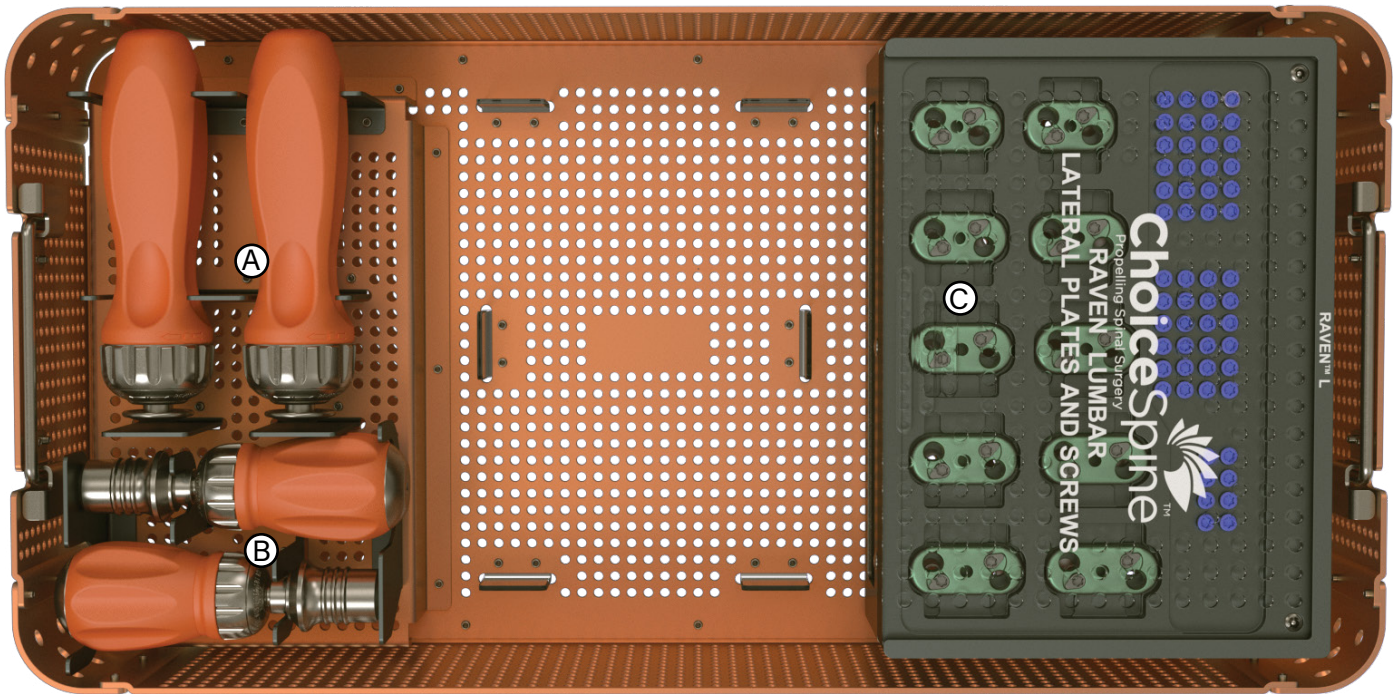
If removal is necessary, use the **Screwdriver** to rotate the cams to the unlocked position, fully exposing the screw heads for **Screwdriver** access. Insert the **Screwdriver** into each screw head and reverse the screw from the vertebral body and plate. Attach the **Lateral Plate Inserter** or other grasping instrument to remove the plate from the surgical site.

Raven® Lateral Top Tray



- Ⓐ **Raven® Combo Inserter Drawrod Removal Tool (Y070-0056)**
- Ⓑ **Plate/Cage Combo Insert, Drawrod (Y070-0055)**
- Ⓒ **Variable Angle Guide (Y070-1004)**
- Ⓓ **Lateral Plate Inserter (Y070-1001)**
- Ⓔ **Raven® Combo Inserters 0mm (Y070-0048), 2mm (Y070-0050), and 4mm (Y070-0052)**
- Ⓕ **Straight Drill (Y070-1005)**
- Ⓖ **Straight Retractable Drill/Awl (Y070-1006)**
- Ⓗ **Straight Drill/Awl (Y070-1007)**
- Ⓘ **Screwdriver x2 (Y070-0043)**
- Ⓙ **Anterior Plate/Cage Combo Inserter (Y070-0046)**
- Ⓚ **Anterior Offset Plate Inserter (Y070-1000)**

Raven® Lateral Bottom Tray



- Ⓐ Ratcheting Quick Connect Axial Handle x2 (M070-0003)
- Ⓑ Ratcheting Quick Connect Palm Handle (E070-0071)
- Ⓒ Lateral Plate/Screw Caddy (Y090-4100)



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