

BLACKBIRD™ HLS

Titanium Hinged Laminoplasty System





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BLACKBIRD™ HLS

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Introduction

The ChoiceSpine Blackbird™ Hinged Laminoplasty System (HLS) design eliminates fitting plates through trial and error bending and allows placement of the contralateral plate before elevating the lamina. In addition, the spacer is pre-tapped to provide a more secure plate connection over a similar allograft, and the lamina contact ends are grit blasted for a high-performance grip. The Blackbird HLS system offers a comprehensive, innovative solution to laminoplasty.

System Features:

Plates

- Hinged Spacer Plate: 4-10 mm (2 mm inc)
- Hinged design to conform to a variety of anatomical geometry
- Hinge design fits range of laminar thicknesses

Screws

- Ø2.4 mm Self-Drilling Screws: 6-10 mm (2 mm inc)
- Ø2.4 mm Self-Tapping Screws: 4-10 mm (2 mm inc)
- Ø2.8 mm Rescue Screws: 6-10 mm (2 mm inc)
- Screws thread lock to screwdriver for secure implantation

Spacer

- Titanium Spacer: 4-10 mm (2 mm inc)
- Tapered thread on spacer provides better fixation to plate than similar allograft
- Grit blasted spacer for high performance grip



Patient Positioning and Exposure



Fig. 1
Proper Alignment

- Place patient on operating table in prone position with head and neck held securely in proper alignment (Figure. 1).
- Confirm proper alignment with imaging as well as direct visualization prior to draping.
- Perform standard midline exposure of involved levels.
- Lateral dissections follow subperiosteal plane out to the edge of lateral mass, preserve the facet joint capsule (Figure 2).

NOTE: When possible, preserve the inter and supraspinous ligament between C7 and T1.

NOTE: It is a prerequisite that, due to the anatomic variability of each patient, the surgeon has available the range of necessary images in order to be equipped to plan the operation appropriately.



Fig. 2
Lateral Dissection

Preparation

- The open side trough is prepared with a burr along the junction of the lamina and the lateral mass (Figures 3 and 4).
- A combination of burrs and kerrisons may be used to create the trough avoiding intrusion of instruments into the spinal cord.
- The hinge side should be prepared in the same manner as the trough with a burr.
- Location of hinge is similar to that of the trough through the contralateral side - at the lamina lateral mass junction.
- The amount of bone to be removed for hinge should be sufficient to create greenstick fracture (Figures 5, 6 and 7).



Fig. 3
Trough Preparation

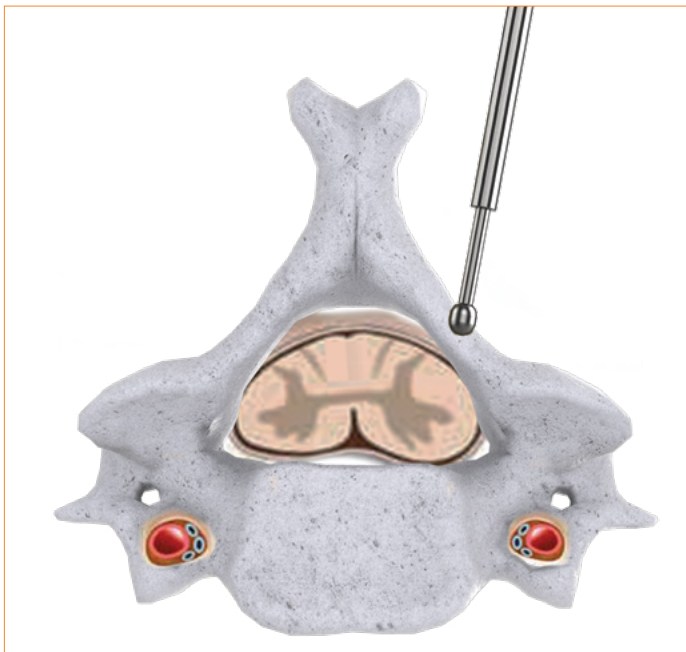


Fig. 4
Trough Preparation Detail

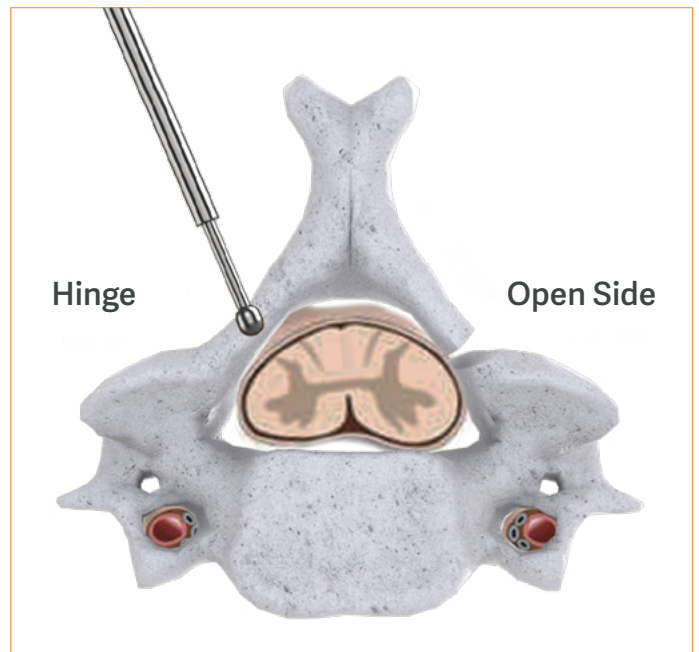


Fig. 5
Hinge Preparation

NOTE: If symptoms are unilateral, trough should be located on symptomatic side. For bilateral symptoms, trough location is left to surgeon discretion.

NOTE: On the hinge side, too much bone removal may result in a fracture requiring additional fixation.



Fig. 6
Opening the Lamina



Fig. 7
Hinge Side

Hinge Plate (if necessary)

- A hinge plate can be placed over the greenstick fracture prior to elevating the lamina to eliminate difficulty placing in the event of a complete fracture or unstable lamina.
- Use the 20° Plate Holder (L070-1005) to grip the hinge plate as shown in Figure 8.
- The lamina should be stabilized and held firm for drilling. The hinge plate is then attached to the lateral mass with two screws followed by fixing the plate to the lamina with two screws (Figure 9). See the Drill/Screw Insertion section on Page 10 for instruction on screw placement.
- Release the plate holder from the plate and fix the upper most hole of the flap to the lamina using a screw provided in the system.
- The lamina can then be opened as usual.
- Repeat this process for all levels. See Figure 10 for final hinge plate view.



Fig. 8
Hinge Plate with 20° Plate Holder

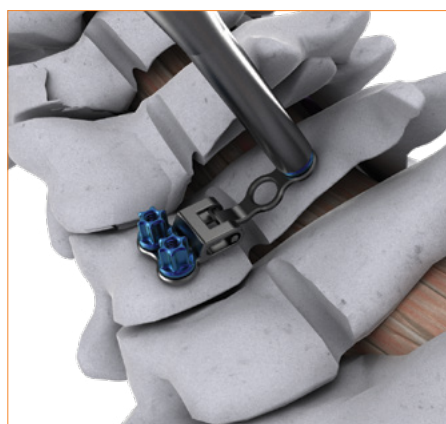


Fig. 9
Hinge Plate Attachment



Fig. 10
Hinge Plate Detail

Trial Sizing

- Insert the Trail (L070-1007 or L070-1008) into the laminar gap (Figure 11) to determine the implant spacer size. Start with the smallest size until the desired fit is achieved.
- Use fluoroscopic guidance for confirmation.

NOTE: Trials are color coded to match plate and spacer.



Fig. 11
Trial Sizing

Plate Offering

4-10mm (2mm inc)

Screw Offering

Ø2.4 mm Self-Drilling, 6-10mm lengths (2mm inc)
Ø2.4 mm Self-Tapping, 4-10mm lengths (2mm inc)
Ø2.8 mm Self-Tapping, 6-10mm lengths (2mm inc)

Titanium Implant

4-10mm (2mm inc)

Plate Contouring

The plates may be sculpted to achieve the best fit for the angles of the lateral mass and lamina in the axial, coronal and sagittal planes. The plate can be contoured with the provided Plate Cutter/Bender (L070-1011).



Fig. 12
Spacer in loading block



Fig. 13
Hinged Plate over Spacer
in loading block

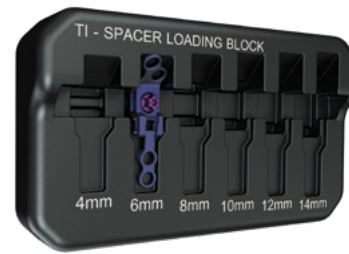


Fig. 14
Hinged Plate/Spacer coupled together
with Self-Tapping Screw (Purple)



Fig. 15
Hinged Plate/Spacer w/ 65°
Plate Holder

After the appropriate spacer/plate size has been determined using the trials, follow one of two implantation options: (1) **Plate/Spacer Construct** (recommended) or (2) **Plate Only**

Option 1: **Plate/Spacer Construct** (recommended)

- To attach the spacer to the plate securely, use the Titanium Spacer Loading Block (L090-4400).
- Place a spacer in the appropriate spot (Figure 12).
- Place a hinged plate over the spacer (Figure 13).
- Then lock the plate to the spacer using a $\varnothing 2.4 \times 4$ mm self-tapping screw (purple) (Figure 14). Ensure the Plate is firmly locked to the spacer prior to gripping with the Plate Holder.
- Grip the construct using the 65° Plate Holder (L070-1004) on the trunk or slots of the plate as shown in Figures 15 and 16.
- Insert the plate/spacer construct into the laminar gap keeping the flap of the plate against the Plate Holder until the plate/spacer construct is in the laminar gap.
- Fix the base of the plate to the lateral mass using screws provided in the system.
- Release the 65° Plate Holder and fix the flap of the plate to the lamina using screws provided in the system.

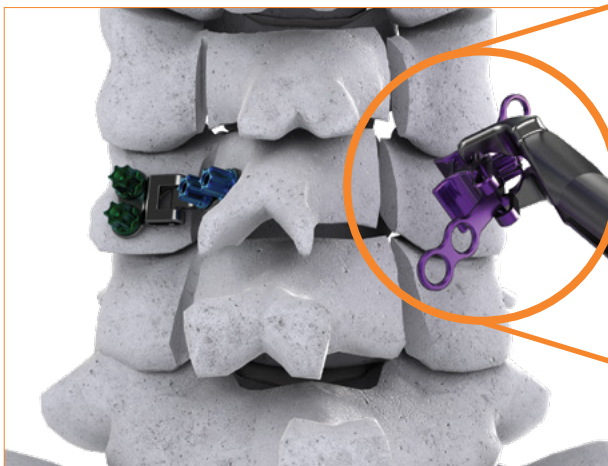


Fig. 16
Plate Placement



Spacer Attachment



Option 2: Plate Only

- Using the 65° Plate Holder (L070-1004), firmly grip the appropriate graft plate in the caddy.
- Insert the plate over the laminar gap as shown in Figure 17 keeping the flap of the plate against the holder until the plate base rests on the lateral mass.
- Fix the plate to the lateral mass and lamina with screws provided with the system then remove the 65° Plate Holder.

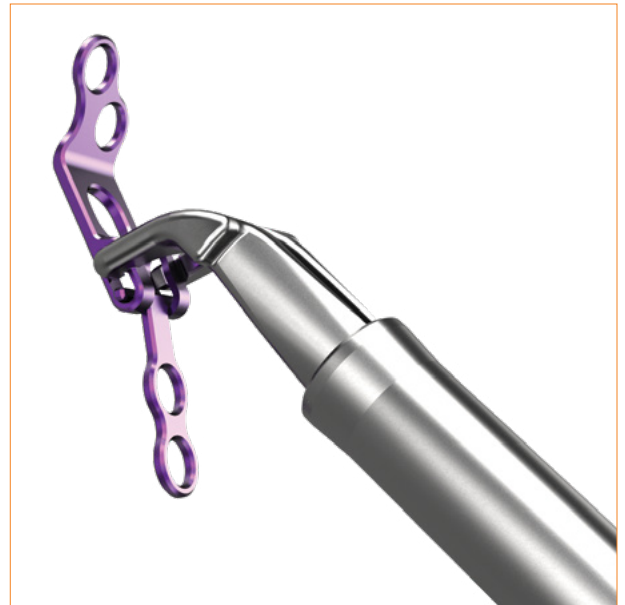


Fig. 17
Plate w/ Plate Holder

Drilling/Screw Insertion

- To attach a screw, place the Screwdriver (L070-1001) over the appropriate screw in the caddy.
- Thread the internal rod in the screwdriver into the screw head to lock the screw to the driver, and lift out of the caddy.
- For self-tapping screws, use the 6-mm fixed Awl/Drill (L070-1006) included in the system to predrill a pilot hole where appropriate (Figure 18). The awl can be used with a standard Short AO Handle (L070-0029) included in the set or connected to power to be used as a drill.

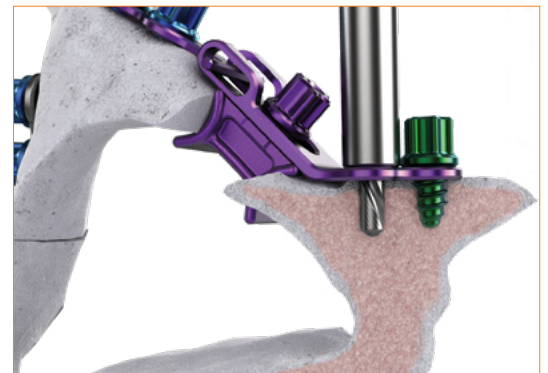


Fig.18
Drilling

NOTE: \varnothing 2.4 mm self-drilling and self-tapping screws are available for standard fixation.

NOTE: \varnothing 2.8 mm rescue screws are provided.

NOTE: Do not overtighten screws to the plate.

Final Locking

- If contralateral plates were placed prior to graft plates and spacers, fix all support plates by placing a screw through the remaining hole.
- If contralateral plates were not placed prior, place hinge plates where the greenstick fracture has become weakened or displaced. (See [Hinge Plate](#) section for details.)
- The contralateral plate can be placed following the same procedure as before. The lamina should be stabilized and held firm for drilling and all screws placed for plate fixation.
- See Figures 19a & 19b for final construct image.



Fig. 19a
Multi level construct



Fig. 19b
Multi level construct

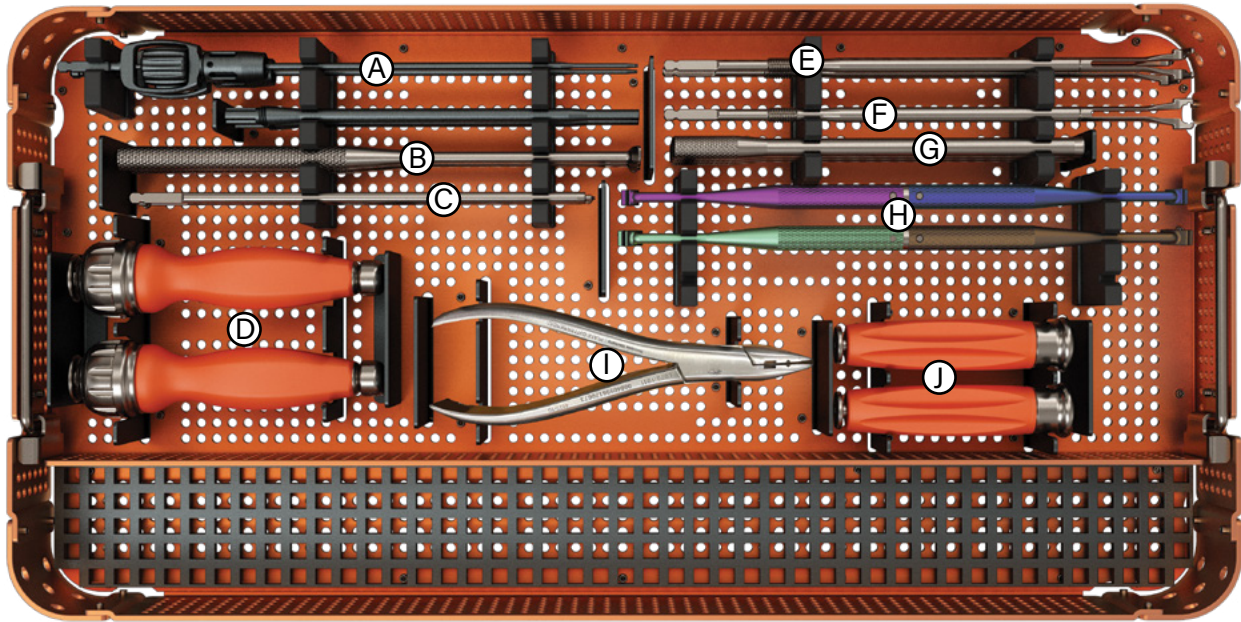
Implant Removal

- To remove both the plates and the screws, it is recommended that a 65° Plate Holder (L070-1004) engage the plate before attempting screw removal.
- To remove the screws, secure the Screwdriver (L070-1001) to the head of the screw and remove all screws from the bone. The plate can then move freely and be removed (Figure 20).



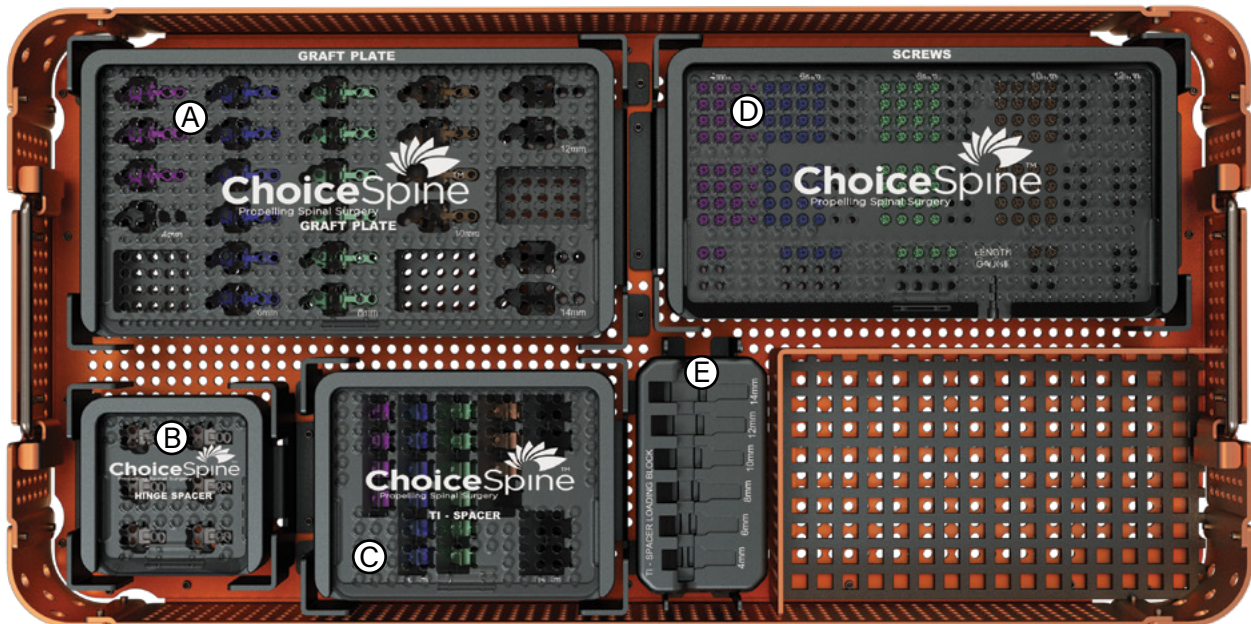
Fig. 20
Plate Removal

Blackbird™ - HLS Set - Top Tray



- Ⓐ Screwdriver (L070-1001) x2
- Ⓑ Lamina Lifter (L070-1002)
- Ⓒ Awl/Drill 6MM (L070-1006) x2
- Ⓓ Axial Ratchet AO Handle (L070-1003) x2
- Ⓔ 65° Plate Holder (L070-1004) x2
- Ⓕ 20° Plate Holder (L070-1005)
- Ⓖ Plater Holder Sleeve (L070-1010) x3
- Ⓗ Spacer Trials (L070-1007 & L070-1008)
- Ⓘ Plate Cutter/Bender (L070-1011)
- Ⓙ Short AO Handle (L070-0029) x2

Blackbird™ HLS Set - Bottom Tray



- Ⓐ Graft Plate Caddy
- Ⓑ Hinge Plate Caddy
- Ⓒ Ti Spacer Caddy
- Ⓓ Self-Drilling, Self-Tapping & Rescue Screws Caddy
- Ⓔ Ti Spacer Loading Block (L070-4400)

Instruments

Part Number	Description	
L090-4400	Spacer Loading Block	
L070-1001	Screwdriver (2)	
L070-1002	Lamina Lifter	
L070-1003	Axial Ratchet AO w/Spin Cap Handle (2)	
L070-1004	Plate Holder 65° (2)	
L070-1005	Plate Holder 20°	
L070-1006	Awl/6mm Drill (2)	
L070-1007	Trial 4-6	
L070-1008	Trial 8-10	
L070-1010	Plate Holder Sleeve (3)	
L070-1011	Plate Cutter/Bender	
L070-0029	Short AO Handle (2)	
L070-1020	Drill Guide (optional)	
L070-1021	Drill (optional)	



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