# Ceres®

Solution of anterior cervical interbody fusion

## SIMPLICITY FLEXIBILITY RELIABILITY

© Distinct locking

© Low-profile

mechanism (Cam-loc)

• Variable angle screws



CHANGZHOU KANGHUI MEDICAL INNOVATION CO., LTD Add: No.11 North Changjiang Road, Xinbei District, Changzhou, Jiangsu 213022, P.R.China Tel: +86-519-85195555 Web: www.kanghui-med.com ©Kanghui



Please refer to the instructions for contraindications and precautions For internal use only, date of expiry is December 31, 2017 For more information, please contact us









## **TABLE OF CONTENT**

Introduction	
Indications	
Surgical Technique	
	Introduction
	Step 1: Patient Positioning a
	Step 2: Choosing Plate Size
	Step 3: Adjusting Plate Curve
	Step 4: Placing Temporary F
	Step 5: Preparing Screw Hole
	Step 6: Drilling Holes
	Step 7: Selecting and Using I
	Step 8: Using the Tap
	Step 9: Inserting Screws
	Step 10: Locking the CAMs
Implants	

Instruments

#### Warning:

This description is not sufficient for immediate application of the instrumentation. Instruction by a surgeon experienced in handling this instrumentation is highly recommended.

	01
	05
	06
	06
and Approach	06
2	07
vature	07
Fixation Pins	09
ble	10
	10
Drill Bits	11
	12
	13
	14
	15
	17



## INTRODUCTION

## INTRODUCTION

Plate thickness is an important consideration in protecting the patient against risk of dysphagia. With a profile of 2.1mm, Ceres® is one of the lowest profile anterior cervical plates currently available today

The second secon



Ease of use

- Safety and reliability
- Modern design
- Redesigned instruments



The Ceres® Anterior Cervical Plate is a semi-constrained (semi-rigid) system designed to offer the surgeon the possibility to choose intra-operatively the screw trajectory that beat fits the individual patient anatomy presented. The'load sharing'design concept accommodates the safe transfer of axial load to the bone graft without putting strain on either the screws or the plate as can occur in more constrained(rigid) systems.









## INTRODUCTION

#### 1. Variable Angle Semi-rigid Fixation System

Design elements, such as the Ceres® Cam-lock mechanism, ensure that all implants screws hold the plate securely in place and are prevented from backing out. The cams do not interfere with screw placement and do not add to the profile of the plate.



## INTRODUCTION

### 4. Optimized by Size

The Ceres® plates have 2.1mm profile and 16mm width. The plates has contoured shape edges. The pre-curved design makes the cervical reconstruction as the normal curve.

#### 2. Numerous Screw and Plate Types for Surgeon Convenience

The Ceres® system includes 25 types plates-one level, two level and three level plates. Self-drilling and Self-tapping screws both and in- cluded in multiple lengths. Every implant option is at the surgeon's fingertips during the procedure.



#### 5. Anti Skid Cleats

Resists plate movement during the holes preparation and screws insertion.

The Character adds zero profile to overall construct-cleats "dig in".

#### 3. Compact and User-friendly Instrumentation

In optimized designed instrumentation of Ceres®, Every element is not only designed with ergonomics ideology, but also designed to work in concert with the whole system. For example, color coding of he drill match the screws color. All the instruments make the procedures more simple and conveniences.











## **INDICATIONS**

The Ceres<sup>®</sup> System offers maximum implant versatility & integrated instrumentation. The Ceres<sup>®</sup> Anterior Cervical Plate System is indicated for stabilization of the cervical spine from C2 to C7 employing unicortical screw fixation at the anterior face of the vertebral bobies. Specific clinical indications for anterior cervical plating include:

- Instability caused by trauma;
- Instability associated with correction of cervical lordosis and kyphosis deformity;
- Instability associated with pseudoarthosis as a result of previously failed cervical spine surgery;
- Instability associated with major reconstructive surgery for primary tumors or metastatic malignant tumors 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 stabilization of the anterior cervical spine. The surgeon is encouraged to utilize the Ceres<sup>®</sup> Anterior Cervical Plating System with those techniques most familiar to the operating surgeon

## SURGICAL TECHNIQUE

#### Introduction

The Ceres<sup>®</sup> Plate is semi-rigid system intended for anterior cervical intervertebral body fixation. Ceres<sup>®</sup> is based on a comprehensive, clinically proven design, modified to incorporate current market technology.

#### Step 1: Patient Positioning and Approach

The patient is placed in the supine position with the head in slight extension. The posterior cervical spine is supported to establish and maintain normal cervical lordosis. The surgeon must then choose a right-or left-sided approach to the cervical column After exposing the cervical spine, the self retaining retractor is placed to provide optimal visualization. Avertebral body distractor (11110) may be used. The distraction shafts(111210) are positioned midine in the vertebral bodies adjacent to the level to be treated. The distractor is placed over the shafts and the appropriate amount of distraction is applied. Discectomy are completed. Median corpectomy will be completed if required. Pituitary forceps, curettes, and kerissons may be used to remove the disc material and cartilage to expose the posterior longitudinal ligament.

Bone graft/substitute(Diamesh,e.g.) is then positioned between both vertebrae.









#### Step 2: Choosing Plate Size

Ceres<sup>®</sup> Anterior Cervical Plates are available in 1-5level configuration with a length ranging from 22-78mm. When handling plates, use caution to avoid scratching or notching the plate surfae. Following anterior bone graft placement, use the forceps(111120) 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.



#### Instruments:





## SURGICAL TECHNIQUE

For additional lordosis, the desired plate BEND ZONE is placed between the lobes(cleats facing downward) 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 at the BEND ZONE along the length of the plate. For straightening of kyphotic bending, the opposite side of the Plate Bender is used. The BEND ZONE is placed between the lobes of the bender (cleats facing upward). 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. Once the sagittal contour has been altered by the Plate Bender, do not bend in the reverse direction.

#### Instruments:



#### Step 3: Adjusting Plate Curvature

The Ceres<sup>®</sup> Plate has a precontoured lordotic curvature, anatomically appropriate in the majority of procedures. If desired, the Plate Bender(111140) may be utilized 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 undersurface and reduced cross-sectional thickness.







Increase the lordosis



Reduce the lordosis



## SURGICAL TECHNIQUE

#### Step 4: Placing Temporary Fixation Pins

After selecting the appropriate plate, use the Temporary Fixation Pins(111220)(TFPS) to hold the plate in place while drilling and placing the screws.



Using one of the plate holders mentioned in step 4, hold and lay the plate evenly on the anterior cervical spine. Place the Temporary Fixation Pin through the pinhole on the plate using the Temporary Fixation Pin Holder (111200).

#### Note: Pre-drilling is not required for Temporary Fixation Pin insertion.

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.

#### Instruments:



**Fixation Pin** 









## SURGICAL TECHNIQUE

#### Step 5: Preparing Screw Hole

Before drilling you may need to prepare your screw hole with an awl. To use the Ceres® Awl, place the tip of the awl(111100)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 should you need to strike it.

#### Instruments:



#### Step 6: Drilling Holes

Screw angle may be selected and the plate stabilized during the drilling procedure. The Plate Holder/Drill Guide (111130) may be attached to the plate by placing the expandable end into a lateral screw hole and turning the knurled knob clockwise.

#### Instruments:









#### Step 7: Selecting and Using Drill Bits

The Ceres® 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 assure that those structures are not at risk. Depth of screw insertion and angular orientation of the screw must also be confirmed by fluoroscopy. Typical screw placement is 5-10 degrees medial angulation with the screw directed 7.5 degrees rostral & caudal to correspond with the superior and inferior disc space respectively. 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 Ceres® System is available with 12mm(blue), 14mm (gold) and 16mm (rose) fixed length drill bits. These colors correspond to their respective screw size colors.



## SURGICAL TECHNIQUE

#### Step 8: Using the Tap

The Ceres<sup>®</sup> System is provided with self-tapping screws. Hence, tapping is not always necessary. However, if tapping is required to prepare the passage of the screw, the Variable Depth Tap(111190) can be adjusted in 1mm increments to correspond to the drill depth setting. 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 measure before using the Variable Depth Tap.

Note: The setting for the Variable Depth Tap can be approximated by preoperative radiographic measurements (CT or MRI) or by interoperative measurement of the exposed vertebral endplates following decompression. The use of interoperative fluoroscopy while drilling and tapping, will further improve the accuracy of screw length selection.

Instruments:









#### Step 9: Inserting Screws

The Ceres<sup>®</sup> screws are available as self-drilling (4.5mm major diameter) in lengths ranging from 12-16mm or self-tapping (4.5mm major diameter). Large-diameter screws (4.8mm major diameter) are available in 12, 14, and 16mm lengths. For identification purposes the screws are color coded for screw type.

- 12mm screws are blue colored.
- 14mm serews are gold colored.
- 16mm screws are rose colored.

Select the appropriate screw length corresponding to the hole drilled. Using the Hex Screwdriver (111231), 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 psitioning, drill, tap if desired and place screw 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.

#### Instruments:





## SURGICAL TECHNIQUE

#### Step 10: Locking the CAMs

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 (111250) 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. 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 cam beyound 270 degrees (vertical slot). Failure to maintain proper alignment of the Cam Tightener may result in a stripped cam. Figure 9b.

For rostral and caudal screw trajectories more than 16 degrees, the cam may not interfere with the screw hand and therefore the torque limiter will not release. In this case, the cam should be positioned within the locking zone to provide screw backout resistance.

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 cam past 270°.

#### Instruments:









Locking Zone 180°-270°



## Ceres<sup>®</sup> One Level Plate

Cod.No	Description	Model No.
33704022	Ceres <sup>®</sup> One Level Plate 22mm	GJC 22mm
33704025	Ceres <sup>®</sup> One Level Plate 25mm	GJC 25mm
33704027	Ceres <sup>®</sup> One Level Plate 27mm	GJC 27mm
33704029	Ceres <sup>®</sup> One Level Plate 29mm	GJC 29mm
33704031	Ceres <sup>®</sup> One Level Plate 31mm	GJC 31mm
33704033	Ceres <sup>®</sup> One Level Plate 33mm	GJC 33mm
33704035	Ceres® One Level Plate 35mm	GJC 35mm
33704037	Ceres <sup>®</sup> One Level Plate 37mm	GJC 37mm



## Ceres<sup>®</sup> Self-tapping Screw

Cod.No	Description	Model No.
33708012	Ceres <sup>®</sup> Self-tapping Screw, 4.5×12mm	GJC φ4.5×12
33708014	Ceres® Self-tapping Screw, 4.5×14mm	GJC φ4.5×14
33708016	Ceres® Self-tapping Screw, 4.5×16mm	GJC φ4.5×16

## Ceres<sup>®</sup> Self-drilling Screw

Cod.No	Description	Model No.
33710012	Ceres <sup>®</sup> Self-drilling Screw, 4.4×12mm	GJC φ4.4×12
33710014	Ceres <sup>®</sup> Self-drilling Screw, 4.4×14mm	GJC φ4.4×14
33710016	Ceres <sup>®</sup> Self-drilling Screw, 4.4×16mm	GJC φ4.4×16

## **Ceres<sup>®</sup> Two Level Plate**

Cod.No	Description	Model No.
33705039	Ceres <sup>®</sup> Two Level Plate 39mm	GJC 39mm
33705041	Ceres <sup>®</sup> Two Level Plate 41mm	GJC 41mm
33705043	Ceres <sup>®</sup> Two Level Plate 43mm	GJC 43mm
33705045	Ceres <sup>®</sup> Two Level Plate 45mm	GJC 45mm
33705047	Ceres <sup>®</sup> Two Level Plate 47mm	GJC 47mm
33705049	Ceres <sup>®</sup> Two Level Plate 49mm	GJC 49mm
33705051	Ceres <sup>®</sup> Two Level Plate 51mm	GJC 51mm
33705053	Ceres <sup>®</sup> Two Level Plate 53mm	GJC 53mm

## **Ceres<sup>®</sup> Three Level Plate**

Cod.No	Description	Model No.
33706054	Ceres® Three Level Plate 54mm	GJC 54mm
33706057	Ceres® Three Level Plate 57mm	GJC 57mm
33706060	Ceres <sup>®</sup> Three Level Plate 60mm	GJC 60mm
33706063	Ceres® Three Level Plate 63mm	GJC 63mm
33706066	Ceres <sup>®</sup> Three Level Plate 66mm	GJC 66mm
33706069	Ceres <sup>®</sup> Three Level Plate 69mm	GJC 69mm
33706072	Ceres® Three Level Plate 72mm	GJC 72mm
33706075	Ceres® Three Level Plate 75mm	GJC 75mm
33706078	Ceres® Three Level Plate 78mm	GJC 78mm



## Ceres<sup>®</sup> Large Diameter Screw

Cod.No	Description	Model No.
33709012	Ceres <sup>®</sup> Large Diameter Screw, 4.8×12mm	GJC φ4.8×12
33709014	Ceres® Large Diameter Screw, 4.8×14mm	GJC φ4.8×14
33709016	Ceres® Large Diameter Screw, 4.8×16mm	GJC φ4.8×16

-PODDO-









Cod.No	Description	QTY.
112900	Ceres <sup>®</sup> Anterior Cervical Plate Instrument Set	1
898273	Ceres <sup>®</sup> Anterior Cervical Plate Instrument Set (Empty)	1
112060	Ceres <sup>®</sup> Anterior Cervical Plate Instrument Set-Implant Case	1



NOTE
------


