

HANFUSE

Expandable Fusion Cage Operating Manual

OVERVIEW

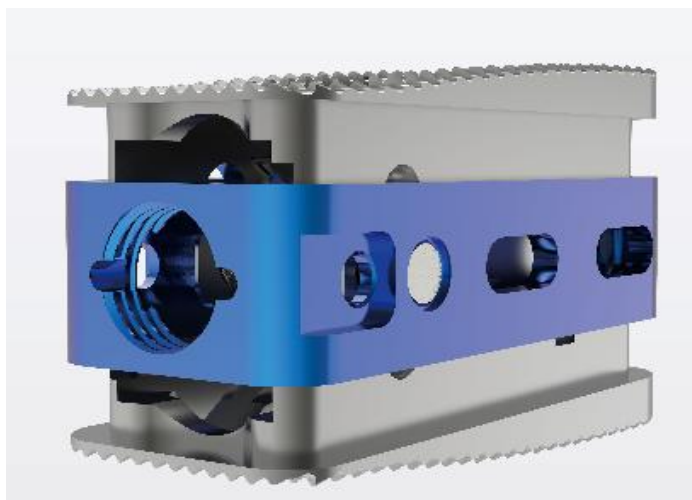
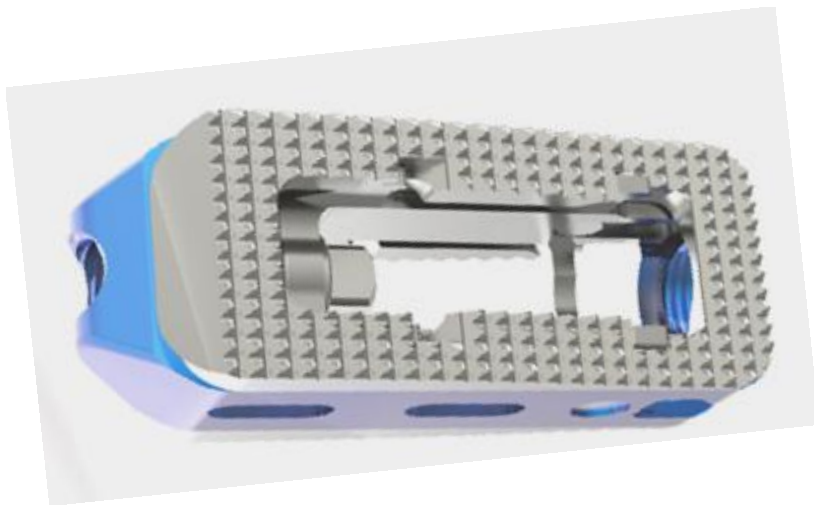
HANFUSE expandable fusion cage is a kind of lumbar interbody fusion cage made of titanium alloy, which can be precisely stretched after implantation. It is designed for spinal diseases that need to replace L1~S1 intervertebral discs due to thoracolumbar and lumbosacral diseases and fusion needed for adjacent vertebrae at this segment.

Features and advantages

Bone graft achievable after parallel expansion / strong compression resistance / immediate stability

Large area end plate fitting / rapid fusion / minimally invasive orthopedics

1. Minimal height implantation, controllable expansion to restore the intervertebral height
2. Parallel expansion, convex multi-angle anatomical design, and the end plate fitting in the best state to meet more utilization
3. Patented design for the sufficient bone graft space after expansion to meet more bone graft requirements
4. The supporting interfaces are much larger than ordinary fusion cage, which can reduce the stress shielding and avoid settlement after implantation
5. Mesh serrated surfaces, the best anti-retreat mechanism, to achieve immediate stability
6. The superior and inferior surfaces are specially designed to stimulate bone growth; Stiffness coefficient is obviously lower than ordinary titanium alloy
7. Applicable for PLIF/TLIF, MISS-TLIF / ENDOLIF and various open / minimally invasive interbody fusion operations
8. Can co-use with disposable sterile fusion tools, applicable for open and MISS-TLIF fusion operations



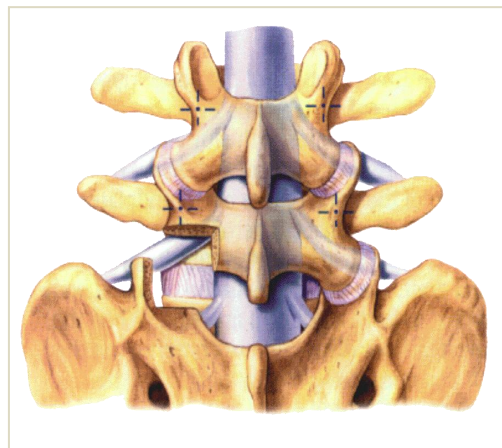
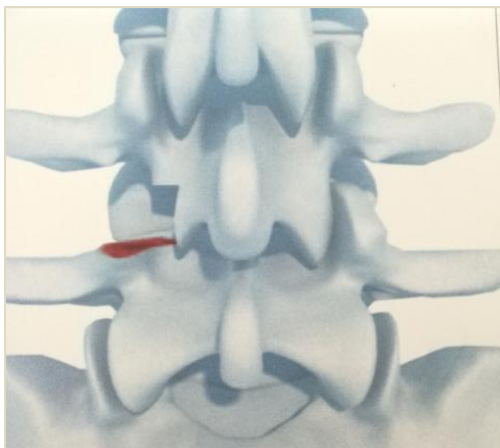
Open TLIF operation procedure

1. Surgical approach

The lumbar posterior median incision separates the muscular layer to the operative segment, exposes the intervertebral space, and facilitates decompression. (If necessary, the lamina spreader can be placed at the bottom of the spinous process base of the vertebral segment, and carefully stretch it to an appropriate position, which is conducive to the exposure of the intervertebral space and convenient for decompression and implantation of the fusion cage).

2. Establishment of bone window for foraminal approach

Use bone rongeur or osteotome to remove the lower articular process of the relevant head vertebra and the upper articular process of the tail vertebra, and establish the bone window through the intervertebral foramen. Then use bone rongeur and drill to remove more bone and osteophyte.



3. Prepare intervertebral space and handle intervertebral disc

Cut the fibrous ring of the intervertebral disc through the intervertebral foramen, and then remove the intervertebral disc.

Use the nucleus pulposus forceps to remove the soft tissue fragments of the intervertebral disc, including the nucleus pulposus etc., and then select small and medium sized lateral curette and stretchable reamer to enter the intervertebral space according to the needs. First, stretch the intervertebral space, use force to rotate the lateral curettes in both directions, and use adjustable reamers to reame the intervertebral disc tissue.



Lateral curette (small/medium)



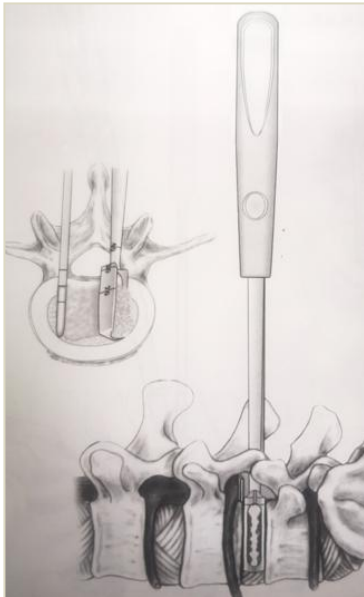
Round scraper (small/medium)



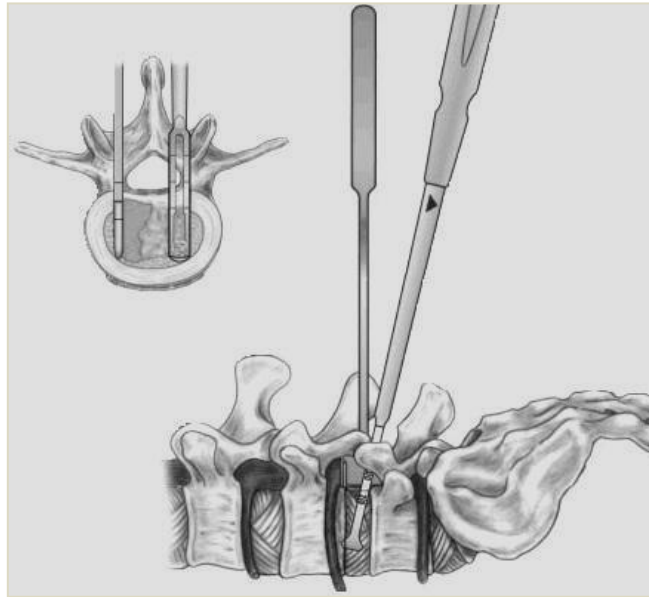
Adjustable reamer (9-14mm)



Nerve retractor (large/small)



Lateral curette reaming
intervertebral disc



Scraping the cartilage layer of the endplate
with a round scraper

4. End plate treatment

After the intervertebral disc is completely treated, the end plate is treated with a round scraper, and the remaining soft tissue and the cartilage layer covering the end plate are cleaned up until blood oozes from the bone surface. (Note: Excessive removal of subchondral bone tissue may affect the strength of the vertebral endplate. If the endplate is completely removed, it may lead to postoperative settlement and segmental instability of the intervertebral fusion cage.)

5. Intervertebral space preimplantation

Preserve the cortical bone layer under the cartilage layer of the superior and inferior vertebral endplates; Then, the articular process or vertebral

lamina bone that has been excised is de-cartilaginized and made into bone particles of appropriate size (or the allograft bone and autologous bone are mixed evenly), which are implanted into the front and side of the intervertebral space through the bone graft funnel and bone graft shaft.



bone graft funnel



bone graft shaft

6. Implantation of HANFUSE expandable fusion cage

The selected fusion cage (HANFUSE expandable fusion cage has a length of 28/32/36mm, and models with different lordosis angles can be selected) shall be held and fixed firmly with an impactor first, and then slowly pushed in along the treated intervertebral space, or gently knocked in with a hammer, and then C-arm fluoroscopy shall be performed in the positive and lateral position (when in the positive position, the fusion cage shall be located at 3/5 of the vertebral body, close to the center of the intervertebral space; when in the lateral

position, the fusion cage shall be located at 4/5 of the vertebral body, and the posterior edge shall be 3-5mm away from the posterior edge of the vertebral body). (During operation, it must be confirmed that the dural sac and nerve root are well protected)



Impactor



Fusion Cage



Impactor holds HANFUSE fusion cage



Hammer

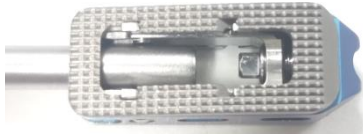
7. Expand the HANFUSE fusion cage

When the position of the fusion cage is appropriate, then use a special square wrench to stretch the expandable fusion cage to enter the port at the rear edge of the fusion device along the upper hollow channel of the driver, and rotate the square bolt inside clockwise. With the continuous entry of the spreading bolt in the fusion device, the fusion cage will gradually stretch up and down in parallel until there is obvious resistance; Then C-arm fluoroscopy showed that the upper and lower end faces of the fusion device were fitted with the upper and lower end plates. The reticular inverted tooth structure on the upper and lower surfaces of the fusion device could be fixed on the upper and lower end plates, which played a role in fixing and stabilizing the fusion device and preventing the fusion device from sliding.

Note: The fuse can be expanded to 9, 10, 11, 12, 13 mm from the height of 8 mm by turning the square spanner clockwise. As the resistance of the square spanner increases, the intervertebral space also increases significantly, and the upper and lower planes of the fusion cage continue to expand to the required height.



square wrench



Square wrench enter into the fusion cage



Square wrench enter into the spreading bolt



Rotate the square wrench clockwise to expand the fuse



HANFUSE Parallel expand the fuse



Connect the impactor to the funnel



Funnel

8. Bone graft after expansion of fusion cage

After the HANFUSE expandable fusion cage is implanted and propped up to a proper position, the funnel is connected with the hollow thread on the top of the impactor, and then place the prepared autologous bone particles or allograft bone and other bone graft materials. The bone graft shaft enters the already expanded fusion cage along the hollow channel of the impactor and fills the fusion cage.. C-arm fluoroscopy shows that the intervertebral space is well expanded and the bone graft shadow is visible. The fusion cage and location depth are appropriate, and then

explore the epidural and intervertebral foramen to ensure complete nerve decompression.

The height of the implanted fusion cage can be adjusted according to the Roman numeral disc at the far end of the impactor, which is arranged in the order of the clock.

At the same time, there is a fixed pointer at the handle of the hexagonal socket screwdriver. With the clockwise rotation of the screwdriver, the number of turns can be calculated. With the increase of the number of turns, the upper and lower blades of the fusion cage will gradually expand, and the intervertebral space will obviously expand, and the height will increase. (In design, the maximum height that can be expanded out of the height adjustable fusion cage is 5 mm. The hexagonal socket screwdriver needs to be rotated clockwise for 6 cycles, rising from 8 mm to 13 mm, with an average of 0.83 mm.)

9. Conventional fixation and locking of pedicle screws and rods

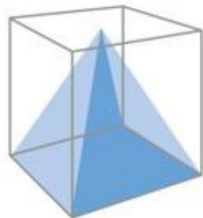
According to the actual situation, the pedicle screws and rods fixation of the relevant vertebral body segment can be performed before or after the implantation of the fusion cage; During the operation, the fixed rod can be loosened and then compressed to ensure the close contact between the fusion cage on the bone graft surface and the vertebral endplate surface prevent the loosening and sliding of the fusion cage.

10. End of operation

Finally, the C-arm fluoroscopy showed that the fusion cage and internal fixation screws and rods were in proper position, and the wound could be sutured, and a drainage tube was placed in the wound.

Note: It is recommended to use this fusion cage together with the spinal pedicle screw internal fixation system.

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