# Percutaneous Minimally Invasive Spine System

--Jiangsu Jinlu Group Medical Device Co.,Ltd.

The Third Generation Percutaneous Minimally Invasive Spine System

From left to right:
1.Polyaxial screw
2.Monoaxial screw
3.Monoplane screw

## Monoplane Screw Patent!

Characteristic:

1.The length of the screw head is 85mm,the outer diameter of the screw is 14mm.

2.There is triangular groove in the end of the rod.

3.Three types screws-polyaxial/monoaxial/monoplane screw

JINLU MEDICAL

# A new generation of patented products: percutaneous single plane screws

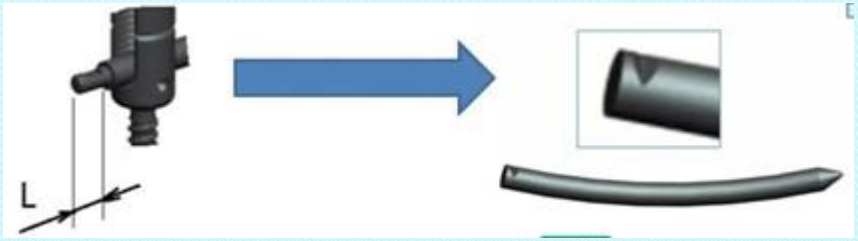
- The right and left directions movement are beneficial to the implantation of rods
- The fixation of the up and down directions does not disperse the power of the reduction forcep and which is good for reduction of anterior column of spinal column.

JINLU MEDICAL

# Improvement of Minimally Invasive Percutaneous Spine System

Problem : The old rod end part is too long and has a high profile design.

Solution : The triangular groove in the end of the rod reduce the protrude out volume at the end but which do not influence the connection of the rod.




JINLU MEDICAL

# Improvement

Problem : when distract the polyaxial screw for reduction , sometimes the reduction will lost.

Solution:

1.Produce monoaxial screw , it can avoid the

Reduction lost when distraction or compression.

2.Produce monoplane screw, the screw head can

Only swinging on the coronal plane which can

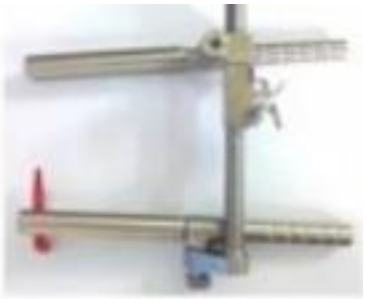
avoid the reduction lost . When putting the rod the screw head it can be adjusted in the screw head coronal plane. It is easier for the operation esp. for multi segmental spine operation.

# Improvement

Problem : the distractor and reduction tool can not adapt to the different heights of the screws and different angle of screw angulation.

Solution : the new designed reduction tool can adapt the above mentioned problems .The same reduction tool can finish the distracting and compression in different assemble ways.





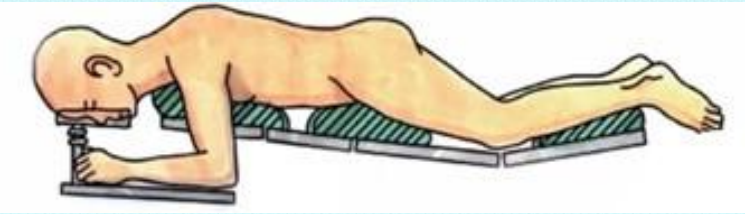
| 1.Distracting | 2.compression | 3.angulation |
|---|---|---|

JINLU MEDICAL

# Classic Operation Steps for Percutaneous Minimally Invasive Spine System Operation

## operation  preparation

The operation needs to be done with X-ray or navigation system so the patient should lie prone on a fluoroscopic operating bed to ensure the complete perspective of the anteroposterior position and lateral position . First, the patient can achieve partial or complete reduction of the fractured vertebral body by postural adjustment after the patient is anesthetized.



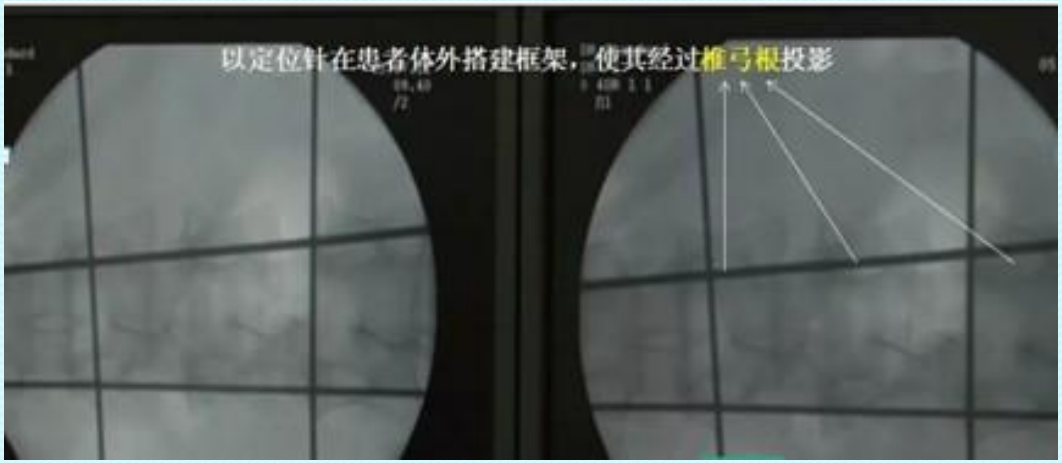
JINLU MEDICAL

# Fix Position

In perspective, it is necessary to keep the ball tube of C arm machine and the vertebral body completely perpendicular, that is **the vertebral body upper and lower end plate is a line.**

JINLU MEDICAL

# Classic Operation Steps for Percutaneous Minimally Invasive Spine System Operation




--

A frame of the guide pins was constructed in the patient  body to make it through the pedicle projection

JINLU MEDICAL

# Percutaneous Puncture

JINLU MEDICAL

# The Ideal Puncture Point under Fluoroscopy

The puncture tip was placed on the outer edge of the pedicle projection by anterior and posterior X-ray fluoroscopy（ It's 9-10 on the left and 2-3 on the right ）

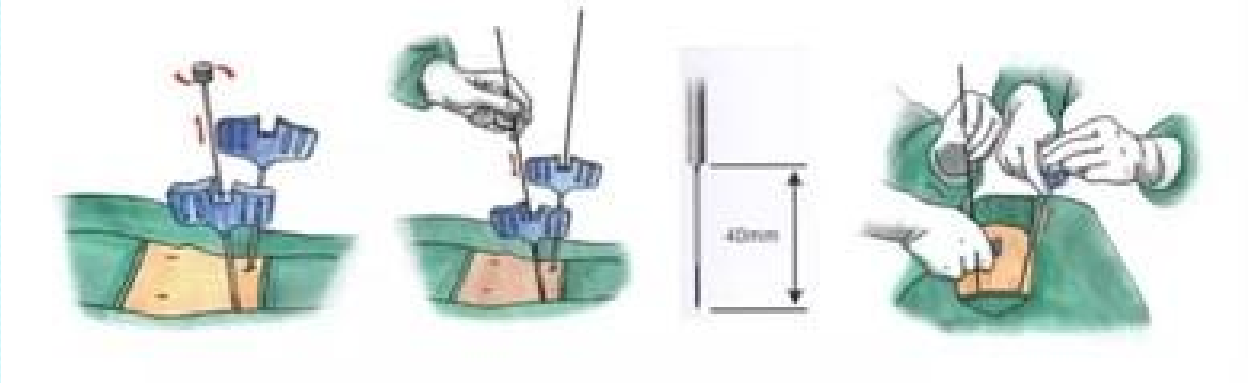
JINLU MEDICAL

# Puncture Technique

**Puncturing the vertebral body tilt 10 to 15 ° parallel to the end plate， the puncture needle is inserted into the bone with approximately 2cm (just entering the vertebral body) and the tip of the puncture needle does not reach the medial cortex in the pedicle projection**

JINLU MEDICAL

# Guide Pin Placed



**Pull out the puncture core and insert the guide pin into the puncture needle. The guide pin should beyond 35 to 40mm to the puncture needle and get bone stability . The depth of the guide pin should be deeper than the tapping depth . Remove the puncture needle when the guide pin reach the desired depth.**

JINLU MEDICAL

# Guide Pin Implant

JINLU MEDICAL

# Preparation for Pedicle Approach

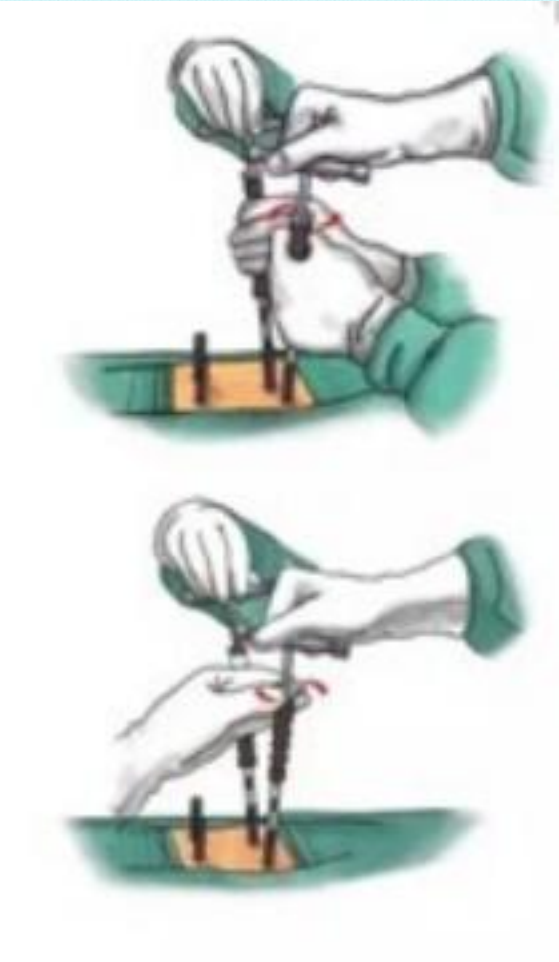

Insert the small sleeve along the guide pin to the bone surface and insert the medium sleeve outside of the small sleeve. Remove the small sleeve after the medium sleeve reach the bone surface . Insert the cannulated open drill along the guide pin to enlarge the opening of the vertebral body , and then tapping by the tap which is outside of the guide pin(pay attention to the depth).Be careful to prevent guide pin move forward during the whole process o(the operator can use vascular clamp clip on the guide pin to prevent its slide)

JINLU MEDICAL

# Tapping along the Guide Pin

JINLU MEDICAL

# Pedicle Screw Implant



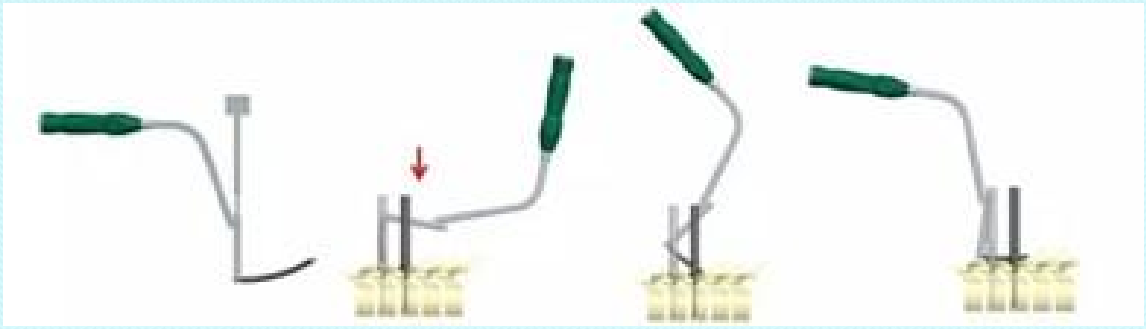
Insert big sleeve along the medium sleeve and then remove the medium sleeve . Implant the pedicle screw(the specification have been decided before the operation) by screw driver along the guide pin. Note the position of the pedicle screw by C arm machine perspective . After implanting the screw, rotate anti clockwise the screw driver and remove the screw driver. Then remove the guide pin.

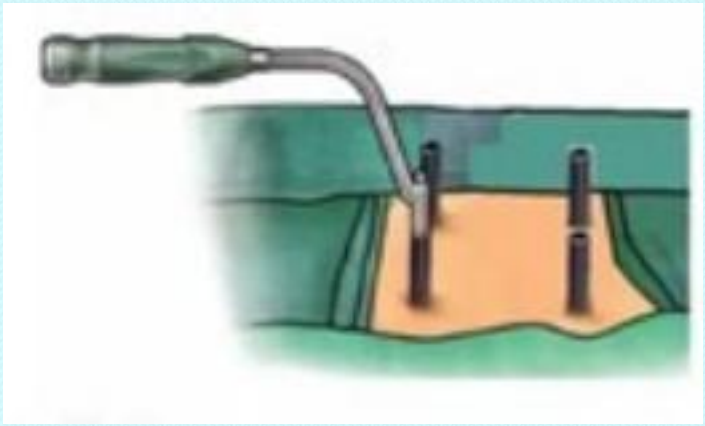
JINLU MEDICAL

# Implant the Monoplane screw along the Guide Pin

JINLU MEDICAL

# The Rod Implant





Hold the rod with rod holder and insert it down according to the arrow direction along the head of the screw until reach the bottom of the U shape screw head.
If necessary , please bend the rod by rod bender.

JINLU MEDICAL

# Fixation of the Rod

JINLU MEDICAL

# The Initial Fixation of the Rod

After confirming the rod is on the bottom of the U shape screw head by observation or probing tight the nut of the screw on the sharp end of the rod.

JINLU MEDICAL

# Tight and Fix the Nut of the Screw

JINLU MEDICAL

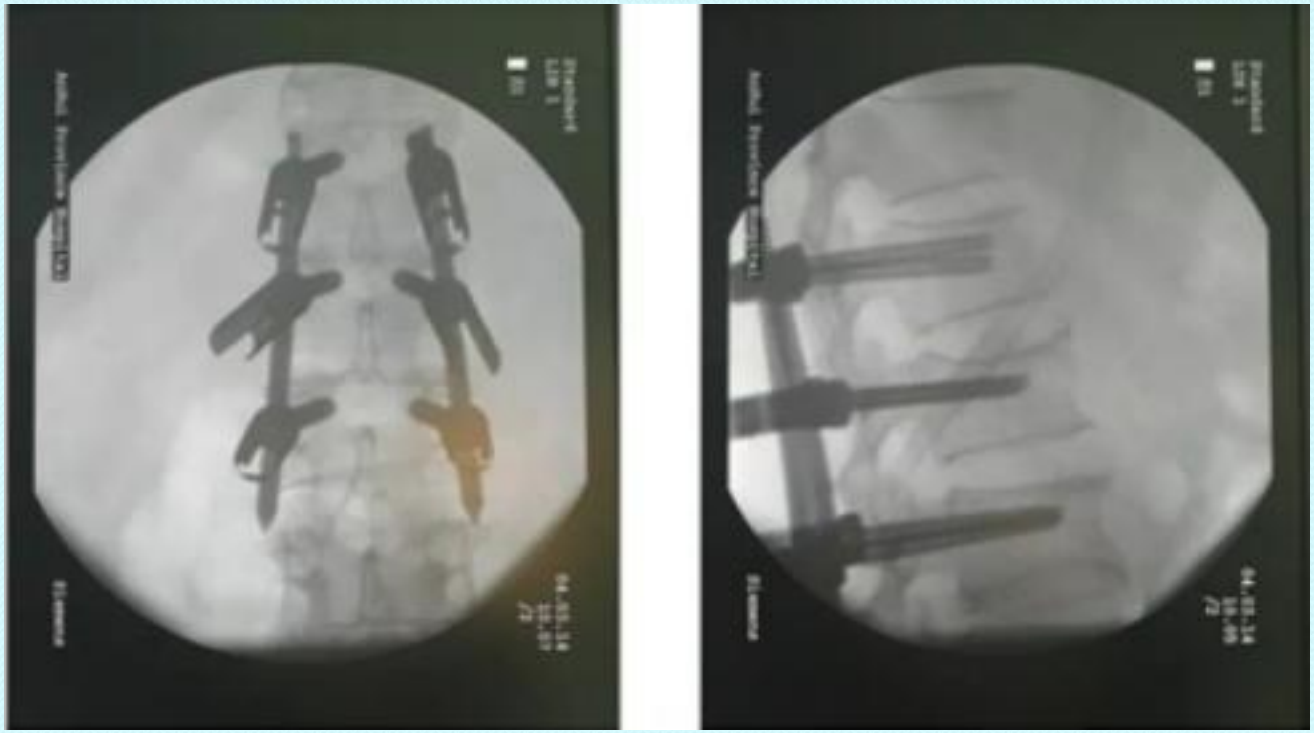
# Distracting and Compression

Put the distracting and compression tool on the pedicle screw , distracting or compression according to the operation and then tight all the nuts.

| 1.Distracting | 2.compression | 3.angulation |
|---|---|---|

JINLU MEDICAL

# Confirmation by Perspective after Operation



JINLU MEDICAL

# Breaking off the Long Head of the Screw

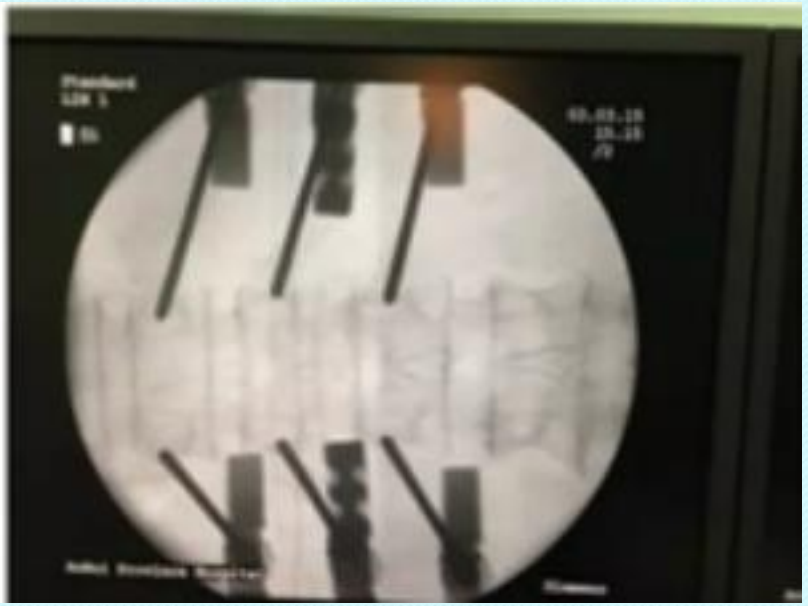
Break off the long head of the screw by the break off screw clamp . After that , stitch the wound in the skin.

JINLU MEDICAL

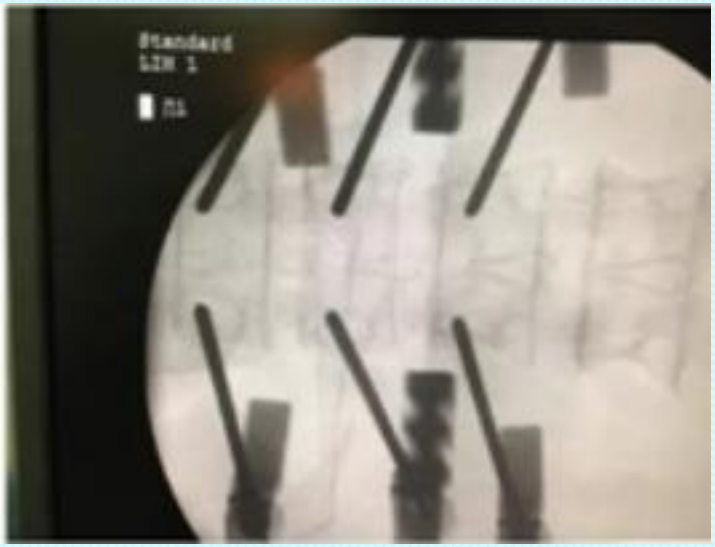
# Appearance of the Skin after Stitching

JINLU MEDICAL

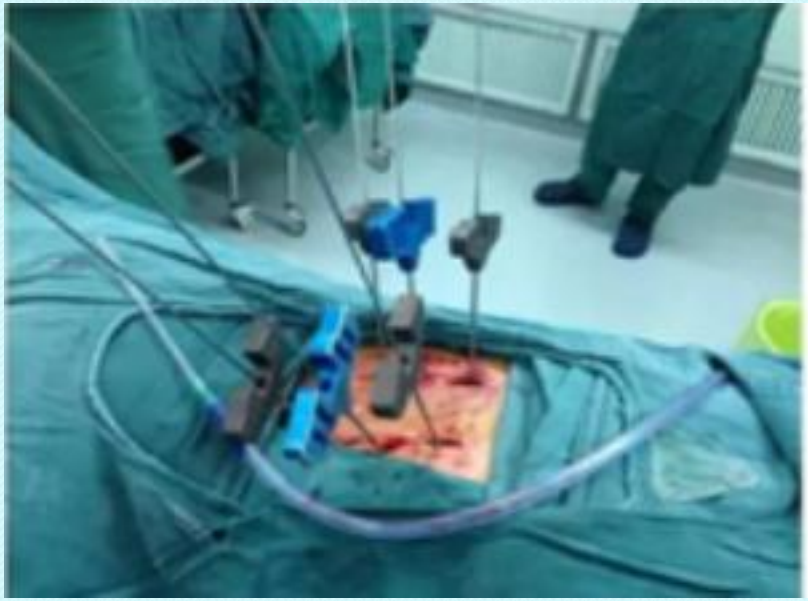
# Reduces the Number of Perspective Techniques



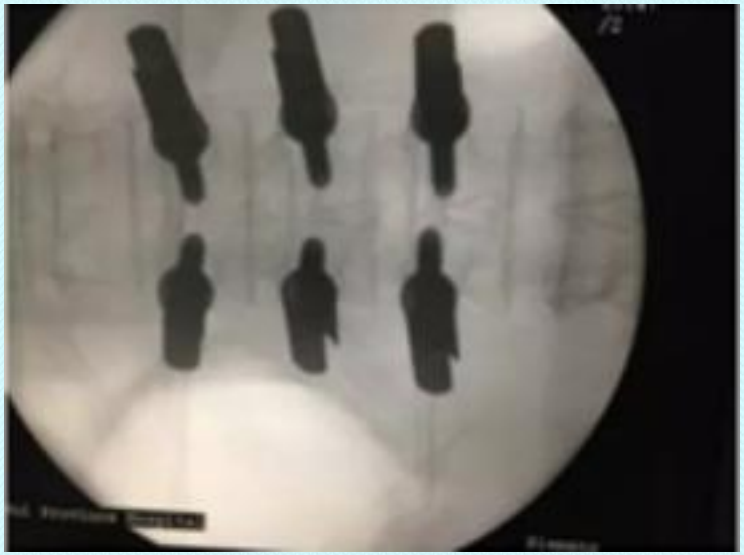
JINLU MEDICAL

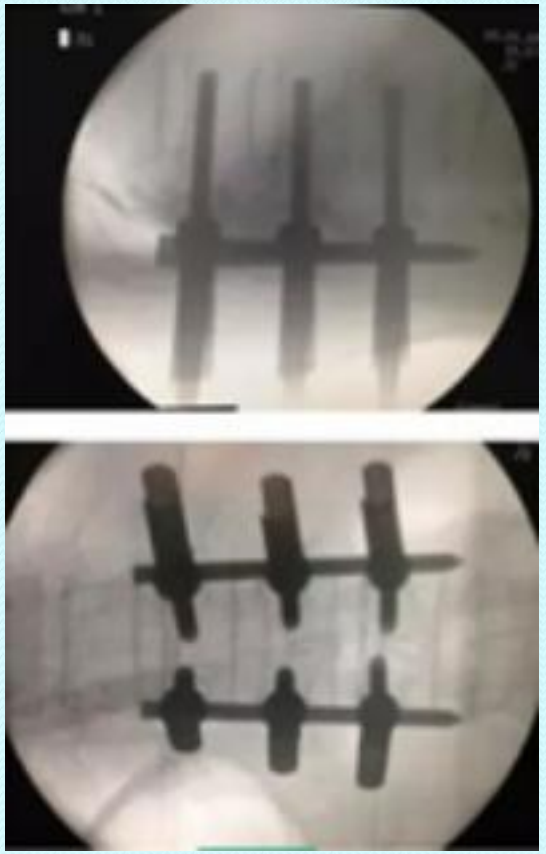



JINLU MEDICAL



JINLU MEDICAL





JINLU MEDICAL

# Caution

Positioning: the location of the puncture point and the direction of puncture are important to the success of the operation. When you have conditions, you should make more connections and other preparations.

JINLU MEDICAL

# Caution

Screwdriver: Due to the strict equipment design and strong coordination, if the improper assembly can damage the pedicle screws, the operation will be accidental.

**When implanting the screw ,if the screwdriver can not press the briquetting tightly the briquetting will come out**

JINLU MEDICAL

# Caution

Guide pin position : assure the place of the guide pin place  do no move during the whole operation process to prevent accidents during surgery. The vascular forceps can be used to clamp  the guide pin to prevent the rotation , movement or too deep in the body.

Perspective: minimally invasive surgery will inevitably require more perspective and should be prepared for this.

JINLU MEDICAL