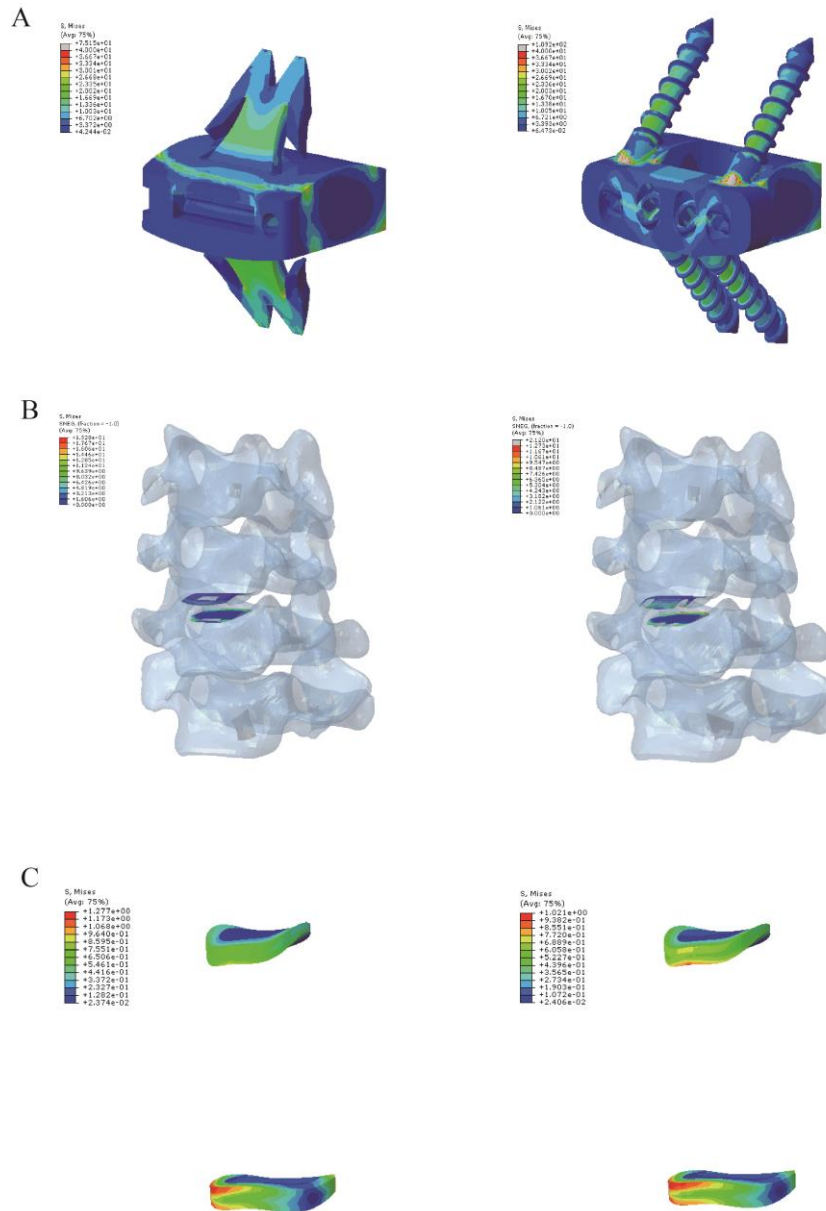


**Table S1.** ROC of these two surgical models after surgery, rang of motion (ROM) (degree/°).

| Type of surgical model                | Segment | Flexion | Extension | Left bending | Right bending | Left axial torsion | Right axial torsion |
|---------------------------------------|---------|---------|-----------|--------------|---------------|--------------------|---------------------|
| Surgical model with new cage          | C3/4    | 7.54    | 7.15      | 2.59         | 2.80          | 4.42               | 4.53                |
|                                       | C4/5    | 0.43    | 0.49      | 0.54         | 0.50          | 0.91               | 0.86                |
|                                       | C5/6    | 6.32    | 6.56      | 2.53         | 3.78          | 3.92               | 3.86                |
| Surgical model with conventional cage | C3/4    | 7.87    | 7.50      | 2.94         | 3.12          | 4.76               | 4.85                |
|                                       | C4/5    | 0.42    | 0.51      | 0.59         | 0.54          | 0.86               | 0.84                |
|                                       | C5/6    | 6.33    | 6.58      | 2.48         | 3.69          | 3.88               | 3.75                |

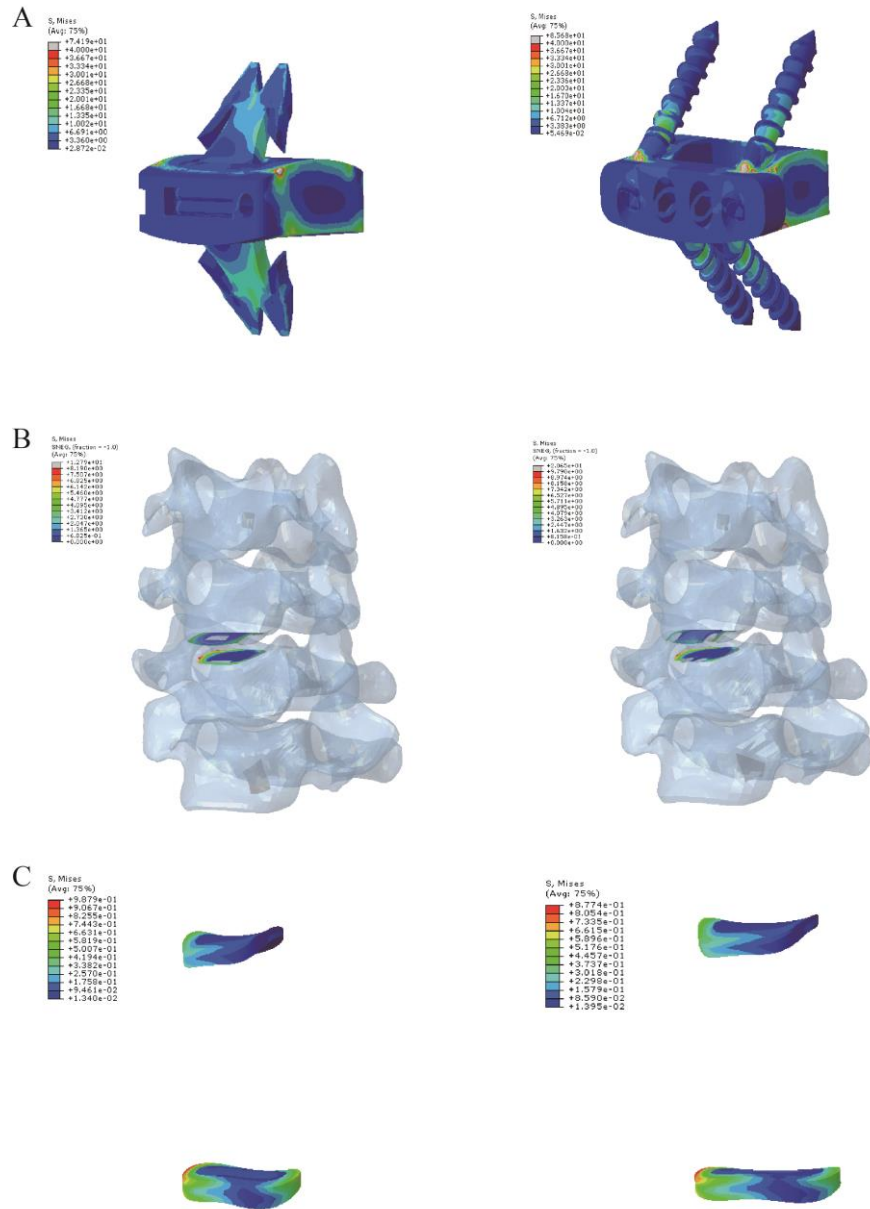
**Table S2.** Element and node of these two surgical models.

| Part                           | Element | Node   |
|--------------------------------|---------|--------|
| New cage                       | 41994   | 67636  |
| Conventional cage              | 54514   | 91222  |
| Bone                           | 194594  | 137641 |
| Cartilage and ligament         | 22723   | 37724  |
| Disc                           | 20672   | 33707  |
| In total                       |         |        |
| Model with newly invented cage | 279983  | 276708 |
| Model with conventional cage   | 292503  | 300294 |

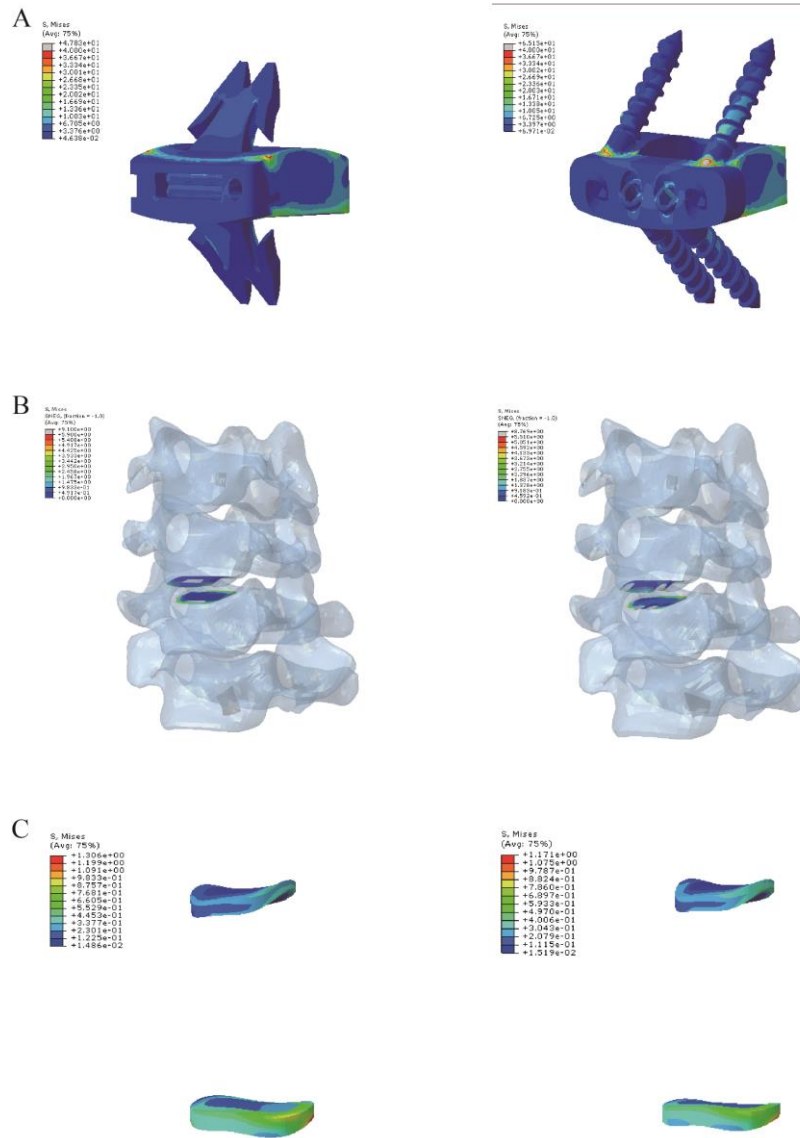


**Supplementary Figure 1.** The comparisons of the peak von Mises stress between new and conventional surgical models under extension condition (nephogram of von Mises stress). (A-C). The comparison of cage, plate and screw, endplate, adjacent disc peak von Mises stress between new and conventional surgical models under extension condition.

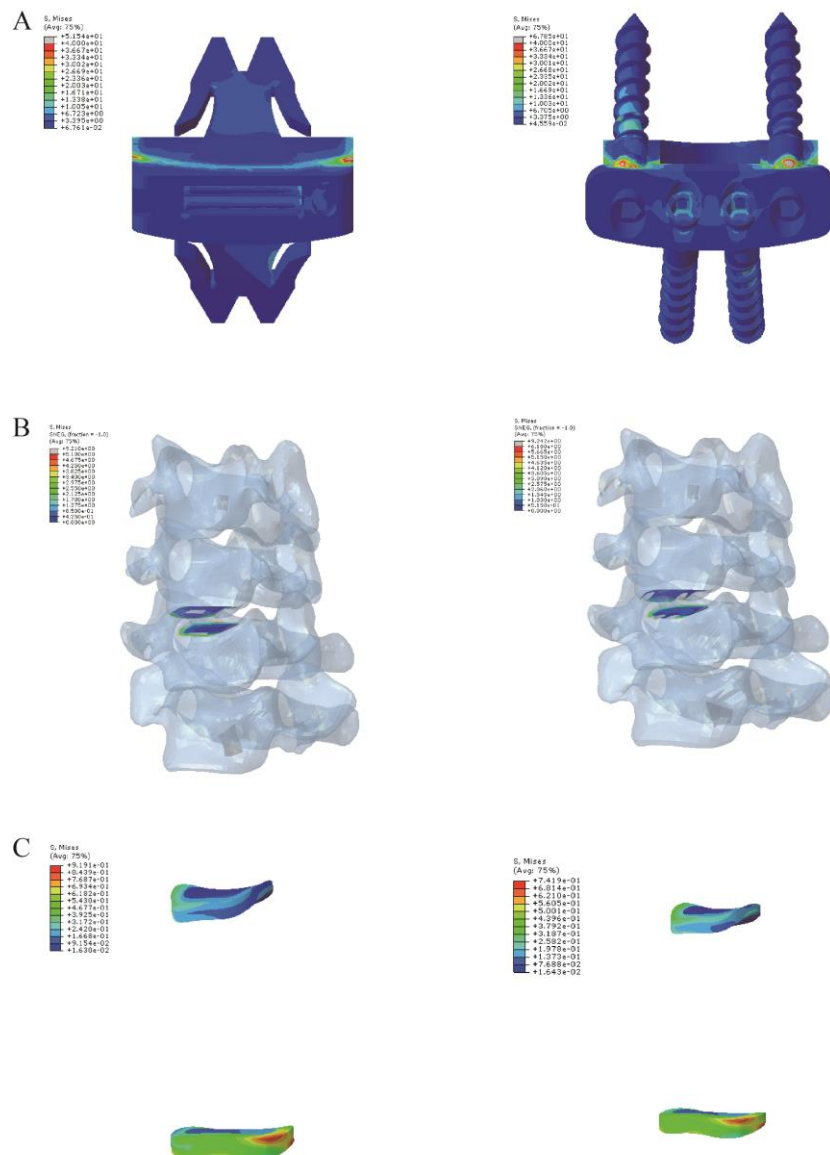




**Supplementary Figure 3.** The comparisons of the peak von Mises stress between new and conventional surgical models under right bending condition (nephogram of von Mises stress). (A-C). The comparison of cage, plate and screw, endoplate, adjacent disc peak von Mises stress between new and conventional surgical models under right bending condition.



**Supplementary Figure 4.** The comparisons of the peak von Mises stress between new and conventional surgical models under left axial torsion condition (nephogram of von Mises stress). (A-C). The comparison of cage, plate and screw, endplate, adjacent disc peak von Mises stress between new and conventional surgical models under left axial torsion condition.



**Supplementary Figure 5.** The comparisons of the peak von Mises stress between new and conventional surgical models under right axial torsion condition (nephogram of von Mises stress). (A-C). The comparison of cage, plate and screw, endplate, adjacent disc peak von Mises stress between new and conventional surgical models under right axial torsion condition.