Objective: To investigate the revision surgery for severe kyphoscoliosis after the failure of one stage surgical fusion and evaluate the effect and risk of this surgery.

Methods: From October 2006 to June 2009, 32 patients with severe kyphoscoliosis after failure of one stage surgical fusion were treated with revision surgery. There were 7 male and 25 female with an average age of 23.8 years (19-31 years old). The average interval after past surgery was 11.3 years (7-21 years). The average number of times was 2.3 (1-7 times). The pre-operative scoliosis Cobb angle was 123.2° (83°-156°) and kyphosis Cobb angle was 87°(53°-129°). Trunk shifts in the coronal plane was found in 17 patients, about 2.7cm (2.1-6.1 cm). 3 patients suffered the injury of spinal cord. Asia classification C: 1 case, D: 2 cases. Among the 32 patients, instrument was fixed in 12 patients’ spine. The materials were taken out at the one stage surgery. And the revision surgery was done at the second stage. The other 20 patient were treated with the revision surgery at the one stage. The structure of the spine and the state of the spinal cord were pre-operative measured by CT photograph, 3D reconstruction and the MRI photograph. All patients underwent total vertebral osteotomy on the apex vertebra, trans-pedieular fixation combined with supporting of Ti cage. Autogenous bone and Allogenic bone were used for Bone grafting. Spinal canal bony mediastinum occurred in one patient. And Tethered Cord syndrome occurred in 4 cases. The neurosurgeons did the spinosustomy and loosing of the tethered cord at the same time. The operation time, blood loss, complication of perioperation, the reconstruction to the scoliosis and kyphosis, trunk shift and the patients' satisfied degree were evaluated.

Results: There was no major complication of neurological injury and hardware failure. The average surgery time was 260 mins and average blood loss volumn of 1875ml (960-8200m1). The post-operative average kyphosis and scoliosis curve was 37.1° (correction rate: 57.4%) and 58.4° (correction rate: 52.6%), respectively. The average trunk shift was 1.3 cm (correction: 51.9%). The Asia C case before the operation became Asia D after the operation. one of the two Asia D cases before the operation became Asia E after the operation, the other was still Asia D. The complication rate was about 40.2%. Impairment of inferior extremities nerve: 2 cases. Hyperalgesia of inferior extremities: 1 case. These 3 cases were recovered after surgery. Hemopneumothorax: 1 case. Pleural effusion: 2 cases. Superior mesenteric artery syndrome: 3 cases. Stress Digestive Ulcer: 1 case. Superficial skin necrosis: 3 cases, cured after treatment. The average follow-up was 2.2 years (1-3 years). No pseudarthrosis and collapse of interal fixation. At the latest follow-up, 27 patients were satisfied with the revision surgery.

Conclusion: The revision surgery for severe kyphoscoliosis after the failure of one stage surgical fusion has the characteristic of difficulty to reconstruction, high risk and complication. Satisfied clinical effect would be achieved by the complete measurement before operation, total vertebral osteotomy on the apex vertebra and trans-pedieular fixation. The serve complication rate was also decreased.