

## The Spinal Cord Pyramidal Structures Reaction to Intraoperative Instrumental Correction of Spine Deformity

Shein AP\*, Krivoruchko GA and Ryabykh SO

Federal State Budgetary Institution "Russian Ilizarov Scientific Center "Restorative Traumatology and Orthopaedics" of Ministry of Healthcare, the Russian Federation, Kurgan, Russia

\*Corresponding author: Alexander Shein, Federal State Budgetary Institution "Russian Ilizarov Scientific Center "Restorative Traumatology and Orthopaedics" of Ministry of Healthcare, the Russian Federation, 6 M.Ulyanova street, Kurgan, 640014, Russia, Tel: +7 (3522) 45-47-58; E-mail: [sheinap@mail.ru](mailto:sheinap@mail.ru)

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### Introduction

The aim of this study was electroneuromyographic evaluation of the spinal cord pyramidal structures reactivity when performing the one-stage (intraoperative) instrumental correction of spinal deformities of various etiologies and severity, achieved through immersion transpedicular fixation systems.

**Keywords:** Reactivity; Electroneuromyography; Spinal cord; Spine deformity

### Materials and Methods

Before treatment and 4-31 ( $9.6 \pm 0.3$ ) days after surgery using methods of global (surface) and stimulation (M-responses) electroneuromyography were examined 135 patients 8-50 ( $16.4 \pm 0.6$ ) years (42 male, 93 female) with spinal deformities of various etiologies and severity. The intraoperative maximum angle correction of the spinal column, performed under intraoperative neurophysiological monitoring, ranged from  $3^\circ$  to  $95^\circ$  ( $37.2 \pm 1.5^\circ$ ). To assess the reactivity of the spinal cord structures located at the top of the primary deformation arc, was used integral indicator - the index of sensorimotor deficit (ISD) [1], calculated by the combination of EMG indicators of the left and right lower extremities muscles and expressed as an averaged percentage from normal values.

### Results and Discussion

The lowest ISD values and most distinct postoperative negative trends of this indicator were observed in individuals with gross spine deformities of the neuromuscular etiology. Found in 80 patients (59.26%) subclinical functional changes in the neuromotor system of the lower extremities, as reflected in the reduction of the ISD can be interpreted as a light ischaemic disturbances of the conductor-integrative functions of the spinal cord (the result of the one-step anatomo-biomechanical change in the «spinal column - spinal cord» system). Registered in 51 (37.8%) patients "paradoxical" (positive)

trend of postoperative ISD, presumably due to partial normalization of peri- and intramedullary blood flow at the top of the spine deformity. Study of microcirculation in spinal arachnoid revealed that correction of relatively light scoliosis improved the indices of microcirculation [2]. In 4 patients (2.96%) in the postoperative period was marked by significant (atypical) ISD decrease, correlating with clinical signs of development of neurological deficits. This fact indicates that the possibility of intraoperative neuromonitoring, as a means of preventing iatrogenic damage of the spinal cord structures during the performance of complex surgical interventions on the spine, still not fully exhausted and this method needs further development and improvement.

### Conclusion

Obtained data allow concluding that applied in Ilizarov centre methods of spinal deformity correction based on the using of transpedicular fixation submersible systems, despite the large-scale surgery and the risks of neurological complications, characterized by a low traumatism in relation to the spinal cord pyramidal structures. However, this fact does not preclude the necessity of using in more than 50% of cases specialized neuro rehabilitation therapy in the postoperative period and in accordance with the severity of postoperative sensorimotor disorders.

### References

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