**Introduction:** It is known commonly that the palsy of the posterior interosseous nerve which is a branch of the radial nerve is the representative disease as one of cause of unilateral fingers extension disorder, so-called drop fingers, but some cases of the cervical spondylosis also show similar symptoms presenting severe isolated muscle weakness of upper extremities without long tract signs and sensory disturbances from its early stages. The cervical spondylosis which presented unilateral drop fingers is known as a rare specific clinical condition, but so far there are only a few reports (1)(2)(3). The pathomechanism of the unique condition has been not elucidated definitely yet. In this study, we investigated the cause of the cervical spondylosis which presented unilateral fingers extension disorder by evaluating each the perioperative electrophysiological findings and the magnetic resonance imaging (MRI) findings. The evaluation of these findings could give us many clues to elucidate the pathomechanism.

**Materials and Methods:** In this study, we defined cases presenting unilateral fingers extension disorder without long tract signs and sensory disturbance as cervical drop fingers (CDF). We investigated 5 patients (4 males and 1 female) (average age 61 years; range from 48 to 70 years). They were treated by the operative method and electrophysiological examination was also evaluated perioperatively in detail. 4 cases were treated by cervical posterior laminoplasty from C3 to C7. The unilateral foraminotomy to C7 and C8 nerve root was also added to these cases in consideration of all pathogenesis. The other case was treated by anterior spinal fusion from C6 to Th1.

We recorded both evoked spinal cord potentials (ESCPs) by the peripheral nerve stimulation through the skin at the wrist and compound muscle action potentials (CMAPs) of extensor digitorum communis (EDC) by the nerve root stimulation directly as the electrophysiological assessment to elucidate the pathomechanism of CDF. The CMAPs of EDC were recorded by the belly-tendon method. The cervical nerve roots were stimulated directly by needle electrode (9013R0222; Medtronic Dantec, Skovlunde, Denmark), which was inserted into the cervical intervertebral facet joint. On the other hand, to record the ESCPs, the active electrodes were inserted in the ligamentum flavum at each intervertebral level and the reference electrode was placed in the subcutaneous soft tissue of posterior neck in the 4 cases treated by posterior decompression. The other case whose nerve roots were possible to be stimulated directly showed apparent abnormal electrophysiological findings perioperatively. Their CMAPs were charactorized with the prolonged latency, the low amplitude and the tendency of multiple phases by the stimulation of C7 nerve root in comparison with the contralateral C7 nerve root stimulation of normal side. 2 of the 4 cases showed different findings of CMAPs by the stimulation of C8 nerve root. They showed low amplitude of CMAPs as same as C7 nerve root stimulation, but did not show the delay of latency. The high signal intensity change within the spinal cord with compression was found at C6/7 intervertebral level on their T2-weighted MRI findings. Furthermore, the abnormal ESCPs finding with the multiple N11 potential peaks and the low amplitude of N13 potential were recorded only at C6/7 intervertebral level by the ulnar stimulation on the affected side. The other 2 cases showed the similar abnormal findings of CMAPs with the delay of latency and the low amplitude by the stimulation of C8 nerve root. There was no abnormal intramedullary lesion within the spinal cord that showed high signal intensity on T2-weighted MRI in these cases. Any difference of ESCPs by the median nerve stimulation between the affected side and normal side was not found in the case which was treated by anterior spinal fusion, but the wave forms of ESCPs at both C6/7 and C7/Th1 intervertebral level had two peak phases and the low amplitude by the ulnar nerve root stimulation of affected side. There was not apparent compressive lesion of spinal cord on MRI in this case.

**Discussion:** we have presented five cases with drop fingers due to the cervical spondylosis. The clinical symptom of CDF is very similar to that of the posterior interosseous nerve palsy, but it was possible to differentiate each clinical condition by the assessment of preoperative electrophysiological findings. It was considered from the perioperative electrophysiological assessment that the pathomechanism of CDF depended on the complicated combination of nerve root disorder and the spinal cord segment disorder as to C7 and C8. In this study, it was estimated that the complicated combination of C7 nerve root disorder and C8 spinal cord segment disorder or both C7 and C8 nerve root disorder or isolated C8 nerve root disorder might cause CDF. The electrophysiological approaches were significant to elucidate the pathomechanism of CDF.