Herpes zoster (HZ) is a type of viral infection caused by varicella zoster virus. The most common complication of HZ is postherpetic neuralgia (PHN) with a frequency of 15–25%. Berry reported that patients with complex regional pain syndrome (CRPS)–like symptoms are at higher risk of PHN. As such, it is desirable to provide radical treatments to HZ patients who exhibit CRPS–like symptoms, even though there currently are no established treatments for CRPS–like symptoms.

In this report, we present the case of a patient who suffered from CRPS–like symptoms. Because the symptoms were drug–resistant, we attempted combination therapy with limited-duration spinal cord stimulation (L–SCS) and physical therapy (PT), which resulted in a rapid improvement and a complete recovery.

### I Introduction

Herpes zoster (HZ) is a type of viral infection caused by varicella zoster virus. The most common complication of HZ is postherpetic neuralgia (PHN) with a frequency of 15–25%.

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### Abstract

An 83–year–old female patient suffered from herpes zoster in the left arm and developed complex regional pain syndrome–like symptoms, including drug–resistant pain and immobilization of the arm. A dramatic relief of the symptoms was achieved by limited–duration spinal cord stimulation for 1 week combined with physical therapy 40 days after onset, and the patient completely recovered. This clinical course suggests that intensive spinal cord stimulation treatment during the acute phase not only brought about a rapid palliation of pain, but it was also useful to enhance the effects of aggressive physical therapy without blocking any motor nerves.

### Keywords

zoster–associated pain, complex regional pain syndrome, spinal cord stimulation

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involving the C5–6 level dermatomes. The skin temperature on the affected side was lower than that on the contralateral side. The grip strength of the hand on the affected side was lower than that on the contralateral side (right and left: 13 kg and 6 kg). The motor strength of the left arm was such that shoulder flexion, extension and abduction, elbow flexion and extension, wrist flexion and extension and finger flexion, extension and abduction were all 4/5. The patient suffered from insomnia and a decreased QOL (EuroQol–5 Dimension Questionnaire (EQ5–D) = 0.363).

In addition to the pain having been drug–resistant, the patient developed dizziness and hepatic dysfunction after receiving the analgesics. We performed a cervical epidural block and brachial plexus block, however the nerve blocks had only a short–term weak effect of several hours. Although PT was desirable to prevent possible disuse atrophy, the physical therapist could not even touch the limb due to marked allodynia. Therefore, we chose to employ the L–SCS in an intensive manner, as it is a type of interventional pain management that can be used concomitantly with PT.

The SCS electrode was inserted into the patient under X–ray guidance 40 days after the onset of HZ. After a cisthesis through the C7/Th1 level, an Octad lead (Medtronic, sub–compact type) was inserted at the C3–5 level. The implant operation was determined to be successful after the patient felt stimulation in her left C5–6 region that was the site of pain. Stimulation was applied using 0.9 V (adjustable within 0–5.0 V), 90 µS (fixed) and 20 Hz (adjustable with 2–50 Hz), all of which were adjustable by the patient. Approximately 2 h of continuous stimulation was provided four to five times during the day, and continuous stimulation was provided throughout the night.

L–SCS alleviated pain and allodynia in a short time span, enabling the start of physical therapy, which contributed to an improvement the edema in the left hand, the range of motion, as well as the overall movement of the upper arm. At the time of discharge from the hospital, her visual analogue scale (VAS) was reduced from 82 to 20 and the edema and lightening pain disappeared (Figure 1B).

The SCS electrodes was removed after one week of intensive treatment. No adverse effects were observed due to L–SCS. The pain remained at VAS: 10–20 mm after the electrode was removed without any more exacerbation. The motor strength level of the left arm remained at 4/5, and

Figure 1 The patient arms
A: The findings of the initial visit (24 days after onset). At the time of the first examinations, the patient’s left arm appeared dark purple and was generally edematous. The first and second fingers of the affected hand were heavily swollen, and their flexions were restricted.
B: The findings after limited–duration SCS combined with physical therapy (50 days after onset).
PT was continued. The drugs were gradually decreased in dosage and ultimately discontinued. The patient was completely free of pain 4 months after the onset of HZ, her muscle strength was almost normal, and the QOL score recovered to within the normal levels.

In this case report, we showed that L-SCS had excellent alleviating effects on severe zoster-associated pain (ZAP) and CRPS-like symptoms in a patient with HZ of the arm. Several case reports have demonstrated the efficacy of L-SCS during the acute phase of intractable ZAP. Harke administered L-SCS to 4 patients within 2 months of the onset of the diseases and the pain was completely resolved in all patients. Moriyama provided L-SCS combined with continuous epidural blocks to 14 patients for 3 months or less, achieving favorable outcomes in 12 of them. We also previously reported favorable outcomes by providing L-SCS to 2 patients who were within several months after the onset of HZ. Among these reported cases, only one patient had HZ in the arm. In that case, the authors did not describe the association of CRPS-like symptoms.

Therefore, the present case may be the first report to indicate that L-SCS is effective in alleviating ZAP and associated CRPS-like symptoms in the upper extremities.

SCS is recommended as a treatment of CRPS, if the condition is refractory to more conservative measures. Previous studies have demonstrated that somatic and sympathetic nerve blocks, such as an epidural block and satellite ganglion block, can alleviate ZAP. However, the effects of the nerve blocks were often transient and not adequate as seen in our case. SCS appears to be more beneficial than the nerve blocks, because it preserves an intact motor function and makes early physiotherapeutic intervention possible. This is quite important because immobilization of the affected limb has been shown to be involved in the development of CRPS.

Abnormal sensitization and the resulting dysfunction of the central nervous system caused by severe inflammation, as well as continuous transmission of "ongoing pain" signals from the peripheral nerves due to inflammation, have been suggested to be involved in the transition from HZ to PHN. Therefore, the prevention of such sensitization and dysfunction during the acute phase of the condition should be crucial for the successful treatment of ZAP. SCS has been shown to provide analgesic effects by normalizing the hyperexcitability of the wide dynamic range neurons of the spinal dorsal horn that provoke allodynia, and by increasing the level of γ-aminobutyric acid, which suppresses the secretion of excitatory amino acids that are elevated during chronic pain. These mechanisms could underlie the rapid effects of L-SCS on alleviating ZAP and preventing PHN.

Although we speculate that L-SCS was effective because a decrease in ZAP was observed immediately after the initiation of SCS, further research is required to verify its therapeaic value since spontaneous remission of ZAP often occurs.
In conclusion, we herein presented a case which indicated that the combination of L–SCS and PT is a promising option to treat patients with severe ZAP associated with CRPS–like symptoms.

References