ONLINE CONTENT

The following cases from our records (in addition to the printed cases) further show the immense variability of NDSD phenomenology and the response to an array of treatment interventions. The case reports show:

- Resolution of NDSD and functional recovery with “change in beliefs” and attitude (case number 1S),
- Resolution of NDSD and functional recovery with diverse interventions such as spinal stimulation (case number 3S) and nerve blocks, resulting in long-lasting pain relief (case number 4S),
- Permanent and severe NDSD deficits associated with paralysis and functional imaging changes (case number 2S),
- Spontaneous migration or resolution of NDSD and motor deficit (case number 2S),
- NDSDs in a husband and wife (cases numbers 3S and 4S) resolving permanently or temporarily with diverse interventions,
- Bilateral presentation of NDSDs,
- Painless NDSD in the absence of underlying physical pathology (case number 3S)

Case Number 1S

A 56-year-old woman (Fig. 1S) had a microdiscectomy in 1988 for low back and right leg pain. During the surgery, a L4-5 disk rupture, severely compressing the right L5 and S1 roots, was documented. Postoperatively, she experienced complete back pain relief, but had a painful right leg and a drop foot which necessitated a brace. In addition, she developed intense numbness involving the right buttock, perineum and vaginal wall, and the whole right leg and foot. She continued to complain of inability to feel the right side of the vagina during intercourse and had difficulty discriminating between defecation and urination. In February 2004, after reading the senior author’s popular science book1 in which reference is made to “NSDSs,” she and her husband decided to “retrain her brain”! With the help of her supportive husband she engaged in repeat tactile stimulation of the extremity during constant visual feedback and started taking progressively longer walks. Within a week after “convincing herself that the numbness was the result of altered brain activity,” as explained in the book, she noticed gradual recovery of the sensation starting proximally and spreading distally, and stopped using the foot brace and discontinued nortriptyline.

She presented to our clinic in November 2004 complaining of a remaining patch of numbness in the right lateral foot and 1 to 3 episodes per day of sharp shooting pain in the same distribution, lasting a few minutes at a time, wondering if the remaining sensory deficit was also “a brain game”! On examination she had L5-S1 root territory hypoesthesia; absent right ankle jerk; mild weakness in dorsiflexors, evertors, and plantar flexors; and a cold but pain-free right leg. Review of her old medical records confirmed a sequestered disk, electrophysiologically documented severe L5 and S1 radiculopathy, and unexplainable extensive hypoesthesia as described by the patient. Repeat electrophysiological studies in our unit confirmed old right L5-S1 radiculopathy. It was explained to her that the remaining sensory deficit was permanent and secondary to nerve root injury. The patient was content with the explanations and considered that her residual few episodes of paroxysmal pain were easily managed without medications.

Case Number 2S

This 61-year-old female (Fig. 2S) in 2000 during a bout of pneumonia developed acute exacerbation of right
shoulder pain (which she had suffered from for 14 y) and a 24-hour episode of complete right-sided anesthesia and paralysis affecting both the right arm and leg, which necessitated hospitalization. The second hospital day she regained spontaneously full movement and sensation of the right leg and proximal arm, but remained with a flaccid and anesthetic right hand. In addition, within hours she developed a flaccid, painless, and anesthetic left leg preceded by the onset of short-lived proximal left thigh pain. The right shoulder pain had remained severe and unrelenting at all times. She discharged herself home after she overheard her physician telling her daughter that the paralysis was “a product of her mind” as all investigations for stroke were negative. Quite angry, she boiled water and poured it over the left thigh to test her anesthetic leg! Within a minute or so she experienced waves of dysesthesiae across the left thigh/groin and quickly regained her sensation from the groin to the knee.

Upon presentation to our unit 13 months after the onset of her symptoms, she was wheelchair bound with profoundly swollen right hand and left foot, which were cold, anesthetic, and flaccid. Severe hypoalgesia was also noted across the right upper body including the right arm and face. Pain was confined to the right shoulder with some burning discomfort in the left groin (which according to the patient appeared after she threw boiling water over her anesthetic thigh and had persisted since then). Confirming her report, a large scar secondary to a second-degree burn was apparent in her left thigh. Right shoulder investigations showed significant degenerative changes in the shoulder joint complex. The patient was submitted to functional imaging with 3 more similar patients as part of a research study and proved to have significant alterations in brain activation patterns, similar to case number 3S presented below. She was lost to follow-up 2.5 years after the onset of her symptoms having had no recovery.

Of interest, retrieval of old records indicated that she had sustained a left-sided hemiparesis in 1993 that appeared suddenly after attending her father’s funeral and recovered completely after a year of rehabilitation. Nevertheless, brain scans had then failed to document a cerebrovascular event, which, in retrospect, we attributed to the emotionally charged situation experienced at her father’s funeral, which in our opinion resulted in functional brain changes. These changes did not last more than a year, contrary to the more recent episode that seemed to have produced permanent brain alterations.

**Case Number 3S**

This 40-year-old male had an L4-5 microdiscectomy in 1993 after an injury at work. A few months after the surgery, he presented to our program with a densely anesthetic but painful left leg and an anesthetic but painless right arm. The affected limbs exhibited slightly decreased mobility and dexterity with complete loss of vibration and pressure sense. Except for some left L5 root perineural fibrosis, no underlying pathology was found to account for the right arm and left leg findings. Somatosensory-evoked potentials were normal from both the upper and lower limbs. IV sodium amytal (preceded by single-blinded normal saline infusion to which the patient failed to

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**FIGURE 25.** First hospital day (Left); second hospital day (Centre); 13 months later (Right). Hutchet areas represent NDSD (with associated flaccid paralysis) and shaded areas, pain regions.
respond) led to at least 50% reduction of left leg pain and dramatic amelioration of hypoesthesia of the left leg and right arm, lasting a few hours. The response to placebo and sodium amytal was always the same during several admissions, even if the order of the infusions was reversed or when both the senior author who administered the infusions and the patient were blinded. Years later, the right arm anesthesia resolved spontaneously for no apparent reason.

The patient’s left anesthetic leg was studied with functional imaging 7 years after the onset of symptoms (this patient was a part of the same study as patient number 2S, see Mailis-Gagnon et al, 2003). Stimulation of the anesthetic left leg (but not the right normal leg) failed to activate the primary somatosensory cortex (in addition to the other abnormalities in brain activation patterns) (Fig. 3S). Subsequently, the patient had insertion of a spinal cord stimulator with dramatic and nearly instantaneous and sustained pain relief in the left leg. However, the sensory deficit remained for another 2 months and then recovered rapidly with the exemption of a narrow strip of residual hypoalgesia at the L5 root distribution. Unfortunately, 6 months after the spinal cord stimulator insertion, the stimulator became infected and had to be removed. Left leg pain relief and NDSD resolution persisted and the patient took up a job as a bus driver. A year later, however, he was involved in a job dispute and both pain and NDSD returned and remained in long-term follow-up. Psychometrics again showed a deep Conversion V MMPI profile.

Case Number 4S

In 2003, the wife of case number 3S above was involved in a rear-end collision and presented to us with right-sided neck pain. Examination showed a substantial right-sided sensory deficit involving the right face, arm, and torso, although she had consistent and reproducible tenderness across the right occiput. Occipital nerve block was followed by dramatic amelioration of pain and sensory deficit with the effects lasting for many months. Of note, this patient was the only employed person in the household and had become very depressed and frightened after her car accident. A series of 3 occipital blocks within the year improved this lady’s condition dramatically and she was able to resume her job (although the sensory deficit ultimately resolved). Psychometrics was suggestive of someone who tended to deny or minimize personal or psychosocial problems.

REFERENCES


FIGURE 3S. Functional imaging after brush stimulation. Note activation of the left S1 area after stimulation of the right normal leg (Left). Stimulation of the anesthetic left leg fails activate S1 (Right). Printed with permission from Dr. Karen Davis, Toronto Western Hospital, Toronto, Ontario, Canada.