

## Osteopathic Manipulative Treatment in the Management of Notalgia Paresthetica

Blakely S. Richardson, DO  
Bill V. Way, DO  
Arthur J. Speece, III, DO

**Notalgia paresthetica is a chronic sensory neuropathy characterized by pruritus of the upper to middle back, typically below the left shoulder blade. Symptoms may include pain, hyperesthesia, paresthesia, and hyperpigmentation of the affected area. Although the etiologic process of this condition is poorly understood, recent correlations with degenerative spinal changes suggest that spinal nerve impingement may play a role. The authors report the case of a 59-year-old woman with notalgia paresthetica who received one 20-minute session of osteopathic manipulative treatment that focused primarily on thoracic spine and rib somatic dysfunctions. After treatment, the patient reported immediate improvement of symptoms. A discussion of this condition based on previously published literature is also provided.**

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**N**otalgia paresthetica (NP) is a sensory neuropathy of the back, often characterized by pain. The term *notalgia paresthetica* is derived from the Greek root word *notos*, meaning “back,” and *algia*, meaning “pain.” The condition was first described by Astwazaturow in 1934 and has been thought to arise from the dorsal rami of thoracic nerves T2 through T6.<sup>1,2</sup>

Clinical symptoms of NP consist of pruritus, localized dysesthesia, and hyperesthesia in the distribution of one of the cutaneous dorsal rami of the upper thoracic region. This condition may also result in hyperpigmented skin in the scapular region. Although symptoms most often present uni-

laterally in the left parascapular paravertebral region, bilateral or right-sided symptoms may occur instead. In our experience, some patients complain of “tingling” and hyperalgesia with tenderness localized to the spinous processes. Sensitivity to temperature, light touch, and vibration may be abnormal, and hypoesthesia to pinprick test may be noted.<sup>2</sup>

In the current report, we describe the case of a 59-year-old woman who presented with neck and back pain and pruritus. She was diagnosed as having NP and was treated using osteopathic manipulative treatment (OMT). A review of the literature for etiologic processes and treatment options for patients with this condition is also provided.

### Report of Case

A 59-year-old well-nourished white woman presented to the clinic with chief complaints of neck pain as well as upper and lower back pain. According to the patient, the pain began after a rear-end motor vehicle collision approximately 2 years prior. She was restrained by the seatbelt and did not go to the emergency department. However, she visited her primary care physician within 1 week of the collision and was given medication for her pain. Results from a radiographic image taken at that visit were normal.

At presentation, the patient described constant burning and tingling sensations as well as undiminished pruritus along the medial border of her left scapula. The patient stated that the pruritus began 3 to 4 months after the collision. On a subjective scale of 0 (no discomfort) to 10 (worst discomfort), she rated her level of discomfort as a 6 or 7. The patient had also noticed an area of hyperpigmentation that had been increasing in size during the past year.

About 1.5 years before presenting to the clinic, the patient received a series of epidural steroid injections (3 injections, 6 months apart) to her cervical and lumbar regions to manage the pain related to this condition. The injections provided some immediate relief, but pain returned. For her pruritic symptoms, the patient took an oral antihistamine and used an over-the-counter hydrocortisone cream as needed, to minimal relief.

The patient stated she had mild chronic back pain before the accident. Her medical history was also positive for bulging disks in the cervical and lumbar spine and for degenerative disk disease, restless leg syndrome, and hypertension. Family history was positive for heart disease, hypertension, and type 2

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From University Hospitals Richmond Medical Center in Cleveland, Ohio (Dr Richardson); from the Dermatology Institute of the Texas Division of Kirksville College of Osteopathic Medicine-A.T. Still University in Duncanville (Dr Way); and from the University of North Texas Health Science Center—Texas College of Osteopathic Medicine (UNTHSC/TCOM) in Fort Worth (Dr Speece). Dr Richardson was an osteopathic medical student at UNTHSC/TCOM at the time of the present report.

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Address correspondence to Blakely S. Richardson, DO, 1426 E 15th St, Cleveland, OH 44114-4156.

E-mail: blakely.richardson@uhhospitals.org

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diabetes mellitus. The patient denied past or present tobacco or illicit drug use and stated that she rarely consumed alcohol. She denied any previous operations or hospitalizations.

On physical examination, the patient was awake, alert, and cooperative with cranial nerves grossly intact. Her vital signs were normal.

Visual inspection of the patient's back revealed a macular patch of brownish discoloration that was 4 cm in diameter just below the inferior angle of her left scapula at the level of vertebrae T6 and T7. Palpation and range-of-motion screening revealed restriction in the cervical and lumbar spine. Osteopathic examination findings included neutral, sidebent left, rotated right vertebral segments C7 through T6 as well as extended, rotated right, and sidebent right vertebral segment L3. The patient's fifth rib on the left side had inhalation somatic dysfunction (ie, exhalation restriction) and was tender on palpation. Tissue texture changes were observed in vertebrae T2 through T7 with tenderness at the tips of the spinous processes, and an appreciableropy and fibrotic texture at the left scapula. The patient had sensitivity in four of 18 fibromyalgia tender points.

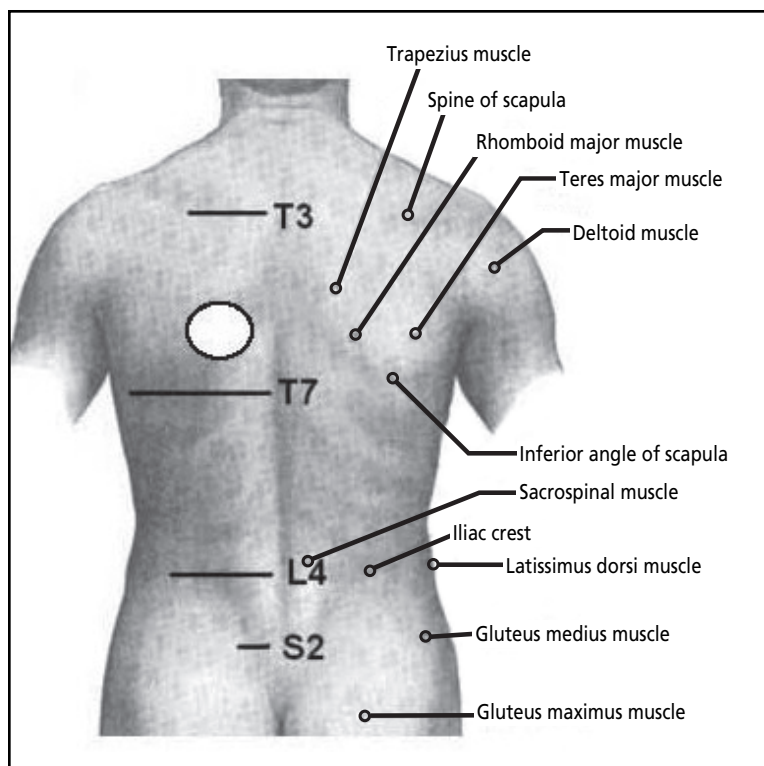
The patient denied any symptoms of fatigue or sleep disorder, lowering the suspicion of fibromyalgia. There was no evidence of synovitis on examination. She also denied any morning stiffness or pain in her hands or feet. The patient was not screened for autoimmune disorders because she had no other symptoms.

### Osteopathic Manipulative Treatment

To alleviate the patient's pain and discomfort, OMT was prescribed. Suboccipital decompression was used to normalize the parasympathetic nerves, and muscle energy was used to manage the upper thoracic and cervical regions. Inhibition and other soft tissue techniques (eg, stretching, kneading) were applied to a tender point over the patient's left scapular region. After mobilizing the fifth rib back to a neutral position by indirect means, rib raising was used to normalize the sympathetic nerves. Finally, scapulothoracic fascial release was applied to the patient's left scapula.

Total treatment time was approximately 20 minutes, after which the patient stated that her discomfort improved (rated 2 on a 10-point subjective scale).

She returned 2 weeks later with sustained improvement. The patient reported that her pruritic symptoms occurred less often and were less severe, and she rated her discomfort at 3 on a 10-point subjective scale. The patient did not return for additional evaluation or OMT and could not be reached by telephone for follow-up.



**Figure.** Most common location of skin manifestations in patients with notalgia paresthetica is at the medial border of the left scapula. Adapted from Grey's Anatomy of the Human Body, 1918. Public domain. **Abbreviations:** T3, T7, L4, and S2 represent vertebrae in the thoracic, lumbar, and sacrum regions, respectively.

### Comment

The exact cause of NP is unknown, but several hypotheses have been considered. For example, one probable cause of the pruritus associated with NP is entrapment of the posterior rami of spinal nerves T2 through T6 (Figure).<sup>1</sup> Pleet and Massey<sup>1</sup> suggested that the posterior rami pursue a right angle course through the multifidus muscles, predisposing them to entrapment, leading to ischemic changes, nerve swelling, and damage.

Noxious stimuli in the periphery fibers of the involved nerve activate C fibers. Impulses are transmitted to the spinal cord and brain and are perceived as pruritus. Sometimes, neurons are activated without the involvement of peripheral nerve endings. Inflammation can enhance neuronal excitability, causing repetitive activation of the C fibers. Pressure from an entrapped nerve can also stimulate these nerve fibers.<sup>3</sup>

Wallengran<sup>3</sup> suggested that NP may be explained by increased dermal innervations, viscerocutaneous reflex mechanism, spinal injury, or chemical neurotoxicity. Springall et al<sup>4</sup> investigated neural immunohistochemistry of skin biopsies and found an increase in the sensory epidermal innervations

in affected skin. The authors<sup>4</sup> further proposed that the increase in dermal innervations reflexively perpetuated the symptoms.

Savk and Savk<sup>5</sup> studied 34 patients with NP and found that the presence of otherwise asymptomatic degenerative changes and herniated nucleus pulposus were found in up to 79% of patients. Results of radiographic testing demonstrated that the involved segments corresponded to the affected dermatomes in 82% of patients.<sup>5</sup> The correlation between the spinal pathology and the symptomatic region demonstrates that spinal nerve root impingement may contribute to the pathogenesis of NP. This finding is consistent with the present report, in which the patient had a history of spinal degenerative changes.

While some hereditary cases have been noted—predominantly in young patients with multiple endocrine neoplasia type II—NP occurs primarily in middle-aged and older women.<sup>6</sup> Most patients with NP have sporadic pathologic processes linked with musculoskeletal compression of spinal nerves. The condition has also been reported in patients with a history of neuritides, thereby suggesting an underlying predisposition to peripheral neuropathy.<sup>6</sup>

Dermal lesions, which typically present as pigmented maculae of varying sizes with indistinct borders, have been described in two-thirds of all published studies.<sup>6</sup> These pigmented patches on the skin and friction amyloidosis can arise with irritation, as prolonged friction degenerates keratinocytes and keratin is replaced by amyloid.<sup>6</sup> Skin biopsy has shown intraepithelial necrotic keratinocytes with melanin and melanophages in the papillary and middle dermis. Before diagnosing NP, it is important to rule out other pruritic pathologic processes, including Malassezia folliculitis, neurodermatitis, parapsoriasis, pigmented contact dermatitis, and primitive cutaneous amyloidosis.<sup>6</sup>

### Treatment

Common treatments for patients with NP include local anesthetics, topical and intralesional corticosteroids, and topical capsaicin. However, all standard therapies used to treat NP have been relatively unsuccessful. For example, topical capsaicin cream applied five times daily for 1 week depleted substance P and relieved some pain and pruritus, but symptoms recurred after the treatment was discontinued.<sup>7</sup>

One case report<sup>8</sup> described a patient with severe NP who was treated successfully with paravertebral nerve blocks (bupivacaine) and anti-inflammatory (methylprednisolone acetate) injected into the T3-6 intervertebral spaces. The patient remained symptom-free for 1 year after treatment.<sup>8</sup>

Botulinum toxin injections may also alleviate symptoms of NP. In one study,<sup>9</sup> patients were treated with intradermal injections of botulinum toxin type A using a method similar to that used for postherpetic neuralgia. Some patients remained symptom-free for 18 months with evident fading of the pigmented lesion.<sup>9</sup>

Gabapentin is an anticonvulsant often used to treat neuropathic pain. Recently, it has been used to manage severe NP.<sup>10</sup> For neuropathic pain, 300 mg is started daily and then titrated up to 900 mg per day. Gabapentin has also been used to manage brachioradial pruritus, which is a similar disease that affects the cervical nerves and presents with pruritus of the arms and sometimes the chest and back. While gabapentin has some antipruritic effects,<sup>10</sup> similar results have not yet been achieved by pregabalin. However, further investigation is warranted.<sup>11</sup>

Tricyclic antidepressants and selective serotonin reuptake inhibitors may help relieve neuropathic itch.<sup>12,13</sup> Carbamazepine and oxcarbazepine have also proven to be beneficial in chronic painful neuropathies. These medications act by decreasing repetitive charges, blocking membrane sodium currents, and increasing the firing threshold in A delta fibers. One study<sup>14</sup> documented a therapeutic effect of oxcarbazepine 300 mg twice a day in the management of NP. However, the mechanism of action is unknown.

Partial relief has also been observed using transcutaneous electrical nerve stimulation, which may be beneficial as an adjunctive therapy.<sup>15</sup> Other therapies mentioned in the literature include physiotherapy, neck traction, and cervical manipulation.<sup>16</sup>

Research regarding manual treatment for patients with NP is lacking. In 1999, Raison-Peyron et al<sup>6</sup> demonstrated sustained improvements with paraspinal physiotherapy and manipulation in 4 of 6 patients with varying degrees of relief from 1 to 9 years. There has been one report<sup>16</sup> of spinal manipulation being effective for patients with brachioradial pruritus. Cervical spine manipulation was also successful in treating patients with this condition.<sup>16</sup> Ten of 14 patients reported resolution of symptoms after manipulative treatment, which consisted of rotating the neck away from the symptomatic side while applying traction. This technique results in increased space for the nerves to exit, relieving symptoms. All 6 patients in the study who had cervical spine disease responded positively to the therapeutic interventions.<sup>16</sup>

### Conclusion

Notalgia paresthetica can be frustrating for patients and physicians as a result of the lack of medical knowledge and effective treatment options. Because evidence has shown that NP is most likely the result of pathologic processes and dysfunction in the spine or ribs, OMT may be an effective treatment modality—alone or combined with other methods.

By applying muscle energy and indirect techniques to the involved segments as well as applying traction and stretching the musculature, physicians may be able to relieve some pressure on the exiting dorsal rami, providing relief from pruritus, dysesthesia, and hypesthesia. By normalizing the sympathetic and parasympathetic tones to the skin and by

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stimulating blood flow, the appearance and texture of the skin may improve.

Continued research is necessary to better understand the etiologic process of NP. As stated earlier, there is a lack of case studies evaluating the effectiveness of manipulation for the management of NP. Most importantly, studies are needed to reveal how OMT may help patients with this condition and provide much-needed relief of their symptoms.

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