Traumatic Neuralgia From Pressure-Point Strikes in the Martial Arts: Results From a Retrospective Online Survey

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Context: Many techniques in Asian martial arts hand-to-hand combat systems emphasize hitting or striking specific sites on the body that correlate with exposed portions of peripheral nerves.

Objective: To evaluate the prevalence and clinical effects of this unique sports-related injury.

Methods: An anonymous self-administered retrospective 20-question electronic survey was posted on a high-traffic martial arts Web site. Primary outcome measures were demographic and medical history data, including martial arts experience and neuropathic symptoms associated with injury from this form of combat. Risk of symptoms was calculated by dividing the number of individuals with symptoms in each pressure-point area by the number of individuals who were struck in these areas during martial arts training.

Results: Of the 651 survey responses received, 605 met inclusion criteria. Neuropathic symptoms were reported by 291 subjects. Most symptoms occurred in individuals aged between 20 and 30 years as well as in individuals with less than 1 year of martial arts training. The majority of respondents with neuropathic symptoms reported a symptom duration of less than 1 year (207 [71%]). Individuals with more than 5 years of combat training experience had a greater risk of chronic symptoms associated with injury in the novice martial artist—and to confuse a family physician who is confronted with vague complaints from patients experiencing neurologic symptoms.

Conclusion: Symptoms of neurapraxia can occur in individuals as a result of practicing martial arts involving strikes on pressure points. Although the majority of symptoms resolve within 1 year, individuals with prolonged exposure to pressure-point strikes may be more likely to have chronic symptoms.


Techniques used in many forms of Asian martial arts emphasize combat methods that target attack to specific sites on an opponent’s body—sites that correlate with exposed portions of peripheral nerves. The targeted areas are known variously as acupuncture points, dim mak points, kyusho points, pressure points, and vital points.

Dim mak, a Chinese term that translates into “death touch,” is the oldest term used to describe the codified martial arts combat techniques centered on impact to acupuncture points. Kyusho jitsu, the Japanese and Okinawan term, can be translated as “vital-point striking” or, more literally, as “1-second fighting.” Two common English terms for this type of martial arts training are vital-point fighting and pressure-point fighting. In addition, all the targeted points are commonly referred to as pressure points in English (Figure).

There is some confusion among the public regarding the pressure-point aspects of Asian martial arts. Contrary to popular belief, striking pressure points is not a specific style of martial arts. Rather, it is a technique used in many different styles of martial arts training—most often taught to martial artists in advanced levels of study (eg, black belt).

The use of pressure points in martial arts combat settings has substantially increased since the mid-1990s. There are numerous books, videos, and seminars available for martial artists interested in learning these techniques—often focused on making contact at the carotid sinus, distal median nerve, facial and trigeminal nerves, radial nerve branches, and ulnar nerve. These techniques have the potential to cause serious injury in the novice martial artist—and to confuse a family physician who is confronted with vague complaints from patients experiencing neurologic symptoms.

The clinical effect of prolonged exposure to pressure-point strikes has not been adequately investigated. A search of the United States National Library of Medicine’s MEDLINE database using the keywords dim mak points, kyusho points, pressure points, and vital points for literature that had been published through June 7, 2004, revealed no studies evaluating the clinical effects of striking exposed nerves during martial arts practice.

The primary purpose of the present survey-based pilot study was to describe and determine the prevalence of neuropathic symptoms associated with pressure-point strikes in martial arts training, a unique form of sports injury.
Methods
A self-administered survey composed of 20 questions related to medical history, martial arts experience, pressure-point strikes, and neuropathic symptoms was posted on a popular martial arts Web site. Several international martial arts associations were contacted and asked to distribute the Web address of the survey to their members. In addition, the Web address was listed on several popular online martial arts forums, and electronic mail messages were sent to 750 individuals who had previously requested information about pressure points from the host Web site. Survey responses were collected for 7 months after Web posting.

The survey instrument was designed to gather demographic information and medical history data from respondents in addition to information about their martial arts experience and any associated injuries. Questions addressed symptom frequency, duration, and locations. Symptoms evaluated included aching, numbness, tingling, and weakness. Descriptive terms evaluated included burning, dull, electric, sharp, and shooting.

Some survey questions were repeated with altered wording. If a participant provided inconsistent answers to related questions, all data from that participant was discarded. All results from individuals who reported medical histories (ie, previous illnesses or injuries) that could be the cause of their symptoms were also discarded.

The risk of symptoms associated with particular pressure-point strikes was calculated by dividing the number of individuals with symptoms in each body region by the number of individuals who were struck in those areas during martial arts practice sessions.

Results
A total of 651 individuals responded to the survey. Forty-six of these responses were discarded because of incomplete or inconsistent answers or because previous illness or injury could be the cause of the reported symptoms. Thus, a total of 605 surveys were used for analysis in the present investigation.

The average age of respondents was 28 years, with an age range from 11 to 100 years. Forty-five percent of survey respondents aged 20 to 30 years reported having neuropathic symptoms, representing the greatest percentage of individuals having symptoms among all age groups. Thirty percent of respondents younger than 20 years reported having neuropathic symptoms. The risk of symptoms declined with increasing age; only 5% of individuals older than 50 years reported such symptoms. All but 7 survey respondents were men.

Individuals with less than 1 year of martial arts combat training had the highest percentage of symptoms reported when compared with respondents of all other experience levels; 19 of these individuals (45%) reported having symptoms. Symptom risk declined with each additional year of martial arts training—until 15 years of training was reached. At that point, only 5 respondents (9%) reported neuropathic symptoms. The duration and frequency of martial arts practice sessions were not statistically significant in terms of symptom risk.

Four hundred forty individuals (73%) reported that they had been struck on pressure points during martial arts practice (Table 1). Two hundred ninety-one individuals (48%) reported having neuropathic symptoms (ie, pain or numbness).

Of these individuals, 232 (80%) had a history of routinely receiving pressure-point strikes during martial arts practice. Fifty-nine individuals (20%) denied practicing or receiving pressure-point strikes. One hundred forty-five respondents (50%) described their pain symptoms as aching; 128 (44%), numbness, sharp, or tingling; 93 (32%), electric; and 49 (17%), burning. Most of these individuals reported two or more of...
these pain symptoms. Duration of symptoms in the majority of respondents (207 [71%]) was less than 1 year. However, 44 respondents (15%) had symptoms that persisted for more than 5 years, with 33 individuals (76%) reporting more than 5 years of experience in martial arts training.

Pressure points on the arms were most commonly mentioned by respondents as combat targets during martial arts practice, with 250 symptomatic individuals (86%) reporting strikes received to these sites. Pressure points on the head and the neck were the second most common targets during combat practice, with 215 symptomatic individuals (74%) receiving strikes to these locations. Groin pressure points were the least likely targets of attack during practice, with only 64 individuals (22%) reporting this pressure-point strike location.

Blows to pressure points on the back carried the greatest risk of neuropathic symptoms. One hundred twenty-eight survey respondents (44%) reported such symptoms from combat strikes in this body region. Strikes to abdominal pressure points were at the lowest risk of inducing these symptoms, with 64 individuals (22%) calculated to be at risk as a result of such contact. Data for symptom-inducing strikes to other pressure-point regions are presented in Table 2.

Comment
The increased number of symptomatic individuals with less than 1 year of martial arts training can be explained by the fact that it is customary in the discipline of this sport to demonstrate pressure-point techniques on inexperienced, lower ranked students. In addition, experienced martial artists are more likely to have learned how to avoid injury from having been involved in such demonstrations during their early years of training.

The duration of symptoms reported by survey respondents indicates that the pressure-point technique learned in many forms of martial arts training can damage exposed peripheral nerves. The fact that—in 71% of symptomatic individuals—most symptoms resolved within 1 year suggests that most symptoms can be attributed to a form of neurapraxia. However, the survey instrument did not inquire about the precise duration of symptoms in participants, so it is unknown whether the symptoms resolved within days, weeks, or months. In addition, the survey did not inquire how many individuals discontinued their martial arts training after they became symptomatic—a finding that would be of interest to future researchers.

Aching pain was the most commonly reported symptom, having been experienced by 50% of survey respondents. This symptom can be explained by the local soft-tissue trauma that results from striking the body. The present study did not consider aching pain to be a symptom of neurapraxia. However, pain symptoms reported as “burning,” “numbness,” “tingling,” and “weakness,” all being indicative of nerve injury, were considered evidence of neurapraxia.

Although neuropathic injuries resulting from pressure-point strikes in the martial arts seem similar to “stingers” commonly reported in football, rugby, and wrestling, a different mechanism of injury is involved in martial arts. Stingers are typically caused by stretching of the brachial plexus or compression of the cervical nerve roots. By contrast, the mechanism of traumatic neuralgia caused by pressure-point strikes involves direct nerve trauma.

Fifteen percent of symptomatic individuals reported symptoms persisting more than 5 years, raising the possibility of several other, more severe injuries for these respondents, including axonotmesis, neurotmesis, and complex regional pain syndrome.

<table>
<thead>
<tr>
<th>Survey Response</th>
<th>No. (%)</th>
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<tbody>
<tr>
<td>Struck on pressure points</td>
<td>440 (72.7)</td>
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<tr>
<td>Neuropathic symptoms present</td>
<td>291 (48.1)</td>
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**Table 1**
Survey Results of Pressure-Point Strikes in Martial Arts (N=605)

<table>
<thead>
<tr>
<th>Pressure-Point Area</th>
<th>No. (%)</th>
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<tbody>
<tr>
<td>Back</td>
<td>128 (44.0)</td>
</tr>
<tr>
<td>Groin</td>
<td>116 (39.9)</td>
</tr>
<tr>
<td>Head or neck</td>
<td>111 (38.1)</td>
</tr>
<tr>
<td>Arms</td>
<td>108 (37.1)</td>
</tr>
<tr>
<td>Legs</td>
<td>102 (35.1)</td>
</tr>
<tr>
<td>Chest</td>
<td>70 (24.1)</td>
</tr>
<tr>
<td>Abdomen</td>
<td>64 (22.0)</td>
</tr>
</tbody>
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**Table 2**
Risks of Neuropathic Symptoms in Martial Arts Survey Respondents (n=291)*

* Risks of symptoms were calculated by dividing the number of individuals with symptoms in each pressure-point area by the number of individuals who reported being struck in these areas during martial arts practice.
Axonotmesis involves a disruption of axons and surrounding endoneurial sheaths with epineurium and perineurium remaining intact. In addition, this condition includes some wallerian degeneration.2,3 Recovery from axonotmesis can take many months.2,3 In neurotmesis, by contrast, wallerian degeneration occurs along with a complete disruption of axons, endoneurium, epineurium, and perineurium.2,3

Neurotmesis usually requires operative repair and has a poor prognosis.2,3 Interestingly, the majority of respondents who had symptoms lasting more than 5 years also had 5 or more years of experience in the martial arts. This correlation suggests that repetitive striking of the nerves might cause chronic neuropathic symptoms and permanent nerve injury.

It would be helpful to know if long-term symptoms reported by martial artists persist in the absence of new strikes to pressure points. The answer to this question is important because it likely affects treatment options for patients.

Based on the present results, the initial treatment for martial arts–associated neuropathic symptoms would be to discontinue any forms of training that may exacerbate the injury. However, persistent symptoms are more likely to require pharmacologic management. Patients with neuropathic pain have been successfully treated with calcium channel blockers, anticonvulsants, analgesics such as opioids, and psychotherapeutic agents such as tricyclic antidepressants.4,5 Thus, individuals with persistent neuropathic symptoms could be treated with such medications as amitriptyline hydrochloride, tramacol hydrochloride, gabapentin, and pregabalin.4,5 Unfortunately, the sedative effects often associated with these medications may be poorly tolerated by some individuals.4,5

Safety Issues and Future Studies
The results of this study are limited by the fact that its design called for a retrospective self-administered electronic survey rather than physical examination or electromyogram (EMG) analyses of study subjects. Nevertheless, the survey results raise questions regarding safety issues in martial arts forms that include the practice of striking vulnerable peripheral nerves. Given the high percentage (80%) of symptomatic individuals who were routinely struck on pressure points during practice, it appears that this type of martial arts training can cause neuropathic symptoms.

The pressure-point techniques used in martial arts are intended to cause pain and injury—indeed to incapacitate or neutralize their targets. Given the obvious ethical problems related to asking healthy volunteers to undergo physical assault in a codified combat setting, it seems unlikely that a prospective study could be designed to evaluate neuralgia from pressure-point strikes.

Future research efforts in this area would benefit from thorough documentation of subjects’ medical histories, physical examinations, and EMG studies as well as records of any medical treatments received for martial arts–associated neuropathic symptoms. Such information could help guide future treatment protocols and recommendations made by physicians who treat patients with this form of sports injury.

The present study suggests that pressure-point strikes received during martial arts practice have the potential to cause neuropathic symptoms. Thus, physicians may wish to discourage participation in this form of physical activity—or to encourage a more conservative, cautious approach to training, especially during the first year of participation in this sport.

Conclusion
Symptoms of neurapraxia can occur in martial artists who use combat techniques that involve striking exposed portions of vulnerable nerves. The most commonly attacked areas reported in the present survey of martial artists were the arms and the head or neck. This finding is logical because these areas have many exposed nerves that lie under the targeted pressure points, such as the carotid sinus, distal median nerve, facial and trigeminal nerves, radial nerve branches, and ulnar nerve. Strikes to pressure points on the back had the greatest risk of inducing neuropathic symptoms.

The majority of neuropathic symptoms associated with pressure-point strikes resolve within 1 year. However, individuals with prolonged exposure to this type of martial arts practice seem more likely to have chronic symptoms.

References