

Scratch Collapse Test Is a Useful Clinical Sign in Assessing Long Thoracic Nerve Entrapment

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Abstract

Keywords

- long thoracic nerve
- long thoracic nerve palsy
- nerve entrapment
- scapula winging
- scratch collapse test

The scratch collapse test (SCT) is a relatively new clinical test in which a positive result implies entrapment neuropathy of the nerve tested. Initially described for carpal and cubital tunnel syndromes, subsequent authors have found it useful for the assessment of median, ulna, radial, axillary, and common peroneal nerves. We report a case illustrating the value of the SCT in the clinical assessment of thoracic nerve entrapment.

Introduction

The scratch collapse test (SCT) was originally described in 2008 as a clinical test for suspected carpal and cubital tunnel syndrome.¹ Other authors have subsequently expanded its utility to help diagnose other entrapment neuropathies including radial, axillary, and common peroneal nerves.^{2,3} The SCT is performed in two stages: initially, power of the posterior rotator cuff is tested with the arms adducted and the elbows flexed at 90 degrees (see ►Fig. 1), then the clinician scratches or strokes the skin overlying the nerve of interest and then retests the posterior rotator cuff.¹ The test is performed on both sides for comparison. A positive result is determined by momentary weakness of external rotation such that the arm “collapses” toward the patient’s torso. We report a case of long thoracic nerve entrapment with resolution of SCT and shoulder symptoms following surgical decompression and neurolysis.

Case Report

A 24-year-old right hand dominant gentleman presented with a 5-year history of right shoulder pain, weakness, and scapular winging. His symptoms were attributed to a shoulder injury during a rugby tackle, following which a long thoracic nerve injury was diagnosed. He received community and specialist physiotherapy but remained symptomatic, describing burning pain, sleep disturbance, and difficulty both playing rugby and

performing overhead activities. Clinically, he had a full range of movement with some scapulothoracic dysrhythmia. Scapular winging was visible on wall press test (►Fig. 1) and on forward elevation (►Video 1). He had a positive SCT when stroking directly over the right long thoracic nerve (along the midaxillary line, just anterior to the latissimus dorsi muscle) (►Video 2). A severe isolated right long thoracic nerve lesion was confirmed on electromyography.

Video 1

Scapula winging on forward elevation of shoulder. Online content including video sequences viewable at: <https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0036-1585429>.

Video 2

Positive preoperative scratch collapse test for right long thoracic nerve entrapment. Online content including video sequences viewable at: <https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0036-1585429>.

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Due to the chronicity of his condition, surgical exploration of the thoracic part of the long thoracic nerve was offered. An external neurolysis of the thoracic part of the long thoracic nerve was performed with release of the fascia and vessels overlying the nerve. The nerve was then stimulated confirming contractions of the serratus anterior muscle.

At 7 weeks following surgery, he reported complete resolution of shoulder pain, improved strength, and uninterrupted sleep. He had returned to playing rugby by 6 weeks postoperatively. Repeat clinical examination showed normal scapulothoracic rhythm (► **Video 3**) and a negative SCT (see ► **Video 4**). He continued to be asymptomatic and free of scapular winging at 10 months postsurgery.

Video 3

Resolution of scapula winging following surgical decompression of long thoracic nerve. Online content including video sequences viewable at: <https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0036-1585429>.

Video 4

Negative scratch collapse test following surgical decompression of long thoracic nerve. Online content including video sequences viewable at: <https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0036-1585429>.

Discussion

This case demonstrates the value of the SCT in the assessment of long thoracic nerve palsy. The test uses the phenomenon of the cutaneous silent period to briefly inhibit tonic shoulder external



Fig. 1 Wall press test.

rotation as a response to noxious stimulus of the skin overlying a chronically constricted nerve.¹ Cheng et al first described the clinical test and compared its usefulness with other established provocative tests (Tinel test and flexion/compression test) for diagnosing carpal tunnel and cubital tunnel syndromes.¹ For carpal tunnel syndrome, the SCT was superior to other provocative tests with a positive predictive value (PPV) of 99% and negative predictive value (NPV) of 73%. For cubital tunnel syndrome, elbow Tinel sign had a better NPV than SCT (98 vs. 86%), although the accuracy of the SCT was more superior (89 vs. 84%). These results, however, have not been mirrored by other authors, with Blok et al and Makanji et al both reporting inferior sensitivity for diagnosing electrophysiologically proven carpal tunnel syndrome (32 and 31%, respectively).^{4,5} Makanji et al reported a lower PPV compared with other provocative tests (71 vs. 73–92%), although the NPV was similar (25 vs. 21–29%).⁵ A learning curve in performing the SCT has been acknowledged in the original article and this may be at least partly responsible for the discrepancy in its reported accuracy.¹ This theory is supported by similarly encouraging results being reported by the originating senior author for peroneal nerve compression (sensitivity 0.77 and specificity 0.99).²

It is widely accepted that nerve compression may be present in the absence of positive electrophysiology findings and that these patients may benefit from surgical decompression.⁶ Neurophysiology is usually used as the gold standard against which the reliability of the provocative tests was assessed which is a potential significant limitation. Patients may be correctly identified as having a positive SCT but labeled as “no entrapment neuropathy” when nerve conduction studies are normal. It is an area for future research to consider the predictive value of the SCT for resolution of symptoms following nerve decompression.

The SCT may be useful in determining the precise level of nerve compression.⁷ For long thoracic nerve palsy, this may be especially helpful as compression may be proximal in the neck, or distal overlying the thorax.⁸ Proximally, potential sites of compression include the scalenus medius muscle, a fascial band from the inferior brachial plexus or angulation over the second rib.^{8–11} Overlying the thorax, the nerve may be compressed by traversing vessels. Another proposed etiology is acute or repetitive stretching of the nerve between the fixed points of scalenus medius and the lower part of serratus anterior. Interestingly, successful outcomes have been reported either with supraclavicular or thoracic decompression,^{12,13} which may reflect patient selection of individual studies, the possibility of variable sites of entrapment or an unknown mechanism by which patients respond to either technique. Preoperative demonstration of a positive SCT over the thorax may thus aid surgical decision making. Compared with supraclavicular neurolysis of the long thoracic nerve, neurolysis of the thoracic part only is associated with a concealed scar, lesser degree of potential surgical morbidity, as well as the option of performing a distal nerve transfer (using a branch of the thoracodorsal nerve) if intraoperative muscle contraction is absent following nerve stimulation.¹⁴

The originating authors report that the SCT is reliable at predicting electrophysiologically proven entrapment

neuropathy.¹ We have demonstrated that the test can be used to assess long thoracic nerve palsy, and raises the possibility that a positive result may predict a good surgical outcome. It is, however, important to appreciate that clinical tests, such as the SCT, Tinel test, and flexion/compression test, are not interpreted in isolation. Rather, they serve as aids to reaching an accurate diagnosis following history taking and a thorough clinical examination.

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Informed Consent
Informed consent was obtained from the individual participant included in the study. Additional informed consent was obtained from the participant for whom identifying information is included in this article.

Conflict of Interest
None.

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