

Keele Critically Appraised Topic (CAT Form)



Clinical Question

In patients with suspected Carpal Tunnel Syndrome (CTS,) is the Boston Carpal Tunnel Questionnaire (BCTQ) as sensitive and specific in diagnosing the condition as Nerve Conduction Studies (NCS)?

Clinical bottom line

There was no available evidence comparing Boston Carpal Tunnel Questionnaire (BCTQ) and Nerve Conduction studies (NCS).

The available evidence suggests the BCTQ correlates with Electromyographical (EMG) studies but cannot replace it. The two available studies have methodological weakness due to lack of longitudinal follow-up. Result should therefore be viewed with caution.

While the BCTQ is a tool for assessing Carpal Tunnel Syndrome (CTS), the findings from the research do not support its sole use as a diagnostic tool for CTS.

Plain Language Summary

People who may have carpal tunnel syndrome (CTS) are seen by a clinician. The clinician asks questions and examines their hands. Many people are sent for a nerve test called a nerve conduction study (NCS) to see how well their nerves work.

Another test called Electromyographical (EMG) uses a small needle to check muscles, but it is not usually needed for carpal tunnel syndrome.

The NCS test helps clinicians decide if CTS is mild, moderate, or severe. Mild and moderate cases are treated with advice, exercises, splints, or injections. Severe cases may need surgery.

Clinicians can also use a questionnaire called the Boston Carpal Tunnel Questionnaire (BCTQ) . It asks about symptoms and how well the hand works.

Guidelines say nerve tests are not always needed if symptoms are clear. We wanted to look at the evidence to see if using questionnaires could reduce the need for nerve tests and shorten waiting times.

This critically appraised topic (CAT) shows that the BCTQ is a tool for checking CTS symptoms, but it should not be used on its own. Clinicians should also use medical tests, especially when the condition is severe.

Why is this important?

Patients with suspected CTS routinely receive a thorough clinical examination which includes extensive history taking and an objective clinical examination. They are often referred for investigations called nerve conduction studies, commonly known as NCS tests.

Providers of our diagnostic service do not routinely offer EMG studies for patients with CTS. The EMG test measures electrical activity in the muscle via a small needle. It gives an understanding of the functions from the muscle. Depending on the clinical scenarios, EMG gives additional input into patient's clinical presentation if required.

EMG and NCS are two related tests that assess nerve and muscle function, but they measure different things. NCS evaluates how well electrical signals travel along a nerve by stimulating it with mild electrical pulses and measuring the response. In contrast, EMG directly measures the electrical activity of muscles themselves, typically by inserting a small needle electrode.

The NCS tests routinely categorise patients as having no CTS), mild, moderate or severe CTS. Patients are managed with advice, exercise, splinting and possibly injections when they have mild to moderate symptoms. If severe they are often referred for a surgical opinion.

The BCTQ is recommended by The British Society of Hand Surgery and NHS England GIRFT (Getting It Right First Time) pathway as an adjunct when assessing adults with CTS. It is a 19-item tool to assist diagnosis. It comprises of a Symptom Severity Scale (SSS) and the Functional Status Scale (FSS).

<https://www.gettingitrightfirsttime.co.uk/wp-content/uploads/2021/12/BCTQ.pdf>

NHS England have produced a decision support tool to assist decision making. This states, 'your healthcare professional might want to do tests to understand how severe your symptoms are' but give no further information.

<https://www.england.nhs.uk/wp-content/uploads/2022/07/Making-a-decision-about-carpal-tunnel-syndrome.pdf>

NICE states, 'be aware that referral for nerve conduction studies is not usually needed if there are typical symptoms of CTS. Consider arranging referral, depending on local referral pathways, if: The diagnosis is uncertain. Referral for surgical management is being considered.'

<https://cks.nice.org.uk/topics/carpal-tunnel-syndrome/diagnosis/assessment/>

We are interested in exploring the evidence comparing the two diagnostic tests to see if patient burden could be reduced and negate the need for NCS studies and reduce waiting time.

[Search timeframe](#)

2016-2026

Search criteria

Population Intervention Comparison Outcomes (PICO) themes	Description	Search terms
Population and Setting E.g. adults with OA, primary care	Patients presenting to primary care and community MSK Services with a potential diagnosis of carpal tunnel	Adults, presenting with suspected CTS, CTS, Peripheral Neuropathy, Median nerve entrapment, Peripheral nerve entrapment
Intervention or Exposure (i.e. what is being tested) e.g. manual therapy	Boston Questionnaire	Excluded: Trauma, cancer, inflammatory arthritis, EMG
Comparison, if any e.g. usual care, leaflet	Nerve conduction studies	NCS Neurophysiological tests.
Outcomes of interest e.g. Visual analogue scale, Range of motion	Ability to diagnose mild, moderate or severe CTS with high level of sensitivity and specificity	Diagnostic reliability, Sensitivity, Specificity
Types of studies e.g. Randomised Controlled Trials, Systematic reviews	RCT SR Cohort study pro or retrospective	

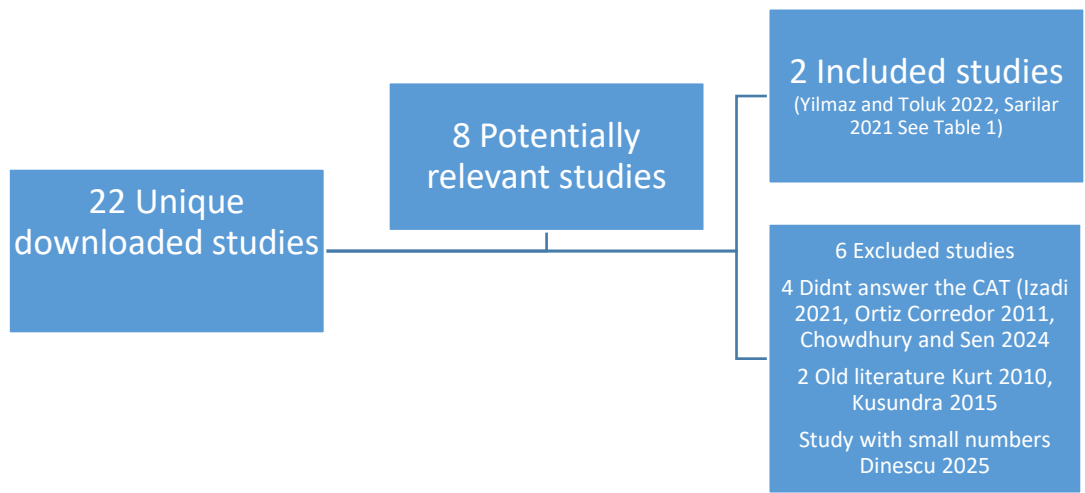
Databases searched

Medline, Embase, Emcare, Web of Science, TRIP

Date of search

14.11.25.

Results of the search: include the number in each box



There were 22 unique downloaded studies. There were eight relevant studies. There were two included and their critical appraisal is included in Table 1. There were six excluded studies.

Table 1- Detail of included studies

First author, year and type of study	Population and setting	Intervention or exposure tested	Study results	Assessment of quality and comments
Sarilar et al 2021 Consecutive patients Prospective study	Erciyes University Hospital Department of Neurology, Turkey Recruited between August 2019 and November 2019	174 individuals. Control group [n = 68] Intervention [n = 106]) Numbness, and paraesthesia in the unilateral or bilateral median nerve trace Diagnosed with idiopathic CTS or normal after electrophysiological testing Turkish version of the BCTQ applied to patients Correlation between the BCTQ, SSS, and FSS scores and CTS stages was evaluated with Spearman analysis	157 (90.2%) female 29.9% (n = 52) had mild CTS 21.8% (n = 38) moderate CTS 9.2% (n = 16) had severe CTS. Both the Symptom Severity Scale (SSS) and functional status scale (FSS) scores were evaluated between the groups, and there was a significant difference between the groups ($P < 0.001$ and $P = 0.001$, respectively). Although there was a significant difference between the groups, the huge overlap in the distribution of the scores indicated that discrimination of	Consecutive patients not a trial Turkish version of BCTQ used Difference in numbers between control and intervention -no explanation for this Patients with a history suggesting diabetes mellitus, connective tissue disease, hypothyroidism, previous diagnosis of neuropathy, and familial hereditary neuropathy, malignancy, and those who received chemotherapy were excluded. Patients with a previous history of CTS excluded

			an individual according to FSS/SSS scores is unrealistic in the clinical setting	
--	--	--	--	--

AI summary (Copilot) - generated June 2026

Strengths

- Larger sample + control group
- Detailed EMG methodology
- More robust statistical analysis

Weaknesses

- No follow-up (not true cohort)
- Limited confounder adjustment
- Questionnaire cannot reliably stage severity

First author, year and type of study	Population and setting	Intervention or exposure tested	Study results	Assessment of quality and comments
Yilmaz and Toluk 2022 Prospective study	Undertaken in Turkey September-December 2020 85 patients (133 hands) presented to the Physical Therapy and Rehabilitation outpatient clinic consecutively with numbness, tingling, pain and weakness in their hands Evaluated for demographic and clinical features Confirmed CTS by EMG	Evaluated the link between EMG findings and clinical status, (BCTQ) and the severity of pain in patients with pre-diagnosis of CTS <i>Abbreviations</i> SSS- sensory symptom scale SCV- sensory conduction DML- distal motor latency CMAP- Compound muscle action FSS Functional severity scale	Eighty-five patients (58 female and 27 male) participated 133 hands Statistically significant relationship between the BCTQ and nerve conduction study results A statistically significant relationship was found between SSS and duration of symptoms, VAS, both right and left SCV, DML and CMAP. A statistically significant relationship was found between FSS and duration of symptoms, VAS and only right SCV, DML and CMAP	Small numbers Consecutive patients Clear exclusion criteria Non-UK population so may affect generalisability Poor explanation for separating right- and left-hand results (significant for right hand) No long term follow up

AI Summary (Copilot) - generated June 2026

Strengths • Clear aim

- Valid tools (BCTQ, VAS, EMG)
- Statistically significant findings

Weaknesses

- Small sample
- Limited confounder control
- Not a true cohort (weak follow-up)

Summary

There were no studies that answered the specific CAT question comparing the sensitivity and specificity of the BCTQ to NCS.

There was, however, evidence that compared another related test, the EMG study, to the BCTQ. In the United Kingdom many services do not have access to EMG studies to assist in the diagnosis of CTS and national guidance suggests it is not necessarily a typical presentation of CTS.

AI summary – Copilot – generated June 2026

Both studies:

- Show correlation between BCTQ and EMG
- Highlight limitations of symptom-based tools alone
- Sarilar et al (2021): Stronger methodology, clinically more cautious conclusions
- Yilmaz and Toluk (2022): Simpler, smaller, less robust

Boston Questionnaire is:

- Useful for symptom severity and function
- Not reliable alone for disease severity

Implications for practice

Considering the evidence, our management pathways for patients presenting with suspected CTS will still involve a detailed examination including history taking and a clinical examination. We will propose adding the BCTQ to our consultation, to assist in the understanding of the impact of any symptoms and functional difficulties for the patient. It will not reduce waiting time or the patient burden but will give clinicians a fuller understanding of the impact of the condition. This information can be included in referrals to NCS or to secondary care. We propose to still use NCS as the gold standard, but challenge the need for such test in typical presentation as suggested by GIRFT

What would you post on social media?

The BCTQ can be used as an adjunct but should not be used alone when diagnosing CTS.

References

<https://www.gettingitrightfirsttime.co.uk/wp-content/uploads/2021/12/BCTQ.pdf>

Sarilar, Ayse Çağlar; Gök, Duygu Kurt. Value of Boston Questionnaire in Carpal Tunnel Syndrome. Neurological Sciences and Neurophysiology 38(4):p 245-249, Oct–Dec 2021. | DOI: 10.4103/nsn.nsn_82_21

https://journals.lww.com/nsan/fulltext/2021/38040/value_of_boston_questionnaire_in_carpal_tunnel.6.aspx

Yilmaz E, Toluk Ö. Comparison of clinical findings and electromyography results in patients with preliminary diagnosis of carpal tunnel syndrome. J Electromyogr Kinesiol. 2022 Aug;65:102688. doi: 10.1016/j.jelekin.2022.102688. Epub 2022 Jul 20. PMID: 35901602.

<https://pubmed.ncbi.nlm.nih.gov/35901602/>

Please tick the box that best reflects your clinical bottom line and include the picture on page 1

CAT image	Evidence quality	Checkbox
	Good quality evidence to support use....	☐
	Insufficient or poor quality evidence OR substantial harms suggest intervention used with caution after discussion with patient...	☐
	No good quality evidence, do not use until further research is conducted OR Good quality evidence to indicate that harms outweigh the benefits....	☒

If you require this document in an alternative format, such as large print or a coloured background, please contact health.iau@keele.ac.uk

©Keele2024

Appendix 1 Copilot CASP comparison of two studies

CASP Cohort Study Appraisal Table

CASP Question	Study 1: Yilmaz et al. (2022)	Study 2: Sarılar & Gök (2021)
1. Clearly focused issue?	✓ Yes – aim to evaluate relationship between EMG, Boston Questionnaire, and pain. Evidence: “evaluate the link between EMG findings... Boston questionnaire and... pain” Comparison of clinical findings and electromyography results in patients with preliminary diagnosis of carpal tunnel syndrome - ScienceDirect	✓ Yes – investigates association between BCTQ scores and electrophysiology. Evidence: “investigate the association between BCTQ scores and electrophysiological findings”value_of_boston_questionnaire_in_carpal_tunnel.6.pdf
2. Cohort recruited acceptably?	✓ Consecutive sampling reduces selection bias. Evidence: “patients... presented... consecutively” Comparison of clinical findings and electromyography	✓ Clear inclusion/exclusion criteria improve validity. Evidence: exclusions (diabetes, neuropathy, surgery etc.)value_of_boston_questionnaire_in_carpal_tunnel.6.pdf

CASP Question	Study 1: Yilmaz et al. (2022)	Study 2: Sarılar & Gök (2021)
	results in patients with preliminary diagnosis of carpal tunnel syndrome - ScienceDirect ⚠ Single centre limits generalisability	
3. Exposure accurately measured?	✅ Valid tools used (BCTQ, VAS). Evidence: “Visual analog scale... Boston Questionnaire” Comparison of clinical findings and electromyography results in patients with preliminary diagnosis of carpal tunnel syndrome - ScienceDirect	✅ Detailed validated BCTQ structure. Evidence: “SSS consists of 11 items... FSS consists of 8 items”value_of_boston_questionnaire_in_carpal_tunnel.6.pdf
4. Outcome accurately measured?	✅ Objective EMG measures. Evidence: “SCV, DML, CMAP”Comparison of clinical findings and electromyography results in patients with preliminary diagnosis of carpal tunnel syndrome - ScienceDirect	✅ Detailed nerve conduction methodology. Evidence: “conduction velocity... latencies recorded”value_of_boston_questionnaire_in_carpal_tunne l.6.pdf

CASP Question	Study 1: Yilmaz et al. (2022)	Study 2: Sarilar & Gök (2021)
5a. Confounders identified?	⚠ Partially – demographics collected but unclear full identification	⚠ Partially – age identified as risk factor. Evidence: “increase in age... risk factor”value_of_boston_questionnaire_in_carpal_tunnel.6.pdf
5b. Confounders adjusted for?	✗ No clear adjustment methods reported	⚠ Limited – regression used but not comprehensive. Evidence: “logistic regression analysis... age, BCTQ scores”value_of_boston_questionnaire_in_carpal_tunnel.6.pdf
6a. Follow-up complete?	✗ Not applicable (cross-sectional)	✗ Not applicable (cross-sectional)
6b. Follow-up long enough?	✗ No follow-up period	✗ No follow-up period
7. What are the results?	✓ Significant correlations between BCTQ, pain, and EMG. Evidence: “statistically significant relationship... SSS... VAS... SCV, DML, CMAP”Comparison of clinical findings and electromyography results in patients with preliminary diagnosis of carpal tunnel syndrome - ScienceDirect	✓ Significant group differences but poor discrimination. Evidence: “significant difference... $P < 0.001$” AND “discrimination... unrealistic”value_of_boston_questionnaire_in_carpal_tunnel.6.pdf

CASP Question	Study 1: Yilmaz et al. (2022)	Study 2: Sarılar & Gök (2021)
8. Precision of results?	⚠ Limited – no confidence intervals reported	☒ Better – includes CI, OR, p-values. Evidence: “OR... 95% CI”value_of_boston_questionnaire_in_carpal_tunnel.6.pdf
9. Do you believe results?	☒ Moderate – consistent but small sample and limited control of confounders	☒ Moderate–strong – larger sample, stronger analysis but still cross-sectional
10. Applicability?	☒ Applicable – typical CTS population. Evidence: “mean age 48.3... 68.2% female”Comparison of clinical findings and electromyography results in patients with preliminary diagnosis of carpal tunnel syndrome - ScienceDirect	☒ Applicable – similar demographics. Evidence: “common age group 40–60... majority female”value_of_boston_questionnaire_in_carpal_tunnel.6.pdf
11. Fits with other evidence?	☒ Yes – acknowledges weak symptom–EMG correlation. Evidence: “subjective symptoms... poorly correlated”Comparison of clinical findings and electromyography results in patients with preliminary	☒ Yes – confirms weak correlation. Evidence: “correlation was not sufficient”value_of_boston_questionnaire_in_carpal_tunnel.6.pdf

CASP Question	Study 1: Yilmaz et al. (2022)	Study 2: Sarilar & Gök (2021)
	diagnosis of carpal tunnel syndrome - ScienceDirect	
12. Implications for practice?	✔ Use BCTQ alongside EMG. Evidence: “not only... electrodiagnostic... also clinical picture” Comparison of clinical findings and electromyography results in patients with preliminary diagnosis of carpal tunnel syndrome - ScienceDirect	✔ BCTQ useful but cannot replace EMG. Evidence: “not sufficient to distinguish severity... EMG required”value_of_boston_questionnaire_in_carpal_tunnel .6.pdf

Appraisal Summary Table

Category	Study 1	Study 2
Strengths	Valid tools, clear aim, objective EMG	Larger sample, control group, stronger statistics
Weaknesses	Small sample, no confounder adjustment, no follow-up	No follow-up, limited psychosocial confounding
Unknowns	Extent of bias control	Impact of socioeconomic/psychological factors