A New Physical Diagnostic Tool for the Diagnosis of De Quervain's Tenosynovitis: First Compartment Synergy Test

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ABSTRACT

Introduction: There are two main provocative tests that can help us identify De Quervain's tenosynovitis. These are better known as the Finkelstein and Eichhoff tests. Both maneuvers are passive and attempt to elongate the affected tendons. Following the notion of muscle synergy, we decided to describe a new active maneuver for diagnosing De Quervain's tenosynovitis, thus incorporating a new physical diagnostic tool for a more precise diagnosis. **Materials and Methods:** A prospective study was conducted, evaluating all skeletally mature patients who presented with mechanical pain on the radial border of the wrist between April and July 2023. Tests for De Quervain's tenosynovitis were performed, as well as assessments for other radial border diseases. Diagnostic imaging studies were requested to confirm the diagnosis. The specificity and sensitivity of the physical tests were determined. **Results:** A total of 38 patients were included, and 43 wrists were evaluated (29 females, 9 males). The average age was 47 years. The sensitivity and specificity of the synergy test were 94.87% and 100%, respectively, with a positive predictive value of 100%. **Conclusion:** The findings reveal that active maneuvers outperform passive maneuvers for reaching the correct diagnosis; in this case, the proposed synergy test is the most specific. However, this maneuver should not replace existing ones.
Keywords: De Quervain's tenosynovitis; physical diagnosis; first dorsal compartment; synergy test.
Level of Evidence: II

Nueva herramienta semiológica para el diagnóstico de la tendinitis de De Quervain: prueba de sinergia del primer compartimento

RESUMEN

Introducción: Existen dos maniobras de provocación principales que pueden ayudar a identificar una tenosinovitis de De Quervain, más reconocidas como prueba de Finkelstein y prueba de Eichhoff. Ambas maniobras son pasivas buscando la elongación de los tendones comprometidos. Siguiendo el principio de sinergia muscular, decidimos describir una nueva maniobra activa que permita diagnosticar la tendinitis de De Quervain y así incorporar una nueva herramienta semiológica para llegar a un diagnóstico más preciso. **Materiales y Métodos:** Se realizó un estudio prospectivo que evaluó a todos los pacientes esqueléticamente maduros que acudieron con dolor mecánico en el borde radial de la muñeca entre abril y julio de 2023. Se les realizaron las maniobras para tendinitis de De Quervain, así como para otros cuadros del borde radial, y se solicitaron estudios diagnósticos por imágenes para confirmar la enfermedad. Se determinó la especificidad y sensibilidad de las pruebas semiológicas. **Resultados:** Se incluyó a 38 pacientes (43 muñecas), 29 mujeres y 9 hombres. El promedio de edad era de 47 años. La sensibilidad y especificidad de la prueba de sinergia fueron del 94,87% y 100%, respectivamente, con un valor predictivo positivo del 100%. **Conclusiones:** Los resultados obtenidos demuestran que las maniobras activas son superiores a las pasivas para llegar al diagnóstico correcto; en este caso, la prueba de sinergia propuesta fue la más específica. Esta maniobra no debería reemplazar a las existentes.
Palabras clave: Tendinitis de De Quervain; tendinitis del primer compartimento; extensor de muñeca; semiología; prueba de sinergia.
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INTRODUCTION

De Quervain's tenosynovitis is a common and frequent condition of the first extensor compartment of the wrist. It mainly affects manual workers and, to a greater extent, the female gender in a 4:1 ratio, with a peak incidence at the age of 40.[1]

The osteofibrous tunnel that forms the first extensor compartment of the wrist, located at the level of the radial styloid, has an average length of 2 cm and contains the tendons of the extensor pollicis brevis and abductor pollicis longus, with different anatomical variants.[2]

Many diagnostic techniques have been described for this syndrome, which can be divided into two categories: passive maneuvers, the most well-known of which are the Finkelstein and Eichhoff tests, and active maneuvers, which include the wrist hyperflexion and abduction of the thumb (WHAT) test.[3,4]

Following the principle of muscle synergy and taking into account the work of Ruland and Hogan on the extensor carpi ulnaris [ECU] synergy test,[5] we decided to describe a new active maneuver to diagnose de Quervain's tendinitis and thus incorporate a physical diagnosis tool that, together with those previously described, allows for a more precise diagnosis.

MATERIALS AND METHODS

An analytical, descriptive, prospective study was conducted between April and July 2023, in which all patients with mechanical pain over the first extensor compartment of the wrist were evaluated.

Skeletally mature patients (>16 years old) with pain in the first extensor compartment were included. All underwent four physical tests for the diagnosis of de Quervain's tendinitis (Finkelstein, Eichhoff and WHAT) including the test described in this article. In addition, the patients were tested for further disorders that cause radial border pain, including trapeziometacarpal or scaphotrapeziotrapezoid osteoarthritis, ligament instabilities, tumors, and compressive neuropathies.

Patients with previous surgery on the radial border of the wrist and those who had been treated with injections were excluded.

The synergy test is performed with the patient seated, the elbow resting on the table and flexed at 90°, and the forearm and wrist in the neutral position. The patient is asked to spread the fingers apart without resistance, which may cause pain over the first compartment. Resistance is then applied by using the second and fifth fingers to exert the opposite force as the patient. Palpation reveals the contraction of the wrist-stabilizing muscles (Figure). A test is considered positive if the person feels pain in the first dorsal compartment of the wrist or immediately distal to it during finger separation or during the application of resistance.

All patients underwent anteroposterior and lateral radiographs of the affected wrist; additionally, depending on the case, an MRI or ultrasound was requested to confirm or rule out the diagnosis of de Quervain's tendinitis. The request for one or the other study was left to the choice of each physician.

Figure. Synergy maneuver of the first extensor compartment of the wrist.

Demographic data, such as age and gender, and clinical data, such as affected hand, positive and negative tests, and studies ordered to diagnose the evaluated disease, were gathered (Table 1).

Table 1. Patient data.

Hand evaluated	Age	Gender	Affected hand	Finkelstein test	Eichhoff test	WHAT Test	Synergy	Diagnostic imaging
1	57	M	Left	Positive	Positive	Positive	Positive	Positive
2	51	F	Right	Negative	Positive	Positive	Positive	Positive
3	37	F	Right	Positive	Positive	Positive	Positive	Positive
4	43	F	Right	Positive	Positive	Negative	Positive	Positive
5	33	F	Right	Positive	Positive	Negative	Negative	Scapholunate instability
6	52	F	Right	Positive	Positive	Positive	Positive	Positive
7	67	F	Right	Positive	Positive	Positive	Negative	Trapeziometacarpal osteoarthritis
8	54	M	Left	Negative	Positive	Positive	Positive	Positive
9	31	F	Right	Negative	Negative	Positive	Positive	Positive
10	31	F	Left	Negative	Positive	Positive	Positive	Positive
11	29	F	Left	Negative	Positive	Positive	Positive	Positive
12	54	F	Right	Positive	Positive	Positive	Positive	Positive
13	44	F	Left	Negative	Negative	Positive	Positive	Positive
14	52	F	Left	Positive	Positive	Positive	Positive	Positive
15	63	F	Left	Positive	Positive	Negative	Negative	Trapeziometacarpal osteoarthritis
16	63	F	Right	Negative	Positive	Positive	Positive	Positive
17	65	M	Right	Negative	Positive	Positive	Positive	Positive
18	39	F	Left	Negative	Positive	Positive	Positive	Positive
19	39	F	Right	Positive	Positive	Positive	Positive	Positive
20	40	F	Left	Negative	Negative	Positive	Positive	Positive
21	40	F	Right	Negative	Positive	Positive	Positive	Positive
22	40	F	Left	Positive	Positive	Positive	Positive	Positive
23	40	F	Right	Positive	Positive	Positive	Positive	Positive
24	48	F	Right	Negative	Positive	Positive	Positive	Positive
25	54	F	Right	Negative	Positive	Positive	Positive	Positive
26	38	F	Left	Negative	Negative	Positive	Positive	Positive
27	38	F	Right	Negative	Positive	Positive	Positive	Positive
28	28	M	Left	Negative	Positive	Positive	Positive	Positive
29	58	M	Left	Negative	Positive	Positive	Positive	Positive
30	41	F	Right	Negative	Positive	Positive	Positive	Positive
31	69	F	Right	Positive	Positive	Positive	Positive	Positive
32	56	F	Right	Negative	Positive	Positive	Positive	Positive
33	23	M	Right	Positive	Positive	Positive	Positive	Positive
34	49	F	Right	Negative	Positive	Negative	Positive	Positive
35	64	F	Right	Positive	Negative	Negative	Negative	Trapeziometacarpal osteoarthritis
36	24	M	Right	Positive	Positive	Positive	Positive	Positive
37	30	F	Right	Negative	Negative	Positive	Negative	Positive
38	70	F	Left	Negative	Negative	Positive	Positive	Positive
39	49	M	Right	Negative	Negative	Positive	Negative	Positive
40	55	F	Right	Positive	Negative	Positive	Positive	Positive
41	54	M	Left	Negative	Negative	Positive	Positive	Positive
42	65	F	Left	Negative	Positive	Positive	Positive	Positive
43	54	F	Left	Positive	Positive	Positive	Positive	Positive

M = male; F = female; WHAT = wrist hyperflexion and abduction of the thumb.

The sensitivity and specificity of each of the physical tests for De Quervain's tendinitis were calculated using IBM SPSS Statics 29.0 software and compared to the synergy test results. A p-value ≤0.05 was considered statistically significant.

This study was approved by the institution's Ethics and Research Committee.

RESULTS

Thirty-eight patients were included with a total of 43 wrists evaluated (5 with bilateral disease). Twenty-nine (76.31%) were women and nine (23.68%) were men, with a mean age of 47 years (range 23-70).

In four of the 43 wrists, disease was ruled out by physical and imaging studies. One patient had scapholunate ligament instability, as evidenced by a positive MRI for scapholunate injury, positive scapholunate ligament stability maneuvers, and positive Finkelstein and Eichhoff tests, but the WHAT and synergy tests were negative. In the remaining three wrists, trapeziometacarpal osteoarthritis was diagnosed by physical maneuvers and confirmed by radiographs. All three patients had positive Finkelstein and Eichhoff tests and only one, a positive WHAT test, while the synergy test was negative in all three cases. To rule out the presence of both entities in the same wrist (trapeziometacarpal osteoarthritis plus De Quervain's tendinitis), ultrasound and MRI scans were requested, which were negative in both cases.

The sensitivity and specificity of the synergy test were 94.87% and 100%, respectively, with a positive predictive value of 100%. The results of the remaining maneuvers are shown in Table 2.

Table 2. Calculated values for each maneuver.

Maneuver	Sensitivity	Specificity
Synergy	0.9487	1
WHAT	0.9487	0.7500
Eichhoff	0.7692	0.2500
Finkelstein	0.3333	0.0000

WHAT = wrist hyperflexion and abduction of the thumb.

When comparing the synergy test with the passive tests (Finkelstein and Eichhoff), it was observed that the specificity of this active test is statistically superior for the diagnosis of the disease. However, no differences were found between the WHAT test and the synergy test (Tables 3 and 4).

Table 3. Comparison of the maneuvers with the synergy test.

Comparison	Sensitivity p	Specificity p
Synergy vs. WHAT test	1	0.1667
Synergy vs. Eichhoff	0.2329	0.0026
Synergy vs. Finkelstein	<0.0001 (p <0.05)	0.0002 (p <0.05)

WHAT = wrist hyperflexion and abduction of the thumb.

Table 4. Calculation of the positive predictive value of the active maneuvers.

Test	TP	FP	PPV
Synergy	37	0	100%
WHAT	37	1	97.37%

TP = true positive; FP = false positive; PPV = positive predictive value; WHAT = wrist hyperflexion and abduction of the thumb.

DISCUSSION

Classically, de Quervain's disease is diagnosed by passive maneuvers, such as the Eichhoff and Finkelstein tests.[1-3] The function of these two maneuvers is to provoke passive mobilization of the tendons of the first extensor compartment causing or accentuating the pain referred by the patient.

The WHAT test is a new maneuver that actively evaluates the first extensor compartment of the wrist. It was described in 2014.[3] According to the authors, this test has the advantage of enabling the patient to stop at any time, allowing them to control the intensity of pain during the maneuver.

Taking into account Ruland and Hogan's study on the extensor carpi ulnaris synergy test[5] and the study conducted by Shah et al.[6] on the importance of the abductor pollicis longus in wrist mobility, we decided to describe a new active maneuver to increase sensitivity and specificity in the diagnosis of the disease.

The results obtained show that active maneuvers are superior to passive maneuvers for a correct diagnosis; in this case, the proposed synergy test is the most specific.

This test has the advantage of being a very reproducible maneuver and allows the patient to decide when to stop the test in relation to the pain.

A weakness of the study is the small sample size and short time frame, as it was conducted over a few months. Its strengths include a prospective design, a disease-specific approach, the use of multiple diagnostic maneuvers and imaging studies to confirm and rule out the disease.

This maneuver should not replace those already described in the literature, but should be used as a complement to the physical tests used for the diagnosis of the disease. This could have the benefit of reducing the need for expensive imaging studies.

Moreover, using both maneuvers together could increase the positive predictive value. It should be noted that both maneuvers have a high positive predictive value.

We hope to develop a study with a much more representative sample to support these observations.

Conflict of interest: The authors declare no conflict of interest.

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