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Therapeutic evaluation of quervain tendonitis - systematic review with meta-analysis systematic review with meta-analysis of randomized clinical trials

Bianca Gabriella de Oliveira

Acadêmica de Medicina pela Universidade Salvador, Salvador,BA, Brasil

Manoel Machado Pereira

Médico residente em Ortopedia e Traumatologia pelo Hospital Aroldo Tourinho, Montes Claros, MG, Brasil

Eric Zaneti Teixeira Baptista

Médico residente em Ortopedia e Traumatologia pelo Hospital Alvorada Moema, São Paulo, SP, Brasil

Pedro Augusto Espírito Santo de Carvalho

Médico residente em Ortopedia e Traumatologia pelo Centro Médico de Campinas, Campinas, SP, Brasil

Lisse Veronica Rocha Salazar

Médico residente em Ortopedia e Traumatologia Hospital Santo Amaro, Guarujá, SP, Brasil

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Abstract: Objective: The aim of this study is to summarize the treatment of De Quervain's tenosynovitis, from a conservative point of view, by means of corticosteroid injection versus corticosteroid injection with immobilization of the thumb, establishing criteria for prognostic evaluation and a systematic review with meta-analysis.

Methodology: Systematic review with meta-analysis registered under the prolific ID CRD42024557767. The research questions were defined using the PICOS model in accordance with the PRISMA guidelines.

Results: 207 patients were included, of whom 103 underwent corticosteroid injection and 104 corticosteroid injection with immobilization. The studies analyzed in this systematic review showed better results

in the Disabilities of Arm, Shoulder and Hand (DASH) assessment in the corticosteroid injection with immobilization group.
Conclusion: Even though corticosteroid injections alone are considered a promising choice of conservative treatment, current evidence points to a multimodal approach, employing various non-surgical modalities associated with better results, studies show that the combination of thumb immobilization with corticosteroid injection is a first-line treatment for patients with De Quervain's tenosynovitis.

Keywords: Tenosynovitis; Tenosynovitis De Quervain; Conservative treatment; De Quervain's disease.

Introduction: Popularly known as De Quervain's syndrome, stenosing tenosynovitis of the extensor pollicis brevis and abductor pollicis longus tendons is caused by biomechanical and functional overload due to ergonomics, although this occasionally occurs in association with rheumatoid arthritis. Marked by severe pain in the wrist and thumb which improves at rest and with hypersensitivity near the radial styloid process over the site of the tendon sheaths involved, it most frequently affects women aged between 30 and 50. 1,2

The diagnosis is made on symptomatic presentation and confirmed by physical examination, especially the Finkelstein test. It is performed so that the patient performs adduction and wraps the thumb with the fingers. It is positive if the passive ulnar deviation of the wrist results in severe pain in the sheaths of the affected nerves. In addition, evaluation of the active maneuver of resisted extension of the thumb with a pain response also confirms the diagnosis. 1,2,3,4,5,6

The therapeutic approach consists of inflammatory control and acute pain through the use of a splint, local moist heat and doses of non-steroidal anti-inflammatory drugs. With pharmacological evolution, corticosteroid infiltration of the flexor tendon sheath can be inserted along with the use of a splint, which can provide safety: a possibility of an agile response to the pain and shortening component. In the event of therapeutic failure, operative release is recommended, such as performing a fascial-fatty neighborhood flap, which provides proper coverage of tissue, tendons and nerves, as well as treating the disease and providing a reduced and aesthetic scar.2,3,4,5,6,7 The aim of this study is to summarize the treatment of De Quervain's tenosynovitis, from a conservative point of view, using corticosteroid injection versus corticosteroid injection with immobilization of the thumb, establishing criteria for prognostic evaluation and a systematic review with meta-analysis.

METHODOLOGY

The systematic review was carried out according to the recommendations of Khan et al considering: 1) framing the questions for a literature review; 2) identifying the relevant research; 3) assessing the quality of the studies; 4) summarizing the evidence; 5) interpreting the results.

The research questions were defined by the PICOS model in accordance with the PRISMA guidelines, as follows:

1. Population: Patients with de Quervain's tendonitis.

2. Intervention: Conservative treatment

3. Comparator: Comparing recovery intervals of different lengths

4. Results: Corticosteroid injection with thumb immobilization versus injection alone

5. Study design: Randomized controlled designs, counterbalanced crossovers or repeated measures designs that investigated the effects of the recovery interval.

Database search method During the period from March to MAY 2024, records were analyzed from 3 electronic databases (Pubmed, Biblioteca Virtual da Saúde BVS, Ebsco Sportdiscus). The keywords were obtained using the PubMed "mesh terms" query. The search was conducted with the English terms for: QUERVAIN TENDINITIS with a combination of "AND" and "OR". The study protocol was drawn up and registered in the Prospective Register of Systematic Reviews (ROSPERO) database under the identification IDCRD42024557767.

Inclusion and exclusion criteria

The inclusion criteria for the articles were:

(01) studies evaluating surgical techniques for the treatment of De Quervain's tenosynovitis (2) studies older than 15 years (2) studies evaluating ultrasound-guided (USG) or blind corticosteroid injection (3) studies addressing patients diagnosed with De Quervain's tenosynovitis treated with corticosteroid injection and thumb immobilization.

Studies with the following criteria were excluded: (1) experimental studies using animal models (2) non-original studies - literature reviews (3) opinion studies (4) studies which dealt with management after infection had been established, i.e. which did not discuss prevention and diagnosis of the infection (5) studies published more than five years ago (6) studies which did not meet the other inclusion criteria mentioned above.

The search and selection of studies was carried out by two reviewers who independently analyzed the studies.

Initially, studies published in the last five years (2017-2022) were selected using the aforementioned DECS and Boolean operators, followed by an analysis of titles and abstracts. At this stage, studies using animal models, opinion articles and literature reviews were excluded.

Once this stage was completed, the full texts of the articles were retrieved to analyze the other inclusion and exclusion criteria. Duplicate citations and studies not corresponding to the proposed review parameters were also excluded. Possible disagreements were resolved by discussion with a third reviewer, and inclusion was decided after consensus with the two main reviewers.

In order to prioritize methodological quality, studies classified as "Good" after the NIH quality assessment were included, with studies with more than nine items ticked being considered suitable for inclusion.

Epidemiological and demographic data was extracted using a Microsoft Excel spreadsheet, including parameters such as number of patients, surgical approach, risk factors described and infection prevention strategies.

RESULTS

A total of 32 articles were selected during the search process, and after excluding those published more than 15 years ago, 28 remained. Analysis of the title and abstract allowed the exclusion of 15 papers that did not correspond to the objective of this study. A complete reading of 13 articles was carried out, 10 of which were excluded because they did not meet the inclusion criteria, and 03 of which were selected for this article (Figure 1).

The three articles selected featured patients diagnosed with De Quervain's tenosynovitis who had undergone treatment with corticosteroid injection or corticosteroid injection with immobilization of the thumb. The Disabilities of the Arm, Shoulder and Hand (DASH) functional assessment was carried out, in addition to the VAS (pain analogy assessment) scale reported in the studies. 207 patients were included, of whom 103 underwent corticosteroid injection and 104 corticosteroid injection with immobilization.

Table 1 shows the articles selected and their results[5], [9], [10]

Table 2 shows the functional assessment score of the Disabilities of the Arm,

Shoulder and Hand (DASH) after 06 months of treatment[5], [9], [10].

Figure 2 shows the Forest graph with the analysis of the Disabilities of the Arm, Shoulder and Hand(DASH) scale of the studies analyzed[5], [9], [10]

In the prospective randomized trial by Ippolito et al, 20 patients took part in the study, 09 in the corticosteroid injection (CSI) group and 11 in the CSI with thumb immobilization group. Pain intensity, assessed by the Visual Analog Scale (VAS) score, was 1.1 ± 0.9 in the CSI group and 1.4 ± 1.9 in the CSI with immobilization group (p=0.797). The Disabilities of the Arm, Shoulder and Hand (DASH) score, which analyzes functional outcome, was 8.4 ± 9.4 in the CSI group and 9.7 ± 14.4 in the CSI group with immobilization (p=0.864). Patients in the CSI group had greater resolution of radial wrist pain than the CSI group with immobilization (100%[9/9] versus 63%[7/11]; p=0.043). The CSI group with immobilization had better results when it came to resolving sensitivity to palpation (p=0.202) and the negative Filkelstien test (p=0.822).

In the Mardani-Kivi[9] randomized clinical trial, 34 patients underwent CSI and 33 underwent CSI with immobilization. 01 patient in the CSI group and 02 in the CSI with immobilization group were lost to follow-up before the first appointment after 03 weeks, due to a plane crash, death and a change of city, respectively. Five patients were excluded from the study for taking analgesics, one from the CSI group with immobilization and four from the CSI group. The success rate assessed at the first return was considerably higher in the CSI group with immobilization, successful in 32 of the 33 patients (97%), while in the CSI group it was higher in 26 of the 34 patients (p=0.027). The 09 patients with poor results repeated the treatment and were seen 03 weeks later, all with successful results and at the 06-month follow-up.The final result was good in 28 of the 30 patients in the CSI with immobilization group (93%) and in 20 of the 29 patients in the CSI group (69%) (p=0.021). All the patients who did not improve had tenderness and pain in the first dorsal compartment. VAS scores were 0.37 ± 0.4 in the CSI immobilization group and 1.7 ± 1.5 in the CSI group (p=0.001). Both groups had good results in reducing pain, however, combined therapy was significantly more effective (p=0.001). VAS scores were reduced by 96% and 80% in the CSI with immobilization and CSI groups, respectively. DASH values in the CSI group with immobilization were 10 ± 9 and 19 ± 2 in the CSI group, with reduction rates of 87% and 76%, respectively.

In Kumar[10]'s study, 60 patients underwent CSI and 60 underwent CSI with thumb immobilization. At the first visit, 4 weeks after the intervention, the treatment was successful in 58 of the 60 patients in the CSI with immobilization group (96.67%) and in 48 of the 60 in the CSI group (81.67%) (p=0.037). The 14 patients who did

not have positive results were re-treated and assessed 4 weeks later, all of whom had good results. At the final follow-up (at 6 months), the values were the same and all those who didn't respond to treatment had pain and tenderness in the first dorsal compartment. As for the VAS score, in the CSI group it was 2.3 ± 1.79 and CSI with immobilization was 0,44 ± 0,65(p<0,001). The DASH values were 20 ± 21 in the CSI group and 11.2 ± 1.3 (p<0.001) in the CSI group with immobilization. The average reduction in the DASH score was greater in the CSI group with immobilization (75 ± 18) than in the CSI group (68 ± 23) (p,0.001). The tendency towards pain relief was also greater in the CSI group with immobilization.

DISCUSSION

The Disabilities of the Arm, Shoulder and Hand (DASH) is a form of clinical and functional assessment for upper limbs. In all the studies used for analysis, patients in the CSI group with immobilization had a better score when compared to the CSI group. CSI with immobilization was also associated with a better VAS (pain analogue scale) score after therapeutic intervention, resolution of sensitivity to palpation and a negative Finkelstein test[5], [9], [10].

Conservative treatment of De Quervain's tenosynovitis differs based on the severity of the disease. Options include corticosteroid injections [11], the use of non-steroidal anti-inflammatory drugs and immobilization. Based on information in the literature, the effectiveness of conservative treatments varies, with plaster being 36% effective, immobilization 19% and corticosteroid injections between 60-90%[12].

Some studies state that corticosteroid injection has been considered one of the main interventions in conservative treatment for De Quervain's tenosynovitis[13]. According to anatomical studies, this technique can be employed in two ways, as a one-point injection or a two-point injection.That said, the two-point injection technique is performed on the tendon of the extensor pollicis brevis and the abductor pollicis longus, leading to a more desirable result[14] is significantly better than the one-point injection technique. For this reason, research suggests that if the one-point injection technique is performed, a proximal injection is advised rather than a distal injection, because of its greater likelihood of infiltrating both compartments of a septated first dorsal compartment[15].

Corticosteroid injections have been found to be very effective in resolving pain, function and grip strength[13], with a short-term success rate after two or fewer injections of over 70%[14]. However, the use of corticosteroids presents notable risks, including skin hypopigmentation, tendon ruptures, skin atrophy, temperature sensitivity, skin fragility[15] and in type 1 diabetics and/or insulin-dependent diabetics, elevated serum glucose levels for two days after an injection[14]. Therefore, corticosteroids should be used with caution and in properly selected patients, avoiding patients with contraindications and comorbidities such as diabetes[15].

As for immobilization, another conservative treatment option, the results were excellent and the treatment safe. That said, there are a few types of immobilization technique, all of which have an effective result, such as static orthoses, which prevent movement of the hand and thumb, and result in a reduction in inflammation of the tendon sheath[16] and the thumb stabilizer splint, which reduces movement of the wrist and thumb and can be of the thermoplastic type made to measure or made of prefabricated neoprene [17].

Immobilization techniques can be indicated mainly in patients with mild symptoms[17]. The use of orthoses has been shown to be very effective in the acute phase, and their main purpose in this phase is to inert the limb involved and reduce inflammation, helping to cure De Quervain's tenosynovitis[16]. Regarding the types of thumb splint, it is important to note that the thermoplastic splint has a greater advantage over the neoprene splint, as it adjusts better to each patient and does not present eczema or dermatitis, symptoms that can be caused by the neoprene splint[17].

CONCLUSION

It can be concluded that even though injections and corticosteroids alone are considered a promising choice of conservative treatment, current evidence points to a multimodal approach, employing various non-surgical modalities associated with better results. Thus, the studies show that the combination of thumb immobilization and corticosteroid injection is a first-line treatment for patients with De Quervain's tenosynovitis.

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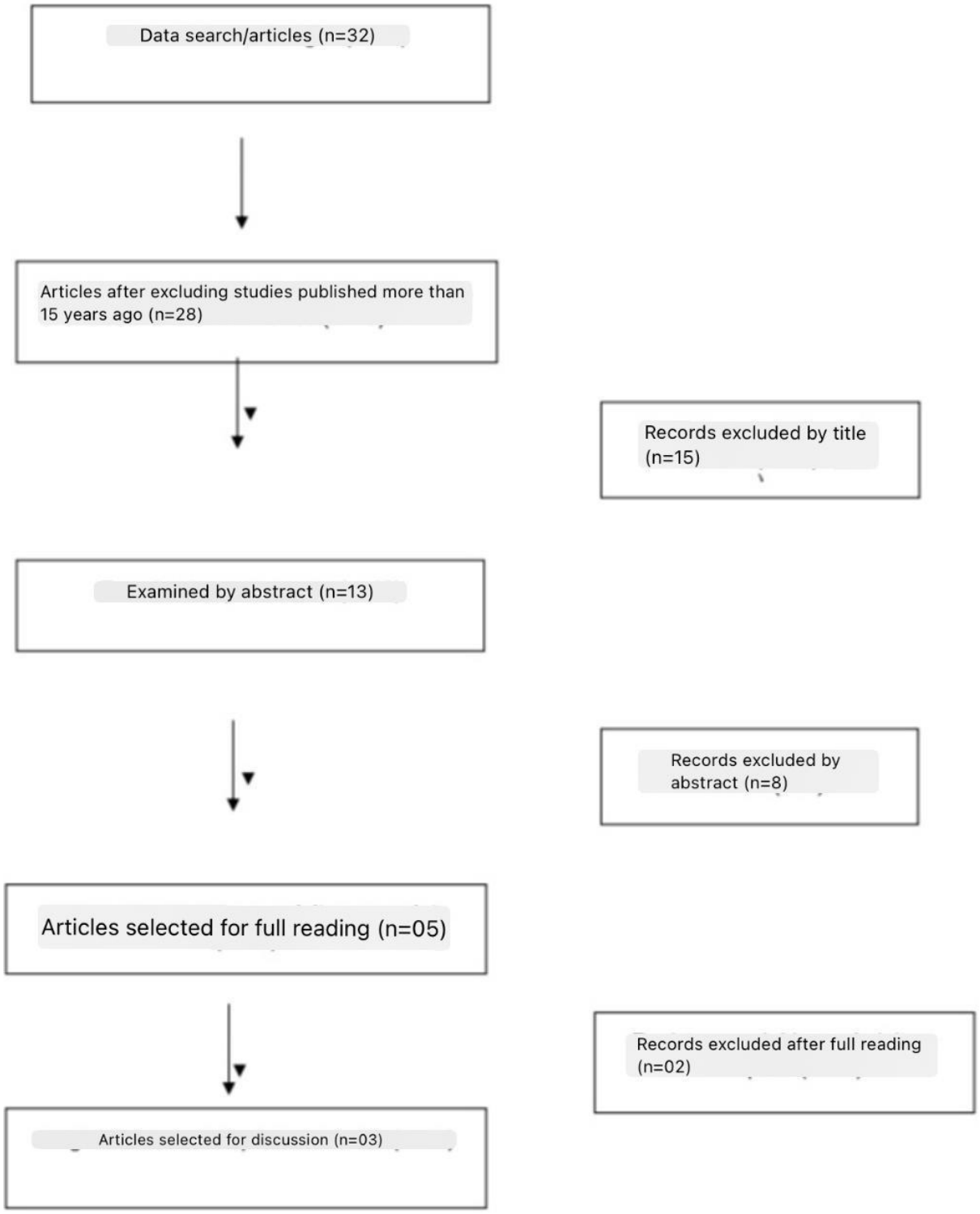
FIGURES

Figure 1 - Studies selected according to the PRISMA methodology.



Source: Own authorship (2024).

Table 1. Results obtained by the selected studies.

Study	Approach	Patients	Results
Ippolito et al	Corticosteroid injection Corticosteroid injection with immobilization	20	Visual Analog Scale (VAS), pain scale, Functional result with DASH score.
Kumar et al Corticosteroid injection Corticosteroid injection with immobilization		120	Pre-treatment with VAS and DASH analysis and at final follow-up.
Mardani-Kivi et al Corticosteroi	corticosteroids Corticosteroid injection with immobilization	67	Time to full return to work Robinson classification; Clavicular shortening; Constant; Radiological signs of bone healing.

Table 2- DASH score after 6 months of corticosteroid injection versus corticosteroid injection with thumb immobilization

Study	Sample	Mean age	Corticosteroid injection	Corticosteroid injection with immobilization
Ippolito et al	20 patients	50 years for injection; 42 years for ini + immobilizac	8.4 ÷ 9.4	9.7 ÷ 14.4
Kumar et al	120 patients	47 for injection; 42.5 for injection + imobi	20 ∓ 21	11,2 ÷ 1,3
Mardani-Kivi et al	67 patients	45 for injection; 42 for injection + imob	19 ∓ 2	10 ∓ 9

Figure 2 - shows the Forest graph with the analysis of the Disabilities of the Arm, Shoulder and Hand (DASH) scale of the studies analyzed.