International Journal of Research in Medical Sciences
Abotaleb AF. Int J Res Med Sci. 2025 Aug;13(8):3195-3202
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20252384

Original Research Article

Comparative study between 3 commercially available injectants for the treatment of trigger finger in the hand in Egyptian patients

Ahmed Fouad Abotaleb*

Department of Trauma & Orthopedics and Medicine, Alexandria University, Egypt

Received: 15 July 2025
Revised: 24 July 2025
Accepted: 25 July 2025

***Correspondence:**
Dr. Ahmed Fouad Abotaleb,
E-mail: ahmed.abotaleb.clinic@gmail.com

ABSTRACT

Background: Introduction: The recent trend of using hyaluronic acid or platelet-rich plasma in injection of trigger finger rather than steroids in Egyptian population lacks a pragmatic comparative study. Pragmatic comparison of hyaluronic acid, platelet-rich plasma and steroids in the treatment of adult trigger fingers in hands.
Methods: Initially 431patients were evaluated for possible inclusion in the study between August 2022 and May 2024. The condition was classified according to the modified Quinnell classification and the patients completed the visual analog scale (VAS) and Michigan Hand Outcome questionnaire (MHOQ) at the pre-injection visit, 2 weeks after injection, 6 weeks after injection and 12 weeks after injection.
Results: In all groups, the 12 weeks post-injection VAS was better than the pre-injection VAS ($p=0.001$). The strongest statistical correlation with the final MHOQ was with the grade of the inflammation before the injection as classified by Quinnell ($p<0.001$). Age, gender and affection with diabetes didn't affect the outcome. Injection with hyaluronic acid achieved better results with patients affected in their non-dominant hand with duration of symptoms less than 15 weeks and in the retiree and office-based workers subgroups.
Conclusions: There is no advantage of using either hyaluronic acid or platelet-rich plasma over corticosteroids in injection of trigger finger of the hand.

Keywords: Diabetic trigger finger, Flexor tenosynovitis, Hyaluronic acid, Platelet-rich plasma, Trigger finger

INTRODUCTION

One of the main causes of hand problems is trigger finger (TF), which is also called stenosing tenosynovitis. It often affects children under eight years old and adults in their 50s and 60s. These groups show a bimodal pattern in the way TF appears.[1] In adults, the chance of developing TF during life is about 2 to 3 percent. Each year, about 28 out of 100,000 people get it.[2,3]

Women are more likely to develop TF and it usually appears in the long and ring fingers of the dominant hand. Several health conditions, such as diabetes, hypothyroidism and mucopolysaccharidosis, as well as some joint diseases, can make people more likely to TF. These systemic health issues also tend to make the condition more severe.[4] People with diabetes mallitus (DM) are more likely to have worse and more common episodes of TF. Their rate of experiencing TF is at least double that of the general population. The percentage of people with diabetes who face TF ranges from 5% to 20%.[5] The flexor tendon is kept in place during arc of motion by the sheath which is reinforced by pulley; 3 of them are cross-shaped and 5 of them are ring-shaped (Figure 1).[6] Triggering is caused by either thickening of the A1 pulley or tendon thickening which can happen due to various reasons.[3] Despite the commonly used name "tenosynovitis", the microscopic examination of the pulley reveals either fibro-plastic or chondrogenic changes rather than inflammatory changes.[7,8] The exact reason behind these changes has not yet been identified although these condition is described since 1850.[2] Earlier evidence

incriminated ipsilateral carpal tunnel release (CTR) as a precipitating factor in the onset of the condition.[6] A more recent evidence by Zhang et al, contradicted that, by conducting a retrospective review of patients with CTR where there was no significant difference in the risk of new onset TF before or after CTR.[9]

Treatment as usual starts with non-operative alternatives which include modification of activity, orthotic immobilization, physiotherapy exercise regimens, nonsteroidal anti-inflammatory drugs and local injections are examples of conservative treatment modalities for TF.[10] Minimizing tendon-sheath mismatch is the suggested mechanism of the local corticosteroid (CTS) injection.[11] Efficacy in the short-term after the local CTS injection has been shown in multiple studies, however there is paucity of evidence about the long term results.[12]

However, the local CTS injection can infrequently lead to undesirable effects like transient hyperglycemia in diabetics, fat necrosis, skin atrophy, increased risk of local infection, delayed rupture of the tendon.[13,14]

The reduction of symptoms associated with various tendon pathologies through the administration of platelet-rich plasma (PRP) has been demonstrated in numerous studies and appears to surpass the efficacy of CTS.[15,16] While PRP therapy is regarded as safe and practicable, there is insufficient evidence to suggest that it can reverse degenerative changes in tendons, notwithstanding its composition of growth factors.[17] Nevertheless, beyond considerations of cost and potential discomfort at the injection site, a recent comprehensive literature review indicated that PRP may be associated with infrequent yet serious adverse effects, including potential blindness when administered near the ocular globe, inflammatory responses, allergic reactions particularly linked to the inclusion of calcium citrate, postoperative infections that may stem from non-adherence to stringent antiseptic protocols during preparation and the development of nodules following dermal injections. Notably, post-injection infections constituted the majority of the adverse events reported in the literature.[18]

The tendon sheath and synovial fluid are enriched with hyaluronic acid (HA), a type of glycosaminoglycan. Its noteworthy properties include Visco-supplementation, antinociception, a reduction in pro-inflammatory cytokines, as well as the inhibition and modification of fibroblast activity, among numerous others.[19,20] Due to these properties, HA has been the subject of investigation for the management of a variety of tendinopathies, including TF, de'Quervain's tenosynovitis, rotator cuff disorders and tennis elbow.[21] Recent publications have emerged detailing several trials that evaluate the soft tissue applications of HA, nevertheless, there exists a lack of consensus concerning its efficacy, safety and comparative effectiveness in relation to alternative injectable treatments for soft tissue conditions.[22] This study aimed to evaluate pragmatically whether there is added benefit in using the more expensive PRP or HA in terms of efficacy or safety rather than using the standard CTS injection.

METHODS

The research took place at El-Hadra University Hospital in Alexandria, Egypt from August 2022 to May 2024. This was a prospective investigation. A visual representation of the flowchart of the study can be seen in figure 2. Criteria for exclusion involved individuals under 18 years old, those who had previously undergone treatment for the current issue, individuals with connective tissue or rheumatologic conditions, a history of cancer, people with hand problems on the same side, patients with local skin infections or irritation nearby, those with more than one affected finger and individuals who did not finish the follow-up for reasons such as needing a second injection, opting for surgery or failing to attend assessment appointments.

A clinical evaluation of the symptoms, such as pain, triggering and limitations in daily and/or work-related activities, as well as examination results of tenderness opposite the metacarpophalangeal joint and the patient's potential demonstration of clicking, whether actively or passively corrected, served as the basis for the diagnosis. The results showed that the patients' self-administered Michigan Hand Outcome Questionnaire (MHOQ) and visual analog scale (VAS) were used to rate their condition in accordance with Quinnell's classification.[23,24] Prior to selecting an injection, all patients underwent initial medical treatment for a minimum of two weeks. The injectable substance was not concealed from the patient or the assessor. Regardless of the injection material, none of the diabetic patients received injections until their diabetes mellitus was under control.

After being informed of all the alternatives, including potential benefits and drawbacks and the opportunity to leave the research at any moment if they wanted to undergo more injections or surgical release, each patient consented to begin therapy.

In the CTS group, a 40 mg/ml ampoule of triamcinolone acetonide (Kenacort®) was utilized. For the PRP group, the preparation took place in the hospital. A total of 9 ml of whole blood was drawn from the patient's antecubital vein and stored in test tubes containing 1 ml of acid citrate dextrose. The collected blood underwent centrifugation at 250 g for ten minutes using a gentle spin. A platelet concentrate was obtained by centrifuging the platelet-rich supernatant plasma at a higher speed (300 g) for an additional ten minutes.

Subsequently, the concentrate was transferred to another sterile tube without any anticoagulant. Platelet-poor plasma (PPP) was removed and discarded after the formation of a platelet pellet at the bottom of the tube. In the hyaluronic acid group, 1 ml of 1.5% hyaluronic acid sodium salt (Hyalubrix®) was used. Sterile conditions

were ensured throughout the outpatient procedure. Mepivacaine (0.5% ml) will be administered in the A1 pulley area along with either 1 ml of 40 mg triamcinolone acetonide ampoule, 1 ml of PRP concentrate or 1 ml of sodium salt containing 1.5 percent hyaluronic acid for the CTS, PRP and HA groups, respectively.

Patients had their wrists facing upwards on the table while sitting for the injection. Subsequently, the first annular pulley and the flexor tendon were located by touch. The needle was inserted through the skin into the space above the tendon at a slightly slanted angle, moving from distal to proximal. The lack of resistance during the injection confirmed placement around the tendon sheath, avoiding accidental injection into the tendon itself. A sterile bandage will be applied at the injection site. After a ten-minute monitoring period, the patient was allowed to leave.

All patients received identical post-injection guidance, which included the use of cold compresses, anti-swelling medication, any type of hand splint for the initial 10 days and paracetamol as needed. Follow-up (FU) appointments were scheduled for 2, 6 and 12 weeks after the injection. Patients who sought a second treatment (either a repeat injection or surgical intervention) before the FU period concluded (3 patients in the steroid group, 8 in the platelet-rich plasma group and 14 in the hyaluronic acid group) were excluded from the study. At each FU visit, patients were asked to complete the self-administered VAS and MHOQ. Participants (n=39) who did not complete the necessary FU assessments were also excluded from the study.

Descriptive analysis of the numerical data was conducted using averages, deviations and ranges. The outcomes were tested to determine whether they fell within the anticipated range. The Shapiro-Wilk test was employed to check the normality of the data distribution. For results that followed normal distribution, a t-test for independent samples was used for comparison. For data that did not follow a normal distribution, the Mann-Whitney U test served as a two-way analysis of variance to evaluate independent variables. A significance threshold was set at a p value less than 0.05. The analysis was performed using SPSS software (IBM SPSS Statistics 26, Chicago, Illinois).

RESULTS

The overall mean of age in the study was 41.1 years (range 22-63 years; SD 8). The overall mean of pre-injection duration of symptoms was 16.5 weeks (range 4-58 weeks; SD 6.9). The individual data for each group is shown in Table 1. The age distribution across groups showed no statistically significant differences according to the independent samples Kruskal-Walli's test (p=0.3).

Similarly, there were no statistically significant differences in the duration of symptoms before injection between the groups (p=0.3). The distribution of gender in the different groups is shown in Figures 3 and 4. There were statistically significantly more females in the HA group (p=0.04). The distribution of the affection in the dominant hand was not statistically different between groups (p=0.4). The ring finger was most frequently affected in the CTS group and the HA group (44.6% and 34.2% respectively) and the middle finger was the most frequently affected in the PRP group (34.1%). The distribution of occupational activity in the 3 groups is summarized in figure 4. There was no statistically significant difference between the groups in terms of the distribution of occupational status (p=0.5). There was no statistically significant difference between groups in the distribution of diabetics (p=0.7).

The condition was categorized by using the modified Quinnell classification during the pre-injection appointment, 2 weeks post-injection, 6 weeks post-injection and 12 weeks post-injection. The results are documented in Table 2, Figure 5.

The distribution of patient grades within the groups showed a significant difference, with more grade III patients in the PRP group compared to the CTS and HA groups, which had a higher number of grade IV patients (p=0.001).

The average scores for VAS and MHOQ across the three groups prior to the injection, as well as at two weeks, six weeks and twelve weeks following the injection, are illustrated in Figures 6 and 7. By the conclusion of the follow-up, patients classified with grade I were rated excellent, grade II were rated good, grades III and IV were rated fair and grade V was rated poor. Their distribution across the three groups at the end of the follow-up is depicted in Figure 8.

Patients with ratings of excellent and good were deemed satisfactory, while those with ratings of fair and poor were deemed unsatisfactory. There was no statistically significant difference between groups in terms of satisfied patients at the end of the FU (P=0.4).

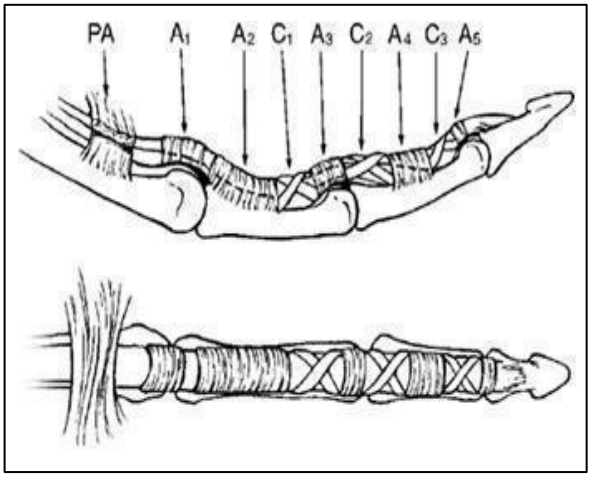

Figure 1: The pulley system of the flexor tendons.[6]

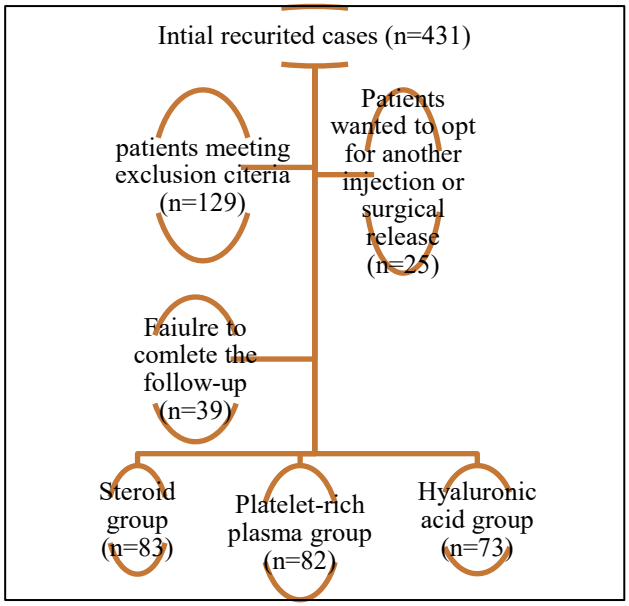

Figure 2: Flowchart of the study.

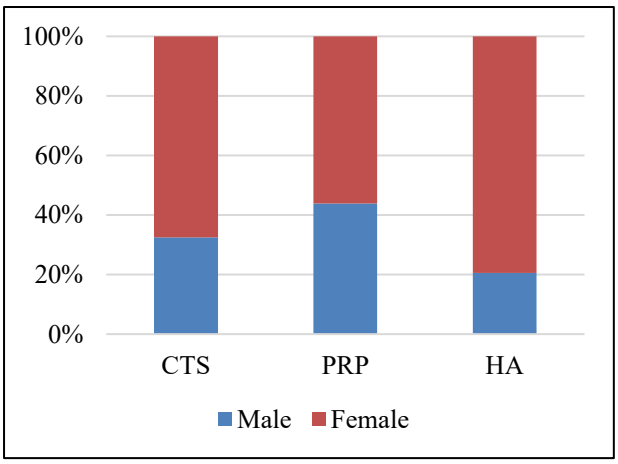

Figure 3: The distribution of the gender in the 3 groups.

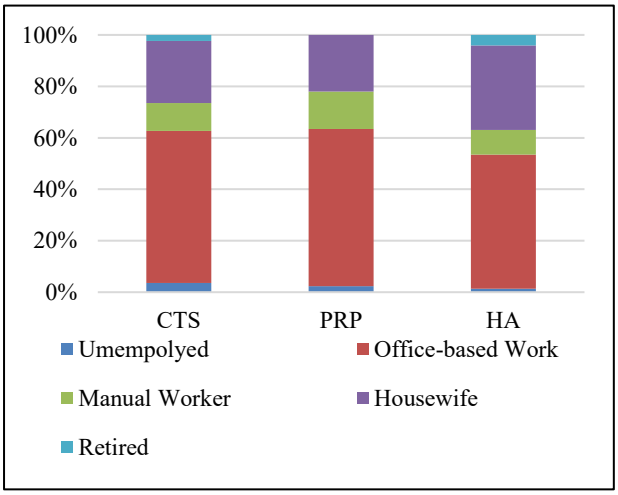

Figure 4: The distribution of occupational activity in the 3 groups.

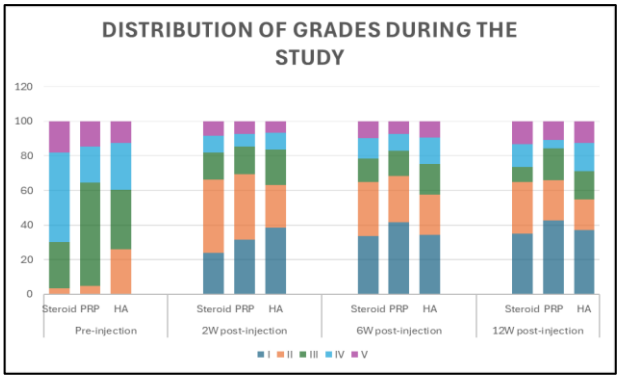

Figure 5: The distribution of grades of the triggering according to the Quinnell grading before injection, 2 weeks post-injection, 6 weeks post-injection and 12 weeks post-injection.

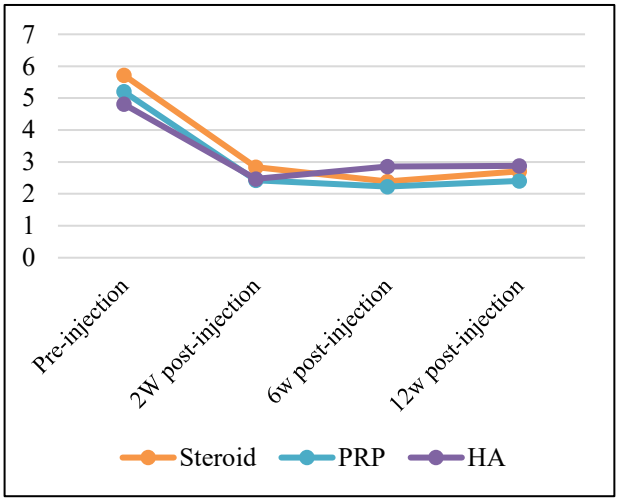

Figure 6: the VAS meaning of each group pre-injection, 2 weeks post-injection, 6 weeks post-injection and 12 weeks post-injection.

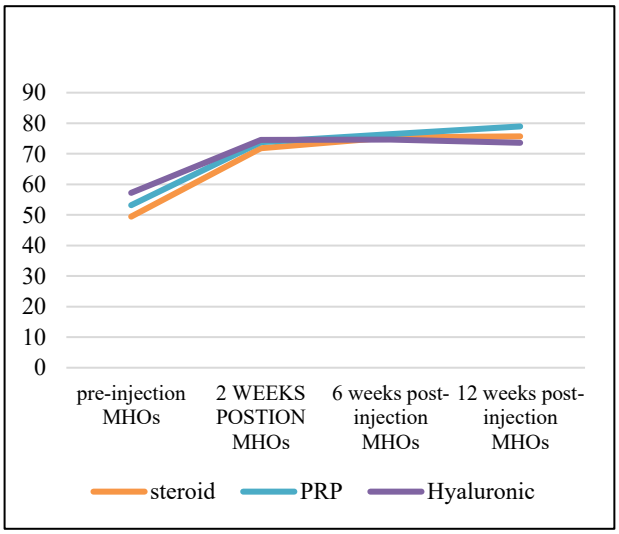

Figure 7: the mean MHOQ before injection, 2 weeks post-injection, 6 weeks post-injection and 12 weeks post-injection.

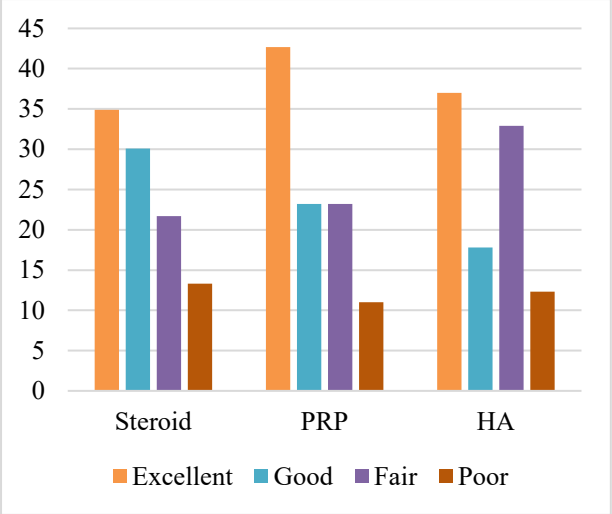

Figure 8: the distribution of the final grading according to Quinnell's classification of the outcome at the end of the follow-up.

There was absence of a significant statistical difference in VAS among the three groups at 2 weeks after the injection, 6 weeks post-injection and at the end of the follow-up period, according to the independent-samples Kruskal-Wallis test (p=0.8, p=0.4, p=0.7 respectively) (Figure 8). Across all groups, VAS at 12 weeks after the injection improved compared to the score before the injection (p=0.001).

No significant relationship was found between age and VAS at 12 weeks across all groups (Spearman correlation coefficient = 0.005, p=0.8). Additionally, when analyzing each group separately CTS, PRP and HA age did not show a significant correlation with the VAS at 12 weeks (Spearman correlation coefficients of -0.06, -0.04 and 0.2 respectively, with p values of 0.4, 0.6 and 0.5 respectively). Overall, there was no meaningful statistical connection between the patient's age and the final MHOQ at 12 weeks (correlation coefficient -0.14, p=0.6). In a subgroup analysis, no significant statistical association was found between age and the final MHOQ in the different treatment groups (with p values of 0.7, 0.5 and 0.1 for the CTS, PRP and HA groups, respectively).

Gender did not show a statistically significant association with the final Quinnell grading outcomes nor MHOQ (p=0.4, p=0.08). In subgroup analysis, gender was also not significantly associated with the final Quinnell grading outcomes in the CTS, PRP and HA groups (p=0.6, p=0.3 and p=0.4 respectively). This lack of statistical significance was consistent across each individual group analysis (p=0.5, p=0.3, p=0.4 for the CTS, PRP and HA groups respectively). There was no statistically meaningful link between occupational activity and the final grading of the Quinnell score nor MHOQ (p=0.5, p=0.3). In the subgroup analysis, occupational activity was not statistically linked to the final grading of the Quinnell score in the CTS, PRP and HA groups (p=0.8, p=0.6 and p=0.2 respectively). However, in a separate group analysis, occupational activity did not significantly correlate with the final MHOQ in the CTS and PRP groups (p=0.7, p=0.3 respectively) and correlated significantly with the MHOQ in the HA group (p=0.03), with notably higher scores in both retirees and office-based workers subgroups. Overall, there was no statistically significant association between the presence of DM as a comorbidity and the final grading according to Quinnell's classification nor MHOQ (p=0.4, p=0.5). In subgroup analysis, DM was also not significantly associated with the final Quinnell score grading within the CTS, PRP and HA groups (p=0.7, p=0.6 and p=0.4, respectively).

In general, there was no statistically significant correlation between the occurrence of the condition in the dominant hand versus the non-dominant hand and the degree of improvement in VAS after the injection across groups (p=0.8). In the subgroup analysis, the affection in dominant versus non-dominant hands was not statistically significantly correlated with the final grading of Quinnell score in the CTS, the PRP and the HA groups (p=0.9, p=0.6, p=0.1 respectively). Whether the affection was in the dominant hand or the non-dominant hand, it didn't affect significantly the final MHOQ (p=0.6). In a subgroup analysis, the affection of the dominant hand versus the non-dominant hand didn't correlate significantly with the final MHOQ in the CTS group and the PRP (p=0.9, p=0.2 respectively). However, in the HA group patients affected in the non-dominant hand achieved significantly higher final MHOQ than those affected in the dominant hand (p=0.04).

Overall, there was a weak but statistically significant inverse relationship between how long symptoms persisted before the injection and the final MHOQ score (correlation coefficient of -0.3, p=0.03). In subgroup analyses, the duration of symptoms prior to injection did not show a significant association with the final MHOQ score in the CTS and PRP groups (p=0.7, p=0.3 respectively). However, in the HA group, patients with shorter symptom duration before injection (<15 weeks) attained significantly higher final MHOQ scores compared to those with longer symptom duration (p=0.001). Generally, there was no statistically significant connection between symptom duration before injection and the final VAS score (p=0.3). This was also true within subgroup analyses, where no statistically significant relationship was found between symptom duration before injection and the final VAS score (p=0.8, p=0.2 in the CTS and PRP groups, respectively). Nevertheless, in the HA group, there was a moderate, statistically significant, inverse correlation between symptom duration and the final VAS score (p=0.001). In a broad analysis, as well as in group-specific analysis, the strongest statistical connection with the final MHOQ and VAS scores was linked to the inflammation grade prior to injection, as classified by Quinnell (p<0.001). This indicates that a lower inflammation grade before injection resulted in better final MHOQ and VAS outcomes.

In analyzing each condition grade separately according to the Quinnell classification, it was observed that all 3 injectants showed unsatisfactory outcomes in relieving symptoms for patients with grade V, with no injection material proving superior to another (p=0.8). For grade II or grade III conditions, there was no statistically significant difference observed among the 3 injectants in terms of VAS or MHOQ scores (p=0.6, p=0.3, p=0.8, p=0.2 respectively). However, in patients with a pre-injection grade IV, there was a statistically significant improvement in VAS and MHOQ scores for the CTS group compared to the HA group (p=0.001, p=0.001) and the PRP group also showed significantly better VAS and MHOQ scores than the HA group (p=0.01, p=0.001). No statistically significant differences were found between the CTS group and the PRP group regarding VAS scores (p=0.3, p=0.6). Throughout the study period, no complications were reported in any of the three groups.

Table 1: The means and the standard deviations of the age and the pre-injection duration of symptoms in the 3 groups.

	CTS	PRP	HA
Age (in years)	47.4; SD 7.7	46.2; SD 7.1	47.8; SD 9.2
Duration of Symptoms (Weeks)	15.9; SD 6.3	17.5; SD 6.4	15.8; SD 7.9

Table 2: The distribution of different grades of Quinnelll's classification of the outcome before the injection, 2 weeks post-injection, 6 weeks post-injection and 12 weeks post-injection. (No. =Number, Per.=Percent).

Group	Quinnell grade	Pre-injection		2 weeks after injection		6 weeks after the injection		12 weeks after the injection	
		No.	Per.	No.	Pre.	No.	Per.	No.	Per.
CTS	I	0	0	20	24.1	28	33.7	29	34.9
	II	3	3.6	35	42.2	26	31.3	25	30.1
	III	22	26.5	13	15.7	11	13.3	7	8.4
	IV	43	51.8	8	9.6	10	12	11	13.3
	V	15	18.1	7	8.4	8	9.6	11	13.3
PRP	I	0	0	26	31.7	34	41.5	35	42.7
	II	4	4.9	31	37.8	22	26.8	19	23.2
	III	49	59.8	13	15.9	12	14.6	15	18.3
	IV	17	20.7	6	7.3	8	9.8	4	4.9
	V	12	14.6	6	7.3	6	7.3	9	11
HA	I	0	0	28	38.4	25	34.2	27	37
	II	19	26	18	24.7	17	23.3	13	17.8
	III	25	34.2	15	20.5	13	17.8	12	16.4
	IV	20	27.4	7	9.6	11	15.1	12	16.4
	V	9	12.3	5	6.8	7	9.6	9	12.3

DISCUSSION

Since the mid-1980s, TF have been considered part of a wider group of conditions, including "repetitive strain injury" (RSI) and "cumulative trauma disorder." A study suggested a potential association between TF and occupation, with a point prevalence of 14% among 665 employees in a meatpacking plant.[25] However, this connection could not be definitively confirmed.[26] In the present research, no statistically significant link was found between work activities and the severity of the triggering. A study assessed the effectiveness of HA and CTS, both given under ultrasound guidance, in treating TF. Results showed that both groups had significant improvements in the VAS and the Disabilities of the Arm, Shoulder and Hand (DASH) score. Initially, the CTS group experienced better results; however, no significant statistical difference was found between the two groups after three months. Additionally, three patients reported early local discomfort within the first week after the injection, though the study did not specify which group these patients belonged to.[27] In this study, no statistically significant differences were observed among the three groups at two, six- and twelve-weeks post-injection, possibly due to the use of lower molecular weight hyaluronic acid (1%) (Hylgan®) in the aforementioned study.

Previous research suggests that the lubricating and anti-inflammatory effects of HA depend on its molecular weight.[19] Moreover, no complications arose in any of the three groups throughout the study period. The absence of complications may not solely be attributed to the injection material but could also be related to the post-injection protocol, which was not detailed in their study. In their assessment of utilizing HA for injections in soft tissue disorders, Khan and associates observed that HA offers no

benefits over other injectable substances in terms of effectiveness for treating TF, nor does it cause significant adverse effects.[28] These findings align with the results of the current study.

The severity of triggering has been linked to the response to different modalities of conservative treatment and prolonged recovery after release whether open or percutaneous.[29,30] In this study, the strongest predictor of outcome whether VAS, MHOQ, Quinell's grade was how severed was the triggering i.e., the worse the grade (more fibrosis at the Ai pulley) the lesser the improvement (p=0.001). DM is incriminated as a reason for more sever triggering.[31] In this study, there was no difference in the frequency of distribution of diabetics between the groups and also no difference between diabetics and non-diabetics in terms of response to either one of the 3 injectants studied. This can be attributed to shorter periods of following the patients, as well as some patients opting to either another injection or surgical release thus being excluded from the final analysis.

A study which compared the open release to sequential local CTS then HA found lesser likelihood of recurrence in the operative group and lack of complications in the injection group.[32] The present study was relatively short to determine the percentage of recurrence; however no adverse events was observed during the FU. A lower VAS at 3 months post-injection in CTS group in comparison to HA group in an earlier study however there was no significant difference in the cases with no triggering at the same period.[33] In the current study, there was no statistically significant difference between the groups in the number of satisfied patients or the average VAS score. This could be due to the lower dose of CTS used in their study (1 cc of 10 mg/ml triamcinolone acetonide) compared to the present study (1 ml of 40 mg triamcinolone acetonide).

Extended symptom duration (over 2.5 months) before receiving an injection resulted in less favorable outcomes for CTS injections according to an earlier study.[34] In the current research, this trend was seen only with HA injections, which were more effective when the symptoms before the injection were present for less than 15 weeks. This difference can be explained by the fact that they included in their study a larger number of patients than in the current study. In a recent literature review, no prior study has pragmatically compared the three injection materials up to now. Aspinen et al, have only shared their protocol for evaluating the long-term effectiveness of PRP against a CTS and a placebo injection.[35]

The limitations of the current study include the absence of automated grip testing, lack of blinding, absence of a placebo-control group and the short duration of FU, meaning that the risk of recurrence was not assessed. The findings of the current study indicate the safety (across all levels according to Quinnell's criteria) and short-term effectiveness (in levels II and III according to Quinnell's criteria) of the three injection materials, as no complications were encountered by any patient in any group during the follow-up period; furthermore, all patients in levels II and III showed significant improvement across the three groups. A symptom duration of less than 15 weeks was associated with better outcomes in the HA group, whereas the duration of symptoms did not affect results in the CTS or PRP group. Patients at level IV demonstrated significantly better improvement with CTS injections compared to those in the HA group and the PRP group. Patients at level V did not improve with any injection. Both HA and PRP are notably more costly than CTS, without providing additional short-term benefits.

CONCLUSION

In conclusion there is no advantage of either HA or PRP over CTS in treatment of TF of the hand. There is much less cost of CTS in comparison to the much more expensive HA or PRP.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. David M, Rangaraju M, Raine A. Acquired triggering of the fingers and thumb in adults. BMJ. 2017;3:59.
2. Fiorini HJ, Tamaoki MJ, Lenza M, Dos Santos JBG, Faloppa F, carlos Belloti J. Surgery for trigger finger. Cochrane Database of Systematic Reviews. 2018(2):68.
3. Lunsford D, Valdes K, Hengy S. Conservative management of trigger finger: A systematic review. J Hand Therapy. 2019;32(2):212-21.
4. Makkouk AH, Oetgen ME, Swigart CR, Dodds SD. Trigger finger: etiology, evaluation and treatment. Curr Rev Musculosk Med. 2008;1:92-6.
5. Stahl S, Kanter Y, Karnielli E. Outcome of trigger finger treatment in diabetes. J Diab Compl. 1997;11(5):287-90.
6. Peters-Veluthamaningal C, Windt DA, Winters JC, Meyboom-de Jong B. Corticosteroid injection for trigger finger in adults. Cochrane Datab Syst Rev. 2009(1):875.
7. Moore JS. Flexor tendon entrapment of the digits (trigger finger and trigger thumb). J Occup Environmen Med. 2000;42(5):526-45.
8. Uchihashi K, Tsuruta T, Mine H, Aoki S, Nishijima-Matsunobu A, Yamamoto M, et al. Histopathology of tenosynovium in trigger fingers. Pathol Int. 2014;64(6):276-82.
9. Zhang D, Collins J, Earp BE, Blazar P. Relationship of carpal tunnel release and new onset trigger finger. J Hand Surg. 2019;44(1):28-34.
10. Matthews A, Smith K, Read L, Nicholas J, Schmidt E. Trigger finger: An overview of the treatment options. J Hand Surg. 2019;32(1):17-21.

11. Blood TD, Morrell NT, Weiss A. Tenosynovitis of the hand and wrist: a critical analysis review. JBJS Reviews. 2016;4(3):7.
12. Wang C, Zhang Z. Efficacy of corticosteroid injection for treatment of trigger finger: a meta-analysis of randomized controlled trials. J Invest Surg. 2019;6:56.
13. Mol MF, Neuhaus V, Becker SJ, Jupiter JB, Mudgal C, Ring D. Resolution and recurrence rates of idiopathic trigger finger after corticosteroid injection. Hand. 2013;8(2):183-90.
14. Qian X, Lin Q, Wei K, Hu B, Jing P, Wang J. Efficacy and safety of autologous blood products compared with corticosteroid injections in the treatment of lateral epicondylitis: a meta-analysis of randomized controlled trials. PMR. 2016;8(8):780-91.
15. Barile A, La Marra A, Arrigoni F, Mariani S, Zugaro L, Splendiani A, et al. Anaesthetics, steroids and platelet-rich plasma (PRP) in ultrasound-guided musculoskeletal procedures. British J Radiol. 2016;89(15):201355.
16. Hall MP, Band PA, Meislin RJ, Jazrawi LM, Cardone DA. Platelet-rich plasma: current concepts and application in sports medicine. J American Acad Ortho Surg. 2009;17(10):602-8.
17. Le AD, Enweze L, DeBaun MR, Dragoo JL. Current clinical recommendations for use of platelet-rich plasma. Curr Rev Musculosk Med. 2018;11:624-34.
18. Arita A, Tobita M. Adverse events related to platelet-rich plasma therapy and future issues to be resolved. RegTher. 2024;26:496-501.
19. Dicker KT, Gurski LA, Pradhan-Bhatt S, Witt RL, Farach-Carson MC, Jia X. Hyaluronan: a simple polysaccharide with diverse biological functions. Acta biomaterialia. 2014;10(4):1558-70.
20. Maharjan AS, Pilling D, Gomer RH. High and low molecular weight hyaluronic acid differentially regulate human fibrocyte differentiation. PloS One. 2011;6(10):26078.
21. Spaková T, Rosocha J, Lacko M, Harvanová D, Gharaibeh A. Treatment of knee joint osteoarthritis with autologous platelet-rich plasma in comparison with hyaluronic acid. American J Phys Med Rehabil. 2012;91(5):411-7.
22. Kim YS, Park JY, Lee CS, Lee SJ. Does hyaluronate injection work in shoulder disease in early stage? A multicenter, randomized, single blind and open comparative clinical study. J Shoulder Elbow Surg. 2012;21(6):722-7.
23. Quinnell R. Conservative management of trigger finger. Practition. 1980;224(1340):187-90.
24. Chung KC, Hamill JB, Walters MR, Hayward RA. The Michigan Hand Outcomes Questionnaire (MHQ): assessment of responsiveness to clinical change. Ann Plas Surg. 1999;42(6):619-22.
25. Gorsche R, Wiley JP, Renger R, Brant R, Gemer TY, Sasyniuk TM. Prevalence and incidence of stenosing flexor tenosynovitis (trigger finger) in a meat-packing plant. J Occup Environ Med. 1998;40(6):556-60.
26. Trezies A, Lyons A, Fielding K, Davis T. Is occupation an aetiological factor in the development of trigger finger. J Hand Surg. 1998;23(4):539-40.
27. Kanchanathepsak T, Pichyangkul P, Suppaphol S, Watcharananan I, Tuntiyatorn P, Tawonsawatruk T. Efficacy comparison of hyaluronic acid and corticosteroid injection in treatment of trigger digits: a randomized controlled trial. J Hand Surg. 2020;25(1):76-81.
28. Khan M, Shanmugaraj A, Prada C, Patel A, Babins E, Bhandari M. The role of hyaluronic acid for soft tissue indications: a systematic review and meta-analysis. Sports Health. 2023;15(1):86-96.
29. McKee D, Lalonde J, Lalonde D. How many trigger fingers resolve spontaneously without any treatment. Plastic Surg. 2018;26(1):52-4.
30. Shultz KJ, Kittinger JL, Czerwinski WL, Weber RA. Outcomes of corticosteroid treatment for trigger finger by stage. Plas Reconstr Surg. 2018;142(4):983-90.
31. Kuczmarski AS, Harris AP, Gil JA, Weiss A-PC. Management of diabetic trigger finger. J Hand Surg. 2019;44(2):150-3.
32. Callegari L, Spano E, Bini A, Valli F, Genovese E, Fugazzola C. Ultrasound-guided injection of a corticosteroid and hyaluronic acid: a potential new approach to the treatment of trigger finger. Drugs RD. 2011;11:137-45.
33. Liu DH, Tsai MW, Lin SH, Chou CL, Chiu JW, Chiang CC, et al. Ultrasound-guided hyaluronic acid injections for trigger finger: a double-blinded, randomized controlled trial. Arch Phys Med Rehabil. 2015;96(12):2120-7.
34. Hollins AW, Hein R, Atia A, Taskindoust M, Darner G, Shammas R, et al. Symptom duration and diabetic control influence success of steroid injection in trigger finger. Plastic Reconst Surg. 2022;150(2):357-63.
35. Aspinen S, Nordback PH, Anttila T, Stjernberg-Salmela S, Ryhänen J, Kosola J. Platelet-rich plasma versus corticosteroid injection for treatment of trigger finger: study protocol for a prospective randomized triple-blind placebo-controlled trial. Trials. 2020;21:1-9.

Cite this article as: Abotaleb AF. Comparative study between 3 commercially available injectants for the treatment of trigger finger in the hand in Egyptian patients. Int J Res Med Sci 2025;13:3195-202.