

Comparison of Percutaneous A1 Pulley Release versus Steroid Injection in Terms of Mean Pain Score in Trigger Digits

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ABSTRACT

Objective: To compare percutaneous A1 pulley release and steroid injection in terms of mean pain score in trigger digit.

Study Design: Comparative cross-sectional study.

Place and Duration of Study: Orthopedic Department Combined Military Hospital, Rawalpindi Pakistan, from Mar to Aug 2018.

Methodology: Patients with trigger finger diagnosed clinically in Out Patient Department meeting inclusion and exclusion criteria were included in the study. Patients were randomly allocated to Group A & B by lottery method. Group A had percutaneous release of A1 pulley using a surgical blade 11, after preparation of the skin and injection of 1ml 2% plain Lidocaine. Group B had injection with corticosteroid. Both procedures were carried out in Out Patient Department under strict aseptic measures. Visual analogue score at start and end of the study was recorded.

Results: A total of 185 patients were included in this study, 122(66%) were males and females were 63(34%). The mean age of patient was 37.80±11.80 years with range from 15-60 years. Mean score of Group A was 39.16±12.22 years and the mean age Group B was 38.93±10.98 years. 56(30.3%) patient had mild visual analogue score, 96 (51.9%) had moderate visual analogue, 33 (17.8%) had severe visual analogue.

Conclusion: Percutaneous release was found better option for the treatment of the trigger digit with a high success rate. Surgery should be reserved only for cases refractory to steroid injection technique.

Keywords: Per cutaneous release of A1 Pulley, Trigger Digit, visual analogue score.

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INTRODUCTION

In adults, trigger fingers are common cause of pain in the hands. Studies in the past have suggested that ring finger and thumb are the most prevalent trigger fingers. Risk factors, such as diabetes and hypothyroidism, have been reportedly linked to trigger fingers.¹ In the Pediatric age Group trigger thumb presents usually in early childhood. The common presentation is with the thumb flexed at interphalangeal joints.²

A mismatch between size and flexor tendon sheath contents causes trigger digits, it may result in aching clicks at joints, initiating with thumb or finger movements, and secondarily contracted proximal interphalangeal joint.³ Trigger digit affects the function of the hand due to pain. The affected digit is painful and presents with triggering in the A1 pulley region.⁴ The pathological change in the flexor sheath is fibrocartilaginous Metaplasia and hypertrophy and fibro-

cartilaginous nodule in the palm at the base of the finger.⁵ Diagnosis of trigger digit can be made by finger flexion at joint, which is interphalangeal, finger snapping in extension, observation of clicking or by a fixed flexion deformity of the joint, which is interphalangeal.⁶ Spontaneous resolution, etiology, effectiveness of splint, timing of surgery and methods of surgery as a treatment for trigger digit are controversial.⁶

Trigger digits can be treated by various methods including percutaneous release or A1 pulley released by open surgery corticosteroid injections in or around flexor tendon sheath The first line treatment is usually corticosteroid injections. However, there is a relapse of 33% in one year.^{7,8} Percutaneous release procedure using different methods and instruments have been reported with less complications and good results in a study by Rajeshwaran G *et al.* in UK with relief of pain at one month in percutaneous Group with mean and standard deviation of 0.8±0.6 and in steroid Group 4.6±1.88. The procedure of percutaneous release surgery has been famous in the last 20 years but the best cure of trigger digits still remains unknown.³

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In one study percutaneous release versus steroid infiltration resulted pain relief in 93% patient in the percutaneous release Group as compared to steroid injection Group, where pain was relieved in 45% at one month. whereas R. Amirfeyz *et al.* in 2016 in UK found variability in results conducted on 95 patients compared percutaneous release trigger finger versus steroid injection showed a success rate of 95% in terms of pain relief in the corticosteroid Group at 1 month.⁴

The objective of the study was to determine the mean pain score of percutaneous release versus steroid injection to fine which treatment is superior in trigger digit. Corticosteroid is easily available and easy to inject Percutaneous release can be done by surgical blade in an OPD setting.

METHODOLOGY

The comparative cross-sectional study was conducted in Orthopedic Department of Combined Military Hospital Rawalpindi from February to August 2018. Sample size was calculated by using WHO sample size calculator keeping 95% confidence interval, 5% error and 14% Anticipated frequency or prevalence¹⁹ the sample size become 185. Non Probability Consecutive sampling was adopted as sampling technique.

Inclusion Criteria: Patients of either gender, between 15-60 years of age clinically diagnosed with trigger finger, tenderness at the A1 pulley, Visual Analogue Score >5 and failed conservative management with NSAIDS were included.

Exclusion Criteria: Patients with previous procedure for trigger finger, Neuropathic symptoms (radiculopathy, carpal tunnel syndrome), individuals having complex regional pain syndrome, Diabetes Mellitus, Rheumatoid arthritis, infections, Peripheral vascular disease and metabolic diseases including gout, clotting disorder, anticoagulation therapy were excluded.

After approval from the ethical council of the hospital (Certificate No-0035) informed written consent was taken. Procedure was conducted in OPD under Aseptic conditions by a consultant. Patient were divided in two Groups visual analogue score (VAS) at start and end of the study were recorded on Pro forma. Group A had percutaneous release of A1 pulley using a surgical blade 11, with cleaning of the skin and injecting 1ml 2% plain Lidocaine. Group B was infiltrated with steroid injection. Figure-1 showed Visual Analogue Score.

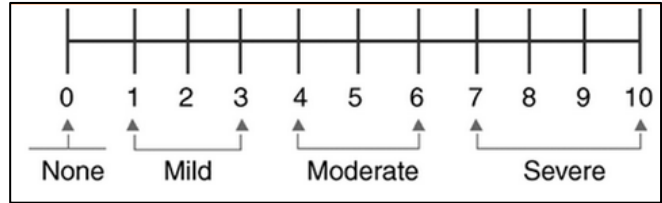


Figure-1: Visual Analogue Score

Demographic data was recorded on Pro forma including address. All patients were allocated to Group A & B by lottery method. Patients were divided in two Groups visual analogue score (VAS) at start and end of the study were recorded on Pro forma.

Group A had percutaneous release of A1 pulley using a surgical blade 11, with cleaning of the skin and injecting 1ml 2% plain Lidocaine. Group B was injected with corticosteroid. Patients were called for follow up after 1 month. Visual Analogue Score at one month was recorded on the Pro forma.

Data was analyzed by using SPSS version 20.00. Mean±SD was calculated for quantitative variables. Frequency and percentages were calculated for qualitative variables. Chi square test was used for comparison of two Groups. A *p*-value ≤ 0.05 considered significant.

RESULTS

A total of 185 patients were included in this study, 122(66%) were males and females were 63(34%) shown in Figure-2. The mean age of patient was 37.80±11.80 years range from 15-60 years. Mean score of Group A was 39.16±12.22 years and the mean age Group B was 38.93±10.98 years. 56(30.3%) patient had mild visual analogue score, 96(51.9%) had moderate visual analogue, 33(17.8%) had severe visual analogue shown in Figure-3.

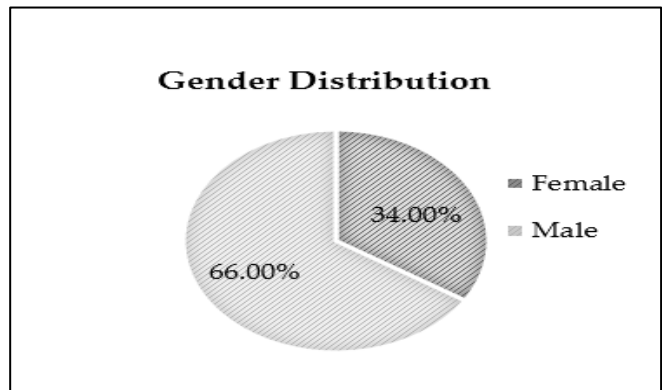


Figure-2: Gender distribution (n=185)

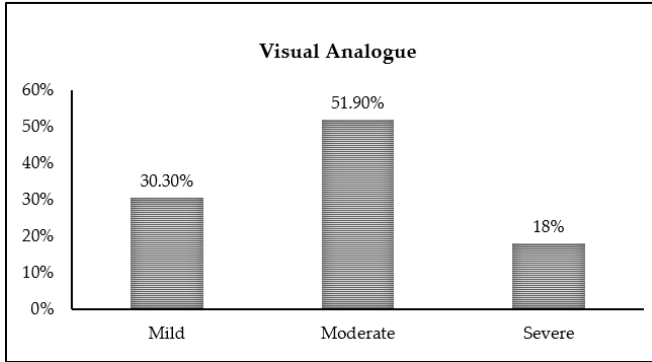


Figure-3 Visual Analogue Score (n=185)

56(50.9%) had Mild visual analogue in Group A followed by 33(44%) had severe visual analogue in Group B. there was statistically significant value association between two Groups $p=0.001$ shown in Table.

Table: Comparison of Visual analogue score between Group A and B(n=185)

	Group A	Group B	p-value
Mild	56(50.9)	-	0.001
Moderate	54(49.1)	42(56)	
Severe	-	33(44)	

DISCUSSION

It is still unknown what the true etiology of trigger finger is but there is some consensus that repeated trauma may be a cause.⁹ Metaplasia of the fibro cartilage on the inner surface of the A1 pulley was found as a cause of triggering by Sampson.¹⁰ At the construction site in the fibrous flexor sheath a fibrous nodule may be found as the bunching of the spiral fibers of the flexor tendons.¹¹ Most commonly trigger finger occurs in the long and ring fingers and rarely in the index finger. Although surgical release has reported as success of 83% but major complications have also been reported.¹² The best choice when the finger is locked in extension or flexion is open surgery.¹³ Several techniques for percutaneous release have been described like with a hypodermic needle Eastwood *et al.*¹¹ It was reported by HAKI 16 that the thickened pulley was not completely divided by the needle and it use to bend during the procedure. HAKI achieved 93% results in his patients with specially designed knife. Where as in present study a success rate of 100% was achieved. Percutaneous release should be the treatment of choice if a patient fails injection treatment was recommended by Ha.¹⁴ There is considerable risk of injury to the digital nerves in the thumb when percutaneous technique is tried due to

their close proximity which has been shown by several authors.^{15,16}

In our institution, trigger finger release was treated by corticosteroid injection and sometimes repeats injection in a month due to recurrence. Percutaneous release, which is also an office-based procedure, was relatively new technique for us to follow. But this technique was started initially in some patients; it was encouraging to see that the recurrence of the trigger finger decreased markedly from the start of the study.

Percutaneous release technique has two phases of treatment one is the procedure and second is the post-operative physiotherapy. The main aim of ours was to see relief of pain in percutaneous release of A1 pulley. Post-operative physiotherapy is a different part of this study was and was not a part of this study.

The mean VAS score in our study was 6.05 in steroid Group as compared to 3.62 in percutaneous Group. Mean number of percutaneous patients in our study was 55. Initially there was some learning curve but with time and guidance from seniors' better results and patient satisfaction were achieved. This was also reported in a study by Doring AC *et al.* and good anatomic knowledge remained pivotal to perform better surgery.¹⁷

No Patients had recurrence in our study. It was very encouraging to see our initial experience, as we were able to correct triggering in 54 patients out of 55(96.4%). Marij Z *et al.* in their study found 100% success while Werthel, JD *et al.* found 94%.^{18,19} The results of our study changed our treatment for trigger digit, and the number of recurrent steroid injections in our department has decreased remarkably in our department.

Of all the patients 1 was not completely treated with this method and probably had incomplete release or adhesion to the surrounding structures. Although the triggering was somewhat relieved, but there was persistent tenderness, even after percutaneous release followed by steroid injection were not able to get the required pain relief result. There was some tenderness left. The patient later had recurrence and open surgery had to be performed.

The study duration, which was six months, was one of the limitations for this study. Although the relief of pain in the initial treatment phase can be well assessed, but the no index entries found. Long-term absence of triggering deformity requires a regular

long-term follow-up. The long term phase in which physiotherapy is done is as important as the treatment phase, perhaps even more important, because this phase needs competent patients more than a competent doctor. If the compliance by the patient is not present and they do not follow the physiotherapy program properly, there is every chance of recurrence of deformity. Therefore, a long-term study is needed to assess the maintenance of percutaneous trigger finger release patient.

Although percutaneous release showed promising result, many doctors do still not know the proper technique. Workshops to teach better and proper technique should be arranged at remote hospitals for better results. Help from The electronic and print media should be sought to create awareness among masses that trigger finger is a treatable disease.

An important factor for better patients' compliance is that all the patients should be seen on the same day. One or two patients were called initially in the study every day for trigger finger release or corticosteroid injection. Later patients of same Group were called the same day so they could discuss their problems and interact with patients with similar problems, and to share their problems with others. Another important thing adequate knowledge of the disease should be given to the patient with reading material, which helps better patient compliance with the treatment.

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CONCLUSION

Percutaneous release was found to be better option for the treatment of the trigger digit with a high success rate. Surgery should be reserved only for cases refractory to steroid injection technique.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

SI & MAB: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

RI & MRS: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

MAB & WAN: Concept, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of

any part of the work are appropriately investigated and resolved.

REFERENCES

- Loong CK, Nawawi RF, Manas AM, Tatt GJ, Harikrishnan KT, Aslam MF. A cross sectional study of the relationship between fibonacc ratio and trigger finger. *Bio Science Research Bulletin* 2018; 35(1): 7-14. <https://doi.org/10.1177/1753193416682917>
- Bauer AS, Bae DS. Pediatric trigger digits. *The Journal of hand surgery* 2015; 40(11): 2304-2309.
- Weiss ND, Richter MB. Percutaneous release of trigger digits. *Am J Orthop (Belle Mead NJ)* 2017; 46: E263-7.
- Amirfeyz R, McNinch R, Watts A, Rodrigues J, Davis TR, Glassey N, et al. Evidence-based management of adult trigger digits. *Journal of Hand Surgery (European Volume)* 2017; 42(5): 473-480. <https://doi.org/10.1177/1753193416682917>
- Liu W-C, Lu C-K, Lin Y-C, Huang P-J, Lin G-T, Fu Y-C. Outcomes of percutaneous trigger finger release with concurrent steroid injection. *The Kaohsiung journal of medical sciences* 2016; 32(12): 624-629.
- Marij Z, Aurangzeb Q, Rizwan H, Haroon R, Pervaiz M. Outpatient percutaneous release of trigger finger: a cost effective and safe procedure. *Malaysian orthopaedic journal* 2017; 11(1): 52. <https://doi.org/10.5704/moj.1703.021>
- Abe Y. Clinical results of a percutaneous technique for trigger digit release using a 25-gauge hypodermic needle with corticosteroid infiltration. *Journal of Plastic, Reconstructive & Aesthetic Surgery* 2016; 69(2): 270-277.
- Rajeswaran G, Healy JC, Lee JC. Percutaneous release procedures: trigger finger and carpal tunnel. In *Seminars in musculoskeletal radiology* 2016 Nov (Vol. 20, No. 05, pp. 432-440). Thieme Medical Publishers.
- Sharma BD, Sah DN. The efficacy of local corticosteroid injection in the treatment of trigger finger. *Janaki Medical College Journal of Medical Science* 2017; 5(2): 13-18.
- Wu T-T, Wu P-T, Lee S-Y, Wu K-C, Shao C-J, Chern T-C, et al. Effect of metacarpophalangeal joint position on A1 pulley and flexor digitorum tendons in trigger digit. *J Chin Med Assoc* 2019; 82(10): 778-781. <https://doi.org/10.1097/jcma.000000000000165>
- Prasad Chaudhari D, Kanade G, Kale S, Janardhan VA. Percutaneous trigger finger release or steroid injection-which is better in trigger finger treatment. *International Journal of Orthopaedics* 2019; 5(3): 512-514. <http://dx.doi.org/10.22271/ortho.2019.v5.i3i.1580>
- Hansen RL, Søndergaard M, Lange J. Open surgery versus ultrasound-guided corticosteroid injection for trigger finger: a randomized controlled trial with 1-year follow-up. *The Journal of hand surgery* 2017; 42(5): 359-366.
- Park K-H, Shin W-J, Lee D-H, Kim J-P. Ultrasound-guided percutaneous release of the trigger thumb. *Journal of the Korean Society for Surgery of the Hand* 2016; 21(4): 218-224.
- Gancarczyk SM, Jang ES, Swart EP, Makhni EC, Kadiyala RK. Percutaneous trigger finger release: a cost-effectiveness analysis. *J Am Acad Orthop Surg* 2016; 24(7): 475-482.
- Nair V, Chaudhary A, Desouza C, Hurkat H, George S. Percutaneous Release of Trigger Finger: A Safe And Cost effective Procedure. *Pain* 2017; 25: 48.51.
- Aksoy A, Sir E. Complications of Percutaneous Release of the Trigger Finger. *Cureus* 2019; 11(2): e4132. <http://doi: 10.7759/cureus.4132>
- Döring A-CD, Hageman MG, Mulder FJ, Guitton TG, Ring D, Adams J, et al. Trigger finger: assessment of surgeon and patient preferences and priorities for decision making. *The Journal of hand surgery* 2014; 39(11): 2208-2213. e2.
- Marij Z, Aurangzeb Q, Rizwan HR, Haroon R, Pervaiz MH. Outpatient percutaneous release of trigger finger: a cost effective and safe procedure. *Malays Orthop J* 2017; 11(1): 52-56.
- Werthel JD, Cortez M, Elhassan BT. Modified percutaneous trigger finger release. *Hand Surg Rehabil* 2016; 35(3): 179-182.