J Orthop Spine Trauma. 2019 September; 5(3): 62-4. DOI: http://dx.doi.org/10.18502/jost.v5i3.4287

Research Article

Comparison of Patient-Reported Outcomes between Two Different Techniques of Carpal Tunnel Release: Classical Incision versus Minimal Incision

Sajad Heidari[1], Alireza Taabbodi[2,*], Mahmoud Farzan[3], Sadegh Saberi[4], Mitra Ashrafi[5]

[1] Orthopedic Surgeon, Department of Orthopedics, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran; Mofatteh Hospital, Varamin, Iran
[2] Assistant Professor, Department of Hand Surgery, Madani Hospital, School of Medicine, Alborz University of Medical Sciences, Karaj, Iran
[3] Professor, Department of Orthopedics, Imam Khomeini Hospital Complex, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
[4] Associate Professor, Department of Orthopedics, Joint Reconstruction Research Center, Imam Khomeini Hospital Complex, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
[5] General Practitioner, Joint Reconstruction Research Center, Imam Khomeini Hospital Complex, Tehran University of Medical Sciences, Tehran, Iran

[*] Corresponding author: Alireza Taabbodi; Department of Hand Surgery, Madani Hospital, School of Medicine, Alborz University of Medical Sciences, Karaj, Iran. Tel: +98-9173159102, Email: alireza.taabbodi@gmail.com

Received: 15 April 2019; **Revised:** 03 June 2019; **Accepted:** 26 July 2019

Abstract

Background: Carpal tunnel syndrome (CTS) is the most common compression neuropathy in the upper limb which needs surgery in many cases. Two common surgical incisions for carpal tunnel release (CTR) are classical incision and minimal incision. In this survey, the aim is to compare patient-reported outcomes of these two types of incisions.
Methods: In this retrospective study, patients with CTS who underwent two different approaches for CTR (classical or minimal) during one year were included. The diagnosis was confirmed clinically and by electrodiagnostic studies. The patients were categorized into two groups regarding the type of surgery. At the 12-month visit, the patients were assessed for functional outcome, level of the pain, and satisfaction with Quick Disability of Arm, Hand and Shoulder score (QuickDASH), the visual analogue score (VAS) scale, and the scar appearance and symptom relief, respectively.
Results: 39 patients were entered in this study, 3 of who had bilateral symptoms. The 42 operated hands were divided into two groups: classical incision group (n = 21) and minimal incision group (n = 21). No significant difference was discovered between the two groups considering age and sex. In addition, no significant difference was found in the variables evaluated between the two groups, except for the higher patient satisfaction with the scar appearance in minimal incision group after 12 months.
Conclusion: After a one-year period, the minimal incision procedure had no priority to classical incision procedure, except for higher patient satisfaction considering the scar appearance.

Keywords: Carpal Tunnel Syndrome; Surgical Incisions; Scar; Patient-Reported Outcome Measures

Citation: Heidari S, Taabbodi A, Farzan M, Saberi S, Ashrafi M. **Comparison of Patient-Reported Outcomes between Two Different Techniques of Carpal Tunnel Release: Classical Incision versus Minimal Incision.** *J Orthop Spine Trauma* 2019; 5(3): 62-4.

Background

Carpal tunnel syndrome (CTS) is the most common peripheral neuropathy in which the compression of the median nerve at the carpal tunnel results in paraesthesia and pain in the hand and radial side fingers (1-3). The peak incidence of this complication is between 30-60 years of age (3, 4) and its diagnosis is usually performed by history taking and physical examination, confirmed by electromyography (EMG) and nerve conduction velocity (NCV) (5).

The treatment options for CTS are conservative treatments and/or surgical procedures (6). Two common surgical incisions are used in carpal tunnel release (CTR), including classical incision and minimal incision. The disadvantages of the classical incision are hypertrophic, painful, and large scar (7). Some studies suggest that minimal incision is superior to the classical approach due to the less trauma to the tissues, resulting in a lower risk of complications and a better outcome (8).

In this study, a comparison was made on the subjective outcomes of surgery for two types of incision during a one-year period to determine the method of choice in CTR in terms of patient's function, satisfaction, and symptom relief.

Methods

This study was carried out with a retrospective cohort approach. The survey was launched at Imam Khomeini hospital of Tehran University of Medical Sciences (Tehran, Iran) between March 2017 and March 2018. The patients who underwent CTR in this period were invited via phone call to have a follow-up visit one year after the surgery. All patients had clinical symptoms of CTS which were confirmed by electrodiagnostic studies and were not responsive to conservative management for 6 weeks. It is worth noting that the non-idiopathic CTS cases were excluded. Finally, out of 81 patients who had CTR, 39 patients were entered in this survey. Surgeries were performed by two academic hand surgeons, one using classical incision and the other one applying minimal incision. Based on the incision type, two groups were formed. Informed consent was obtained from all participants.

For anaesthesia, a regional block was used for all patients. Classical skin incision was started at the level of the distal carpal ligament and followed 6 mm ulnar to the thenar crease to ensure that scarring was away from median nerve and it was curvilinear and parallel with thenar crease. Then, it crossed the base of the palm and

wrist in a zigzag fashion, extending to 2 cm proximal to the wrist crease. The minimal incision method was 6 mm ulnar and curvilinear parallel to the thenar crease, but was less than 2.5 cm in length and did not cross the base of the palm (3). Transverse retinaculum was incised totally and external neurolysis was performed on the median nerve. The same post-operative protocol was applied for both groups. The short volar splint extending distally to the proximal palmar crease was used for 7 days. The full range of motion (ROM) of finger joints was encouraged from the first day of the surgery.

All patients were followed by a senior orthopaedic resident during the one-year study period. The follow-up visits were held at the 1st and 3rd weeks after surgery. The hand physiotherapy was advised if the patient showed any stiffness or limited cooperation. One year after the surgery, the patients were recruited for further follow-up. At the first follow-up visit, the volar splint was removed and the dressing was changed for the first time. Light activities were allowed after 14 days and usual activities were initiated after 28 days.

The patients were evaluated and compared based on the type of incision for CTR with Quick Disability of Arm, Hand and Shoulder (QuickDASH) questionnaire (9). Moreover, the pain level was measured using the visual analogue score (VAS) scale in range of 1-10, with the pain severity categorized as severe, moderate, and mild based on the score ranges of 8-10, 4-7, and 1-3, respectively. Furthermore, the patient's satisfaction about symptom relief (paraesthesia or numbness) and scar appearance was defined using questionnaires designed based on the Likert scale, with the level of satisfaction categorized as complete satisfaction, moderate satisfaction, and dissatisfaction (10).

The data was analysed by SPSS software (version 18, SPSS Inc., Chicago, IL, USA) for windows. The preoperative and post-operative QuickDASH questionnaire, post-operative patient's satisfaction, and pain VAS score were evaluated using the t-test and chi-square test. Statistical significance was designated to the P-value of less than 0.05.

Results

There was a total of 42 CTS hands (from 39 females who underwent CTR), forming two groups: classical incision group (n = 21) and minimal incision group (n = 21). Three patients had bilateral symptoms. For one of these three patients, classical incision was used in one side and minimal incision on the contralateral side. The other two patients had the same incision for both sides.

The mean age in the classical incision group and minimal incision group was 50.47 ± 5.67 and 48.14 ± 4.88 years, respectively. No significant difference was discovered between the groups regarding age, sex, and comorbidities.

The scar appearance satisfaction was significantly higher in the minimal incision group at the 12-month follow-up (P-value ≤ 0.03). In the minimal incision group, 100% of the patients were completely satisfied, while in the classical incision group, 71.4%, 23.8%, and 4.8% were completely satisfied, moderately satisfied, and dissatisfied, respectively.

The pain level did not show a significant difference comparing the two groups at the 12-month visit. In the minimal incision group, the pain was mild in 95.2% of the patients and moderate in 4.8%. In the classical incision group, it was mild, moderate, and severe in respectively 90.4%, 4.8%, and 4.8% of the cases.

The satisfaction of patients with the symptom relief was not significantly different between the two groups at the 12-month follow-up. In the minimal incision group, 95.2% of the patients had complete satisfaction and 4.8% were moderately satisfied. In the classical incision group, 85.7% of the patients showed complete satisfaction, 9.5% were moderately satisfied, and 4.8% were dissatisfied.

Subjective functional assessment was performed before and after the surgery by the QuickDASH questionnaire. This score represented no significant difference comparing the two groups at any time whether on pre or post-operation (P-value ≤ 0.80). However, the function was better at the one-year follow-up in each group (P-value ≤ 0.04 for classical incision group ≤ 0.02 for minimal incision; Figure 1).

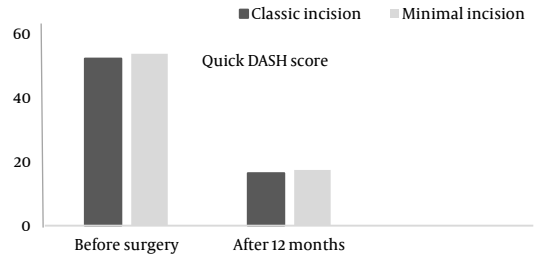

Figure 1. Quick Disability of Arm, Hand and Shoulder score (QuickDASH) score by the type of incision during the one-year follow-up

There were no operation-related complications during the one-year follow-up in none of the groups.

Discussion

CTS is the most common upper limb compressive neuropathy which requires surgical intervention in many cases to release the transverse carpal ligament. Two common surgical procedures are classical incision and minimal incision (2, 5, 11).

In the study by Aslani et al., satisfaction with the surgery in the first month for the mini-incision method was higher than the classical open incision (7). However, after four months, the satisfaction of the two methods became equal. In this survey, patient satisfaction with the scar appearance was higher in minimal incision group at the one-year follow-up. All the patients in the minimal incision group were completely satisfied with the scar appearance, while in the classic method, 4.8% of the patients were dissatisfied and 23.8% had moderate satisfaction.

In the present study, no significant difference was found between the methods regarding the CTS symptom relief (paraesthesia and numbness) and pain level. In the study by Isik and Bostanci (12), 8 out of 143 patients with mini incision decompression had temporary paraesthesia at four months after surgery and no recurrence was observed. In the study carried out by Aslani et al. (7), paraesthesia of all the patients was resolved during the four-month follow-up, and paraesthesia was observed only in one case of the classic method.

During the one-year follow-up, a significant decrease was observed regarding pain and QuickDASH scores in both methods. However, no significant difference was observed between the two surgical methods in the current study.

The major limitations of this study were the small number of patients and the overlap of CTS symptoms (pain, paraesthesia, and numbness) with the symptoms

related to the surgery and its scar. Additionally, the differentiation between these symptoms was merely subjective and based on the patient's judgment.

Conclusion

No statistically significant difference was found between classical and minimal incision techniques of CTR, except that minimal incision showed a better cosmetic scar appearance during the one-year follow-up period.

Conflict of Interest

The authors declare no conflict of interest in this study.

Acknowledgments

We would like to appreciate Dr. Farhoud, Assistant Professor of Orthopaedic Hand Surgery, Department of Orthopedics, Imam Khomeini Hospital Complex, School of Medicine, who shared his vast knowledge and experience to help us performing this study.

References

1. Franzini A, Broggi G, Servello D, Dones I, Pluchino MG. Transillumination in minimally invasive surgery for carpal tunnel release. *Technical note. J Neurosurg*. 1996;85(6):1184-6. doi: 10.3171/jns.1996.85.6.1184. [PubMed: 8929518].
2. Rempel D, Evanoff B, Amadio PC, de Krom M, Franklin G, Franzblau A, et al. Consensus criteria for the classification of carpal tunnel syndrome in epidemiologic studies. *Am J Public Health*. 1998;88(10):1447-51. doi: 10.2105/ajph.88.10.1447. [PubMed: 9772842]. [PubMed Central: PMC1508472].
3. Mackinnon SE, Novak BC. Compression neuropathies. In: Wolfe SW, Pederson WC, Hotchkiss RN, Kozin SH, Cohen MS, Editors. Green's operative hand surgery E-book. Philadelphia, PA: Elsevier Health Sciences; 2016. p. 921-58.
4. Cellocco P, Rossi C, Bizzarri F, Patrizio L, Costanzo G. Mini-open blind procedure versus limited open technique for carpal tunnel release: A 30-month follow-up study. *J Hand Surg Am*. 2005;30(3):493-9. doi: 10.1016/j.jhsa.2005.02.007. [PubMed: 15925158].
5. Keramettin A, Cengiz C, Nilgun C, Ayhan B. Microsurgical open mini uniskin incision technique in the surgical treatment of carpal tunnel syndrome. *Neurol India*. 2006;54(1):64-7. doi: 10.4103/0028-3886.24710. [PubMed: 16679646].
6. Scholten RJ, van der Mink M, Uitdehaag BM, Bouter LM, de Vet HC. Surgical treatment options for carpal tunnel syndrome. *Cochrane Database Syst Rev*. 2007;(4):CD003905. doi: 10.1002/14651858.CD003905.pub3. [PubMed: 17943805]. [PubMed Central: PMC6823225].
7. Aslani HR, Alizadeh K, Eajazi A, Karimi A, Karimi MH, Zaferani Z, et al. Comparison of carpal tunnel release with three different techniques. *Clin Neurol Neurosurg*. 2012;114(7):965-8. doi: 10.1016/j.clineuro.2012.02.017. [PubMed: 22421246].
8. Lee WP, Strickland JW. Safe carpal tunnel release via a limited palmar incision. *Plast Reconstr Surg*. 1998;101(2):418-24. doi: 10.1097/00006534-199802000-00025. [PubMed: 9462775].
9. Ebrahimzadeh MH, Moradi A, Vahedi E, Kachooei AR, Birjandinejad A. Validity and reliability of the Persian version of shortened disabilities of the arm, shoulder and hand questionnaire (Quick-DASH). *Int J Prev Med*. 2015;6:59. doi: 10.4103/2008-7802.160336. [PubMed: 26288703]. [PubMed Central: PMC4521304].
10. Bock O, Schmid-Ott G, Malewski P, Mrowietz U. Quality of life of patients with keloid and hypertrophic scarring. *Arch Dermatol Res*. 2006;297(10):433-8. doi: 10.1007/s00403-006-0651-7. [PubMed: 16528552].
11. Jin GQ, Yang J, Li CY, Ming XF, Zhao XF, Cheng CS. Treatment of carpal tunnel syndrome with mini-incision decompression. *Zhongguo Gu Shang*. 2012;25(1):58-61. [PubMed: 22489526].
12. Isik HS, Bostanci U. Experience of carpal tunnel syndrome that operated using a limited uni skin incision. *Turk Neurosurg*. 2011;21(2):177-80. doi: 10.5137/1019-5149.JTN.3246-10.2. [PubMed: 21534199].