A research on the presentation and results of the mini-incision procedure for carpal tunnel syndrome.

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Abstract:

Background: A serious occupational health problem, carpal tunnel syndrome (CTS) is characterised by hand pain, tingling, and numbness that interferes with day-to-day activities. Although conservative care and surgery are among the available treatment options, minimally invasive procedures like mini-incision carpal tunnel release have become more well-liked due to their ability to lessen symptoms and postoperative problems. Therefore, utilising a 1.5 cm mini-incision approach, the study sought to assess the presentation and results of carpal tunnel decompression.

Methodology: Mini-incision carpal tunnel release was performed on 20 CTS patients who were not responding to conservative therapy. The median nerve was decompressed after a 1.5 cm incision was made. Results were evaluated both before and after surgery. Recovery and symptom relief were used to assess functional outcomes.

Results: With a mean age of 46.15±8.09 years, the study comprised 20% male and 80% female patients. Of the cases, 25% had left CTS, 35% had bilateral CTS, and 40% had right CTS. There were no immediate issues following surgery. Nonetheless, prolonged tingling sensations were observed by 25% of patients. After surgery, the mean Boston Carpal Tunnel Questionnaire (BCTQ) score considerably decreased from 14.1±0.79 to 8.2±1.28. In 75% of cases, functional outcomes were good, and in 25% of cases, they were moderate.

Conclusion: With significant symptom reduction and no serious side effects, the mini-incision carpal tunnel release procedure proved to be both safe and effective. This method offers patients a good choice, guaranteeing symptom relief with little chance of unfavourable consequences.

Keywords: Mini incision, carpel tunnel syndrome, surgical outcomes, decompression.

Introduction : Carpal tunnel syndrome (CTS) is the most prevalent type of entrapment neuropathy [1]. It affects between 1% and 4% of the general population and is responsible for 90% of all nerve entrapment disorders [2, 3]. CTS is a serious upper extremity occupational disorder associated with high medical expenses. Repetitive pressure or stress on the wrist is one of the main causes, which makes it a major occupational risk factor [4]. Recurrent numbness, tingling, and discomfort in the fingers and palm are the hallmarks of this illness, which impairs daily functioning and lowers productivity and quality of life [5].

Treatment options range from more invasive surgical procedures to conservative methods including splinting and corticosteroid injections [6]. To reach the transverse carpal ligament, doctors might use a variety of Carpal Tunnel Release (CTR) procedures. Smaller incisions are becoming more popular in order to minimise postoperative pain, lessen surgical trauma, and save money [7]. Open surgery using various techniques was an option for patients with severe, advanced CTS who did not improve with conservative treatment [8]. Many endoscopic procedures and small skin incisions have been suggested as minimally invasive and efficient ways to avoid excessive scar formation and improve aesthetic results [1].
Therefore, the purpose of this study was to assess the presentation and results of carpal tunnel decompression utilising a 1.5 cm longitudinal mini-incision method.

Materials and Methodology : This study was carried out in the OT complex of the Sri Siddhartha Institute of Medical Sciences (SIMS & RC) Hospital in t.begur banglore rural, where a mini-incision carpal tunnel release technique was used to treat patients with Carpal Tunnel Syndrome (CTS). The patient was placed supine at the start of the procedure, and a tourniquet was used to stabilise the injured limb. Anatomical landmarks were established during induction with either general anaesthesia or a supraclavicular block, and a 1.5–2 cm incision was made at the point where the Kaplan line and the radial border of the third web space intersect. In order to decompress the median nerve, the palmar fascia and the underlying transverse carpal ligament were carefully dissected after the incision.

After achieving haemostasis, Ethilon 3-0 sutures were used to seal the wound. Early mobilisation exercises beginning on day two, wrist splints for three weeks, and suture removal after fourteen days were all part of the postoperative therapy. After three months, patients with bilateral CTS underwent contralateral surgery. The Boston Carpal Tunnel Questionnaire was used to measure outcomes both before and after surgery, guaranteeing a comprehensive assessment of symptom alleviation and functional recovery.

Results :

Table 1: Demographic according to age & gender.

Gender	No. of cases	% of cases
Male	FOUR	TWENTY
Female	SIXTEEN	EIGHTY

Age (Mean±SD)	46.15±8.09	

The group's average age was 46.15±8.09 years. Twenty percent of the cases were male (4 cases), and eighty percent were female (16 cases).

Table 2: Distribution according to NCS Study.

NCS Study	No. of cases	% of cases
Left Carpal tunnel syndrome	FIVE	TWENTY FIVE
Right Carpal tunnel syndrome	EIGHT	FOURTY
Both upper limb Carpal tunnel syndrome	SEVEN	THIRTY FIVE

According to the above table, 25% of cases had left carpal tunnel syndrome, 35% had bilateral carpal tunnel syndrome, and 40% had right carpal tunnel syndrome.

Table 3: Distribution according to post-op complications & Delayed complications.

Post-op complications	No. of cases	% of cases
No	TWENTY	HUNDRED
Yes	ZERO	ZERO
	Delayed complications	
No	FIFTEEN	SEVENTY FIVE
Tingling	FIVE	TWENTY FIVE

The table demonstrates that none of the patients encountered postoperative issues immediately following the surgery, as all 20 instances reported no complications. Furthermore, no delayed problems occurred in 75% of individuals. Nevertheless, delayed tingling sensations were noted as a problem by 25% of individuals.

Table 4: Distribution according to time since surgery (in months) wise

Time since surgery	No. of cases	% of cases
<=6 months	SEVEN	THIRTY FIVE
7-12 months	NINE	FOURTY FIVE
>=13 months	FOUR	TWENTY
Mean±SD	14.3± 14.89	

35% of the cases underwent surgery within six months, 45% between seven and twelve months, and 20% more than thirteen months ago. The average duration following surgery was 14.3±14.89 months.

Table 5: Comparison of pretest and posttest BCTQ scores

Time	Mean±SD	p-value
Pretest	14.1± 0.79	0.0001*

Posttest	8.2±1.28	

The posttest score was 8.2±1.28, and the pretest score was 14.1±0.79. With a p-value of 0.0001, the change was statistically significant.

Table 6: Distribution according to Functional outcome-wise.

Functional outcome	No of cases	% of cases
Good	FIFTEEN	SEVENTY FIVE
Moderate	FIVE	TWENTY FIVE

25% of cases had a below-average functional outcome, whereas 75% of cases had a satisfactory outcome.

Discussion :

The most common compressive neuropathy seen in clinical practice is Carpal Tunnel Syndrome (CTS). It is caused by the median nerve being compressed inside the carpal tunnel at the wrist. CTS is more common in women and mostly affects middle-aged people [3, 4]. The average age of the participants in the current study was 46.15±8.09 years, and there were more females (80%) than males (20%).
According to a different study by Umakanth K et al. [4], 76% of the participants were female and 24% were male. The findings of this investigation are consistent with earlier studies that have demonstrated that the anatomically narrower carpal tunnel, which is more vulnerable to increased internal pressures and consequent compression of the median nerve, is one of numerous variables contributing to the higher prevalence of CTS in women [8, 9]. Of the cases, 25% had left carpal tunnel syndrome, 35% had bilateral carpal tunnel syndrome, and 40% had right carpal tunnel syndrome. According to Matsis R et al. [10], 63.6% of their patients had dominant side CTS, 23.37% had nondominant side involvement, and 12.98% had bilateral CTS.

Furthermore, similar to the results of this investigation, Mardanpour K et al. [1] discovered that the majority of CTS patients were in the right hand. 75% of patients in the current study had no delayed problems, and there were no postoperative issues. A statistically significant improvement in symptoms was indicated by the mean preoperative BCTQ score of 14.1±0.79, which dramatically dropped to 8.2±1.28 after surgery. According to a study by Saaiq M [11], preoperative BCTQ scores revealed 53.24% of patients with moderate symptoms and 46.75% with severe symptoms; postoperative results showed 96.10% of patients with only mild symptoms, with no cases of moderate or severe symptoms.
The mean preoperative GSS score of 7±2.5 decreased to 1.3±0.34 postoperatively, and the mean VAPSS score improved to 8.3±1.5 throughout the follow-up period, according to a study by Mardanpour et al. [1]. Both trials show notable symptom relief and functional improvement after the intervention, which is consistent with the current study's findings. The majority of patients achieved positive outcomes and regained good function after therapy, as evidenced by the fact that 75% of patients had a good functional outcome and 25% had a moderate outcome.

In line with the current study and Matsis R et al., where the majority of patients experienced relief following decompression surgery, Bland JD et al., [12] found that 79% of patients reported considerable improvement in symptoms following carpal tunnel release. In a similar vein, a study by Saaiq M et al. found that, with the exception of three patients, all patients had symptom relief within four months following surgery, and no serious intraoperative complications were noted. This finding is consistent with the current study, which also found no serious intraoperative problems. Furthermore, 75% of patients showed satisfactory recovery, according to Bahar-Moni AS et al. [13].
The small sample size in this study may limit how far the results may be applied. It was also challenging to compare the mini-incision procedure with other surgical techniques because the study did not include a control group. For more definitive findings, more research with bigger sample numbers and longer follow-up is required.

Conclusion :

For most patients, the mini-incision open carpal tunnel procedure was quite successful in reducing discomfort. In addition to providing substantial relief from CTS symptoms, this method showed a solid safety profile with no serious side effects or recurrences. These results demonstrate the benefits of the mini-incision technique in reducing the probability of unfavourable consequences while improving symptoms.

Conflicts of interest : The authors declare that there is no conflict of interest.

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Data access : The data that support the findings of this study are available from the corresponding author upon reasonable individual request.

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