

# De Quervian Tenosynovitis: Clinical Outcomes of Surgical Treatment with Longitudinal and Transverse Incision

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## Abstract

**Objectives:** De Quervain disease is a mechanical tenosynovitis due to inadequacy volume between abductor pollicis longus, extensor pollicis brevis and their tunnel. Treatment methods include immobilization, steroid injections, and operation. For the first time Fritz De Quervain described surgical treatment of this disease. Since then, various ways of treatment have been reported. The purpose of this study is to compare the clinical outcomes of a longitudinal incision with a transverse incision in De Quervain disease.

**Methods:** This was a randomized controlled clinical trial conducted in three hospitals in Iran, Yazd from March 2003 to September 2008. One hundred-twenty patients with De Quervain disease who did not respond to conservative treatment were operated with two different incisions. The patients were followed for three months to compare the surgical outcomes.

**Results:** During a three month follow-up, a significant difference was shown between the two methods ( $p=0.03$ ). Results of surgical treatment with longitudinal incision were excellent (only 5 hypertrophic scars), but there were 13 postoperative complaints with transverse incision.

**Conclusion:** According to our findings, longitudinal incision in surgical treatment of De Quervain disease is better than transverse incision.

**Keywords:** De Quervian disease; Longitudinal incision; Transverse incision; Surgical treatment.

## Introduction

De Quervain disease (DD) is a mechanical tenosynovitis due to volume insufficiency between abductor pollicis longus (APL),

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extensor pollicis brevis (EPB) and their tunnel. DD is mostly observed in women with an average age of 47 and almost not before 30.<sup>1</sup> Treatment methods include immobilization, steroid injections, and operation.<sup>2</sup> One hundred years ago for the first time, Fritz De Quervain described surgical treatment of this disease. Since then, various procedures for treatment have been reported.<sup>3</sup>

The advantages of longitudinal incision include easy finding of compartment variations, superficial branches of radial nerve and prevention of palmar tendon subluxation as a result of more dorsal release of the compartment sheath.<sup>4</sup> Using a longitudinal incision is associated with poor wound healing and damage to the terminal branches of the radial nerve.

The aim of this study is to compare the results obtained by longitudinal and transverse incision in de Quervain's disease. According to our data, transverse incision causes damage to superficial radial nerve and then neuroma in the scar which is very painful. In some cases; injection, neuroma excision and repeated surgery are needed. Using longitudinal incision causes mark and keloid scars which are not a serious problem. For this reason we conclude this incision is better for preventing damage to the superficial radial nerve.

## Methods

The study protocol was approved by the ethics committee of Shaheed Sadoughi Medical University and the Informed consent of all patients was taken before inclusion in the study. The study took place from March 2003 to September 2008. During this period, a surgeon examined patients with simple De Quervain disease confirmed by clinical examinations. The inclusion criteria were positive Finkelstein's test and no response to conservative treatment for three months. Patients with diabetes mellitus, hypothyroidism, rheumatoid diseases, carpal tunnel syndrome and first CMC osteoarthritis were not included in our study. For evaluation of carpometacarpal (CMC) arthritis, physical examination and simple radiography of CMC joints were used. For diagnosis of first CMC osteoarthritis, the same method was also used. Patients who presented with clinical symptoms of carpal tunnel syndrome underwent NCV and EMG to rule out this syndrome. They underwent conservative treatment (such as splintage and corticosteroid injection).

All of the cases received splintage as well as corticosteroid injection. Finally, 120 patients were divided into two groups of longitudinal/transverse incision while they were blindfolded. A general practitioner who performed the blinded assessment Using systematic allocation to determine the type of surgery that patients were assigned by the order in which they presented. They were operated in three hospitals in Iran-Yazd namely: Shaheed Sadoughi, Mortaz and Mojibian. Each group consisted of 48 women and 12 men. The mean age at the time of operation was 45 years (ranging from 32 to 58 years). (Table1)

**Table 1:** Demographic distribution in two groups.

Year	Transverse incision			Longitudinal incision		
	Female	Male	Mean age	Female	Male	Mean age
2003	3	3	48.6	5	1	40.1
2004	6	0	47.1	6	2	47.2
2005	7	3	46.2	9	3	46.4
2006	14	2	46.5	12	2	47.2
2007	11	3	45.9	11	3	42.8
2008	7	1	45	5	1	40.6
<b>Total</b>	<b>48</b>	<b>12</b>	<b>46.5</b>	<b>48</b>	<b>12</b>	<b>44</b>

All patients were operated by the same surgeon under general anesthesia. After using tourniquet a 1.5-2 cm incision was placed over the prominent thickening of the first dorsal compartment with using longitudinal and transverse incision. Once the skin was incised, the first dorsal compartment is sharply opened longitudinally and transversally for approximately 2 cm. (Table 2)

**Table 2:** Prevalence of two incisions in both hands.

Type of surgery	Hand		Total
	Right	Left	
Longitudinal incision	35	25	60
	58.3%	41.7%	100.0%
Transverse incision	36	24	60
	60.0%	40.0%	100.0%
<b>Total</b>	<b>71</b>	<b>49</b>	<b>120</b>
	<b>59.2%</b>	<b>40.8%</b>	<b>100.0%</b>

The tendon(s) were inspected to ensure that the APL and the EPB were released. If presented, a septum separating the 2 motor units could be deceiving. By gently moving the patient's thumb distinguishes one tendon from the other. If a tendon glides with metacarpophalangeal (MCP) joint motion, it belongs to the EPB. If a septum between the abductor pollicis longus and the EPB was identified, it was also released. The skin was sutured. A soft, dry,

circumferential wrist dressing was placed for a week. If there was an aberrant tendon, it was released.

The patients were followed for three months to assess the clinical outcome of the two different incisions. In another study, after the interventional procedure, a blinded assessment was made by a general practitioner who also determined patients in two groups a week after to look for infection, followed by two weeks more for removing sutures and finally followed by three months for final assessment. According to functional score (SF-36) and visual scores, the pain was evaluated and the persistent pain, pain induced activity and local tenderness on styloid process were noticed. The scar was evaluated with observation and colloid tissue or painful hypertrophic scar were noticed. Pain relief and the ability to perform daily activities for evaluation of patient satisfaction were considered. The Chi-Square test was used to analyze the data.

## Results

After a period of 3 months, 14 patients (eight patients from the transverse incision group and six patients from longitudinal incision group) did not cooperate in follow up from the first time. According to our data, a significant difference was shown between the two methods, ( $p=0.03$ ). The complications of surgical treatment with longitudinal incision were lower than the transverse incision. Patients who had undergone the longitudinal incision had five hypertrophic scars, including painful ones which were treated with corticosteroid injections however, no injury to the nerve or vein was reported.

There were eleven postoperative complaints including three lesions to the superficial branch of the radial nerve, five injuries to the vein in the snuffbox area and five hypertrophic scars due to transverse incision, (Table 3). Using longitudinal incision odd risk was 0.3 (95% CI). No palmar tendon subluxation or superficial infections were observed in the groups of patients. However, there were seven accessory first extensor compartments, one case with two involved tendons and six cases with one tendon.

**Table 3:** Prevalence of complications between longitudinal and transverse incisions. Different outcomes observed between the two procedures ( $p=0.03$ )

Complications (%)	Longitudinal Incision	Transverse Incision	p value
Nerve damage	0	3 (5.77%)	0.11
Vein damage	0	5 (9.62%)	0.02
Hypertrophic scar	5 (9.26%)	5 (9.62%)	1.00
Total Complications	5 (9.26%)	13 (25%)	0.03
No. Complications (%)	49 (80.74%)	39 (61.6%)	
<b>Total</b>	<b>54 (90%)</b>	<b>52 (86.6%)</b>	

## Discussion

De Quervain disease, or stenosing tenosynovitis of the first dorsal compartment of the wrist, is common in wrist pathology. Pain is due to resisted gliding of APL and EPB tendons in their canal. De Quervain disease is common in women. Diagnosis could be made on physical examination. Radiographs help to rule out offending bone pathology. Nonsurgical treatment consists of steroid injections and thumb spica splinting is usually successful. However, in the event that conservative management fails, surgery should be considered.<sup>1,2,5,6</sup> In 1895 Fritz de Quervain described a specific entity involving APL and EPB tendon sheaths at the radial styloid process. Before him, a similar entity was reported in the 13th edition of Gray's Anatomy Textbook under the title of "Washer Woman's Sprain."<sup>7</sup>

De Quervain was the first one who described the surgical treatment of this type of tenosynovitis. Since then, various procedures of treatment have been reported.<sup>3</sup> In a study conducted by Zarin and Ahmad from 2001 to 2002, patients with De Quervain disease who did not respond to conservative treatment were operated and followed up for a minimum period of 3 months to assess their clinical outcome of procedure. The Study showed that the surgical release of the tendons had an excellent result in patients with De Quervain disease.<sup>8</sup>

Wetterkamp et al. reviewed 100 years of de Quervain stenosing tenosynovitis of the literature and personal results and reported a series of 72 patients who were treated surgically and reported 82% complete recovery.

Postoperative complaints reported have included irritations of the superficial branch of the radial nerve.<sup>3,9,10</sup> APL luxation, disfavor enlargement and adhesion of the scar. Le Viet and Lantieri reported 62 cases of De Quervain disease treated from 1983 to 1990 by the same surgeon and they found that transverse incision causes less disfavor scars.<sup>1</sup>

A longitudinal incision in surgical treatment of De Quervain disease has many advantages including; easy finding of compartment variations and superficial branches of radial nerve and prevention of palmar tendon subluxation as a result of more dorsal release of the compartment sheath. Since 2002, Gundes and Tosun used a longitudinal incision to release the first dorsal compartment.<sup>4,11</sup>

While Scheller et al. presented the long-term results of De Quervain disease surgery from 1988 to 1998. In this study; 94 patients (80 females and 14 males) were consecutively operated on by a single surgeon. He used a longitudinal incision and a partial resection of the extensor ligament. In all cases with negative Finkelstein's test, a successful outcome was observed. Simple decompression of both tendons and partial resection of the extensor ligament with a maximum of 3 mm can provide excellent long-term results.<sup>5</sup>

Mellor and Ferris reviewed the results of 22 surgical operations on 21 patients during a period of six years. They used longitudinal incision on 17 patients, and after 34 months follow-up, 18 patients had complete relief. They found that a longitudinal incision was

associated with a significant risk of complications namely; a) four poor cosmetic results, b) six evidences of superficial radial nerve injuries, c) two wound infections and d) one reflex sympathetic dystrophy.

Although, De Quervain disease surgery is effective in the treatment of symptoms in most patients, the longitudinal incision results in poor wound healing and damage to the terminal branches of the radial nerve.<sup>12</sup> The use of both transverse and longitudinal incisions is used within different works, however, based on our findings, longitudinal incision results in less nerve and vein injury, (Anatomically in snuffbox area, there is a longitudinal vein that can be damaged with transverse incision), bleeding and adhesion.

## Conclusion

Overall, longitudinal incision can be recommended for surgical treatment of De Quervain disease. Non participation of patients in surgery and then some of them in follow up were the most common methodological limitations.

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