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# Trigger Wrist and Carpal tunnel syndrome caused by a flexor tendon-related ganglion in a teenager: A case report



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## ABSTRACT

**INTRODUCTION:** Trigger wrist is a rare entity and is usually seen in adults. Trigger wrist in children and teenagers is extremely rare.

**PRESENTATION OF CASE:** A case of Trigger wrist and carpal tunnel syndrome in a 16-year-old male is reported. Surgical exploration revealed a ganglion related to the flexor superficialis tendon. After surgical excision, there was complete resolution of symptoms.

**DISCUSSION:** This is a very rare case and there are no similar cases in the literature. The literature is reviewed and a classification of the causes of triggering at the wrist level is offered. The management approach and outcome are also discussed.

**CONCLUSION:** Trigger wrist with concurrent carpal tunnel syndrome is a rare entity. It is usually caused by space occupying lesions. Excision is usually curative.

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## 1. Introduction

Trigger wrist is a rare entity and refers to triggering at the wrist level during finger or wrist movements [1]. Trigger wrist is usually seen in adults and its occurrence in children/teenagers is extremely rare. The literature offers a classification of the etiology of wrist triggering [2], which is shown in Table 1.

In this communication, we report on a teenager with trigger wrist and concurrent carpal tunnel syndrome caused by a ganglion arising from the flexor digitorum superficialis tendon. We also review the literature and offer an extended classification of the etiology of this rare entity.

## 2. Presentation of case

A 16-year-old male presented with a two-month history of triggering of the right wrist. Triggering was induced by finger flexion/extension. The patient also complained of numbness along the median nerve distribution, which worsened over the week prior to presentation. Examination revealed a palpable longitudinal mass in the distal forearm which disappeared into the carpal tunnel upon finger extension. Triggering at the wrist was noted during both finger flexion and extension. Static two-point discrimination was 9 mm in the right thumb compared to 3 mm in the contralateral left thumb. MRI was done with the fingers in extension and

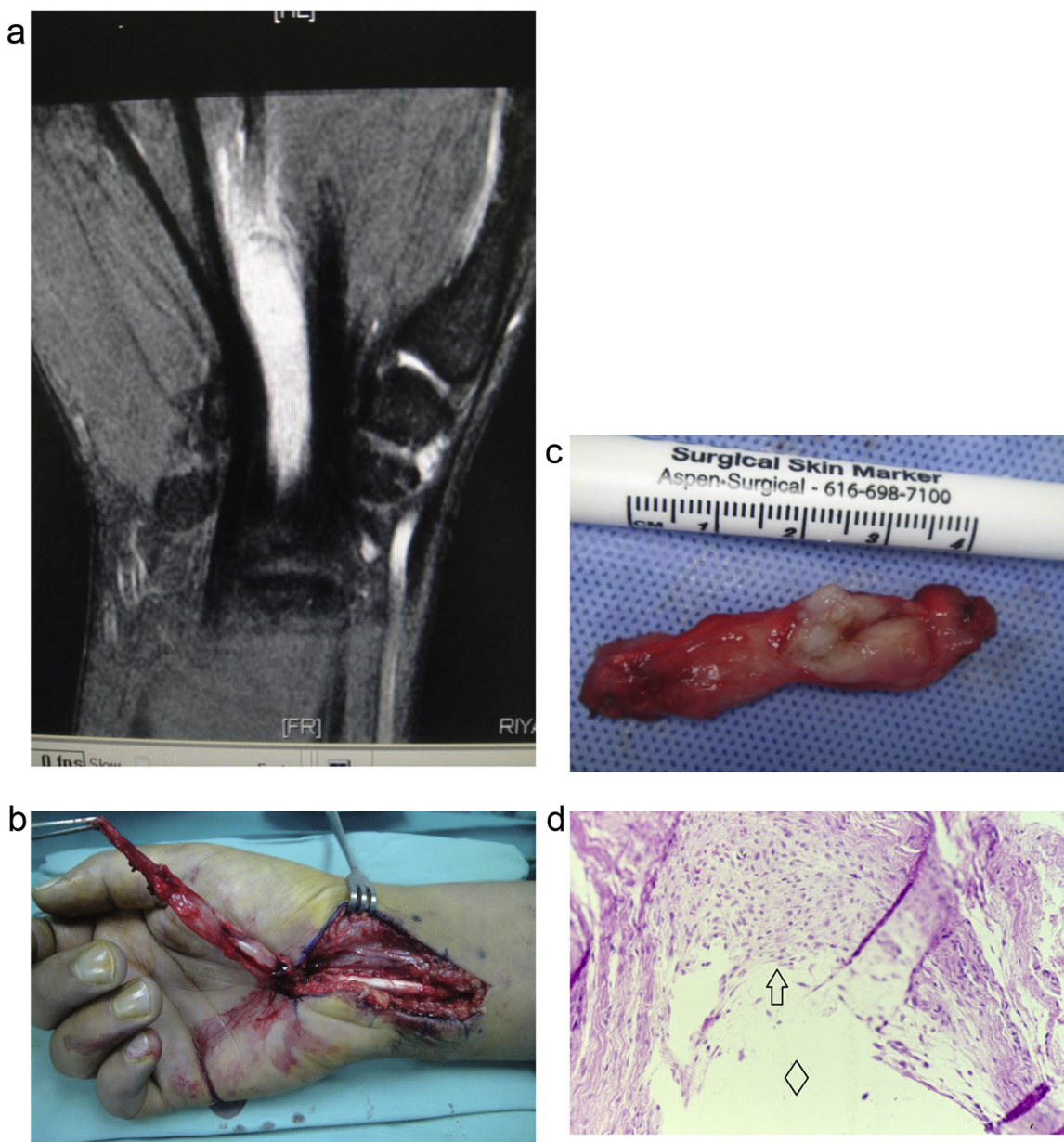
showed an elongated mass across the carpal tunnel. The mass was iso-intense in the T1 and hyper-intense in the T2 images (Fig. 1A). Nerve conduction studies confirmed the presence of right median nerve compression across the right carpal tunnel. Nerve conduction across the left carpal tunnel was normal. Surgical exploration showed a longitudinal mass attached to the volar aspect of the flexor superficialis tendon of the middle finger (Fig. 1B). Grossly, the mass was made up of a cystic cavity with a thick hyalinized wall (Fig. 1C). The excised mass was submitted for histopathological examination, which showed a cystic lesion with mucoid degeneration and few chronic inflammatory cells. The wall was composed of fibrous tissue with no specialized lining. The histopathological picture was consistent with a ganglion (Fig. 1D). The postoperative course was uneventful.

The wrist was splinted in 20° of extension for 7 days in a volar splint, leaving all finger joints free for immediate postoperative active exercises. Following the removal of the splint, wrist exercises were started under the supervision of the physiotherapist. The patient was followed up weekly for a month and then every two months for about a year. At final follow-up 1 year after surgery, the patient remained asymptomatic with return of normal two-point discrimination of the radial digits.

## 3. Discussion

A review of the literature only revealed three cases of trigger wrist in the pediatric age group [1,3,4]. All three cases had tumors related to the flexor tendons within the carpal tunnel: a giant cell tumor of tendon sheath [1], a synovial mass [3], and a fibroma of

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**Fig. 1.** Trigger wrist and carpal tunnel syndrome in a teenager. a) The MRI (T2-image) showing a longitudinal hyper-intense mass across the carpal tunnel. b) The ganglion removed from the flexor aspect of the flexor digitorum superficialis of the middle finger. c) The excised mass was partially incised to show the cystic cavity and the thick cyst wall. d) Histopathology: The diamond is placed within the cyst cavity while the arrow is pointing to the cyst wall. Note that the wall of the cyst is composed of fibrous tissue with no specialized lining.

tendon sheath [4]. None of the pediatric cases had concurrent carpal tunnel syndrome, although it has been reported in adults [5,6]. In our case, triggering was caused by a ganglion and concurrent carpal tunnel syndrome was present. The ganglion was also unusual, being longitudinally oriented and located on the volar aspect of the flexor tendon of the middle finger. The origin of this ganglion supports the hypothesis that mucoid degeneration of fibrous tissue is the main pathogenesis of ganglia, as opposed to “herniation” of the joint capsule [7].

According to the classification of Suematsu et al. [2] (Table 1), our case belongs to type A (caused by a tumor). When we reviewed the literature, we found that triggering at the wrist may also have been the result of other causes such as partial flexor [8] or extensor [9] tendon laceration, and other mechanical causes [10,11]. All these causes may occur in the pediatric age group and hence, an extended classification may be offered (Table 2).

**Table 1**  
The classification of the etiology of trigger wrist Offered by Suematsu et al. [2].

Type	Etiology
A	Tumor within the carpal tunnel
B	Anomalous muscle crossing the carpal tunnel
C	Tumor within an anomalous muscle crossing the carpal tunnel

Table 2 shows the various possible causes of wrist triggering in children. History and physical examination should guide the surgeon to the probable etiology. A history of juvenile arthritis is suggestive of the presence of a synovial mass (Type A) [3]. Anomalous muscles (Type B and C) are usually associated with a bulge in the distal forearm which is more apparent on passive hyper-extension of the wrist [2]. A history of a laceration is suggestive of

**Table 2**  
Our extended classification of the etiology of trigger wrist.

Type	Etiology
A	Tumor or inflammatory mass which may originate from the median nerve, flexor tendon, or other contents of the carpal tunnel
B	Anomalous muscle crossing the carpal tunnel
C	Tumor within an anomalous muscle crossing the carpal tunnel
D	Partial flexor or extensor tendon injury at the wrist level
E	Mechanical causes such as snapping dislocation of a flexor tendon over the hook of the hamate (may occur after carpal tunnel release), and tendon adhesions between the flexor pollicis longus and other flexor tendons within the carpal tunnel (may occur following surgery within or near the carpal tunnel)

type D [8,9], while a history of carpal tunnel release is suggestive of Type E [10,11].

Investigations in children with trigger wrists should include either an ultrasound or an MRI. Ultrasound is preferred in young children given that MRI needs sedation in this age group. Adolescents require no sedation for the MRI. Radiological examination should include the carpal tunnel area as well as the distal forearm. Synovitis, synovial masses, anomalous muscles and space occupying lesions are easily identified. Median nerve conduction studies are only indicated in neurologically symptomatic patients. In these cases, the nerve conduction study will not only document the presence of nerve compression, but will also provide a baseline documentation of the severity of nerve compression prior to surgery. A repeat post-operative electro-physiological testing may then be done to document nerve recovery after surgery.

Conservative management has no place in the management of trigger wrists in children. If there was a history of a laceration on the dorsal aspect of the wrist, exploration of the area of laceration and release of the extensor retinaculum should be done [8,9]. In all other cases, carpal tunnel release is indicated [1–6,10,11]. In neurologically asymptomatic patients, the carpal tunnel release serves to provide access to the pathology within the carpal tunnel rather than to decompress the median nerve. During the release of the carpal tunnel, the surgeon should look for the cause of triggering and treat it accordingly. This will include synovectomy, resection of the anomalous muscles, excision of space occupying lesions, and release of tendon adhesions [1–6,10,11]. Triggering related to partial flexor tendon lacerations is usually associated with oblique lacerations and tendon “flap” formation [12]. Hence, tendon flaps should also be trimmed [12].

The outcome of management is generally good with resolution of triggering [1–4,8–11] and improvement of symptoms related to median nerve compression [5,6]. Children with juvenile arthritis remain at risk of recurrence and hence control of synovitis by appropriate medications is mandatory.

#### 4. Conclusions

Trigger wrist in children is a rare entity and it may be associated with median nerve compression. In most cases triggering is caused by space occupying lesions within the carpal tunnel. Other causes include unrepaired partial tendon lacerations at the wrist level, snapping of the flexor tendon over the hook of Hamate or flexor tendon adhesions within the carpal tunnel. Ultrasound examination is a good and safe alternative to MRI in young children and requires no sedation. Nerve conduction studies are only indicated in neuro-

logically symptomatic patients. Management should be tailored to the cause of triggering and the outcome is usually excellent.

#### Conflict of interest

None.

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#### Ethical approval

The study was approved by the Research Committee of National Hospital (Care), Riyadh, Saudi Arabia.

#### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by Editor-in-Chief of this Journal on request.

#### Author's contribution

All authors contributed significantly and in agreement with the content of the manuscript. All authors participated in data collection and in writing of the manuscript. M. M. Al-Qattan did the surgery.

#### Guarantor

M M Al-Qattan.

#### References

- [1] T. Ogino, H. Kato, I. Ohshio, Trigger wrist induced by finger movement: Pathogenesis and differential diagnosis, *Hand Chir Mikrochir Plast Chir* 26 (1994) 3–6.
- [2] N. Suematsu, T. Hirayama, Y. Takemitsu, Trigger wrist caused by a giant cell tumour of tendon sheath, *J. Hand Surg. Br.* 10 (1985) 121–123.
- [3] Y. Morisawa, S. Takayoema, A. Seki, T. Nakamura, H. Ikegami, A child with trigger wrist caused by finger flexion and extension: a case report, *Hand* 3 (2008) 263–265.
- [4] R.S. Carneiro, L. Velasquez, A. Tietzman, Trigger wrist caused by a tumor of the tendon sheath in a teenager, *Am. J. Orthop.* 30 (2001) 233–234.
- [5] H. Sonada, M. Takasita, H. Taira, T. Higashi, H. Tsumura, Carpal tunnel syndrome and trigger wrist caused by a lipoma arising from flexor tenosynovium: a case report, *J. Hand Surg. Am.* 27 (2002) 1056–1058.
- [6] B. Rand, T.J. Mc-Bride, R.G. Dias, Combined triggering at the wrist and severe carpal tunnel syndrome caused by gouty infiltration of a flexor tendon, *J. Hand Surg. Eur.* 35 (2010) 240–242.
- [7] A. Soren, Pathogenesis and treatment of ganglion, *Clin. Orthop. Relat. Res.* 48 (1966) 173–179.
- [8] A. Minami, T. Ogino, Trigger wrist caused by a partial laceration of the flexor superficialis tendon of the ring finger, *J. Hand Surg. Br.* 11 (1986) 457–459.
- [9] S. Luenom, A. Kosiyatrakul, A. Neti, Acute true trigger wrist following partial extensor carpi radialis brevis tendon rupture, *Musculo Skelet. Surg.* 95 (2011) 241–244.
- [10] T. Itsubo, S. Uchiyama, K. Takahara, H. Nakagawa, M. Kamimura, T. Miyasaka, Snapping wrist after surgery for carpal tunnel syndrome and trigger digit: a case report, *J. Hand Surg. Am.* 29 (2004) 384–386.
- [11] N. Iwasaki, J. Ishikawa, A. Minami, Trigger wrist caused by tendon adhesion between the flexor pollicis longus and flexor digitorum superficialis tendons, *J. Hand Surg. Eur.* 32 (2007) 472–473.
- [12] M.M. Al-Qattan, J.C. Ponsnick, K.Y. Lin, Triggering after partial tendon laceration, *J. Hand Surg. Br.* 18 (1993) 241–246.

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