

Atypical Extensor Tenosynovitis: Case Report and Literature Review

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Learning Point of the Article:

Consider atypical infections as cause for wrist extensor tenosynovitis.

Abstract

Introduction: This is the first reported case of *Mycobacterium parascrofulaceum* extensor tenosynovitis.

Case Report: A 79-year-old male presented with a left dorsal wrist mass that had been present for 8 months. Operative debridement and tenosynovectomy resulted in cultures positive for *M. parascrofulaceum*. His infection was successfully treated with a four drug anti-mycobacterial regimen.

Conclusion: Clinicians must maintain a high index of suspicion for atypical infection when treating extensor tenosynovitis that does not respond to standard treatment.

Keywords: Atypical mycobacteria, wrist extensor tenosynovitis, *Mycobacterium parascrofulaceum*.

Introduction

Determining the cause of extensor tenosynovitis is not always straightforward. It is critical to correctly identify the cause because persistent tenosynovitis can lead to tendon rupture. [1] While extensor tenosynovitis is most commonly seen in patients with inflammatory arthritis, other causes have been reported [2]. Crystal arthropathies, sarcoidosis, amyloidosis, atypical infections, and other causes are documented [3, 4, 5]. Here, we discuss the first reported case of *Mycobacterium parascrofulaceum* extensor tenosynovitis and consider other rare infectious causes of extensor tenosynovitis.

We identified all published case reports or case series of atypical infectious extensor tenosynovitis using a search in PubMed, PubMedCentral, and Web of Science using keywords and

controlled vocabulary for extensor tenosynovitis and viral, parasitic, fungal, or bacterial infections. Studies were eligible if they included cases of infectious extensor tenosynovitis of the upper extremity. Studies were excluded if they were not in English, if they described non-human hosts, involved the lower extremities, or described isolated flexor tenosynovitis.

Case Report

A 79-year-old male presented to our hand clinic in February 2024 for evaluation of a left dorsal hand mass (Fig. 1). Plain radiographs taken at presentation (Fig. 2 and 3) showed a small subchondral cyst and mild erosions at the distal radio-ulnar joint, along with the dorsal soft tissue swelling consistent with the clinical exam. The lesion developed 8 months prior and had

Access this article online

Website:
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DOI:
<https://doi.org/10.13107/jocr.2025.v15.i11.6338>

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Submitted: 26/08/2025; Review: 19/09/2025; Accepted: October 2025; Published: November 2025

DOI: <https://doi.org/10.13107/jocr.2025.v15.i11.6338>

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Figure 1: (a) Preoperative appearance of the left wrist at presentation shows a large dorsal soft tissue swelling. (b) Postoperative appearance of the left wrist.

Fungal and routine bacterial cultures were negative for growth after 5 days of incubation.

In early April of 2024, he was noted to have recurrent tenosynovitis. An inflammatory workup was negative for antinuclear antibodies, rheumatoid factor, and cyclic citrullinated protein antibodies. By May of 2024, the patient had ongoing tenosynovitis, confirmed with a point-of-care ultrasound. He was taken to the operating room for a tenosynovectomy and tissue culture. Six weeks postoperatively, an acid-fast bacillus culture, taken intraoperatively, grew *M. parascrofulaceum*. A musculoskeletal infectious disease specialist started the patient on antimycobacterial therapy: azithromycin

grown slowly. He was a retired oral and maxillofacial surgeon with an extensive international travel history of performing surgeries on medical missions. He had been diagnosed with bladder cancer and started chemotherapy just before the development of the mass. He did recall that a few months prior, he was walking on a wooded trail and a dog “nipped” his left wrist, resulting in a very small skin tear. He did not require any medical attention at that time.

On physical examination, there was a painless cystic dorsal wrist mass, approximately 3 cm wide and 5 cm long. He was able to fully extend all his fingers. A point-of-care ultrasound was consistent with tenosynovitis involving the fourth dorsal wrist compartment.

In March of 2024, he underwent excision of this lesion. A dorsal approach was made in line with the 3rd metacarpal, and a lobular synovial mass was encountered immediately under the skin. There were adhesions and synovitis of the 4th dorsal extensor compartment with fraying of up to 40% of the finger extensors. Multiple rice bodies and copious straw-colored fluid were also present. This fluid was sent for routine bacterial, acid-fast bacillus, and fungal cultures. The synovitis was excised and sent for surgical pathology. Routine bacterial Gram stain and acid-fast bacillus stains were negative.

500 mg daily, rifampin 600 mg daily, and ethambutol 1200 mg daily with a plan to continue for 6 months. He is currently tolerating this antibiotic therapy well. His dorsal wrist swelling has improved, and he retains full extension of his fingers.

Discussion

Infectious extensor tenosynovitis is uncommon and less urgent than infectious flexor tenosynovitis [6]. Infection results from direct inoculation, local spread, or hematogenous seeding [6]. Skin flora, *Staphylococcus* and *Streptococcus* species, are responsible for the majority of hand infections. While



Figure 2 & 3: Plain radiographs taken preoperatively show a small subchondral cyst and mild erosions at the distal radio-ulnar joint.

Table 1: Mycobacterial extensor tenosynovitis case reports

Organism	Year	PMID	Exposure	IC	Antibiotic treatment
Mycobacterium tuberculosis	2024	3.8E+07	None	Yes	Isoniazid, rifampicin, pyrazinamide, ethambutol (2 months)
	2023	3.7E+07	None	No	Isoniazid, rifampin, pyrazinamide, ethambutol (2 months), followed by Isoniazid, rifampin (6 months)
	2023	3.8E+07	None	No	Not reported
	2020	3.3E+07	None	No	Isoniazid, rifampicin, pyrazinamide, ethambutol
	2017	3E+07	None	No	Isoniazid, rifampicin, pyrazinamide, ethambutol
	2016	2.8E+07	None	No	Isoniazid, rifampicin, pyrazinamide, ethambutol
	2012	2.3E+07	None	No	Rifampicin, isoniazid, streptomycin, ethambutol (4 months); followed by isoniazid, rifampicin (3 months)
	2012	2.3E+07	None	No	Not reported
	2011	2.3E+07	None	No	Rifampicine, ethambutol, isoniazid, and pyrazinamide (2 months); bithrapy (10 months)
	2010	2.1E+07	None	No	Isoniazid, rifampin, pyrazinamide, ethambutol (2 months); followed by isoniazid, rifampin (9 months)
	2009	2E+07	None	No	Isoniazid, rifampicin, pyrazinamide, ethambutol (2 months)
	2008	1.9E+07	None	Yes	Isoniazid, ethambutol, rifampicin (10 months)
Mycobacterium marinum	1998	9641519	None	No	Isoniazid, rifampicin, pyrazinamide (2 months); followed by isoniazid, rifampicin (7 months)
	2023	3.7E+07	Steroid injections into the hand	No	Rifampicin, azithromycin (6 months)
	2022	3.6E+07	None	No	Azithromycin, rifabutin, ethambutol
	2021	3.4E+07	None	No	Rifampicin, ethambutol, clarithromycin (6 months)
	2021	33907090 (1)	None	No	Rifampicin, ethambutol, clarithromycin
	2021	33907090 (2)	None	Yes	Rifampicin, ethambutol, clarithromycin
	2017	3.2E+07	Wooden foreign body while fishing	No	Not reported
	2013	2.4E+07	Owned several aquariums, penetrating injury to hand	No	Isoxazole penicillin, clarithromycin
	2011	2.2E+07	Fisherman, penetrating injury from a fish bone	No	Clarithromycin, ethambutol, rifampicin daily (16 months)
	2004	1.5E+07	None identified	No	Not reported
	2001	1.7E+07	Laceration while fishing	Yes	Clarithromycin (3 months)
Mycobacterium avium	1986	3760509	None	No	Isoniazid, rifampin, ethambutol
	2022	3.7E+07	Collecting and cleaning seashells	Yes	Clarithromycin, ethambutol, rifampin
Mycobacterium marseillense	2021	3.3E+07	None identified	Yes	Azithromycin, rifabutin, ethambutol (6 months)
Mycobacterium, unknown species	2021	3.5E+07	IV placement	No	Clarithromycin, ethambutol, rifampin
Mycobacterium kansasii	2020	3.4E+07	Building swimming pools	Yes	Rifampin, isoniazid (6 months)
	2020	3.2E+07	None	Yes	Ethambutol, rifampin, and azithromycin (3 months)
Mycobacterium intracellulare	2018	3E+07	None identified	Yes	Rifabutin, ethambutol, clarithromycin (1.5 years)
Mycobacterium bovis	2015	2.6E+07	Butcher	No	Isoniazid, rifampicin, pyrazinamide, ethambutol
Mycobacterium chelonae	2004	1.6E+07	Air conditioner installer	No	Rifampin, isoniazid, pyrazinamide, clarithromycin (9 months)
Mycobacterium immunogenum	2004	3.9E+07	None identified	Yes	Amikacin, clarithromycin

IC: Immunocompromise

uncommon, mycobacteria are a reported cause of extensor tenosynovitis [7]. Mycobacterial extensor tenosynovitis is indolent and typically presents with painless dorsal wrist swelling [6]. The fourth dorsal wrist compartment is the most commonly affected area [8]. Inflammatory markers are not usually elevated in these infections, as was the case with our patient. Rice bodies may be seen on imaging and at the time of surgical debridement [9]. Treatment involves extensive tenosynovectomy with multi-drug antimycobacterial treatment for many months, often up to 1 year [6]. Distinguishing mycobacteria species is important because antibiotic susceptibility varies by species [10]. Most cases of

mycobacterial extensor tenosynovitis in the literature are secondary to *Mycobacterium tuberculosis* or *Mycobacterium marinum* (Table 1).

The causative agent in this case, *M. parascrofulaceum*, is a slow-growing non-tuberculous bacterium [10]. Infections caused by this organism are very rare, with only 10 case reports in the literature since its discovery in 2004 [11]. The majority of these are pulmonary, but cutaneous and genital infections have also been documented [11, 12]. Health care workers exposed to the respiratory tract, like our patient, may have a higher risk of infection [13].

Table 2: Non -mycobacterial infectious extensor tenosynovitis case reports

Organism	Year	PMID	Exposure	IC	Presenting symptoms in addition to ET	Antibiotic treatment
Bacterial						
Neisseria gonorrhoeae	2020	33088711	None	No	Septic arthritis of the wrist	Azithromycin, ceftriaxone
	2019	31942394	Unprotected intercourse	No	Dermatitis, polyarthralgia	Third-generation cephalosporin
	2018	29685466	Multiple sexual partners	No	None	Azithromycin, ceftriaxone
	2003	12562127	None	No	Septic arthritis of the shoulder	Not reported
Staphylococcus aureus	2010	20924461	Steroid injection	No	None	Not reported
	1989	2794404	Blunt trauma to the wrist	Yes	Cellulitis	Cefazolin (25 days) followed by dicloxacillin (14 days)
Coxiella burnetii	2023	36756305	Well water contaminated by goats	Yes	Draining wound	Doxycycline (18 months)
Campylobacter rectus	2021	35096678	Dog bite	Yes	Sepsis	Unasyn, vancomycin followed by augmentin, doxycycline
Corynebacterium striatum	2020	32011462	None	Yes	Cellulitis	Imipenem, cilastatin, daptomycin, and amikacin (2 weeks) followed by rifampicin (3 months)
Brucella, unknown species	2015	26397296	Unpasteurized dairy	No	None	Doxycycline, rifampicin (6 weeks)
Streptococcus milleri	2015	30766044	None	Yes	Septic arthritis	Penicillin G
Enterococcus faecalis	2015	26217578	Acupuncture	No	None	Not reported
Erysipelothrix rhusiopathiae	2015	26693283	Fish bone penetrating injury	No	Flexor Tenosynovitis	Not reported
Streptococcus pyogenes	2006	16525241	None	No	None	Not reported
Rhodococcus aurantiacus	1998	3343320	First extensor compartment release	No	Abscess	Ofloxacin, minocycline, sulfadimethoxine, rifampin
Fungal						
Thyridium endophyticum	2024	38639012	Prior hand surgery	Yes	Cutaneous ulcer	Liposomal amphotericin B (4 days), voriconazole (6 months)
Coccidioides immitis	2023	37323966	None	No	None	Amphotericin B, voriconazole, caspofungin,
	1985	3978912	None	No	Fever, myalgia, and weight loss of 30 pounds	Amphotericin B (3 months)
	1977	608285	None	No	None	Amphotericin B followed by miconazole
Alternaria alternata	2022	35351014	Thorn puncture	No	Septic arthritis at the 3 rd MCP joint	Itraconazole (9 months)
Candida albicans	2022	35618497	None	Yes	None	Not reported
	1985	4045157	None	Yes	Peri-oral candidiasis	Amphotericin B with 5 - fluorouracil (6 weeks) followed by ketoconazole
Histoplasma capsulatum	2021	34611507	Travel to endemic regions of the United States	Yes	Fevers, night sweats, cough, loose stools	Itraconazole (6 months)
Blastomyces dermatitidis	2012	23997742	None	No	None	Itraconazole
Phaeoacremonium parasiticum	2017	28027843	None	No	None	None
Scedosporium apiospermum	2017	28088169	None	No	Rash	Fluconazole (4 weeks)
Sporothrix schenckii	2017	28502945	None	Yes	Carpal tunnel syndrome	Itraconazole (6 months)
	1986	3711621	None	No	None	Ketoconazole (5 months)
	1981	7246574	None	No	Carpal tunnel syndrome	Amphotericin B
Phialophora verrucosa	2015	26034457	Wooden foreign body while gardening	Yes	None	Itraconazole followed by voriconazole (2 months)
Cryptococcus neoformans	2011	23204976	None	No	None	Fluconazole (3 months)
Parasitic						
Blastocystis, unknown species	2020	33062598	None	No	Urticaria, polyarthritis, diarrhea	Metronidazole (10 days)
Leishmania, unknown species	2010	20672404	Travel to Southeastern Turkey	No	Cutaneous ulcer	Not reported
Tropheryma whipplei	2020	32007648 (1)	None	Yes	Bursitis	Doxycycline
Tropheryma whipplei	2020	32007648 (2)	None	Yes	Polyarthritis, flexor tenosynovitis	Doxycycline
Viral						
Human T Cell Lymphotropic virus I	1997	9082948	Intrauterine transmission	No	Skin nodules, flexor tenosynovitis	Not reported
mRNA-1273 SARS-CoV-2 vaccine	2023	38106933	Vaccination	No	Skin nodules	None

IC: Immunocompromise, ET: Extensor tenosynovitis

There are 15 case reports of non-mycobacterial extensor tenosynovitis in both immunocompromised and

immunocompetent hosts [14, 15]. This includes Gram-negative and Gram-positive organisms (Table 2, Table 3). A



Table 3: Polymicrobial extensor tenosynovitis or no definitive infectious agent

Organism(s)	Year	PMID	Exposure	IC	Antibiotic treatment
No definitive infectious agent	2023	37285503	None	No	Trimethoprim/sulfamethoxazole (3 weeks)
<i>Stenotrophomonas maltophilia</i> , <i>Staphylococcus aureus</i> , <i>Candida albicans</i> , <i>Mycobacterium chelonae</i>	2021	33543870	Dog bite	No	Ampicillin-sulbactam, micafungin, clarithromycin
No definitive infectious agent	2021	33657059 (1)	Cat bite	No	Ceftriaxone, vancomycin, metronidazole
No definitive infectious agent	2021	33657059 (2)	Being unhoused, IV drug use	No	Vancomycin followed by doxycycline, amoxicillin
IC: Immunocompromise					

majority, four cases, are due to *Neisseria gonorrhoeae*. This organism is able to spread to the extensor compartment hematogenously, which may explain why tenosynovitis is seen in up to two-thirds of patients with disseminated gonococcal infections. Tenosynovitis may be the only evidence of disseminated disease in some patients [6]. There are 16 reported cases of fungal extensor tenosynovitis (Table 2). Parasitic and viral infections are much less commonly reported.

Conclusion

It is critical to maintain a high index of suspicion for atypical

infection when treating extensor tenosynovitis that does not respond to standard treatment. If a patient is immunosuppressed or has a high-risk exposure, atypical organisms should be considered.

Clinical Message

This is the first reported case of a musculoskeletal infection secondary to *M. parascrofulaceum*.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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Conflict of Interest: Nil

Source of Support: Nil

Consent: The authors confirm that informed consent was obtained from the patient for publication of this case report

How to Cite this Article

Newsom M, Lewcun J, Frankenhoff J, Reznicek J, Cyrus J, Cotterell I. Atypical Extensor Tenosynovitis: Case Report and Literature Review. *Journal of Orthopaedic Case Reports* 2025 November;15(11): 150-155.