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*Case Report*

# Hand Leiomyoma with Postoperative Heterotopic Ossification: A Case Report and Review of the Therapeutic Approach

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**Abstract:** We present a 42-year-old left-handed female healthcare worker with Factor V Leiden coagulopathy who sustained direct trauma to her left hand and subsequently developed a soft tissue mass of the fourth finger. Surgical excision yielded a histopathological diagnosis of leiomyoma (smooth muscle actin-positive, S100-negative). Postoperatively, she developed heterotopic ossification (HO) with fixed 90-degree flexion contracture of the proximal interphalangeal (PIP) joint, requiring a second surgical intervention. Despite successful HO excision with initial restoration of full extension, progressive PIP contracture recurred secondary to pulley discontinuity and capsuloligamentous fibrosis. Chronic neuropathic pain necessitated multidisciplinary pain clinic involvement with partial response to pregabalin, tapentadol, and topical capsaicin. At two years after the second surgery, a persistent 30-degree PIP flexion contracture and refractory pain remain. This case illustrates the diagnostic complexity of hand soft tissue tumors, the risk of severe postoperative complications, and the importance of long-term multidisciplinary follow-up.

**Keywords:** Leiomyoma; Hand Surgery; Heterotopic Ossification; Flexion Contracture; Neuropathic Pain.

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## 1. Introduction

Leiomyoma is a rare benign smooth muscle neoplasm of the hand, most commonly of vascular origin (angiomyoma), typically presenting as a painful subcutaneous nodule [1]. Its rarity and radiological overlap with glomus tumors and giant cell tumors of the tendon sheath frequently result in diagnostic delay. Definitive diagnosis relies on histopathological examination with immunohistochemistry, where positive smooth muscle actin and negative S100 protein confirm smooth muscle differentiation [2]. Heterotopic ossification (HO), the pathological formation of mature lamellar bone in extraskeletal soft tissues, is most frequently described following hip arthroplasty, burns, and neurological injury [3]. Its occurrence after hand surgery is less well documented but potentially devastating, as even small ectopic bone deposits in the confined anatomical spaces of the fingers can cause severe functional impairment through mechanical joint restriction and neurovascular compression [2].

We report a case of leiomyoma of the fourth finger complicated by postoperative HO, progressive flexion contracture, pulley disruption, and chronic neuropathic pain, requiring two surgical interventions and a multidisciplinary management approach.

## 2. Case Report

A 42-year-old left-handed female healthcare worker sustained direct trauma to her left hand in March 2019, resulting in a palmar laceration treated with primary closure. She subsequently developed global hand hypoesthesia and chronic pain, most pronounced in the second, third, and fourth fingers. These sensory symptoms preceded the 2021 tumor excision by approximately 18 months and were therefore not attributable to the surgical procedure itself. Eighteen months later, orthopedic evaluation revealed a deformity of the PIP joint of the fourth finger with 30-degree extension and 15-degree flexion deficits, and a palpable soft tissue mass spanning from the proximal to the middle phalanx. Electromyography showed no median nerve abnormalities. MRI demonstrated a soft tissue tumor of the fourth finger; the radiological differential included glomus tumor and giant cell tumor of the tendon sheath.

In April 2021, surgical excision via a palmar Z-plasty incision was performed. Intraoperatively, the radial digital vascular bundle was patent; the ulnar bundle could not be identified. Histopathology of the excised fragments (largest 8 mm) confirmed a diagnosis of leiomyoma, with immunohistochemistry positive for smooth muscle actin and negative for S100 [2] (Figure 1). At three weeks postoperatively, the patient reported mild tolerable pain with a residual 10-degree PIP extension deficit (Figueres 2A and 2B). A home-based rehabilitation programme and a three-point extension splint were prescribed at this stage. As access to formal, specialized hand therapy was anticipated to be delayed, the patient was instructed in supervised home exercises in the interim; directed hand therapy was only initiated at 18 weeks (Table 1).

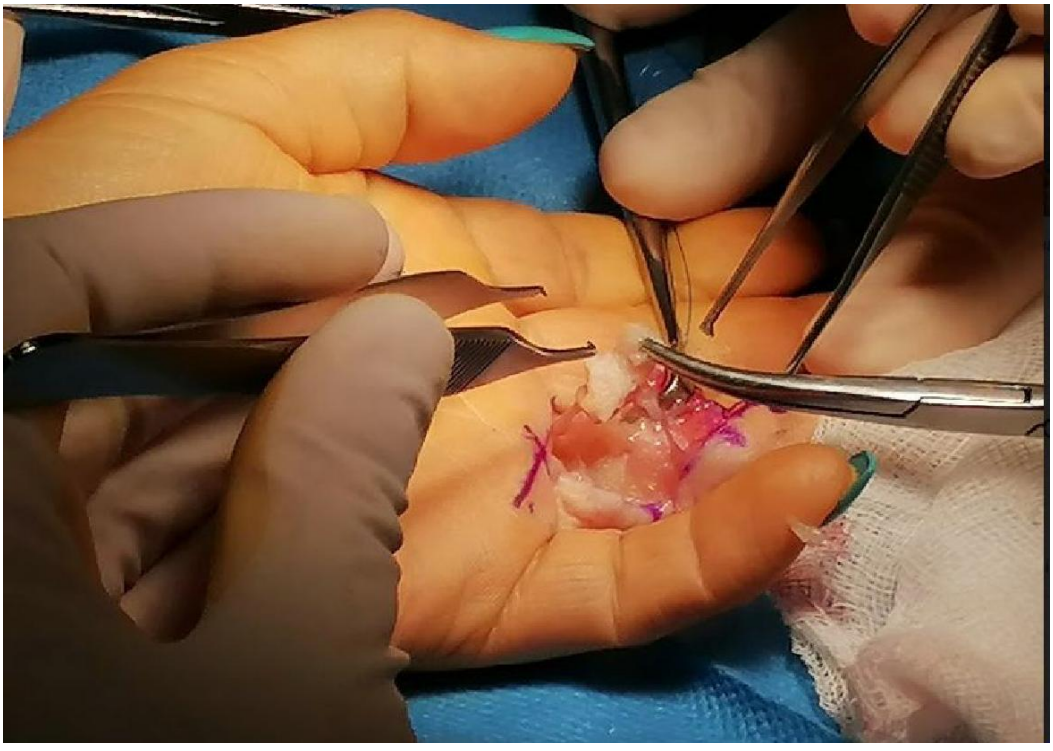

**Figure 1.** Tumor excision.

At seven weeks, the extension deficit had paradoxically worsened to 45 degrees despite relative improvement in flexion (Figures 3A and 3B). Given the concurrent gain in flexion, the surgical team elected to continue the home-exercise and splinting program and judged that neither a change in management nor additional imaging was warranted at that time. At 18 weeks, coinciding with the initiation of formal, specialized hand ther-

apy, she presented with fixed 90-degree PIP joint flexion, paresthesia, and local pain (Figure 4). Radiographs revealed heterotopic ossification on the volar aspect of the PIP joint (Figures 5A and 5B).

**Table 1.** Chronology of clinical findings, rehabilitation, and interventions.

| Time point | PIP joint status | Rehabilitation / splinting | Imaging & intervention |
|---|---|---|---|
| 3 weeks (1st surgery) | 10° extension deficit; mild pain | Home exercise programme; three-point extension splint | Clinical follow-up; formal hand therapy access pending |
| 7 weeks | Extension deficit 45°; flexion improved | Continued home exercises and splinting | No change in management or imaging deemed necessary |
| 18 weeks | Fixed 90° PIP flexion; paresthesia; local pain | Formal, specialized hand therapy commenced | Radiographs → HO; CT and MRI obtained |
| 2nd surgery (Jun 2022) | Full extension restored intra-operatively | — | HO excision; flexor tendons preserved |
| 1 month (2nd surgery) | Full ROM; 90° active PIP flexion | Hand therapy continued | Histology: no neoplasia (reactive HO) |
| 6 months | 90° flexion; 20° extension deficit; volar pain | Maintenance therapy | MRI: pulley discontinuity, capsuloligamentous fibrosis |
| 1 year | Extension deficit 35° | Therapy interrupted for 3 months | Radiographs: no new HO |
| 2 years | Fixed 30° flexion contracture; tender hypertrophic scar | Pain clinic; multimodal analgesia | Reassessment ongoing |

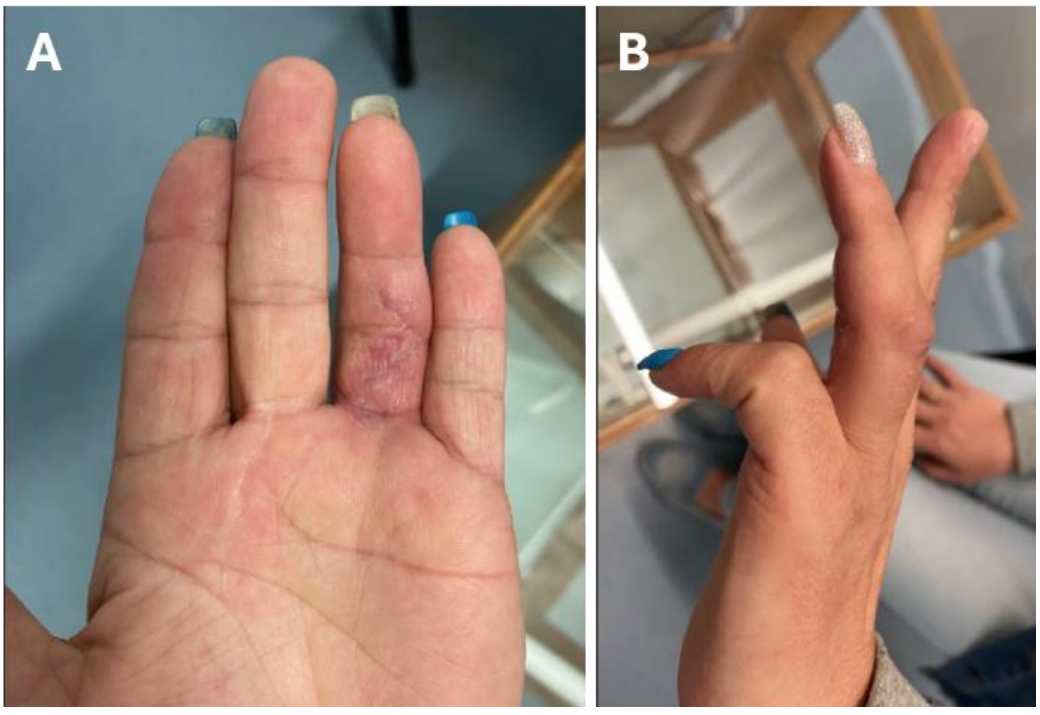


**Figure 2.** Residual extension (A) and flexion deficit (B) at 3 weeks following surgery.

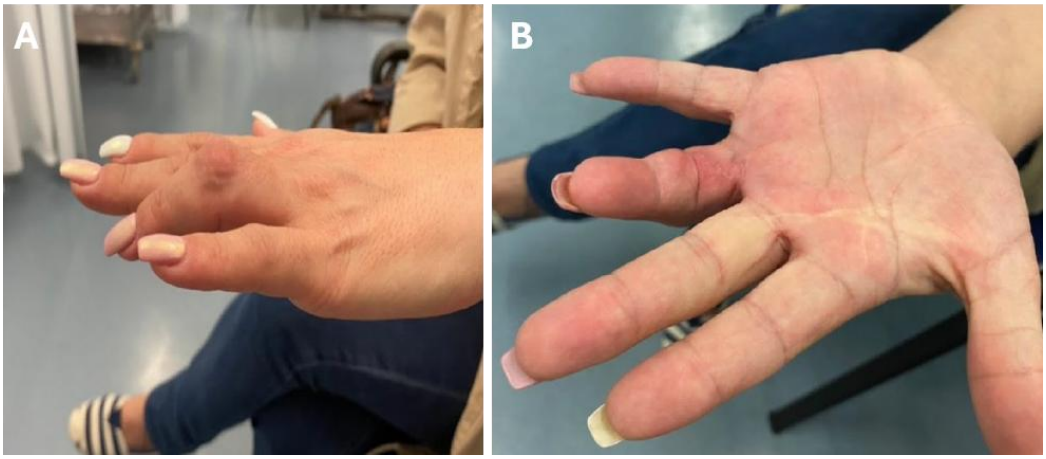


**Figure 3.** A and B. Worsening of extension deficit at 7 weeks following surgery.

**Figure 4.** Fixed flexion of 90º at 18 weeks following surgery.

**Figure 5.** A and B. Radiographs at 18 weeks revealing heterotopic ossification.

CT confirmed coarse soft tissue calcifications in the volar fourth finger with no tendon involvement. MRI showed an infiltrating contrast-enhancing nodular lesion (20 mm

longitudinal; 9 × 13 mm transverse) encasing the flexor tendon sheath, with periosteal involvement consistent with reactive HO [3]. In June 2022, a second surgery was performed: excision of the HO with preservation of the underlying flexor tendons. Intraoperatively, full PIP extension was confirmed following HO removal (Figures 6A to 6C). One week postoperatively, the patient was pain-free with near-full extension (10-degree deficit at rest) (Figures 7A and 7B).

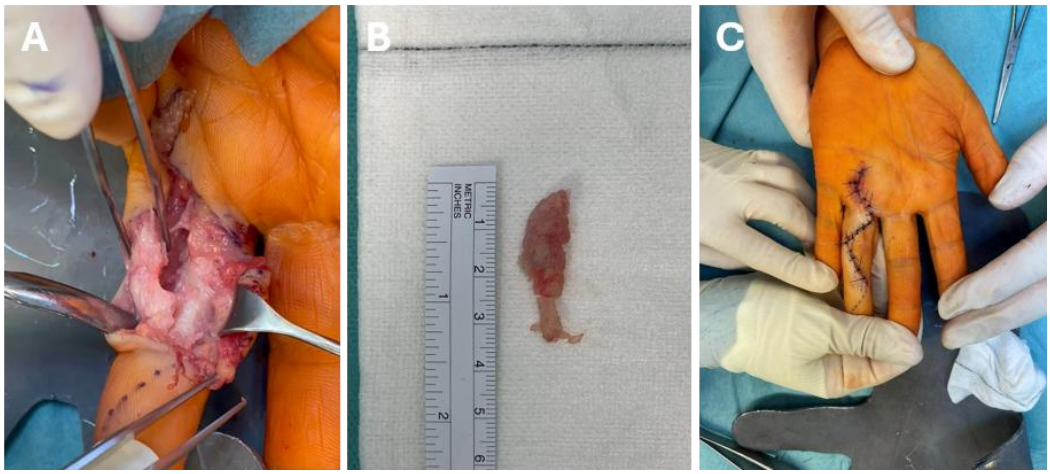


**Figure 6.** A to C. Intraoperative image showing full extension following removal of heterotopic ossification.

**Figure 7.** A and B. Images at one week following second surgery, showing almost complete extension at rest.

At one month, full range of motion was achieved, with 90 degrees of active PIP flexion. Pathological examination of the excised specimen showed no neoplastic tissue, confirming the reactive nature of the HO [3]. Subsequent MRI revealed pulley discontinuity (a finding not appreciated at the time of the second surgery) with separation of the flexor tendons from the PIP joint, two small cystic formations at the middle phalanx epiphysis (interpreted as reactive postsurgical changes), and capsuloligamentous fibrosis. Tendon intrinsic signal and thickness were normal. At six months, the patient had 90 degrees of active PIP flexion with a persistent 20-degree extension deficit and volar pain (Figures 8A and 8B and Figure 9). At one year, following a three-month physiotherapy interruption, the extension deficit had worsened to 35 degrees, though no new HO was detected on radiographs.

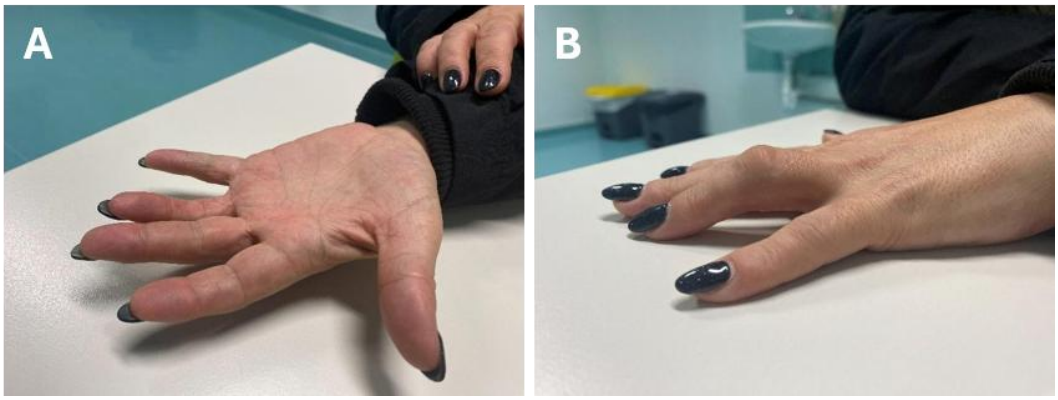


**Figure 8.** A and B. Images at 6 months following second surgery.

**Figure 9.** Radiographs at 6 months following second surgery, showing no new heterotopic ossifications

Due to refractory neuropathic pain, the patient was referred to the Pain Clinic. Multimodal pharmacological treatment was initiated with pregabalin (titrated to 100 mg) and tapentadol 50 mg twice daily, with partial symptomatic relief. High-concentration topical capsaicin (8%; Qutenza®) was subsequently applied, though pain control remained suboptimal. At two years after the second surgery, the patient presents with a fixed 30-degree PIP flexion contracture, a hypertrophic volar scar with tenderness, and a fingertip-to-palm distance of 1 cm. Reevaluation with radiographs and MRI is ongoing.

## 3. Discussion and Conclusion

This case illustrates the diagnostic and therapeutic complexity of soft tissue tumors of the hand and their postoperative sequelae. Leiomyomas of the hand are rare, and their preoperative diagnosis is hampered by their clinical and imaging overlap with other common hand tumors [1]. In the largest published series of angioleiomyomas, upper extremity lesions were particularly associated with pain, a feature explained by compression of adjacent nerve fibers or by the presence of intrinsic neural elements within the tumor capsule [1].

As demonstrated in our case, MRI fails to reliably discriminate leiomyoma from glomus tumor or giant cell tumor of the tendon sheath, making histopathological examination with immunohistochemistry indispensable for definitive diagnosis [2]. This diagnostic overlap stems from shared MRI features: glomus tumors typically demonstrate low-to-intermediate T1 signal, marked T2/STIR hyperintensity, and avid homogeneous post-contrast enhancement reflecting their hypervascularity, whereas giant cell tumors of the tendon sheath characteristically show low T1 and low-to-intermediate T2 signal with hemosiderin-related blooming on gradient-echo sequences and intense enhancement, typically in intimate relation to the flexor tendon sheath. A contrast-enhancing, tendon-sheath–related nodule, as in our patient, may therefore be readily mistaken for either entity, which accounts for the preoperative differential.

The most significant complication was postoperative HO. Although HO pathophysiology is incompletely understood, current evidence supports aberrant differentiation of pluripotent mesenchymal cells into osteogenic precursors, driven by BMP signaling dysregulation within a pro-inflammatory microenvironment [5]. In our patient, recognized local risk factors converged, in particular periosteal disruption during tumor dissection and significant soft tissue trauma [3,4].

Of note, the progressive loss of extension developed during the period of home-based rehabilitation that preceded specialized hand therapy, and the fixed 90-degree contracture was fully recognized only at the 18-week specialist assessment, when directed therapy began (Table 1). The temporal sequence therefore does not implicate formal hand therapy in the deterioration. Whether the intensity or type of early mobilization contributed to ossification cannot be determined from a single case, but the question of rehabilitation timing in patients at risk for HO remains pertinent. Evidence from elbow HO literature suggests that excessively aggressive early mobilization may exacerbate ossification, while prolonged immobilization promotes stiffness, underscoring the need for individually calibrated rehabilitation protocols [6].

In retrospect, HO prophylaxis might have been considered in this patient given the identified risk factors. Indomethacin has demonstrated efficacy in reducing HO following hip arthroplasty; however, evidence for its use in hand surgery remains limited [7]. Low-dose prophylactic radiotherapy, while established in other high-risk settings, raises concerns about adverse effects on soft tissue healing in the hand [4]. Individual risk stratification remains essential, as no single preventive strategy is universally effective [7].

The second surgery successfully restored full PIP extension, but progressive contracture recurred in the absence of radiographic HO recurrence. Postoperative MRI identified pulley discontinuity and capsuloligamentous fibrosis as the likely structural substrate. Disruption of the annular flexor pulley system alters tendon moment arms and can produce progressive joint contracture through bowstringing and mechanical imbalance [8]. In our case, the cumulative surgical insult to the volar plate, flexor sheath, and pulley system, superimposed on HO and the ensuing fibrosis, may have rendered some degree of recurrent contracture biologically difficult to avoid, largely independent of the quality or timing of rehabilitation. Pulley reconstruction in the context of extensive fibrosis represents a formidable technical challenge with unpredictable outcomes, paralleling the complexity described for HO management in other small upper extremity joints [9]. Fu-

ture management options include capsulotomy, staged tenolysis with pulley reconstruction, or PIP joint arthrodesis in a functional position, each requiring careful individualized risk-benefit analysis.

The chronic neuropathic pain component further complicated the clinical course. Neuropathic pain following hand surgery may arise from digital nerve injury, compressive neuritis secondary to fibrosis or ectopic bone, or central sensitization [10]. A peripheral neuropathic mechanism, digital nerve injury or compressive neuritis from fibrosis and ectopic bone, was the most probable substrate, supported in part by the partial response to neuropathic agents. The clinical picture, however, was not confined to the operated digit: the global hand hypoesthesia and pain spanning the second to fourth fingers, the disproportionate and refractory nature of the symptoms, and the trophic changes with a tender hypertrophic scar raise the possibility of complex regional pain syndrome (CRPS) type II, triggered by the initial trauma and compounded by repeated surgical intervention. This diagnosis warrants active consideration, as its confirmation against validated criteria would substantially modify the therapeutic strategy. Multimodal pharmacological management, combining pregabalin, tapentadol, and topical capsaicin, is consistent with current evidence-based recommendations for peripheral neuropathic pain [11].

Several clinically relevant lessons emerge from this case. First, histopathological examination with immunohistochemistry is indispensable for the definitive diagnosis of hand soft tissue tumors, as imaging alone is insufficient. Second, HO is a rare but potentially devastating complication of hand surgery; identification of predisposing risk factors should prompt consideration of prophylactic measures. Third, postoperative rehabilitation must be individually calibrated, balancing mobilization against tissue protection, a challenge that proved particularly difficult in our patient, who lacked timely access to specialized hand therapy; that said, the repeated surgical violations of the volar plate, flexor sheath, and pulley environment, compounded by HO and fibrosis, may have rendered progressive contracture largely unavoidable irrespective of rehabilitation quality. Fourth, structural complications including pulley disruption and joint fibrosis can perpetuate contracture independently of HO recurrence and should be identified early with MRI. Finally, refractory cases require long-term multidisciplinary follow-up, and in patients who reach a functional plateau, realistic goal-setting, focused on pain optimization and functional adaptation, may represent a more achievable outcome than complete anatomical recovery.

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**Research Ethics Committee Approval:** The patient included in this study voluntarily agreed on participation in this report. The informed consent explained the state of his anonymity and the confidentiality of his personal information.

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**Conflicts of Interest:** All other authors declare no conflicts of interest.

## References

1. Hachisuga T, Hashimoto H, Enjoji M. Angioleiomyoma: a clinicopathologic reappraisal of 562 cases. Cancer. 1984;54(1):126-30.
2. Thomas KD, Ro JY, Ayala AG. Leiomyoma of digit of hand: report of three cases with literature review. J Hand Surg Am. 2021;46(2):169.e1-169.e7.
3. Lawand J, Loeffelholz Z, Khurshid B, Barcak E. Heterotopic ossification after trauma. Orthop Clin North Am. 2023;54(1):37-46.
4. Pontell ME, Sparber LS, Chamberlain RS. Corrective and reconstructive surgery in patients with postburn heterotopic ossification and bony ankylosis: an evidence-based approach. J Burn Care Res. 2015;36(1):57-69.
5. Sullivan MP, Torres SJ, Mehta S, Ahn J. Heterotopic ossification after central nervous system trauma: a current review. Bone Joint Res. 2013;2(3):51-7.
6. Siegel P, Smith S, Stark E, Burns C, Dionne TP. A scoping review on active vs. passive range of motion approaches to treat heterotopic ossification at the elbow. Front Rehabil Sci. 2024;5:1327417.
7. Kayani B, Wignadasan W, Fontalis A, Haddad FS. Challenges and advances in the management of heterotopic ossification in total hip arthroplasty. Bone Joint Res. 2025;14(4):351-5.

8. Lilly SI, Messer TM. Complications after treatment of flexor tendon injuries. J Am Acad Orthop Surg. 2006;14(7):387-96.
9. Schmidt SV, Hinzmann J, Völlmecke M, Wallner C, Lehnhardt M, Harenberg PS. Heterotopic ossification following total wrist arthroplasty: a case report. J Med Case Rep. 2025;19:***. doi: [inserir DOI quando disponível].
10. Colloca L, Ludman T, Bouhassira D, Baron R, Dickenson AH, Yarnitsky D, et al. Neuropathic pain. Nat Rev Dis Primers. 2017;3:17002.
11. Attal N, Bouhassira D, Colvin L. Advances and challenges in neuropathic pain: a narrative review and future directions. Br J Anaesth. 2023;131(1):79-92.