CASE REPORT

A Case of Acute Proximal Interphalangeal Joint Articular Injury in the 5th Finger Caused by a Smartphone Ring Holder

Shuji Yakubo[1,2], Akitoshi Taniguchi[1], Saho Yamaguchi[1], Miki Shiina[1], Midori Annaka[1], Masaki Baba[2], Koji Sakata[2]

ABSTRACT

Introduction: **As smartphones become ubiquitous, medical issues associated with their continuous and long-term use become more common. Here, however, we report on a case of acute proximal interphalangeal (PIP) joint articular injury in the 5th finger caused by a smartphone ring holder.**

Case report: **A woman in her twenties visited our clinic with an aching pain, rubefaction, swelling, and a bending disorder in the PIP joint of the 5th finger of her left hand. The evening before her visit at approximately 8 o'clock, she had viewed her smartphone for about 30 minutes, grasping it with her ring holder with her 5th finger. Subsequently swelling had developed in the PIP joint. Our diagnosis was that she had suffered a PIP joint injury due to the use of the ring holder. We treated her with cold packs, and the symptoms subsided after 4 days.**

Conclusion: **We warn of the potential of smartphone ring holders to cause acute proximal interphalangeal joint articular injury in the 5th finger.**

KEY WORDS

proximal interphalangeal joint, acute articular injury a smartphone ring holder, the 5th finger a smartphone

INTRODUCTION

The use of various technological instruments, particularly smartphones, is very common in our daily lives. It is said that, through long-term mobile phone use, individuals are exposed to a higher electromagnetic field, and that prolonged use is also associated with many health problems, such as brain tumors[1]. Many studies have reported on smartphone addiction and other health issues connected to overuse[2-4]. There are many reports on biomechanical risks of smartphone use, particularly for the neck, wrists, fingers, and thumbs, and recently many cases of chronic injury to the hands and fingers have been reported[5-11].

In this paper, we report here on a case seemingly unconnected to long-term use: acute proximal interphalangeal (PIP) joint articular injury in the 5th finger caused by short-term use of a smartphone ring holder.

CASE REPORT

Patient: Female, in her twenties, employed in medical administration.

Principal complaint: Aching pain, rubefaction, swelling, and a bending disorder in the PIP joint of the 5th finger of her left hand.

History of the current complaint: The patient has a ring attached to the back of her smartphone. Usually, she operates the phone while holding it by the ring in the 3rd finger of her left hand (Fig. 1). The previous evening, however, at about 8 o'clock, she had held the ring using the 5th finger of her lefthand while viewing the screen for approximately 30 minutes (Fig. 2). At about 9 p.m. that evening, she had begun to feel pain and experience swelling and rubefaction in the PIP joint of that finger, as well as difficulty bending and extending it. Because the symptoms had continued until the next day, she had presented at the clinic.

Medical history: The patient had no history of rheumatoid arthritis or other relevant issues.

Family medical history: The patient's family also had no history of rheumatoid arthritis or other relevant issues.

Condition/symptoms: Body temperature 36.5℃, blood pressure 98/66 mmHg, pulse 65/min, saturation of percutaneous oxygen 98%. Rubefaction, swelling, and tenderness in the PIP joint of the 5th finger of her left hand confirmed (Fig. 3). She was able to bend and extend the PIP joint in the 5th finger of her right hand, but she had difficulties doing the same in the 5th finger of her left hand due to an aching pain (Visual Analog Scale [VAS] score 7) and swelling (Fig. 4). No sensory abnormalities appeared to be present.

Treatment: Our diagnosis was acute proximal interphalangeal (PIP) joint articular injury in the 5th finger of the left hand caused by the use of a smartphone ring. We instructed the patient not to hold the smartphone by the ring using her 5th finger. We gave her cold packs to use on the finger, and in four days the symptoms had disappeared, and she was also able again to bend and stretch as normal.

A written informed consent was obtained from the patient.

Received on December 8, 2022 and accepted on December 17, 2022

1) Yushoukai Home Medical Clinic Nerima
2-11-22 Hazawa, Nerima-ku, Tokyo 176-0003, Japan
2) Department of Clinical Kampo Medicine, Meiji Pharmaceutical University
2-522-1 Noshio, Kiyose-city, Tokyo 204-8588, Japan
Correspondence to: Shuji Yakubo
(e-mail: yakubo@my-pharm.ac.jp)

ORCID ID:
Koji Sakata: 0000-0003-2892-2886
Masaki Baba: 0000-0003-3579-7470
Shuji Yakubo: 0000-0003-1016-7341

Figure 1: Using a smartphone in the usual way, by inserting the 3rd finger into the attached smartphone ring.

Figure 2: Inserting the 5th finger (left hand) into the smartphone ring (current case). The smartphone is touching the PIP joint?

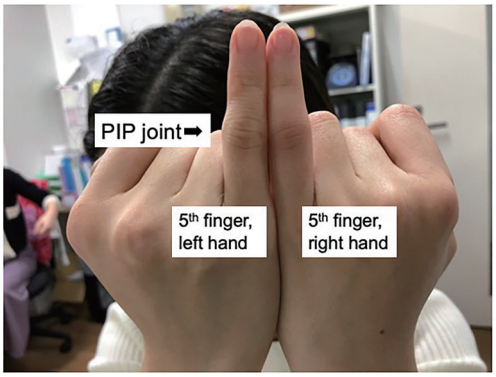

Figure 3: The 5th finger of the patient's left and right hands. Rubefaction and swelling can be observed on the left hand.

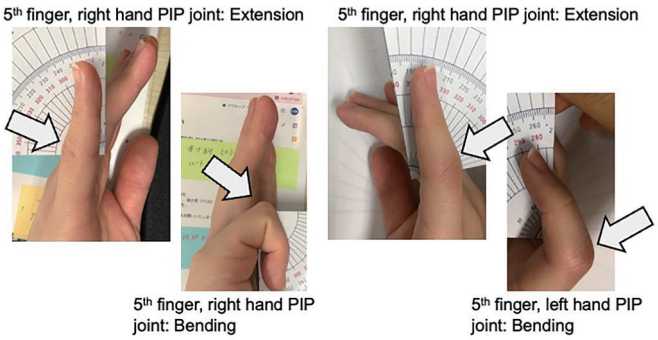

Figure 4: Bending and extending the 5th finger of the right and left hands. Swelling and rubefaction on the left hand can be observed, as well as difficulty bending the finger.

DISCUSSION

It is well-known that excessive, repetitive manipulation of thumbs and finger can cause de Quervain tenosynovitis[5-7]. A case of de Quervain's disease after extended use of the iPhone X has also been reported in Japan by Iwata[8].

Benites-Zapata *et al*. analyzed 491 subjects. The majority were women (52%), and the median age was 20 years. They found an association between smartphone dependence and symptoms of de Quervain's disease. They suggested that a smartphone dependence study should routinely accompany diagnosis of de Quervain's tenosynovitis[9].

Gökmen *et al*. reported a spontaneous swan-neck deformity of the third digit, whose active range of motion was limited due to pain. Ultrasonographic imaging demonstrated digital extensor tenosynovitis of the second, third, fourth, and fifth digits. They concluded that smartphone addiction has an adverse influence on hand function and pinch strength[10].

Canillas *et al*. reported trapeziometacarpal osteoarthritis in young patients suffering from trapeziometacarpal pain. Excessive use of touch-screen cellular phones was the only finding in common. Pain and joint crepitation were found on physical examination and signs of osteoarthritis were observed on MRI scans[11].

As detailed above, chronic disorders of the hands caused by smartphone use are on the increase. It seems clear that indiscriminate use of touch-screen smartphones can cause damage to hands and wrists. In the case reported in this paper, we observe acute PIP articular injury caused by the use of a smartphone ring holder over a short period of time.

It is common these days for smartphone users to attach a ring to the back of their phone. Users commonly insert their 2nd or 3rd finger in the ring when operating their phone (Fig. 1). In the case reported, the patient inserted the 5th finger of her left hand, with that finger supporting the phone (Fig. 2). As a result, the entire weight of the phone was borne by the PIP joint of her 5th finger. We can surmise that this caused inflammation in that joint.

Since in the present case the symptoms of rubefaction, swelling, aching pain, and bending disorder were localized, we did not do blood or other tests to look for systemic problems such as rheumatoid arthritis. We also did not take X-rays to look for joint or bone deformities. Since cold packs for 4 days were sufficient to relieve all symptoms, we can assume that this was a local pathology. We need to be on the lookout for future acute cases of this kind.

CONCLUSION

The ubiquity of smartphones brings much convenience to our lives. At the same time, we are getting ever more reports of chronic tendinitis and adverse effects on hand function due to indiscriminate or inappropriate use of smartphones.

In contrast to the cases reported elsewhere, where smartphone addiction or overuse is implicated, the case reported here concerns acute PIP articular injury on the 5th finger of the left hand caused by holding a smartphone by its ring. Our purpose is to warn of the potential for further cases of this kind in addition to the kinds of chronic problems identified in previous research.

CONFLICTS OF INTEREST

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

FINANCIAL DISCLOSURE

The authors received no financial support for the research and/or authorship of this article.

REFERENCES

1. Naeem Z. Health risks associated with mobile phones use. Int J Health Sci (Qassim) 2014; 8: V-VI.
2. Yen CF, Tang TC, Yen JY, Lin HC, Huang CF, Liu SC, *et al*. Symptoms of problematic cellular phone use, functional impairment and its association with depression among adolescents in Southern Taiwan. J Adolesc. 2009; 32: 863-873.
3. Lopez-Fernandez O. Short version of the Smartphone Addiction Scale adapted to Spanish and French: Towards a cross-cultural research in problematic mobile phone use. Addict Behav. 2017; 64: 275-280.
4. Tegtmeier P. A scoping review on smart mobile devices and physical strain. Work. 2018; 59: 273-283.
5. Storr EF, de Vere Beavis FO, Stringer MD. Texting tenosynovitis. The New Zealand Medical Journal 2007 Dec 14: 120 (1267): U2868 (Online).
6. Ashurst JV, Turco DA, Lieb BE. Tenosynovitis caused by texting: an emerging disease. J Am Osteopath Assoc. 2010; 110: 294-6.
7. Williams IW, Kennedy BS. Texting tendinitis in a teenager. J Fam Pract. 2011; 60: 66-67.
8. Iwata K: Smartphone-induced tendinitis: A case report. J Family Med Prim Care. 2019 May; 8(5): 1784-1785. doi: 10.4103/jfmpc.jfmpc_230_19 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6559090/
9. Benites-Zapataa VA, Jiménez-Torresab VE, Ayala-Roldána MP. Problematic smartphone use is associated with de Quervain's tenosynovitis symptomatology among young adults. Musculoskeletal Science and Practice. 2021 May; 53; 102356. https://doi.org/10.1016/j.msksp.2021.102356
10. Gökmen HM, Gökmen IG, Dilek B, Gülbahar S, Akalin E: Addiction of smartphones and related finger deformities: A case report. Turk J Phys Med Rehabil. 2020 Dec; 66(4): 476-479. doi: 10.5606/tftrd.2020.4256
11. Canillas F, Colino A, Menéndez P. Cellular phone overuse as a cause for trapeziometacarpal osteoarthritis: A two case report. J Orthop Case Rep. 2014 Oct-Dec; 4(4): 6-8. doi: 10.13107/jocr.2250-0685.213.PMID: 27298990