

Addiction of smartphones and related finger deformities: A case report

Hatice Merve Gökmen¹, İsmail Güneş Gökmen¹, Banu Dilek², Selmin Gülbahar², Elif Akalın²

¹Department of Physical Medicine and Rehabilitation, Eskişehir City Hospital, Eskişehir, Turkey

²Department of Physical Medicine and Rehabilitation, Dokuz Eylül University Medicine Faculty, Izmir, Turkey

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ABSTRACT

Widespread and excessive use of smartphones is very common, and its overuse is associated with several health-related conditions. A 58-year-old man presented with a spontaneous swan-neck deformity of the third digit. On his physical examination, full passive range of motion of the finger was achieved, while active range of motion was limited due to pain. Laboratory test results were normal. Ultrasonographic imaging demonstrated digital extensor tenosynovitis of the second, third, fourth, and fifth digits. Plain radiographs of bilateral hands were normal. Magnetic resonance imaging of the affected hand revealed no mass lesion. He attended to the hand rehabilitation program. At the end of the program, his pain decreased, and he was easily able to do the finger range of motion exercises. In conclusion, smartphone addiction has an adverse influence on hand function and pinch strength. Youngsters should be aware of the harmful effects which may result from smartphone overuse.

Keywords: Addiction, digital deformities, hand smartphonopathy, pain, smartphone.

In our daily life, the use of different technological instruments, particularly smartphones, is very common. To date, many studies have been reported about smartphone addiction and health-related problems due to overusing.^[1,2] There is a high biomechanical risk, particularly for the neck, wrists, and thumbs. It is related to poor posture, repetitive movements, and ongoing muscle tension.^[3]

In this article, we describe an unusual case of digital deformity due to smartphone overuse.

CASE REPORT

A 58-year-old man was admitted with spontaneous swan-neck deformity of the third digit. He was a retired military soldier and he had no rheumatic disease or trauma. His medical history revealed that the duration of symptom was about two months. On his physical examination, there was no sign of arthritis; full passive range of motion (ROM) of the

finger was achieved, but active ROM was limited due to pain (Visual Analog Scale [VAS] score 7) and sensory examination was normal. The patient had also joint hypermobility, particularly on his fingers. The Beighton score was 5/9. Complete blood count, acute phase reactants, rheumatoid factor, uric acid, anti-cyclic citrullinated peptide, and antinuclear antibody test results were all normal. There was no evidence of rheumatic or inflammatory disease. Non-steroidal anti-inflammatory drugs (NSAIDs) and cold pack were recommended to the patient. On the following visit, he had a little response to NSAIDs and his symptoms spread to the second and fourth digits (Figure 1a, b). Ultrasonographic imaging findings were as follows: 2-3-4-5th digital extensor tenosynovitis; 2-3rd metacarpophalangeal joint with increased intraarticular fluid. On his detailed history, the patient was using his mobile phone for 15 to 16 h in a day in the same position (Figure 1c). Plain radiographs of bilateral hands were normal. Magnetic resonance

Corresponding author: Hatice Merve Gökmen, MD, Eskişehir Şehir Hastanesi, Fiziksel Tıp ve Rehabilitasyon Kliniği, 26080 Odunpazarı, Eskişehir, Türkiye.

e-mail: hanci2512@gmail.com

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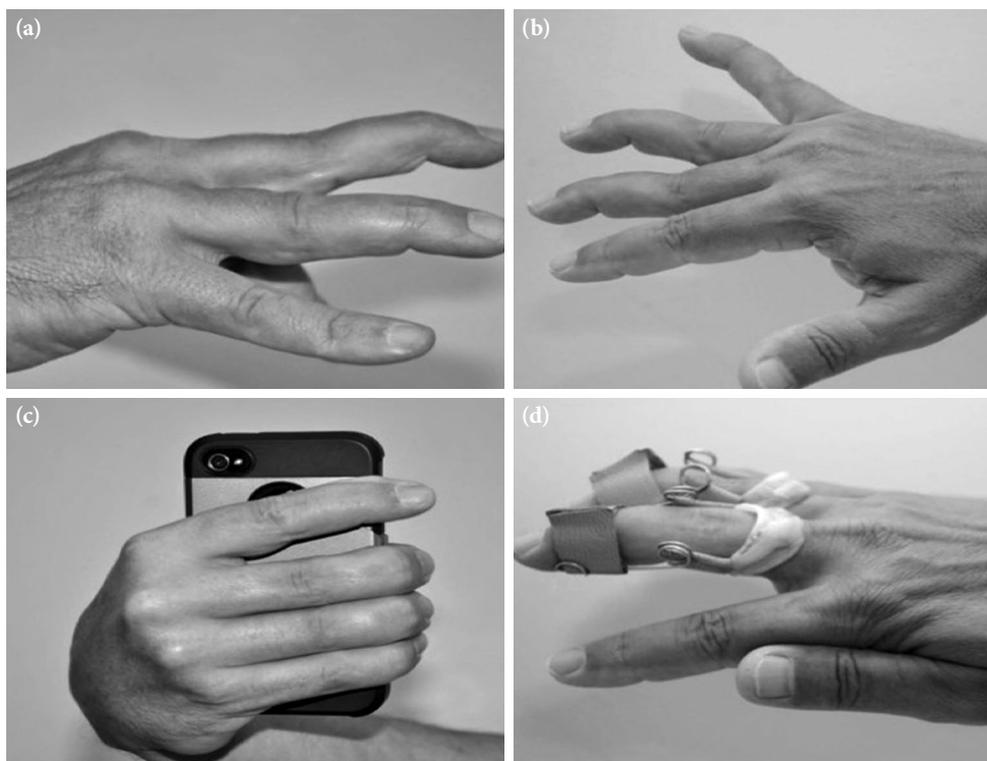


Figure 1. (a, b) Digital deformities in rest position. (c) Patient's hand position while using smartphone. (d) Patient's fingers in ring orthosis.

imaging of the affected hand revealed no mass lesion. Based on all findings, we concluded that his findings were related to hypermobility and overuse of the mobile phone.

The patient was scheduled for the hand rehabilitation program consisting of stretching exercise, ROM exercises, whirlpool, therapeutic ultrasound, and electrical stimulation of the isolated flexor digitorum superficialis. At the end of the program, his pain score decreased (VAS 3) and he was easily able to do the finger ROM exercises. On his following visit at one year, digital deformities still remained unchanged. He had no pain and his grip strength was improved. He was able to use his fingers easily. He was using finger ring orthosis (Figure 1d), particularly at night with regular exercises.

A written informed consent was obtained from the patient.

DISCUSSION

Over the last decades, there has been an enormous progression in the field of technology. Smartphones have become an inseparable part of our daily lives. There is no doubt that technology makes our lives

easier, but we have still a question in our minds: is it safe enough? Smartphone addiction and health-related problems are the new focuses of interest in scientific literature in recent years.

Due to the long-term mobile phone use, individuals are exposed to a higher electromagnetic field. It is also associated with many health problems, such as high-risk for brain tumors.^[4] In the practice of physiatry, clinicians should be aware of harmful musculoskeletal effects of the use of smartphones and mobile devices, particularly on both posture and hand functions or structures. Unfortunately, there is a limited number of data about the effects of widespread use of smartphones. To date, few studies have already shown adverse effects about the long-term use of smartphones.^[1-9] Enlargement of the median nerve, neck pain and disability, decrement of pinch strength, and limited mobility are due to poor craniocervical posture.^[5-9] Hand pain, digital deformities, and limited ROM may develop after prolonged use of the smartphone or poor positioning. These deformities are sometimes reversible, while they can be irreversible, as well. Also, the smartphone size is important for hand pain and functions. According to a study, fatigue of the extensor pollicis longus and abductor digiti minimi

of the large smartphone users was high and muscle fatigue decreased, when the smartphone size was fitted well with the user's hand.^[10] This study finding suggests that the size of the smartphone influence the function of the hand muscles.

In addition, an acute trauma or repetitive loading can cause tendinitis or overuse injury. Occupational overuse in consequence of repetitive use of fingers has been also reported.^[11] In a study, there was pain in at least one body part among 84% of employees.^[12] They were commonly right-handed, and the most frequent pain localization was the base of the right thumb. Also, the rate of participants reporting pain of any severity was as follows: neck in 68%, upper back in 62%, right shoulder in 52%, left shoulder in 46%, right elbow and lower arm in 32%, and left elbow and lower arm in 27%. According to the occupational epidemiology literature, mobile device overuse may also cause de Quervain's tenosynovitis and rhizarthrosis which is also common in these individuals.^[13] It has been suggested that these conditions may be associated with repetitive wrist and thumb movements, while using a mobile device.^[14-16]

It has demonstrated that the thumb is enforced to the maximum motion range, as it moves over the screen of the mini-keyboard. As a result, when a person uses mini-keyboard frequently, hand pain and dysfunction increase and pinch strength decreases. The literature recommends that smartphones should be used with both hands, at least. In this way, it can be possible to reduce the risk of musculoskeletal disorders.^[6] Ongoing wrist flexion and extension, while using smartphones can result in enlargement of the median nerve and carpal tunnel syndrome (CTS).^[17] However, there is no exact link with smartphone overuse and CTS, and further studies are needed.^[6]

Furthermore, putting fingers and wrist in static positions while holding smartphones may be harmful. Playing games or writing text messages repeatedly requires flexion/extension of the fingers and wrist. This would likely to increase load on these joints, tendons, or related muscles.^[18-20] Therefore, smartphone addiction has a bad influence on hand function and pinch strength. Youngsters should be aware of the harmful effects due to smartphone overuse.^[13]

In conclusion, if all these study results are supported with evident clinical findings, hand smartphonopathy may be defined as a pathological term in the future. Further studies and case reports would provide a better insight into this new phenomenon.

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