Case Report

HAND
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DOI: 10.1177/1558944715627634
hand.sagepub.com

Pediatric Trigger Finger due to Osteochondroma: A Report of Two Cases

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Abstract

Background: The trigger finger is characterized by the painful blocking of finger flexor tendons of the hand, while crossing the A1 pulley. It is a rare disease in children and, when present, is usually located in the thumb, and does not have any defined cause. **Methods:** We report 2 pediatric trigger finger cases affecting the long digits of the hand that were caused by an osteochondroma located at the proximal phalanx. Both children held the diagnosis of juvenile multiple osteochondromatosis. They had presented at the initial visit with a painful finger blocking. Surgical approach was decided with wide regional exposure, as compared with the trigger finger traditional surgical techniques, with the opening of the A1 pulley and the initial portion of the A2 pulley, along with bone tumor resection. **Results:** Patients evolved uneventfully, and recovered the affected finger motion. **Conclusion:** It is important to highlight that pediatric trigger finger is a distinct ailment from the adult trigger finger, and also in children is important to differentiate whenever the disease either affects the thumb or the long fingers. A secondary cause shall be sought whenever the long fingers are affected by a trigger finger.

Keywords: trigger finger, pediatric, flexor tendon, bone tumor

Introduction

The trigger finger, also known as stenosing tenosynovitis, is rare in the pediatric population and, when present, is usually located on the thumb and associated with a congenital condition. Nonetheless, it may occur in any digit. It is caused by anything that increases the flexor tendon volume or reduces the capacity of the A1 pulley.[2,10,11,13]

Cardon[2] highlighted the importance of differentiating the adult and pediatric forms of trigger finger. He does consider them as distinct diseases.

Previous descriptions have shown that the pediatric trigger finger, apart from the thumb, may be caused by flexor tendon changes, such as a more proximal decussation of the flexor digitorum superficialis (FDS),[4] flexor tendon nodules or calcification[12] assuming a rosary form, Camper's chiasm narrowing,[4] or partial tendon lacerations.[8]

Al-Harthy and Hayan,[1] in 2003, have provided the only description of a trigger finger caused by osteochondroma.

We report 2 female, pediatric patients who were treated for trigger finger caused by a proximal phalanx osteochondroma affecting long fingers.

Case 1

A 13-year-old girl who had juvenile multiple osteochondromatosis (JMO) reported 18-month long complaints of left hand ring finger pain and snapping. At the initial consultation, she reported that 2 months before the assessment, she had sustained a complete finger blocking at the proximal interphalangeal joint, which remained in 70° of flexion. She showed active finger flexion, but was unable to perform its extension (Figure 1).

A hand X-ray film was ordered, showing a proximal phalanx osteochondroma causing compression of flexor tendons at the A1 pulley, thus blocking finger motion. There were no other lesions of that digit or any articular changes (Figure 2).

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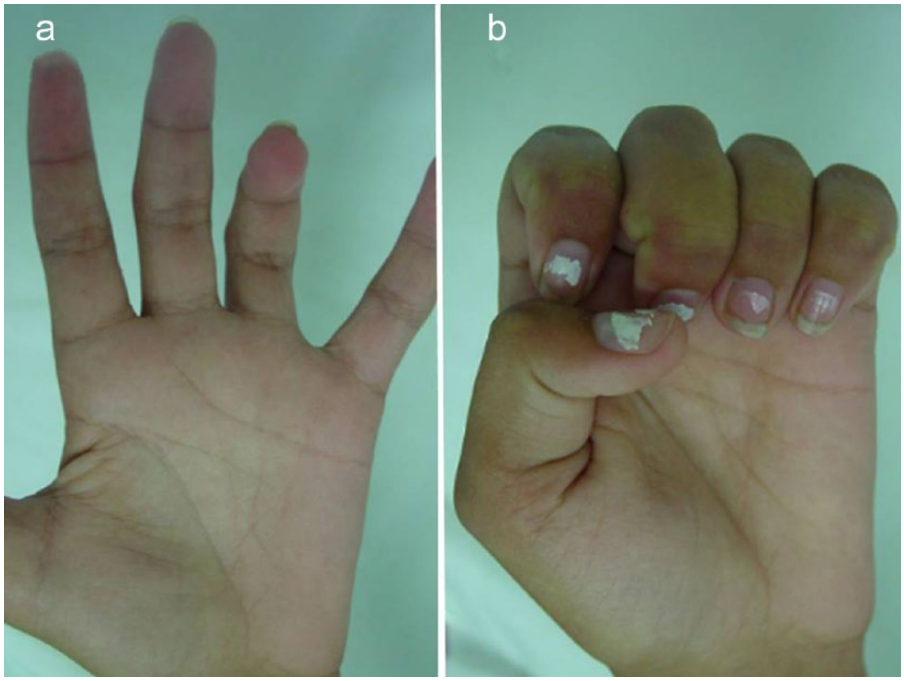

Figure 1. A 13-year-old girl with juvenile multiple osteochondromatosis, with ring finger blocking. Unable to extend the digit (a), but active flexion is present (b).

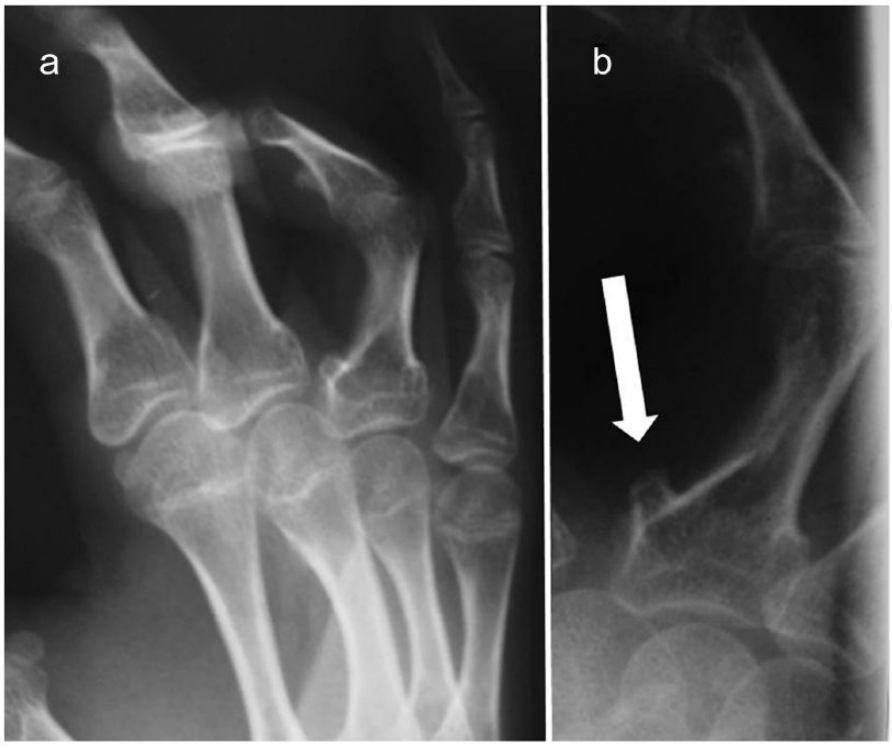

Figure 2. Oblique radiographic view of the hand revealed a proximal phalanx osteochondroma causing extrinsic compression of flexor tendons in the A1 pulley, blocking digit motion (a). White arrow shows lesion in detail (b).

Figure 3. Surgical treatment, wide Z-shaped incision centered at the metacarpophalangeal joint (a). On the opening of A1 pulley and proximal portion of the A2 pulley, the bone tumor is seen compressing flexor tendons and restricting digit motion (b). Bone tumor resection and curettage to smoothen phalanx edges (c). Typical osteochondroma appearance of the resected tumor (d).

A surgical approach was carried out, with the opening of the A1 pulley and the proximal portion of the A2 pulley, along with bone tumor resection (Figure 3). During the procedure and after tendon retraction, the bone lesion that caused the blocking and restricted the digit motion was seen. Lesion resection and curetting to smoothen phalanx edges were performed. The resected tumor had a typical aspect of an osteochondroma.

Immediately postoperatively, the patient has recovered full active and passive digit motion; at 2 months postoperatively, the patient remained asymptomatic (Figure 4). The pathology specimen proved to be an osteochondroma.

Case 2

A 9-year-old girl was referred to the Hand Team due to middle finger blocking and extension inability (Figure 5). No previous trauma was reported, but there was a positive previous history of family and surgical treatments for JMO. The change in the digit started gradually and was observed by her parents a few months before, but they were unable to determine the exact date.

A solid, painful mass on the volar base at the metacarpophalangeal joint region of the digit could be palpated during physical examination. The patient had limited active and

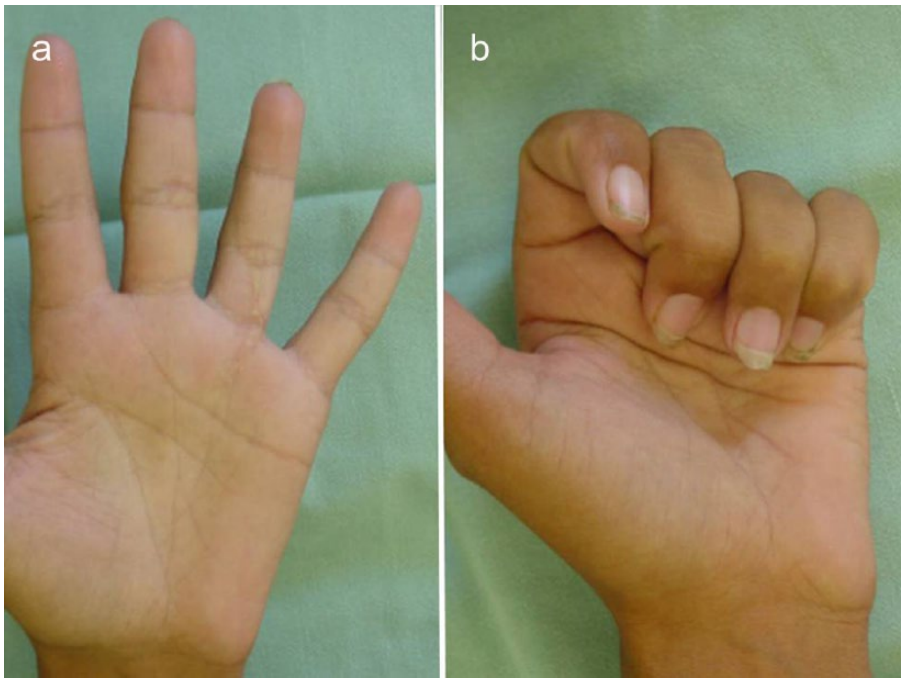

Figure 4. At 2 months postoperatively, the patient has recovered digit motion, both in extension (a) and in flexion (b).

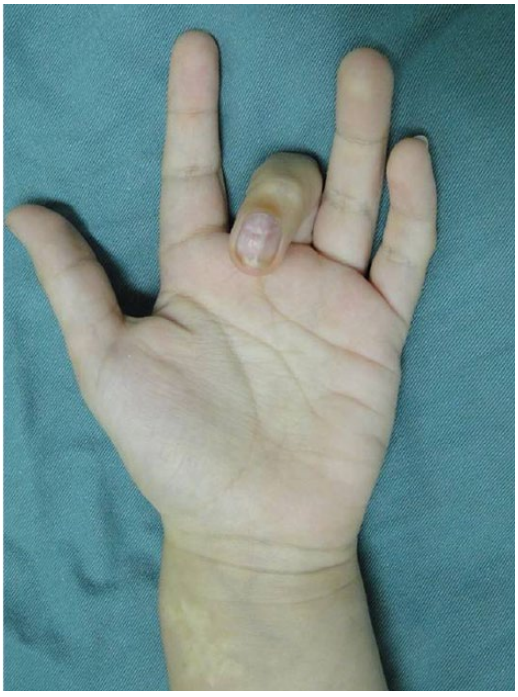

Figure 5. Nine-year-old girl with juvenile multiple osteochondromatosis showing middle finger blocking, unable to perform extension.

passive motion of the digit, and referred pain on passive mobilization, especially on extension. Neurovascular examination was normal. There was nail and middle phalanx deformity too. There was also deformity and increased volume at the distal radius and ulna.

Imaging examinations of the region were performed. Radiographs showed the presence of an exostosis located at the volar and proximal portions of the proximal phalanx. X-ray films also proved that nail deformity was due to a distal phalanx osteochondroma, along with the presence of other metacarpal, other phalanges, and distal radius and ulna osteochondromas (Figure 6). Ultrasound showed the integrity of flexor tendons, with a diffuse increase of local fluid. Radiological findings with a positive family history were all compatible with the diagnosis of JMO.

The area was approached through a zigzag, Brunner-type volar incision, centered at the metacarpophalangeal joint. After the release of A1 pulley and the initial portion of A2 pulley, flexor tendons were retracted to show an osteocartilaginous mass at the proximal phalanx. Tumor resection was performed, and macroscopic examination showed a bony tissue with a cartilage cover (Figure 7). Tumor was sent for pathology, and an osteochondroma was confirmed. No changes of tendons such as nodules or inner thickening were seen during the operation. Perioperatively, the joint recovered full passive motion. A dressing with bandages for 2 weeks was worn until the stitches were out.

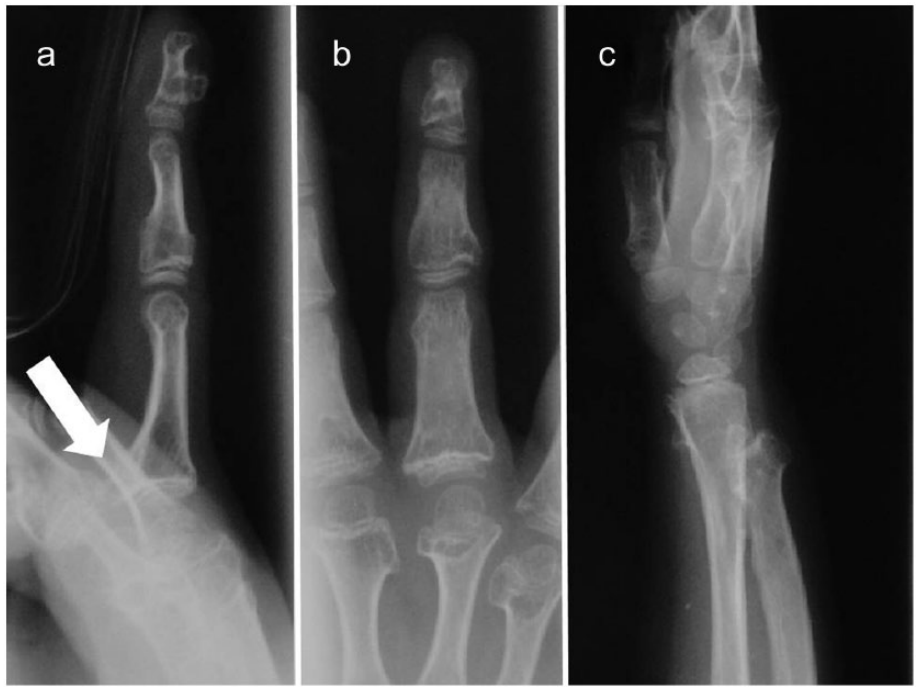

Figure 6. Radiographs showed the presence of an exostosis located at the volar and proximal portions of the proximal phalanx (a). X-ray films also proved the presence of other osteochondromas at the distal phalanx (a and b), as well as in metacarpals, other phalanges, and distal radius and ulna (c).

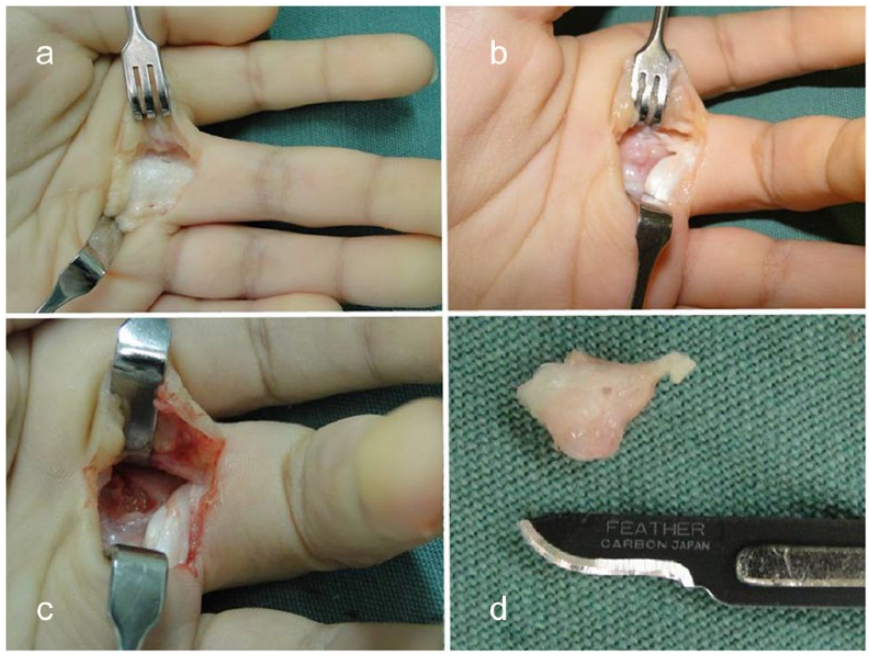

Figure 7. The region was approached through a zigzag, Brunner-type volar incision, centered at the metacarpophalangeal joint (a). After the release of A1 pulley and initial portion of A2 pulley, flexor tendons were retracted to show an osteocartilaginous mass at the proximal phalanx (b). Tumor resection was performed (c), and macroscopic examination showed a bony tissue with a cartilage cover (d).

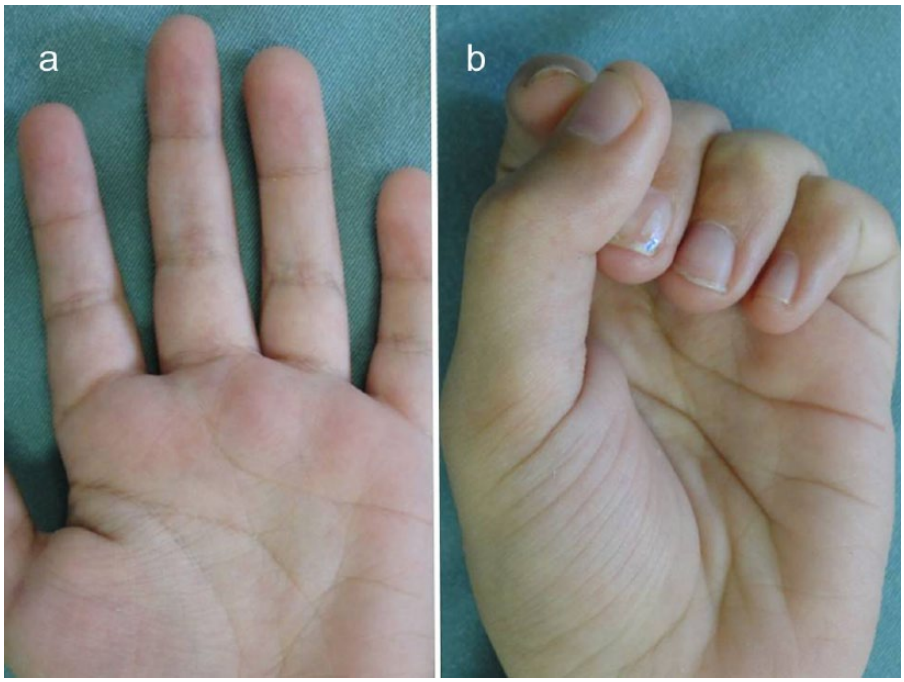

Figure 8. At 6 months postoperatively, the patient presented motion recovery of the operated digit, with complete extension (a) and a deficit of the last 20° of flexion (b), most likely due to a deformity created by metacarpal and middle phalanx osteochondromas of the same finger.

Active motion was prescribed postoperatively, along with a daily program of passive exercises lead by parents. At 6 months postoperatively, the patient had recovered the motion of the operated digit, with complete extension and a flexion lag of 20°, likely due to blockings and deformities caused by metacarpal and middle phalanx osteochondromas of the same digit (Figure 8). There were no symptoms of triggering, and there was no evidence of either digit rotational or angular deformity. Radiographs did not show any evidence of proximal phalanx tumor recurrence.

Discussion

Trigger finger is the painful blocking of digit flexor tendons when crossing the A1 pulley. It is a rare disease in children, with an incidence of approximately 1:2000 births. Whenever present, it mostly occurs at the thumb, with no defined cause. In the long digits, it may be due to any cause that increases the volume of flexor tendons or reduces pulley capacity.[2,13]

According to Cardon,[2] trigger finger in children affects the thumb in 86% of the cases and is also referred as congenital trigger thumb. Nonetheless, recent studies have failed in demonstrating the presence of trigger thumb in newborns and, as such, the term congenital is not the most appropriate to describe the disease.[10] Trigger thumb in children is usually found around 12 months of life, and after a trauma. The compression over the flexor tendon causes its thickening, which originates Notta's nodule. The possibility of spontaneous resolution is also controversial.[11] Studies have described a chance of up to 30% of spontaneous improvement until 3 years of age.[2]

A secondary cause shall be sought whenever the long fingers are affected by a trigger finger. Among those causes, there is the abnormal relationship between the FDS and the flexor digitorum profundus (FDP). This abnormality may be due to the most proximal FDP decussation.[4] Other less common causes include sesamoid bone interposition, or lesion of volar plate, joint capsule, or collateral ligament. Seiler reported a case of trigger finger secondary to post-traumatic calcific tendinitis of the flexor tendon. There is also the association of trigger finger and mucopolysaccharidoses and trissomy 13 in children.[9]

In the cases presented here, digit motion blocking was due to osteochondroma. Al-Harthy and Hayan[1] reported in 2003 the only similar patient to ours.

The osteochondroma is the most frequent bone tumor of the skeleton. It is a benign lesion formed by bony and cartilaginous tissue, and is commonly located at the metaphysis of long bones. In its most frequent, isolated presentation, the

hand is seldom compromised. In its multiple form, the JMO, hand lesions appear in up to 80% of patients, and the proximal phalanx is the most commonly affected, in accordance with patients herewith presented.[3,5-7] Hand compromise in JMO follows the pattern "all or none." Whenever present, there is an average of 11.6 lesions per hand, with the thumb and the distal phalanges less affected, and the proximal phalanx and the ulnar metacarpals mostly affected. Although patients with JMO may present brachydactyly without exostoses, its presence leads to higher bone shortening. Hand osteochondromas affect mainly the metaphyseal area, close to the physis. However, lesions at the distal portion of phalanges, in opposite to the physis, are not uncommon.[5]

The osteochondroma requires surgical removal due to suspicious malignant degeneration, neurovascular or tendon compression, pain or irritation, bone deformities, and also due to cosmetic reasons such as angular or rotational tilt, shortening, and joint blockings; the latter was the surgical indication for the patients presented here.[5]

Cates[3] has classified hand osteochondromas in 3 types by means of radiographic analysis: type A, which are large and globular, affecting more than 50% of the bone; type B, smaller, globular lesions that affect less than 50% of the bone; and type C, pedunculated lesions that affect long bones. In parallel to Cates' description, where most cases corresponded to type B, both cases reported here also belonged to that type.

The rare cases of solitary hand phalanx osteochondromas may present with different features. They are intraarticular, epiphyseal lesions in continuity with the articular cartilage, and its growth will cause deformity and digit motion blocking. That would be a different cause of the cases here presented, as the articular rigidity was caused by mechanical blocking of flexor tendons.[6]

Surgical release of the A1 pulley is decisive in adult trigger finger, as well as in the pediatric trigger thumb. In pediatric trigger finger of long digits, partial or total FDS detachment and A2 or A3 pulleys release may be needed.[2,13] Such conditions warrant a broader flexor apparatus exposure during the surgery, which is different from the simple A1 pulley release performed for the treatment of adult trigger finger. Surgical findings do not show any swelling or fibrosis within the tendon when the pediatric trigger finger affects long digits. It is impossible to perioperatively perform active testing of the pediatric trigger finger release due to the use of general anesthesia.

Authors' Note

This study was performed at the Hand Surgery Service, Hospital Mãe de Deus, Porto Alegre, Brazil.

Ethical Approval

This study was approved by our institutional review board.

Statements of Human and Animal Rights

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with Helsinki Declaration of 1975, as revised in 2008.

Statement of Informed Consent

Informed consent was obtained from all individual participants included in the study.

Declaration of Conflicting Interests

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

Funding

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

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