Clinical and Anatomical Aspects of Anterior Dislocation of the Pisiform Bone

Carlos Romualdo Rueff-Barroso¹ Fernanda Vieira Botelho Delpupo¹ Valéria Paula Sassoli Fazan² Sérgio Ricardo Rios Nascimento³ Lerud Frosi Nunes⁴ Rudi Natalli Montenegro⁴ Jorge Luiz Kriger⁴ Bernardo Garcia Barroso⁴

¹Department of Morphology, Centro de Ciências da Saúde, Universidade Federal do Espírito Santo, Vitória, ES, Brazil
²Department of Surgery and Anatomy, Faculdade de Medicina de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, SP, Brazil
³Centro Universitário São Camilo, Ipiranga, SP, Brazil
⁴Orthopedics and Traumatology Institute, Vitória Apart Hospital, Serra, ES, Brazil

Address for correspondence Carlos R. Rueff-Barroso, Doctor in Sciences (Human and Experimental Biology), Master in Morphology, Associate Professor of Anatomy and Neuroanatomy, Departamento de Morfologia, Centro de Ciências da Saúde, Universidade Federal do Espírito Santo, UFES, Av. Marechal Campos, 1468, Maruípe, CEP:29.043-900, Vitória, ES, Brazil (e-mail: carlosrueff@yahoo.com.br).

Introduction

The pisiform bone is the fourth bone of the proximal row of the carpal bones, and it is located in the tendon of the flexor carpi ulnaris muscle, being considered a sesamoid bone. Traumatic dislocation of the pisiform bone is a rare condition, which usually results from a trauma in dorsal flexion of the wrist. Its treatment can be conservative or surgical, ending or not with the removal of the pisiform bone.

Objective

To report a case of a child who fell from his own height and presented wrist pain, diagnosed with dislocation of the pisiform bone. We emphasize the importance of anatomy knowledge in the evaluation of wrist trauma.

Case Report

The anamnesis confirmed that the fall occurred with the wrist in hyperextension. The physical examination showed a slight limitation of movement due to pain. Radiographic exams and a computed tomography (CT) scan of the wrist were performed, in which an anterior deviation/luxation of the pisiform bone was evidenced. A conservative treatment with plaster immobilization for analgesia was performed for 1 week. As there were no symptoms and no signs of trauma consistent with the images, such as edema and local ecchymosis, in addition to the early complete disappearance of pain, the responsible team proposed the hypothesis of asymptomatic chronic dislocation of the pisiform bone.

Conclusion

Imaging exams in orthopedic traumatology are fundamental for an accurate diagnosis. Nevertheless, they must be associated with knowledge of the anatomy to correlate the image findings with the anamnesis, leading to a better understanding of silent, asymptomatic, and preexisting conditions in the clinical practice.

Keywords

► anatomy
► pisiform bone
► trauma
► dislocation

Abstract

Introduction

The pisiform bone is the fourth bone of the proximal row of the carpal bones, and it is located in the tendon of the flexor carpi ulnaris muscle, being considered a sesamoid bone. Traumatic dislocation of the pisiform bone is a rare condition, which usually results from a trauma in dorsal flexion of the wrist. Its treatment can be conservative or surgical, ending or not with the removal of the pisiform bone.

Objective

To report a case of a child who fell from his own height and presented wrist pain, diagnosed with dislocation of the pisiform bone. We emphasize the importance of anatomy knowledge in the evaluation of wrist trauma.

Case Report

The anamnesis confirmed that the fall occurred with the wrist in hyperextension. The physical examination showed a slight limitation of movement due to pain. Radiographic exams and a computed tomography (CT) scan of the wrist were performed, in which an anterior deviation/luxation of the pisiform bone was evidenced. A conservative treatment with plaster immobilization for analgesia was performed for 1 week. As there were no symptoms and no signs of trauma consistent with the images, such as edema and local ecchymosis, in addition to the early complete disappearance of pain, the responsible team proposed the hypothesis of asymptomatic chronic dislocation of the pisiform bone.

Conclusion

Imaging exams in orthopedic traumatology are fundamental for an accurate diagnosis. Nevertheless, they must be associated with knowledge of the anatomy to correlate the image findings with the anamnesis, leading to a better understanding of silent, asymptomatic, and preexisting conditions in the clinical practice.
described as the flexor carpi ulnaris tendon, the extensor retinaculum, the abductor digiti minimi muscle, the extensor retinaculum, the ulnar collateral ligament of the wrist joint, the articular disc of the distal radioulnar joint, the pisohamate ligament, the pisometacarpal ligament, and the pisiform joint capsule, plus a superficial fibrous bundle between the pisiform bone and the hook of hamate. 3,8,9

Historically, the isolated pisiform fracture was identified and described by Guibout in 1847 during a necropsy, along with other carpal fractures. 1,12,13 Although traumatic luxation of the pisiform is a condition reported as rare in the scientific literature, it usually is a result of a trauma in dorsal flexion of the wrist, in which the impact occurs immediately on the hypothenar eminence with the wrist in hyperextension, the forearm in pronation, and the upper limb in adduction. 13,14

There are also other mechanisms for the pisiform fracture, commonly observed in sports, especially in volleyball players, in which repetitive trauma causes vascular injuries and leads to microfractures and, later, to the evolution to a complete fracture. 1,12,14

Fractures of the carpal and metacarpal bones represent ~ 6% of all fractures. Isolated fracture of the pisiform is a rare condition, since it is constantly associated with other injuries of the carpus or of the distal end of the radius. In the fracture with concomitant rotation of the pisiform and/or ligament rupture, the treatment can be conservative or surgical, ending up or not with the removal of the pisiform bone. 2,14,15

The objective of the present study is to report a case of a 9-year-old child who suffered a pisiform dislocation, emphasizing the importance of previous knowledge of the anatomy in the clinical practice, aiming at the correlation of the clinical findings for the correct diagnosis.

Case Report

A 9-year-old male child, led by his parents, presented to the emergency room of the Vitória Apart Hospital reporting pain in the wrist and in the left hand after falling from his own height playing soccer.

During the anamnesis, it was observed that the fall occurred with the wrist in hyperextension and, on the physical examination, there was a slight limitation of the range of motion due to pain. Anteroposterior (AP) and lateral X-ray examinations were performed, showing an anterior deviation of the pisiform bone (Figs. 3 and 4). The child was
referred for a computed tomography (CT) scan of the wrist with suspected fracture and/or carpal dislocation.

The results of the CT scan showed an anterior dislocation of the pisiform bone; bone irregularity in the pisiform bone with a small adjacent bone fragment measuring 0.2 cm suggestive of microfracture; avulsion or a small ossification nucleus; small joint effusion; slight obliteration of the myotendinous planes; and adipose tissue of the wrist of post-traumatic origin, with preservation of the other bone structures (Figs. 5 and 6).

A conservative treatment with plaster immobilization for analgesia was performed for 1 week. As there were no signs of trauma consistent with the images, such as edema and local ecchymosis, in addition to the early complete disappearance of pain, the responsible team proposed the hypothesis of chronic asymptomatic dislocation of the pisiform bone.

Discussion

The early diagnosis of pisiform fracture is important, since late treatment may result in nonconsolidation and may manifest with chronic pain and limitation of movement. In the present report, the treatment consisted of plaster immobilization for a short period of time that resulted in a good clinical response.

Moojen et al pointed to the fact that traumas of the pisiform bone and of the pisopyramidal joint are not rare. A correct diagnosis, however, is often difficult, in part due to the lack of attention to anatomical structures during the

Fig. 3 Lateral radiography view of the left wrist showing the anterior dislocation of the pisiform bone (arrow).

Fig. 4 Lateral radiography view of the right wrist showing a normal anatomical position of the pisiform and carpal bones.

Fig. 5 Axial computed tomography view of the left wrist showing the anterior dislocation of the pisiform bone (arrow) and a small adjacent bone fragment (arrow).
inspection of the wrist and to the lack of knowledge of the 
kinematics of the region.9

An adequate clinical evaluation and a thorough examina-
tion of imaging exams in orthopedic traumatology are 
essential for an accurate diagnosis. Deep knowledge of the 
anatomy is essential to correlate the findings of these exams 
with the anamnesis and to understand the possible existence 
of silent, asymptomatic, and pre-existent conditions in the 
clinical practice.

Conflicts of Interest
The authors have no conflicts of interest to declare.

References
1 Kalaria GP, Vora PH, Memon RR. An isolated pisiform fracture: a 
2 Verma V, Singh A, Kumar S, Singh MP. Isolated fracture of pisii-
form: case report of a rare injury of wrist. Int J Medical Update 
2016;11(01):19–21
3 Pevny T, Rayan GM, Egle D. Ligamentous and tendinous support of 
the pisiform, anatomic and biomechanical study. J Hand Surg Am 
1995;20(02):299–304
4 Kjosness KM, Hines JE, Lovejoy CO, Reno PL. The pisiform growth 
plate is lost in humans and supports a role for Hox in growth plate 
5 Fleege MA, Jebson PJ, Renfrew DL, Steyers CM Jr, el-Khoury GY. 
6 Yamaguchi S, Vegas SF, Patterson RM. Anatomic study of the 
pisotriquetral joint: ligament anatomy and cartilagenous change. 
J Hand Surg Am 1999;23(04):600–606
7 Werner Platzer. Taschenatlas der Anatomie, in 3 Bänden. 1: 
Bewegungsapparat. 9th ed. Stuttgart: Georg Thieme Verlag KG; 
2005:137–139
8 Rayan GM, Jameson BH, Chung KW. The pisotriquetral joint: 
anatomic, biomechanical, and radiographic analysis. J Hand 
9 Moojen TM, Snel JG, Ritt MJPF, Venema HW, den Heeten GJ, Bos KE. 
10 Raval P, Saeed N, Mahapatra AN. Isolated dislocation of pisiform in 
an 11-year-old, following a horse bite: a rare injury. Eur Orthop 
Traumatol 2013;4:273–275
11 Goriainov V, Bayne G, Warwick DJ. Traumatic dislocation of the 
389–390
12 Jacobs LG. Isolated fracture of the pisiform bone; a case report. 
Radiology 1948;50(04):529–531
13 McCARTY V, Farber H. Isolated fracture of the pisiform bone. 
Surg 2008; 11(01).
15 Hurni Y, Fusetti C, de Rosa V. Fracture dislocation of the pisiform 