




## Retroperitoneal Kirschner wire migration after surgical treatment in a patient with cerebral palsy

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In orthopedic surgeries, Kirschner (K)-wire is one of the most commonly used materials for the bone fixation.<sup>[1,2]</sup> Complications of using a K-wire are often wound-dependent complications which do not occur frequently. Such complications are relatively easier to treat without requiring a secondary surgery.<sup>[2]</sup> On the other hand, K-wire migration is the critical complication which may even result in possible mortality.<sup>[3]</sup> To the best of our knowledge, there have been only a few reports in the pediatric population with late-term migration of pelvic K-wire.<sup>[3-6]</sup>

In this case report of a patient with spastic type cerebral palsy sequel, following surgical treatment of developmental hip dysplasia, we presented the migration of the K-wire used in the stabilization of pelvic osteotomy, in the psoas muscle at the retroperitoneal region. The aim of the study was to call attention to the risk of K-wire migration in pediatric population.

### CASE REPORT

A 10-year-old male patient was routinely followed up by both physical therapy unit and our clinic due to the diagnosis of spastic diplegia. Based on his medical record, he lived in a small town and was given physical therapy starting from the age of one in a

### ABSTRACT

Although Kirschner (K)-wire is among the most commonly used implants in orthopedic surgeries, the migration of this material is a very rare complication. In this article, we present the case of a K-wire migration four years after the surgery detected during the routine control of a 10-year-old male patient who underwent surgical treatment due to the diagnosis of developmental hip dysplasia on the cerebral palsy. The aim of this study was to raise the awareness regarding this complication particularly for the pediatric orthopedic surgeons, and to recommend the removal of the K-wire as soon as bone union occurs.

**Keywords:** Cerebral palsy, K-wire complication, Kirschner-wire migration.

local physical therapy unit. This patient, who was later learned to be mobilized at the age of three-and-a-half, referred to our outpatient clinic in 2012 when he was 5 years old for the first time. The patient could walk with the help of support at that time. On the examination of the patient, it was determined that the hip adductor muscles, iliopsoas muscle, hamstring tendons, and Achilles tendons were all contracted. The presence of subluxation in both hips was also observed in the pelvic X-ray examination of the patient at this date (Figures 1, 2). In February 2012, the patient underwent open adductors tenotomy, iliopsoas tenotomy, percutaneous hamstring tenotomy, and open achilloplasty in order to correct the patient's walking disorder and prevent developmental hip dislocation due to adductor and iliopsoas contraction. Later on, the patient did not visit our clinic until 2014. In his examination in 2014, duck-like walking and positive bilateral Trendelenburg test were detected. The patient's examination revealed that the hamstring and Achilles tendons were not contractile, but the hip abductor tendons and iliopsoas tendon were contractile. When the patient was seen on the control at this date, he could mobilize without any support. After that, a developmental hip dislocation due to

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spastic type cerebral palsy was diagnosed and a radical reduction (adductor tenotomy, open reduction, femoral shortening, varization and derotation osteotomy and Salter pelvic osteotomy) was performed for the left hip with a double incision technique (hip anterior opening [Smith-Petersen incision] and thigh proximal lateral incision) in May 2014.<sup>[7]</sup> The Harris Muller plate and screws were used for the femoral osteotomy fixation and K-wire was used for Salter pelvic osteotomy fixation. After the surgery, hip spica cast was applied, and the cast was removed at the sixth postoperative week. On the X-ray assessment of the patient at the 12<sup>th</sup> week, the hip was found to be congruent while femoral and pelvic osteotomy lines' ossification were detected and the implants were stable (Figure 3). Implant removal from the left hip and radical reduction to the right hip were planned for the patient. However, the patient subsequently did not attend to the follow-up session, and could not be reached through any communication way as well. The patient presented to our outpatient clinic on January 25, 2018 for control examination. The X-ray and tomography examination at the control session revealed that the K-wire migrated to the retroperitoneal region into psoas muscle (Figures 4-6). The patient had no complaints. Surgery was recommended to the patient. K-wire was then removed by an orthopedic surgeon and a general surgeon. The patient was operated in a supine position. Retroperitoneal region was entered through the left lower quadrant J incision between the abdominal muscles. The K-wire was

palpated in the psoas muscle and removed with the help of fluoroscopic imaging. A written informed consent was obtained from the patient's parents.

## DISCUSSION

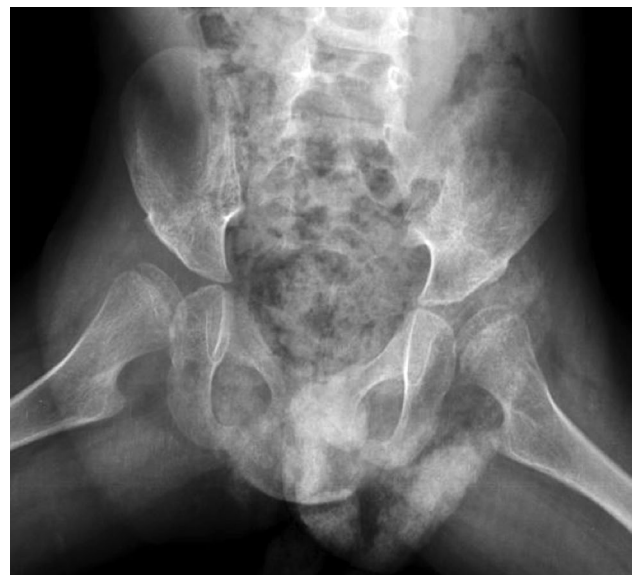
The K-wire was used for the skeletal traction for the first time.<sup>[2]</sup> Since K-wire has low cost and ease of use, it is used commonly in orthopedic surgeries.<sup>[1,2]</sup> Kirschner wire migration is in fact a rare complication although the migration risk is reported to be high because of its flexible structures.<sup>[8]</sup>

Kirschner wire migration has been reported to occur most frequently in shoulder circumferential surgeries such as clavicle, sternoclavicular, and acromioclavicular joints. In such case, it is mostly associated with the wide mobility of the shoulder joint.<sup>[9]</sup> On the other hand, K-wire migration in hip and pelvic region is rarely seen, and a limited number of case reports have been published so far in the literature. For example, Tamura et al.<sup>[10]</sup> and Fong et al.<sup>[11]</sup> contributed to the literature with the case reports of K-wire migration in the 25<sup>th</sup> and 10<sup>th</sup> years after the pelvic fracture treatment. In the case report presented by Tamura et al.,<sup>[10]</sup> they stated that K-wire migration caused the formation of inflammatory polyp. Similar to these cases, Matsumoto et al.<sup>[12]</sup> reported K-wire migration, which led to colon perforation 26 years after pelvic fracture surgery.

Based on our literature search, four case reports of late term pelvic K-wire migration in children have



**FIGURE 1.** Anteroposterior pelvis X-ray of patient in preoperative period.



**FIGURE 2.** Anteroposterior pelvis X-ray in abduction internal rotation position in preoperative period.



**FIGURE 3.** Anteroposterior pelvic radiograph of patient at 12<sup>th</sup> postoperative week.

been published so far.<sup>[3-6]</sup> In one of them, Yurtçu et al.<sup>[4]</sup> reported that the transarticular K-wire, which was placed to reduce the hip, was migrated to the bladder four years after developmental hip dislocation surgery. In the second case presented by Marya et al.,<sup>[5]</sup> a transarticular K-wire was used for the five-year-old patient in the same technique as in Yurtçu et al.'s study<sup>[4]</sup> The K-wire was migrated to the liver asymptotically after the plaster cast was



**FIGURE 4.** Appearance of Kirschner wire migration on pelvis and lumbosacral anteroposterior control radiography at fourth postoperative year.



**FIGURE 5.** Appearance of Kirschner wire migration on lumbosacral lateral control radiography at fourth postoperative year.

removed.<sup>[5]</sup> The last cases are the symptomatic late term K-wire migration pediatric cases presented by Baghdadi et al.<sup>[3]</sup> and Şahin and Karakaş.<sup>[6]</sup> In the case report by Baghdadi et al.,<sup>[3]</sup> they stated that a 10-year-old patient with osteogenesis imperfecta was fixed in the subtrochanteric region fracture using tension band technique with two K-wires and one Cerclage wire. One year after the surgery, they reported the detection of the K-wire migration to the retroperitoneal region in the patient who presented with chest pain and back pain.<sup>[3]</sup> In the last case report study about K-wire migration, Şahin and Karakaş<sup>[6]</sup> reported that they found K-wire migration in three cases after pelvic osteotomy



**FIGURE 6.** Appearance of Kirschner wire in cross-section tomographic image in abdomen.

surgery in pediatric patients. Yurtcu et al.<sup>[4]</sup> and Marya et al.<sup>[5]</sup> reported that this complication can be prevented by tilting the K-wire outside the skin. Firoozabadi et al.<sup>[13]</sup> further suggested that the migration complication can be prevented by the K-wire bending technique they described. Şahin and Karakaş<sup>[6]</sup> suggested that the K-wire should be removed as soon as possible.

In our case, although the tip of the K-wire was already bended, the K-wire was still migrated. This situation was attributed to the non-rigid structure of the K-wire and the excessive muscle contractions because of the diagnosis of the patient's existing spastic type cerebral palsy. To the best of our knowledge, this is the first case in the literature with the diagnosis of cerebral palsy and late term K-wire migration.

To prevent migration of the K-wire, Firozoobadi et al.<sup>[13]</sup> suggested bending the K-wire as they described. However, we suggest that the K-wire should be removed as soon as possible.

In conclusion, in this case report, we wanted to share our experience with our colleagues who are interested in the possible migration of the K-wire following hip surgery of patients with spastic type cerebral palsy and developmental dysplasia of the hip. We recommend that the possibility of this complication should be shared with the patient before the surgery and K-wire should be removed as soon as bone union occurs.

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