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Medial Patellofemoral Ligament Injury in Children: Letter

Peter Balcarek, Daniel W. Green, Christopher K. Kepler and Hollis G. Potter

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Letter to the Editor

Dear Editor:

I read with great interest the article by Kepler et al titled "Zone of Injury of the Medial Patellofemoral Ligament After Acute Patellar Dislocation in Children and Adolescents."⁴ I would like to commend the authors' efforts in addressing this problem that has a clear surgical implication because errors in the interpretation of the medial patellofemoral ligament (MPFL) injury location can compromise a successful surgery. However, there is a need to comment on several points of this article. First, the authors summarized the results of 6 studies (including their own study) describing the location of injury to the MPFL based on MRI (Table 1). The last cited study was the article by Zaidi et al published in 2006. However, there have been several articles published more recently that investigated MPFL injury patterns.^{1,3,6} The results of these articles should have been taken into account because the remarkable difference with regard to injury location among the studies is striking. Second, the authors found that the MPFL insertion site averaged 5 mm distal to the medial physis and stated that no study before had investigated femoral attachment sites with respect to the growth plate. However, a previously published article by Shea et al⁵ found that the origin of the MPFL is just proximal to the femoral physis. Third, in their "Discussion" section, the authors stated, "No previous study has characterized pediatric/adolescent MPFL injury using only patients with MRI stigmata of acute dislocation." Indeed, in a previous study, Balcarek et al² posed the same question and compared MPFL injury patterns in children and adolescents after first-time lateral patellar dislocations with the injury patterns in adults. The imaging examinations were performed within 13 days (range, 1-34 days) of the injury. The authors concluded that the pediatric MPFL injury patterns, as seen on MRIs, were similar to those in adults.

I do believe that the value of the current article would not have been compromised when these earlier works were cited. Instead, it would have offered the opportunity of a more fruitful discussion on MPFL injury patterns as a relevant problem when treating patellar dislocations.

Peter Balcarek, MD
Göttingen, Germany

Address correspondence to Peter Balcarek, MD (e-mail: peter.balcarek@med.uni-goettingen.de).

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Authors' Response: We would like to thank Dr Balcarek for his interest in our article, "Zone of Injury of the Medial Patellofemoral Ligament After Acute Patellar Dislocation in Children and Adolescents," and his letter to the editor.

Dr Balcarek commented on 3 points; 2 of the 3 points relate to the fact that additional articles about the zone of injury of the medial patellofemoral ligament (MPFL) have been published since our manuscript was initially submitted to the 2010 AOSSM meeting and subsequently to *AJSM*. We thank Dr Balcarek for bringing these articles to the attention of the *AJSM* readers.

A third area raised by Dr Balcarek concerns the relationship between the MPFL femoral insertion and the distal femoral growth plate. He cites a recent study by Shea et al³ that concludes that the distal femoral insertion is proximal to the growth plate. Although we have the highest respect for Shea et al, we believe there are weaknesses in their study. First, in their indirect radiographic study, the MPFL was not visualized via dissection or MRI. In addition, to determine the position of the growth plate, only a lateral radiograph of the knee was used; they did not perform anatomic dissection, anteroposterior knee radiographs, or MRI.

We believe that because the distal femoral growth plate is not flat, one cannot use the appearance of the physis on a 2-dimensional lateral radiograph alone to identify the exact location of the most medial aspect of the distal femoral growth plate. This can be demonstrated on the following tomographic MRI of an immature knee to which we have added 2 reference lines (Figure 1). The distal reference line simulates the orientation of an x-ray beam when taking a conventional lateral radiograph: typically, the knee is positioned so that the medial and lateral femoral condyles overlap. The proximal line is used to simulate the location of the most well-defined aspect of the distal femoral growth plate, which one would most easily identify using a lateral knee radiograph. However, as one can see from the curvilinear shape of the growth plate on the coronal MRI, a single lateral radiograph cannot be accurately used to determine the exact position of the medial aspect of the growth plate.

We stand by the conclusions of our MRI study that the MPFL femoral attachment is not proximal to the medial femoral growth plate. We hope to characterize the subtle anatomic pattern of the distal femoral growth plate in future study.

Finally, we would like to stress that if a surgeon secures an MPFL reconstruction into the distal femur proximal to an active distal femoral growth plate, the femoral insertion point of the MPFL reconstruction will move away from the knee proximally at a rate of 9 mm/y until skeletal maturity,² leading to possible contracture and loss of MPFL isometry. To avoid this issue, we recommend an epiphyseal insertion technique or the soft tissue approach as reported by Arendt¹ to secure an MPFL reconstruction in a skeletally immature patient.

Daniel W. Green, MD
Christopher K. Kepler, MD, MBA
Hollis G. Potter, MD
New York, New York

Address correspondence to Christopher K. Kepler, MD, MBA (e-mail: chris.kepler@gmail.com).

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Figure 1. The distal reference line simulates the orientation of an x-ray beam when taking a conventional lateral radiograph: typically, the knee is positioned so that the medial and lateral femoral condyles overlap. The proximal line is used to simulate the location of the most well-defined aspect of the distal femoral growth plate, which one would most easily identify using a lateral knee radiograph.

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