Classification of Dysplastic Femoral Trochlea Depends on Evaluation Plane in Patients with Patellar Instability

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I have no financial conflicts to disclose.
We hypothesized that a dysplastic trochlear type on an axial view provided by the Dejour classification could not represent the entire trochlea.
Purpose

To confirm whether or not the trochlear types on an axial view categorized according to Dejour’s classification represent the entire trochlear shape in patients with patellar instability and in healthy volunteers on three-dimensional computer models.
Subjects

90 knees of 81 patients with patellar instability (PI)
- Female: 62, Male: 19
- Mean age: 21 (12 - 54)
- No prior surgery

15 knees of 10 healthy volunteers (HV)
- Female: 6, Male: 4
- Mean age: 24 (17 - 30)
- No prior surgery
The femoral trochlear planes (FTPs) were established as the virtual cross sections which included the trans-epicondylar axis (TEA).

FTP $\theta$ was defined as the plane making optional angle $\theta$ about TEA to FTP 0.

Trochlear shape was evaluated on FTP 10, 20, 30, 40, 50 and 60.
Evaluation

MRI axial

Dejour’s classification

A knee with a smaller sulcus angle than 145° was defined as normal type.

Dejour H. *KSSTA* 1994

Dejour D. *Med Hyg* 1998

Lippacher S. *AJSM* 2012
Results

Change of trochlear types

PI (90 knees)

HV (15 knees)
Change of trochlear types according to the Dejour classification

Type A

Type C

Type B

Type D
## Agreements of trochlear type on each FTP with that of clinically-used Dejour classification according to the MRI axial plane

<table>
<thead>
<tr>
<th>MRI axial plane</th>
<th>Total number</th>
<th>Number of knees showing agreement with the clinically-used Dejour classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FTP10</td>
<td>FTP20</td>
</tr>
<tr>
<td>PI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(12%)</td>
<td>(59%)</td>
</tr>
<tr>
<td>A</td>
<td>25</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>(36%)</td>
<td>(88%)</td>
</tr>
<tr>
<td>B</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>(60%)</td>
<td>(16%)</td>
</tr>
<tr>
<td>C</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>(55%)</td>
<td>(35%)</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(33%)</td>
<td>(33%)</td>
</tr>
<tr>
<td>total</td>
<td>90</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>(42%)</td>
<td>(49%)</td>
</tr>
<tr>
<td>HV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(20%)</td>
<td>(80%)</td>
</tr>
</tbody>
</table>
The majority of patients with PI (98%) showed changes in their trochlear types on FTPs.

It is difficult to describe the entire trochlear shape using an axial image with the Dejour classification.
Change of trochlear types with various patterns

Various patterns might be caused by 3D morphological variation of dysplastic trochleae.
Conclusion

The trochlear types on an axial view provided by the Dejour classification do not represent the entire trochlear geometry.

References
