CONGENITAL FIBROSIS OF THE VASTUS INTERMEDIUS MUSCLE

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Two articles in the Journal of Bone and Joint Surgery have referred to the condition of progressive fibrosis of the vastus intermedius muscle in children (Hněvkovský 1961, Fairbank and Barrett 1961). In this paper a further six cases are described. All the patients were Chinese and all but one were females (Table I). Hněvkovský noted that in all his twelve cases knee movements were restricted only very little at first and that it was only in the course of time that they became more and more limited. This was also true in one of our cases (Case 2) and in Fairbank and Barrett’s case. But in two of our cases (Cases 5 and 6) the condition is said to have been present since birth. This, together with the occurrence of other congenital anomalies in three of Hněvkovský’s cases and in two of our six cases and the pathological changes described, is thought to justify the prefix “congenital” to the title. This fibrosis may be more or less pronounced in the beginning, and this would explain the time factor in the appearance and the progress of the symptoms. Hněvkovský too mentions the possibility that the condition may be congenital in origin.

Clinical features—The most striking clinical feature is the definite block to flexion at a variable angle. In most cases this occurs at only 5–15 degrees, and in one patient (Case 2) no flexion at all was possible at the time of operation. In the younger children it was possible to show at operation that this block was caused by tightness of the tendon of the vastus intermedius and that it was released after division of the tendon.

<table>
<thead>
<tr>
<th>Case number</th>
<th>Sex</th>
<th>Side</th>
<th>Other congenital anomalies</th>
<th>Age at onset</th>
<th>Knee flexion Age (years)</th>
<th>Range (degrees)</th>
<th>Age at operation (years)</th>
<th>Knee flexion after operation</th>
<th>Time after operation</th>
<th>Range (degrees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female</td>
<td>Bilateral</td>
<td>Cardiac defect</td>
<td>Not known</td>
<td>1</td>
<td>100</td>
<td>30</td>
<td>No operation (cardiac defect)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>Bilateral</td>
<td>—</td>
<td>Not known</td>
<td>2</td>
<td>50</td>
<td>50</td>
<td>3</td>
<td>5 months</td>
<td>140–135</td>
</tr>
<tr>
<td>3</td>
<td>Female</td>
<td>Left</td>
<td>Recurrent dislocation right patella</td>
<td>10 months</td>
<td>5</td>
<td>15</td>
<td>5</td>
<td>3</td>
<td>3 years</td>
<td>135</td>
</tr>
<tr>
<td>4</td>
<td>Female</td>
<td>Left</td>
<td>—</td>
<td>3 years</td>
<td>6</td>
<td>15</td>
<td>7</td>
<td>8 months</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>Left</td>
<td>—</td>
<td>Noticed at birth</td>
<td>9</td>
<td>10</td>
<td>9</td>
<td>11 months</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Male</td>
<td>Right</td>
<td>—</td>
<td>Noticed at birth</td>
<td>24</td>
<td>5</td>
<td>24</td>
<td>7 months</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>
In addition to the secondary changes in the shape of the bony parts of the joint, chondromalacia of the patella was seen at operation in two cases (Cases 5 and 6) (Fig. 1). In one child only nine years old (Case 5) the articular surface was severely eroded with malacia of the whole cartilage.

**Radiological features**—Hněkovský pointed out that the patella, if visible, is higher on the affected than on the normal side (Fig. 2). There may be a tendency to hyperextension of the knees (Fig. 3). It may be that the cases of congenital hyperextension of the knee that do not yield in any way to conservative treatment may be caused by fibrosis of the vastus intermedius muscle. In cases of long standing there is marked flattening of the femoral condyles, particularly of the lateral condyle (Fig. 4). This may be explained by the tightness of the band of tensor fasciae latae which has been shown at operation.

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**FIG. 1**

Figure 1—Case 6. Findings at operation. The patella has been everted to show its articular surface. Note the severe destruction of its articular cartilage, with exposure of bone over almost the whole surface. Figure 2—Case 5. Left knee affected. Antero-posterior radiographs of knees, with patellae outlined. The left patella is smaller and placed higher than the right (left). Note also the flattening of the joint surfaces and the smaller joint space in the left knee.

**FIG. 2**

**FIG. 3**

Figure 3—Case 2. Both knees affected. Lateral radiographs of both knees. Some hyperextension of both knees, more marked on the left side (right). Figure 4—Case 6. Antero-posterior and lateral radiographs of right knee of man of 24 years, showing the late changes associated with congenital fibrosis of the vastus intermedius. Note the deformity of the joint surfaces, especially of the lateral femoral condyle. This radiograph was taken after operation, at which the patella was removed at the same time as the quadricepsplasty was done.
Operation—The technique of operation has varied in the different cases. In Cases 3 and 6 a quadricepsplasty by the method of Bennett was employed. In Case 4 a Z-plasty of the vastus intermedius tendon was done together with a division of the tensor fasciae latae. Finally, in both knees of Case 2 as well as in Case 5 the tendon of the vastus intermedius was divided. The best results were obtained in those patients (Cases 2 to 4) in whom the simplest operation—division of the tendon of the vastus intermedius—was done (Table 1). It seems that this type of operation is sufficient if it is performed at an earlier age (preferably younger than in Case 2). The operation is most easily performed through a small incision at the junction of the tendons of vastus medialis and rectus femoris. The tight tendon of the vastus intermedius can be seen and divided transversely (Fig. 5).

![Figure 5](image)

**FIG. 5**

Figure 5—Case 6. Findings at operation. The rectus femoris muscle and tendon have been retracted to show the tight underlying tendon of the vastus intermedius. The incision is much larger than is necessary in a child. **FIG. 6**—Case 3. Good flexion of the left knee after operation for congenital fibrosis of the vastus intermedius muscle.

After operation the knees were immobilised in full length plasters at 90 degrees of flexion, except for Case 6, where that amount of flexion could not be achieved. The knees of the patients treated by simple division were immobilised only until the wound had healed.

Results of operation—A good improvement occurred in four knees (Cases 2 to 4). These were in the three youngest patients operated on. One knee attained 80 degrees of active flexion, an improvement of 70 degrees, and one (Case 6) did not benefit from the operation. Hněvkovský too obtained the best results in the two patients who were youngest at the time of operation. He stated that "Knee movement up to 90 degrees is sufficient for all important movements..." This may be so for Europeans but it is not for those of other races who spend much time in a squatting position (Fig. 6). In such people it is very important to gain as much flexion as possible. Hněvkovský stated too that "...eventually mobility can be still more improved by a further operation in later years." Judging from Cases 5 and 6 of this series this seems doubtful: secondary changes occur fairly early in the soft tissues and articular cartilage and later in the bony parts of the joint, and might well prevent any improvement from being gained by further operation.

The best results after operation are obtained when the patient is young. At that stage the fibrosis is localised only to the tendon of the vastus intermedius. In due course secondary
changes develop in the capsule and the ligaments of the joint, as well as in the articular cartilage of the patella, and both conditions will vitiate the end result. Operation is far simpler in a young child, where simple division of the tendon of the vastus intermedius is adequate.

SUMMARY
1. The cases of six Chinese children affected by so-called congenital fibrosis of the vastus intermedius muscle are described. The reasons for the choice of name are discussed.
2. Reasons for early operation are put forward: in young children simple division of the tendon of the vastus intermedius is adequate.
3. With increasing age severe changes in all the joint tissues occur, notably in the articular cartilage of the patella. These changes are likely to vitiate the result after operation.
4. The importance of getting as much flexion as possible in children of Asiatic race is stressed.

REFERENCES