PATELLAR INSTABILITY: A MODIFIED DELPHI CONSENSUS STATEMENT

Members of the Patellar Instability International Consensus Group

Disclosures

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- Kirk A. Campbell: Mitek and Stryker
- Miho J. Tanaka: DePuy, FujiFilm, Verywell
- James L. Pace: Arthrex, JRF Ortho
- Mary K. Mulcahey: Arthrex
- Jorge Chahla: Arthrex, CONMED Linvatec, Ossur, Smith & Nephew
Background

• Patellofemoral instability is a debilitating condition that causes knee dysfunction and can lead to patellar dislocation.

• Numerous societies have developed national and international consensus statements on a variety of topics utilizing the modified Delphi method.

• The Delphi technique has four main characteristics:
  – Anonymity
  – Iteration with controlled feedback of group opinion
  – Statistical aggregation of group response
  – Expert input
Purpose

• The purpose of this study was to establish consensus statements via the modified Delphi process on the diagnosis, non-operative management, and MPFC repair for patellar instability.

Hypothesis

• Our hypothesis was that there would be a strong consensus on most statements regarding patellar instability.
Methods

• 60 board-certified surgeons (members of AOSSM, AANA, ESSKA, ISAKOS and the Patellofemoral Foundation) participated in consensus statements

• The project involved 7 working groups:
  1. Diagnosis
  2. Non-operative Management
  3. Medial Patellofemoral Complex (MPFC) Repair
  4. Medial Patellofemoral Ligament (MPFL) Reconstruction
  5. Tibial Tubercle Osteotomy (TTO)
  6. Trochleoplasty
  7. Rehabilitation and Return to Sport
Methods – Modified Delphi Method

- A steering committee compiled an initial set of questions pertaining to each working group based on their own knowledge and review of the current literature.

- The modified Delphi method was used to generate consensus statements for each working group, with groups completing 3 initial rounds of questionnaires, followed by amendments, and lastly a final vote.

  1. Questions progressed from an open-ended to a more structured format, progressing based on the prior round's answers.

  2. Once a preliminary consensus statement was generated within a working group, the liaisons anonymously polled the participants as to whether they “agreed” or “disagreed” with it.

  3. If there was unanimous agreement within a group on a preliminary consensus statement, this statement was elevated to a final vote.

  4. If the agreement was not unanimous, questions were subject to further discussion by members of the entire consensus group, with statements being amended where there was agreement with the proposed change.
Methods – Modified Delphi Method (cont.)

Final Voting

- The final voting process allowed all study participants to assess the consensus statements generated by the other working groups and vote on whether they “strongly disagree” or “disagree” or “agree” or “strongly agree” or were “neutral” with them.

- After the final votes for each question occurred, the degree of agreement was expressed using a percentage rounded to the nearest whole number.
  - “Unanimous consensus”: 100% of the votes in favor of a proposed statement.
  - “Strong consensus”: 90-99% agreeing or strongly agreeing
  - “Consensus”: 80-89% agreeing or strongly agreeing
  - “No consensus”: <80% agreeing or strongly agreeing
## Results – Overview

<table>
<thead>
<tr>
<th>Topic</th>
<th>Total Statements</th>
<th>Unanimous</th>
<th>Strong</th>
<th>Consensus</th>
<th>No Consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosis</td>
<td>8</td>
<td>1 (12.5%)</td>
<td>6 (75.0%)</td>
<td>1 (12.5%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Non-Operative Management</td>
<td>10</td>
<td>2 (20.0%)</td>
<td>4 (40.0%)</td>
<td>2 (20.0%)</td>
<td>2 (20.0%)</td>
</tr>
<tr>
<td>MPFC Repair</td>
<td>9</td>
<td>0 (0%)</td>
<td>4 (44.4%)</td>
<td>2 (22.2%)</td>
<td>3 (33.3%)</td>
</tr>
<tr>
<td>MPFL Reconstruction</td>
<td>15</td>
<td>0 (0%)</td>
<td>9 (60.0%)</td>
<td>4 (26.7%)</td>
<td>2 (13.3%)</td>
</tr>
<tr>
<td>Tibial Tubercle Osteotomy</td>
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<td>0 (0%)</td>
<td>5 (50.0%)</td>
<td>5 (50.0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Trochleoplasty</td>
<td>8</td>
<td>0 (0%)</td>
<td>2 (25.0%)</td>
<td>4 (50.0%)</td>
<td>2 (25.0%)</td>
</tr>
<tr>
<td>Rehabilitation &amp; Return to Play</td>
<td>8</td>
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<td>3 (37.5%)</td>
<td>2 (25.0%)</td>
<td>3 (37.5%)</td>
</tr>
</tbody>
</table>
Results – Unanimous Statements

• **Diagnosis**
  – “In the diagnosis of pediatric patients with patellar instability it is important to assess the status of the physes.”

• **Non-operative management**
  – “When undergoing non-operative management for patellar instability, patients should start range of motion exercises as tolerated once comfort permits.”
  – “Patients should start resistance training exercises once range of motion is normalized and patients can perform the exercises without apprehension.”

**No unanimous consensus was achieved for statements on MPFC Repair, MPFL Reconstruction, TTO, Trochleoplasty, or Rehabilitation / Return to Sport**
Results – Statements Not Achieving Consensus

• Diagnosis
  – “TTTG is superior to TT-PCL for diagnosing patellar distal malalignment. Either CT or MRI are acceptable for calculating the TTTG value.”

• Non-operative management
  – “Knee immobilization may be indicated for up to two weeks in the non-operative management of patellar instability for comfort, and the knee should be either locked in extension or allowed 30 degrees of flexion.”
  – “There is no role for orthobiologics in the non-operative management of patellar instability. However, orthobiologics may play a role if there is a concomitant cartilage injury.”

• MPFC Repair
  – “The primary indication for performing an MPFC repair for patients with patellar instability is a bony avulsion of the MPFC. Additionally, this is also the primary relative indication for performing a repair over an MPFL reconstruction.”
  – “The preferred technique for MPFC repair is by utilizing suture-anchors.”
  – “A VMO advancement may be beneficial to perform alongside an MPFC repair but not required.”
Results – Statements Not Achieving Consensus (cont.)

- **Tibial Tubercle Osteotomy**
  - "When using anchors, at least two should be used for fixation to the patella. Additionally, they should be kept at least 1cm apart."
  - "It is advantageous to fix the patellar side first in MPFL reconstruction as it is easier to avoid overconstraint."

- **Trochleoplasty**
  - "The indications for conducting a trochleoplasty in patients with patellar instability include a) Dejour B-D, Lateral trochlear inclination (LTI) < 5, and c) J sign Additionally, there is no role for an isolated trochleoplasty without MPFL repair/reconstruction."
  - "Osteochondral flap elevation poses minimal risk in terms of cartilage viability."

- **Rehabilitation & Return to Play**
  - "Patients should be allowed to weight-bear as tolerated following MPFL or reconstruction, and trochleoplasty does not impact this. In contrast with a TTO patients should be kept touch-toe weightbearing in a brace locked in extension, until there are radiographic signs of healing."
  - "Patients should not be immobilized following MPFL or reconstruction, and trochleoplasty should not impact this."
Conclusions

• A majority of statements concerning diagnosis, non-operative, and operative management of patellar instability achieved strong consensus.

• There remains a lack of consensus regarding:
  – The role of knee immobilization in non-operative management
  – Use of orthobiologics in non-operative management
  – Indications for MPFC repair
  – Anchor use in MPFL reconstruction and order of graft fixation (patella versus femur).
  – Indications for trochleoplasty
  – Weightbearing vs immobilization post-operatively
  – Whether pediatric patients should avoid early return to play.
References