Closed-Chain Quadriceps Strengthening and Hamstring Stretching in the Conservative Treatment of Medial Plica Syndrome: A Case Report

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Background
Medial Plica Syndrome (MPS) is a source of anteromedial knee pain. Caused by irritation of the medial plica (MP) by overuse, repetitive use or direct impact. Plica are folds on the synovial membrane formed as the synovial joint develops. Conservative treatment aimed at decreasing compressive forces at the knee are recommended. Interventions should include open-chain activities that cause minimal joint stress on the anterior aspect of the knee and hamstring stretching. Tight hamstrings place stress on the anterior aspect of the knee during extension.

History
13-year-old female in the seventh grade. Fell down the stairs and landed on her left (L) anteromedial knee. Diagnosed with chondromalacia patella and participated in physical therapy (PT). PT was terminated after little progress. She played soccer and ran track and field but was unable to participate. She lived at home with her parents and five siblings. Initial X-Rays of her L knee were negative for a fracture. An MRI, taken after conservative treatment failed and pain did not subside with rest, revealed an inflamed MP.

Interventions
Hamstring stretching 2x30 seconds twice a day and once at each PT session. A home exercise program was to be performed once a day, each day.

Closed-chain quadriceps strengthening:
- Low level: quadriceps sets, mini-wall slides with a ball
- Moderate Level: Step-ups and step-downs, single leg squats and standing short arc quad sets
- Advanced Level: Leg Press and Single leg mini squats

As the patient progressed:
- Low Level: Single leg balance single leg stance while kicking a soccer ball
- Moderate Level: Single leg stance while kicking a soccer ball, lateral movement light jogging and the T-drill

Supine Hamstring Stretch

Home Exercise Program

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Sets and Repetitions</th>
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</thead>
<tbody>
<tr>
<td>Quadriceps Sets</td>
<td>2 sets of 20 Repetitions</td>
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<tr>
<td>SLR-Abduction</td>
<td>2 sets of 20 Repetitions</td>
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<tr>
<td>Mini-Wall Slides with Ball Squeeze</td>
<td>2 sets of 20 Repetitions</td>
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<tr>
<td>Clamshells (Side Lying Hip ER with TheraBand™)</td>
<td>2 sets of 20 Repetitions</td>
</tr>
<tr>
<td>Hamstring Stretching</td>
<td>2 repetitions of 30 seconds 2 times a day</td>
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</tbody>
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Discussion
The patient showed a reduction of pain and avoided surgery. In the case of MPS, using closed-chain exercises and hamstring stretching could decrease force on the anterior aspect of the knee. This would allow for the plica to become less irritated, heal and prevent further irritation. This case report suggests that these therapeutic exercises may be beneficial in the conservative rehabilitation in this patient population.

In the future, it would be beneficial to look at long-term results of adolescent females with MPS that used closed-chain quadriceps strengthening and hamstring stretching.