Chronic Knee Pain after Partial Menisectomy

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Focused patient history and workup

- 52 year old male
- Chronic medial right knee pain since partial meniscectomy 9 years ago
- Pain worse after sitting for prolonged periods and has painful popping and catching of right knee
- Has had moderate relief with steroid and HA injections
- TTP right medial joint line but otherwise normal physical exam without loss of range of motion, deformity, instability, or effusion
List of imaging studies

- AP X-rays of both knees
- Sunrise view X-rays of both knees
- Lateral view X-ray of right knee
- Tunnel view X-ray of right knee
- MRI w/o contrast of right knee
AP view of both knees

Medial joint space narrowing of right knee with sclerosis. Preserved joint space of left knee. Otherwise negative x-ray
AP view of both knees

Medial joint space narrowing of right knee with sclerosis. Preserved joint space of left knee. Otherwise negative x-ray.
Sunrise view of both knees

Bilateral patellofemoral osteophytes
Sunrise view of both knees

Bilateral patellofemoral osteophytes
Lateral and Tunnel view of right knee

No fractures, dislocations, lesions, effusions

No loose bodies in the joint space, medial joint space narrowing and osteophytes
Lateral and Tunnel view of right knee

No fractures, dislocations, lesions, effusions

No loose bodies in the joint space, medial joint space narrowing and osteophytes
The body of the medial meniscus is blunted consistent with prior partial meniscectomy. Loss of articular cartilage with subchondral bone marrow edema-like signal.
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Complete loss of the weight-bearing region articular cartilage. Large posterior horn with intermediate signal, raises possibility of superimposed tear.
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MRI R Knee w/o contrast-T2 FS weighted Sagittal

Thickened ACL with near fluid-bright high T2 signal proximally, suggesting small partial tear in the setting of mucoid degeneration.
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Small popliteal cyst
Small popliteal cyst
Typical patient treatment

- Initial treatment involves rest, ice, quadriceps strengthening, unloading brace
- In setting of osteoarthritis, treatment to maximize osteoarthritis is recommended
- Restriction of motion, knee locking, concurrent ACL tear are indications for surgery
- This patient is currently being evaluated for repeat partial meniscectomy
### Imaging Algorithm

**Variant 1:**
Adult or child greater than or equal to 5 years of age. Chronic knee pain. Initial imaging.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiography knee</td>
<td>Usually Appropriate</td>
<td></td>
</tr>
<tr>
<td>Aspiration knee</td>
<td>Usually Not Appropriate</td>
<td>Varies</td>
</tr>
<tr>
<td>CT arthrography knee</td>
<td>Usually Not Appropriate</td>
<td></td>
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<tr>
<td>CT knee with IV contrast</td>
<td>Usually Not Appropriate</td>
<td></td>
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<tr>
<td>CT knee without and with IV contrast</td>
<td>Usually Not Appropriate</td>
<td></td>
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<td>O</td>
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<tr>
<td>MRI knee without IV contrast</td>
<td>Usually Not Appropriate</td>
<td>O</td>
</tr>
<tr>
<td>Tc-99m bone scan knee</td>
<td>Usually Not Appropriate</td>
<td>**</td>
</tr>
<tr>
<td>US knee</td>
<td>Usually Not Appropriate</td>
<td>O</td>
</tr>
<tr>
<td>Radiography hip ipsilateral</td>
<td>Usually Not Appropriate</td>
<td>**</td>
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### Variant 4:

**Adult or child greater than or equal to 5 years of age. Chronic knee pain. Initial knee radiograph demonstrates degenerative changes or chondrocalcinosis. Next imaging procedure.**

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<th>Relative Radiation Level</th>
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</thead>
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<tr>
<td>MRI knee without IV contrast</td>
<td>May Be Appropriate</td>
<td>O</td>
</tr>
<tr>
<td>Aspiration knee</td>
<td>May Be Appropriate (Disagreement)</td>
<td>Varies</td>
</tr>
<tr>
<td>CT knee without IV contrast</td>
<td>May Be Appropriate</td>
<td></td>
</tr>
<tr>
<td>MRI knee without and with IV contrast</td>
<td>Usually Not Appropriate</td>
<td>O</td>
</tr>
<tr>
<td>US knee</td>
<td>Usually Not Appropriate</td>
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Imaging discussion

- Should have at least a frontal projection radiograph, a tangential patellar view, and a lateral knee view.\(^3\)
- Standing positions are preferred to supine because they more accurately show weight bearing cartilage loss.\(^3\)
- MRI without IV contrast is appropriate when used to evaluate for potential surgical candidacy.\(^4\)
## Radiation Exposure and Cost

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<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>X-ray knee</td>
<td>0.001 mSv$^5$</td>
<td>$36-$580+$^6$</td>
</tr>
<tr>
<td>MRI knee w/o contrast</td>
<td>0</td>
<td>$634-$2,935+$^7$</td>
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Sensitivity and Specificity

- MRI has 95% sensitivity and 81% specificity for medial meniscal tears and 85% sensitivity and 93% specificity for lateral meniscal tears.\(^8\)
- With arthroscopy used as a gold standard, MRI was able to detect OA with 69% sensitivity and 93% specificity.\(^9\)
- With arthroscopy used as a gold standard, X-ray had a wide range of sensitivities (3-95%) and specificities (60-100%) for detecting OA.\(^{10}\)
Classic Imaging Findings of OA

Joint space narrowing <3mm on weight-bearing, subchondral sclerosis, marginal osteophytes, subchondral cysts, altered shape of the femoral condyle and tibial plateau
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Joint space narrowing <3mm on weight-bearing, subchondral sclerosis, marginal osteophytes, subchondral cysts, altered shape of the femoral condyle and tibial plateau
Classic Imaging Findings of Meniscal Tear$^{12}$

High intra-meniscal signal extending to at least one articular surface on T2, distortion of the normal meniscal morphology if no prior surgery
Classic Imaging Findings of Meniscal Tear

High intra-meniscal signal extending to at least one articular surface on T2, distortion of the normal meniscal morphology if no prior surgery
First line imagining in chronic knee pain is at least 3 view weight-bearing radiograph
MRI without IV contrast can be considered even in cases with positive radiograph findings if planning for surgery
MRI is best way to evaluate for meniscal tears and ligamentous injury
References