Innovations in
total knee arthroplasty

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Unicompartmental knee arthroplasty:

Isolated unicompartmental involvement requiring unicompartmental knee arthroplasty

- No significant degenerative changes in the other compartments
- Both cruciate ligaments should be intact
- Varus <15°, valgus <20°
- Flexion contracture <10° m
- Knee kinematics during flexion closely resemble the intact knee
- No significant advantage between fixed and mobile bearing tibial component.

Orthopedic Congress Moscow, September 17th, 2014
Conformis iUni with iFit technology

- Complete covering of cortical bone wedge reducing loosening risk
- Individually custom-made prosthesis
- Patientspecific one-way instruments

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Unicompartmental knee arthroplasty

Isolated unicompartmental PF involvement requiring unicompartmental PF knee arthroplasty

- 5-10% patients OA knee
- Younger patients with advanced PF without FT arthritis
- Varus <5°, valgus <10°
- Good resultats in more than 80%
- Full weight-bearing at 10-12 days
- Good range of motion within 30 days

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femoropatellar joint replacement

- Resection guide for femoropatellar plain bearing and drill

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femoropatellar joint replacement

- FP implant
54y male patient
- Isolated PF Osteoarthritis with subluxated Patella
- Previous lateral release without effect
- Postop x-ray same patient

femoropatellar joint replacement

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Bicompartmental knee arthroplasty: medial and femoropatellar involvement requiring bicompartmental knee arthroplasty

- Medial and PF compartments affected, ACL and lateral compartment remains healthy
- More complicated than unicompartmental knee arthroplasty, less invasive than TKA
- Long-term evidence is lacking.
- Contraindications are rheumatoid arthritis, flexion contracture, severe deformities and ACL laxity
Bicompartmental knee arthroplasty: medial and femoropatellar involvement requiring bicompartmental knee arthroplasty
Bicompartmental knee arthroplasty:

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Bicompartmental knee arthroplasty:
Bicompartmental knee arthroplasty:

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Reason for unsatisfied patient: malrotation of tibial compound

Solution:

Patientspecific tibia profile and anatomic orientation of tibia
Tricompartmental customered knee arthroplasty

**Average % Cortical Rim Coverage**

- **Medial**
  - ConforMIS: 77%
  - Stryker: 44%
  - Biomet: 46%
  - Zimmer: 41%

- **Lateral**
  - ConforMIS: 60%
  - Stryker: 41%
  - Biomet: 41%
  - Zimmer: 37%
  - MAKO: 38%
  - SNN: 29%

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Reason for unsatisfied patient: oversizing

Solution: Individual adaptation of design

Preserving knee flexor tendon

1.9 x
Higher pain risk in oversizing

Tricompartmental customized knee arthroplasty

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Tricompartmental customered knee arthroplasty

- High conformity dome Patello-Femoral joint
- Lowered lateral trochlea to decompress soft tissue
- Wide coronal geometry for high conformity to poly with low constraint

Patient specific intercondylar notch width, extended for optimal patella function.

Contact area (mm²) at 60° flexion

<table>
<thead>
<tr>
<th></th>
<th>iTotal G2 ¹</th>
<th>Sigma (Fixed Bearing)²</th>
<th>LCS (Mobile Bearing)³</th>
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<tbody>
<tr>
<td>60° flexion</td>
<td>271</td>
<td>116</td>
<td>242</td>
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Contact area (mm²) at 90° flexion

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<th>iTotal G2 ¹</th>
<th>Sigma (Fixed Bearing)²</th>
<th>LCS (Mobile Bearing)³</th>
</tr>
</thead>
<tbody>
<tr>
<td>90° flexion</td>
<td>337</td>
<td>123</td>
<td>189</td>
</tr>
</tbody>
</table>

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Reason for unsatisfied patient: „knee feels not normal“

Solution:
patient specific J-curve and asymmetric polycompounds
Tricompartmental customered knee arthroplasty

- Single use instruments + Implantats
Tricompartmental customered knee arthroplasty

- Patient specific tibial and femoral guide

- Patient specific tibial and femoral implants, asymmetric polycompounds

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