Current practice in HTO for Knee OA

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### Stages of Osteoarthritis

Detailed radiological assessment is absolutely essential for an accurate indication.

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>wear &lt; 50%</td>
<td>50% &lt; wear &lt; 100%</td>
<td>wear = 100%</td>
<td>penetration of the condyle in the tibial plateau</td>
<td>penetration of the condyle in the tibial plateau, posterolateral tibia subluxation and femorotibial decoaptation</td>
</tr>
</tbody>
</table>

**Modified Alhbäck criteria (Saragaglia et Roberts, Orthopaedics, 2005)**

The sooner the surgery, the better and long lasting the results

Better to operate stage I, II and sometimes III

Controversal to operate stages IV or V
X ray evaluation

Frontal and sagittal plane
Schuss view

Stress X rays

OA GRADE

Tibial slope

Courtoisie P. Neyret
Preop Planification

Proximal tibial osteotomy for osteoarthritis with varus deformity. A ten to thirteen-year follow-up study.
Hernigou P, Medevialle D, Debye J, Goutallier D.
The aim of HTO is to correct the varus deformity to transfer the constraints on the lateral knee compartment.
Which Technique

Several available

Closing wedge
Opening Wedge
Dome shape

Make your choice according the clinical situations and potential benefit
Several tricks and tips
Closing wedge

Advantage:
Bone contact
Better control for tibial slope
Less accuracy

But
Fibular osteotomy
Malunion of the proximal tibial
Patella Alta

Duivenvoorden T\textsuperscript{1}, Brouwer RW\textsuperscript{2}, Baan A\textsuperscript{1}, Bos PK\textsuperscript{1}, Reijman M\textsuperscript{1}, Bierma-Zeinstra SM\textsuperscript{1}, Verhaar JA\textsuperscript{1}. Comparison of closing-wedge and opening-wedge high tibial osteotomy for medial compartment osteoarthritis of the knee: a randomized controlled trial with a six-year follow-up. \textit{J Bone Joint Surg Am.} 2014
Opening Wedge

Advantage
Accuracy
Less malunion residual deformity
Preserve posterolaterales structures
But
Patella Baja
Increase tibial slope

Opening Wedge

Bone osteotomy

Check axis

Symmetric opening
Opening Wedge

Metallic wedge

Plate and screws
Ostéotomy associated with other procedures

Chronic anterior laxity with Prearthrosis

Acl reconstruction and Hig tibial osteotomy

Female 35 y.

Menisectomy and Instability

Varus deformation 5°

ACL reconstruction and HTO
ACL reconstruction and HTO
ACL reconstruction and HTO

1 à 3 ° valgus
ACL reconstruction and HTO

Literature: 15 studies.

No pain 60%
No instability 90%

X-ray:
1 - 3 ° valgus
No evolution
Patella height: 23%
Tibial slope+++
ACL reconstruction and tibial slope

Failure in Acl reconstruction

ACL reconstruction and deflexion osteotomie (Anterior closing osteotomy)

Deflexion Osteotomy

M Bonnin

ACL reconstruction and tibial slope

Pain, Instability and Varus
Knee OA

Objective
T slope at 4°
Medial approach
Efficiency on anterior tibial translation

Dejour D, Kuhn A, Dejour H. Ostéotomie tibiale de déflexion et laxité chronique antérieure, à propos de 22 cas. Rev Chir Orthop 1998; 84 SII : 28-29. 22 cas
ACL reconstruction and tibial slope

Ostéotomie de déflexion
Pente tibiale excessive > 13 °
Intra-articular surgery and osteotomy to protect the knee

Meniscus allograft
Cartilage defect surgery

Preventive Osteotomy???
## HTO in 2015: literature review

### Survivorship analysis

<table>
<thead>
<tr>
<th>Author</th>
<th>n=</th>
<th>5 y.</th>
<th>10 y.</th>
<th>15 y.</th>
<th>20 y.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dubrana France SOO 2007</td>
<td>214</td>
<td>92%</td>
<td>85%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flecher, CORR, 2006</td>
<td>372</td>
<td>95%</td>
<td>93%</td>
<td>90%</td>
<td>85%</td>
</tr>
<tr>
<td>Tang, Knee, 2005</td>
<td>67</td>
<td>90%</td>
<td>75%</td>
<td>67%</td>
<td>66%</td>
</tr>
<tr>
<td>Huang, 2005</td>
<td>93</td>
<td>94%</td>
<td>87%</td>
<td>75%</td>
<td></td>
</tr>
<tr>
<td>Koshino, Knee, 2004</td>
<td>75</td>
<td>97%</td>
<td>96%</td>
<td>93%</td>
<td></td>
</tr>
<tr>
<td>Aglietti, J Knee surg 2003</td>
<td>61</td>
<td>96%</td>
<td></td>
<td>81% at 10 y.</td>
<td>73% at 15 y.</td>
</tr>
<tr>
<td>Sprenger, JBJS Am 2003</td>
<td>76</td>
<td>86%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Billings, JBJS Am 2000</td>
<td>64</td>
<td>85%</td>
<td>53%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jenny, RCO, 1998</td>
<td>109</td>
<td>96%</td>
<td>91%</td>
<td>75%</td>
<td></td>
</tr>
<tr>
<td>Coventry, JBJS, 1993</td>
<td>87</td>
<td>89%</td>
<td>75%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Failure : revision by TKA**
Prognostics factors

- Joint space narrowing < 50 %
- Constitutional varus > 5°
- Age < 60 y.
- Laxity: no or moderate
- Global Varus < 15°
- Mobility: 5° - 100° No flexum
- No osteophytes
- No obese patients
- Evolution less than < 24 months

Vielpeau, SOFCOT 1991
Lootwoet, RCO, 1993
Koshino, Knee, 2004
Tang, Knee, 2005
AAOS guide lines 2000

Spahn, Osteoarthritis and Cartilage, 2006
Correction Value / Axis

Better Results with overcorrection

3° à 6° de valgus

10° à 16° de valgus anatomique (angle fémoro-tibial)

Amendola = 3° à 5° de valgus mécanique

Analyse bibilographique

Goutallier, RCO, 1986
Symposium SOFCOT, 1991 (Segal)
Lootwoet L., RCO, 1993
Koshino T, Knee, 2004

Yasuda, CORR, 1992
Majima, CORR, 2000
Amendola, Arthroscopy, 2003
Sprenger, JBJS Am, 2003
Aglietti, J Knee surg, 2003
Williams, Current Orthopaedics, 2006
Conclusion

• HTO for medial osteoarthritis at 60 y. old is always a good option for the patient with but the incidence is decreased

• HTO in association with meniscal, cartilage and Acl disorders for young active patient is very relevant and efficient.

• There is no indication for preventive osteotomy in excessive asymptomatic significant GVR of the young

• Several techniques but Respect de technique Vessels, Lateral Hinge
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