Forum de l'Institut Marcel Kerboull

Traitement des descéllements fémoraux aseptiques avec perte de substance osseuse majeure

C. PICAULT LYON France
- PERSONAL WORK

THR 1968 -....
REVISION OF SEVERE THR FAILURES ....
Transfemoral Approach (+ Wagner Stem) 1988 -....
Distal Locking 1992 -....

- MULTICENTRIC STUDY 1992 -.....

* AURA GROUP : Ph Charret.....
* ABG GROUP : G Asencio, J Essig, C Nourissat, ...
* J David, A Pailles
* JP Clarac

NUMEROUS COLLEAGUES

Clinical Evaluation Department Biomet Merck
(-2-) DETAIL

CIRCUMFERENTIAL DISSECTION

OF

PERIPROSTHETIC NEO-CAPSULE

BEFORE

ITS OPENING AND RESECTION

*CARCINOLOGIC RESECTION

*LARGE PERIARTICULAR RELEASE

of FEMUR AND FLAPS
TRANSFEMORAL APPROACH

PRIMARY DISTAL STABILIZATION

BY

JAMMING

WEDGING

PRESS FIT

SELF LOCKING
**WAGNER REVISION STEM**

*Picault C :* 40 cases  RCO 1988-1998
*Kolstad K, Adalberth G, Mallmin H :* 31 cases  Act Orth Scand 1996
*Boisgard PE, Tixier H, Levai JP :* 52 cases  RCO 2001
*Chang Dong Han :* 25 cases  AAOS 2002

**METAPHYSIS REBUILDING : 81 %**

DISLOCATION : 10%
LIMPING : « very » frequent  Greater Trochanter
LENGTH : 16%
SUBSIDENCE : 8%  Chang Dong Han : 100% < 11 mm
SECOND REVISION : over 10% before 8 year FU.

FOLLOW UP : STRESS SHIELDING / BONE ATROPHY PROGRESSIVE SUBSIDENCE REMOVAL : ?
POSSIBLE GOOD RESULTS WITH WAGNER STEM
EVEN IF
NARROW, NON HA-COATED, STRAIGHT, SHARP BLADED
WITH WAGNER STEM

LONG TERM SATISFACTORY RESULTS ARE POSSIBLE

IF LATE STABILIZATION IS SECURED WITH THE STEM REMAINING FREE IN THE DISTAL CANAL
JBJS 82-B, N° 8, 2000 : 1151-55

124 PRIMARY CEMENTLESS
4-7 year FU
PERIPROSTHETIC FRACTURES
7 : 5,6%

+ STRESS SHIELDING
LATE
METAPHYSEAL RADIOLUCENT SPACE
WITH DISTAL WEDGING
LORD

1984
EVIDENT NEED
OF
ENLARGED APPROACH
IN SEVERE THR FAILURES

* TROCHANTEROTOMY: ..........

* DIGASTRIC TROCHANTEROTOMY

* EXTENDED SLIDE TROCHANTERIC OSTEOΤOMY ‘ETO

PRESS FIT            MORE OR LESS DISTAL

NO DISTAL LOCKING WITH SCREWS
EXTENDED SLIDE TROCHANTERIC OSTEOTOMY
NO DISTAL LOCKING

* Christensen CP, Altausen PL, Benson ER, et al: Technique and Results of Extended Trochanteric Osteotomy for Femoral Revision, with a modular proximally loading femoral stem. AAOS 2001. poster.
EFFECTS OF STEM LENGTH ON STABILITY AFTER EXTENDED PROXIMAL FEMORAL OSTEOTOMY:

CEMENTLESS S-ROM NO DISTALLY LOCKED WITH SCREWS

S-ROM STANDARD LONG 215 mm
DO NOT PROVIDE ADEQUATE TORSIONAL STABILITY
AFTER 160 mm ETO

NEEDED STEM 255-315 mm
SAFETY ZONE = 70 to 155 mm

WITH DISTAL LOCKING WITH SCREWS
SAFETY ZONE = 60 mm
NECESSITY

of

TIGHT

METAPHYSEAL

OSTEOSYNTHESIS
40 fresh cadaveric human femurs

Surgeons manipulating the femur after ETO should be aware of dramatic reduction in torsional strength

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Mean Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intact State</td>
<td></td>
<td>128 N-m</td>
</tr>
<tr>
<td>ETO Specimens</td>
<td>71% reduction torque to failure</td>
<td>35 N-m</td>
</tr>
<tr>
<td>ETO Repair</td>
<td>No significant improvement</td>
<td>36 N-m</td>
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</tbody>
</table>

Noble et al AAOS 2003
TRANSFEMORAL APPROACH

PRIMARY DISTAL STABILIZATION

BY

DISTAL LOCKING WITH SCREWS
THIGHT OSTEOSYNTHESIS MANDATORY WITH DISTAL LOCKING

UNSTABLE METAPHYSIS = OVERLOADING ON SCREWS

STABLE METAPHYSIS = REGULAR LOADING ALL ALONG THE FEMUR

20-30 % LOAD DECREASE ON SCREWS
DISTAL LOCKING WITH SCREWS

LOCKED NAIL IN DIAPHYSEAL FRACTURES

DISTALLY LOCKED CEMENTLESS STEM IN THR REVISION

P. VIVES  SYMPOSIUM SOFCOT 1989

.............
STATISTICS

PROSPECTIVE STUDY

176 AURA
176 cases

WALKING ABILITY

<table>
<thead>
<tr>
<th></th>
<th>Pre op</th>
<th>Post op</th>
</tr>
</thead>
<tbody>
<tr>
<td>no stick</td>
<td>15,5</td>
<td>47,5</td>
</tr>
<tr>
<td>optional</td>
<td>13,8</td>
<td>32,7</td>
</tr>
<tr>
<td>permanent</td>
<td>35,5</td>
<td>13,6</td>
</tr>
<tr>
<td>1 crutch</td>
<td>13,2</td>
<td>34</td>
</tr>
<tr>
<td>2 crutches</td>
<td>16,4</td>
<td>2</td>
</tr>
<tr>
<td>standing</td>
<td>5,9</td>
<td>1,4</td>
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</table>
WALKING PERIMETER

176 cases

<table>
<thead>
<tr>
<th></th>
<th>Pre op</th>
<th>Post op</th>
</tr>
</thead>
<tbody>
<tr>
<td>no limit</td>
<td>7,4</td>
<td>54</td>
</tr>
<tr>
<td>&gt;500m</td>
<td>13,5</td>
<td>28,5</td>
</tr>
<tr>
<td>&lt;500m</td>
<td>42,6</td>
<td>12,4</td>
</tr>
<tr>
<td>indoor</td>
<td>29,7</td>
<td>2,9</td>
</tr>
<tr>
<td>bed&amp;chair</td>
<td>4,1</td>
<td>0,7</td>
</tr>
<tr>
<td>zero</td>
<td>2,7</td>
<td>0,7</td>
</tr>
<tr>
<td>Condition</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>Post Op Dislocation</td>
<td>9</td>
<td>5.1%</td>
</tr>
<tr>
<td>Screw Fracture</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Unlocking</td>
<td>17</td>
<td>9.7%</td>
</tr>
<tr>
<td>Systematic</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>14</td>
<td>8%</td>
</tr>
<tr>
<td>After Unlocking after unlocking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Migration</td>
<td>10</td>
<td>5.8%</td>
</tr>
<tr>
<td>&lt; 10 mm</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Replacement</td>
<td>8</td>
<td>4%</td>
</tr>
<tr>
<td>Re-revision</td>
<td>3</td>
<td>1.7%</td>
</tr>
</tbody>
</table>
77 years               83 years
6 year FU
3rd CEMENTED STEM

2 DISTAL FRACTURES

POST OP

3 y

CP
4th STEM
2 CEMENTED
2 CEMENTLESS
PSEUDARTHROSIS FOR 2 YEARS

2 Y POST OP
TOMOGRAPHY

CP
# CORTICAL INDEX IMPROVEMENT

measured at ….cm below the Lesser Trochanter

<table>
<thead>
<tr>
<th>SOFCOT</th>
<th>I - II</th>
<th>III-IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 cm</td>
<td>32</td>
<td>52%</td>
</tr>
<tr>
<td>8 cm</td>
<td>27</td>
<td>50%</td>
</tr>
<tr>
<td>15 cm</td>
<td>15</td>
<td>4%</td>
</tr>
</tbody>
</table>

**MAX. GAIN**

* AT THE LEVEL OF FLAPS

* in THE MOST SEVERE CASES

JP Clarac
STEM FREE IN THE DISTAL FEMORAL CANAL
-1- PROBLEMS

STEM FRACTURES
ACCIDENTAL DISTAL WEDGING

CEMENTED/CEMENTLESS STEM FRACTURE

10 y Post-Op
20 y PostOp
18 mPost Op
VOLUNTARY DISTAL WEDGING STEM FRACTURE

18 mPost Op
DISTALLY LOCKED STEM FRACTURE MAY OCCUR IF SHORT STEM

PRIMARY MALPOSITION IN VARUS

STEM NOT OVERPASSING THE APEX OF THE CURVE
STEM FRACTURE
at the
APEX OF THE FEMORAL CURVE
-2- PROBLEMS

FEMUR DEVIATIONS

MALPOSITION OF THE STEM

DIAPHYSEAL PERFORATIONS

FEMUR FRACTURES

HOW TO TAKE CARE OF FEMORAL DEVIATIONS USING INEVITABLY A LONGER STEM?
TWO SOLUTIONS

-1- OBTAIN CONGRUENCE BETWEEN STEM CURVATURE AND FEMUR CURVATURE DIFFICULT!

MODULARITY?

-2- RE-SHAPE THE FEMUR THE BONE COMING TO THE STEM
TULIP SHAPED AND DEVIATED METAPHYSIS

LARGE BONE STOCK LOSS

THREE THIRDS TECHNIQUE

1-FLAP LIFTING LINEA ASPERA
DIRECTLY OPENING THE CANAL

2- MAIN ANTERO LATERAL FLAP

3-TRANSVERSAL OSTEOTOMY
AT THE APEX OF DEVIATION

4-LONGITUDINAL SECTION
OF THE FEMUR MEDIAL PART
CLOSE CONTACT «BONE-STEM» with TRANSVERSAL OSTEOTOMY OF MEDIAL CORTEX OSTEOSYNTHESIS
THE POSITIONING DEVICES

STILL IN USE

FOR

LARGELY OPENED PROXIMAL FEMUR

LOST LANDMARKS !!!!

STEM LENGTH IN TOTALITY
STEM LENGTH IN THE CANAL
NECK ANTEVERSION
DISTAL LOCKING
ACCORDING TO PREOPERATIVE PLANNING
ADJUSTMENT
WITH TRIAL STEM IN STEM-HOLDER

FIXATION OF THE DEFINITIVE STEM

LOCKING

LENGTH

DLS ABG

ANTEVERSION
modulable alignment bracket
-3- PROBLEMS

HOW MANY SCREWS

2……..10…>
Case report 14

- CD, male, age 50
- 1979 - primary arthroplasty
- 1998 - loosening of both components, large debris granuloma

KENT HIP
STRAIGHT STEM
NUMEROUS SCREWS

ROMANIAN SERIES:
142 cases. 8 y FU. Antonescu D, et al. 2002

1993 - 2001
TWO SCREWS

+10y after 1° revision

Post Op

2y

7y

CP
PSEUDARTHROSIS OF GREATER TROCHANTER

ETIOLOGY

* SHORT TROCHANTEROTOMY

* PROGRESSIVE WEAKNENING OF LATERAL CORTEX
GREATER TROCHANTER REBUILDING

TITANIUM HEAD: WORN OUT

CERAMIC CUP: BROKEN

METALLOSIS
PROGRESSIVE WEAKENING OF LATERAL CORTEX OF TROCHANTERIC REGION

HYPO VASCULARIZED WORKING IN TRACTION
PSEUDARTHROSIS OF GREATER TROCHANTER

11% PREOP

50 - 60% UNION
104 & 176 cases AURA

BENEFITS OF FEMORAL FLAPS OVERLAPPING BONE GRAFT TROCHANTERIC PLATE
-5- PROBLEMS

CORTICAL THICKENING

AT TIP OF STEMS

AT LOCKING LEVEL
LONG TERM
DISTAL CORTICAL THICKENING
CEMENTED - CEMENTLESS STEMS

CHARNLEY 30%

OVER 15 YEAR FU
DISTAL CORTICAL THICKENING IN ASYMPTOMATIC PATIENTS
CORTICAL THICKENING AT THE LOCKING LEVEL

66 / 176 = 37.5%

PAINFUL

17 / 176 = 10%
-6- PROBLEMS

PAINFUL PATIENT / STEM INSTABILITY

REBUILT FEMUR
FEMUR REMODELING
LATE MIGRATION
CORTICAL THICKENING
SCREWS FRACTURES
SCREWS BREAKAGE IN HIGH DEMANDING PATIENT

CLIMBING AND DESCENDING KILIMANJARO MOUNTAIN

DA
1 MONTH AFTER UNLOCKING FOR PAIN
MIGRATION 13 mm
BONE ATROPHY BY STRESS SHIELDING

SPONTANEOUS REBUILDING

PEROPERATIVE PRESERVATION OF REMAINING BONE STOCK
NORMALIZED BIOMECHANICAL SOLLICITATIONS
ASYMPTOMATIC PATIENTS
OSSEOINTEGRATION?
TYPE OF INTERFACE?
84 year old    10 year FU    105 Kg
NO FIBROUS TISSUE

QUALITY OF INTERFACE BONE - HA COATING

RADIOLOGICAL APPEARANCE

REALITY
THE AIMS OF TRANSFEMORAL APPROACH

* BONE STOCK RESTORATION

* OSTEOSYNTHESIS

= GREATER TROCHANTER POSITIONING HORIZONTALLY - LATERALLY

= ANTI-DISLOCATION MUSCLES LEVEL ARM

= BONE - HA COATING CONTACT
THE AIMS OF

DISTAL LOCKING WITH SCREWS

VERTICAL ROTATIONAL

TEMPORARY STABILITY