Medial Uni Knee Arthroplasty
Correcting to Neutral
May Be The Wrong Answer!

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Medial UKA & Alignment
Unicondylar Knee Replacement
The Literature and Alignment

- Normal Aligned Knee
  - 0-2° Varus
    - Medial Compartment Load
      - Approximately 70%
    - Lateral Compartment Load
      - Approximately 30%

- Varus Alignment
  - >2° Varus
    - Increased Medial Compartment Load
      - 4x Greater Risk of OA Progression
  - Large Varus Deformity ≥7°
    - Even Greater Risk of OA
      - Surgical Intervention?
        - HTO? TKA? UKA?

- Intraoperative Alignment Correction?

Medial UKA & Alignment
Unicondylar Knee Replacement
The Literature and Alignment

Optimal Postoperative Alignment

- No Consensus
- **Vasso (2015) - Avoid Neutral**
  - 2-7° Varus Postop Alignment
    - International Knee Society (IKS) Scores
      - Outcome Scores Superior
        - If Correction Wasn’t Neutral or Valgus Alignment
  - **No Specific Guidelines on Amount of Intraoperative Correction**
- **Kleeblad & Pearle (February 2018)**
  - 200 Patients w/Large Preop Varus Deformity (7-18°) - Underwent UKA
    - Intraoperative Alignment Correction
      - Avg 6° (Range 0-14°)
    - Postop Alignment
      - Optimal (<4°) 62%
      - Acceptable (5-7°) 36%
      - >7° Varus 2%
  - **No Correlation To Outcomes**

Medial UKA & Alignment
Purpose

- Determine In Medial UKA
  - Ideal Postoperative Alignment
    - Preoperative Deformed Knees
      - Varying Degrees of Varus
        - <4°, 5-7°, 7-15° and 12-15°

- Understand the Impact of Alignment on:
  - Prosthesis Longevity
  - Functional Outcomes
    - KOOS
    - WOMAC
    - Lysholm

- Determine Guidelines for Intraoperative Corrections
Medial UKA & Alignment

Methods

Cohort

- Level IV Cross-Sectional Study
  - Consecutive Series-143 Patients

- Medial UKAs (1999-2016)
  - Single Surgeon (KDP)
  - Indications
    - Isolated Medial Compartment OA
    - Varus Deformity ≤15°
      - Passively Correctable
  - Same Day Arthroscopy
    - Lateral & Patellofemoral Compartments Inspection
    - Loose Bodies Removal If Present
    - Treatment of Lateral Meniscus Tears

- Minimum 2 Year Follow-Up
Medial UKA & Alignment Methods
Subjective & Objective Evaluation

- Preop and Post Op Evaluation
  - Physical Examination
    - Range of Motion (ROM)
    - Strength Testing
    - Gait Analysis
  - Radiographic Evaluation
    - Plain Radiographs
    - MRI Evaluation

- Functional Evaluation
  - Lysholm
  - WOMAC
    - Lower Score
      - Better Function
  - KOOS
    - Higher Score
      - Better Function
Medial UKA & Alignment

Methods

Plain Radiographic Knee Series

➢ Preop
  ◆ Anteroposterior (AP) View
  ◆ Rosenberg View
    ✓ PA View
      - 45° Flexion
  ◆ 3-Foot Standing
    ✓ Mechanical Axis
      • Independent Observer
      • Negative Numbers = Valgus Alignment

➢ Postop
  ◆ Any Disease Progression
    ✓ Lateral Compartment
  ◆ Patellofemoral Compartment
  ◆ Signs of Loosening
  ◆ Prosthesis Wear-Poly?
Medial UKA and Alignment Methods
Surgical Technique-Non Robotic

- **Femoral Exposure**
  - Distal Femur
    - Intramedullary Technique
  - Femoral Cutting Jig
    - Expose 2mm Superiorly Cartilage
    - Place Guide as Close to Notch
    - Drill Peg Holes Prior to Saw Cuts

- **Tibial Exposure**
  - Remove Any Osteophytes
    - Use TKR Depth Gauges
      - Minimal Resection
  - Align the Trial Tibial Baseplate
    - Ensure Complete Coverage
      - Avoid Overhang of Trial on MCL
  - Drill Tibial Fixation Holes
Placing Components

 Emblem Cement the Tibia
  ✓ Place a Sponge Posteriorly
  ✓ Replace Z Retractors Carefully
    • Do Not Re-Introduce Cement

 Emblem Cement the Femur
  ✓ Beware of Hyperflexion
    • Displaces the Tibial Component

 Emblem Remove All Cement Fragments
  ✓ Obtain Audible Snap For the Real Tibial Spacer
143 Medial UKAs
- 124 Patients
  - 61 Male; 63 Female
- Average Age 65 Years
  - Range 39-87 Years
- Average BMI 28.5
  - Range 18.9-45.4
  - Overweight

Average Follow Up
- 7 Years ± 3
  - Range 2-17 Years

No Evidence of Medial Failure!
- 141/143 Knees
  - Loosening, Osteolysis, Polyethylene Wear

Conversion to TKA – 2 Knees
- Lateral Compartment Overload
  - N=2 (1.4%) (143 Patients)
    - 12˚ Varus Corrected to 2˚ Varus
    - 5˚ Varus Corrected to Neutral
      - Revised to TKA at 19 & 21 Months

BMI Classification
- 18.5 or less: Underweight
- 18.5 to 24.99: Normal Weight
- 25 to 29.99: Overweight
- 30 to 34.99: Obesity (Class 1)
- 35 to 39.99: Obesity (Class 2)
- 40 or greater: Morbid Obesity

Number of Patients
- 2-5: 44
- 5-9: 55
- 10-14: 13
- 15+: 2
Medial UKA & Alignment Results

Range of Motion/Functional Outcomes

- Significant Improvement in Postop ROM
  - **Extension** (p=0.005)
    - Preop Average 3° ± 4.1°
      - Range 0-15°
    - Postop Average 1° ± 2°
      - Range: -3-15°
  - **Flexion** (p<0.0001)
    - Preop 121° ± 12°
      - Range 90-145°
    - Postop 128° ± 8°
      - Range 100-148°

- Postop Functional Scores
  - **KOOS/WOMAC**
    - Good to Excellent
  - **100% Return to Preop Sports**
    - Tennis, Skiing, Golf, Running

Postoperative Functional Scores

![Graph showing postoperative functional scores for various sports and domains such as WOMAC, Lysholm, KOOS Symp, KOOS Pain, KOOS Life, KOOS Sport, KOOS QOL. Lower scores indicate better function.]
Medial UKA & Alignment

Results

Radiographic Evaluation (N=143)

- **Mechanical Axis**
  - Preop Varus 7.7° ± 4° (SD)
    - Range: -6 to 15°
  - Postop Varus 5.6° ± 4.3° (SD)
    - Range: -10 to 6°
    - P<0.0001

- **Intraoperative Correction Alignment (Less Varus)**
  - Avg 2.5°
    - Range: 0-10°
  - Postop Alignment
    - No Impact on Functional Outcomes
      - All R² < 0.10
        - All P-Values > 0.05 (NS)
Midterm Follow Up 7yrs ± 3 (SD)
- Minimal Failure Rate 1.4%
  - Lateral Knee Pain
    - Overcorrection of Large Varus Deformity (12°)
  - TKA 10 Year Survival Rate
    - 90-98%

Operative Alignment Correction
- Mild to Moderate Varus Deformity
  - Correction 2.5°
- Severe Varus Deformity (12-15°)
  - Correction 4°
  - Maintain High KOOS/Low WOMAC Scores

Ideal Alignment For Uni TKA?
- Not Just 3° of Varus
- We Need to Correct to Constitutional Not Absolute Varus!