

# BMAC\* Intervention Versus Joint Arthroplasty for Arthritis

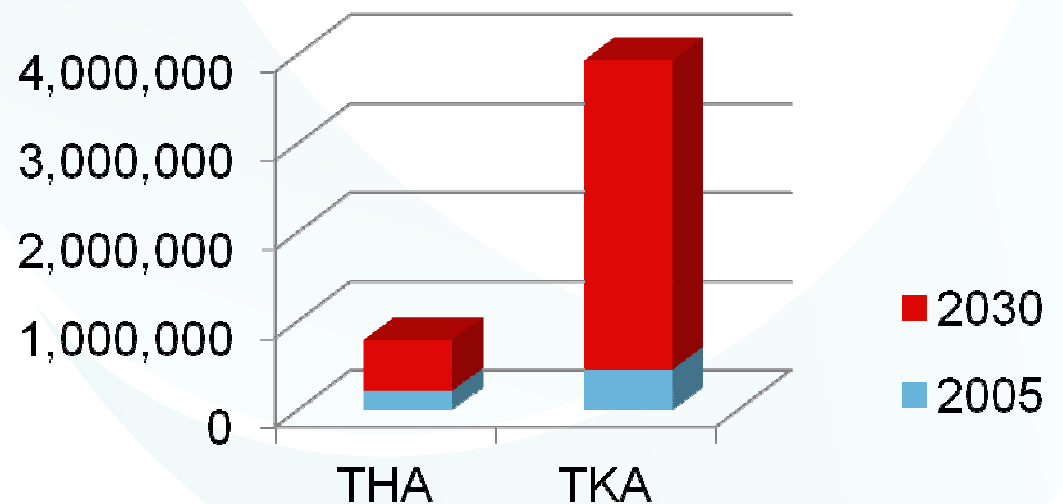
*A Preliminary Report Comparing Outcomes at the Hip and Knee*

\*BMAC ➡ Bone Marrow Aspirate Concentrate



# TJA: Projections

- Between 2005 to 2030, prevalence expected to increase
  - THA 174%
  - TKA 673%
  - Rev. THA 137%
  - Rev.TKA 601%



Kurtz et al., AAHKS 2008

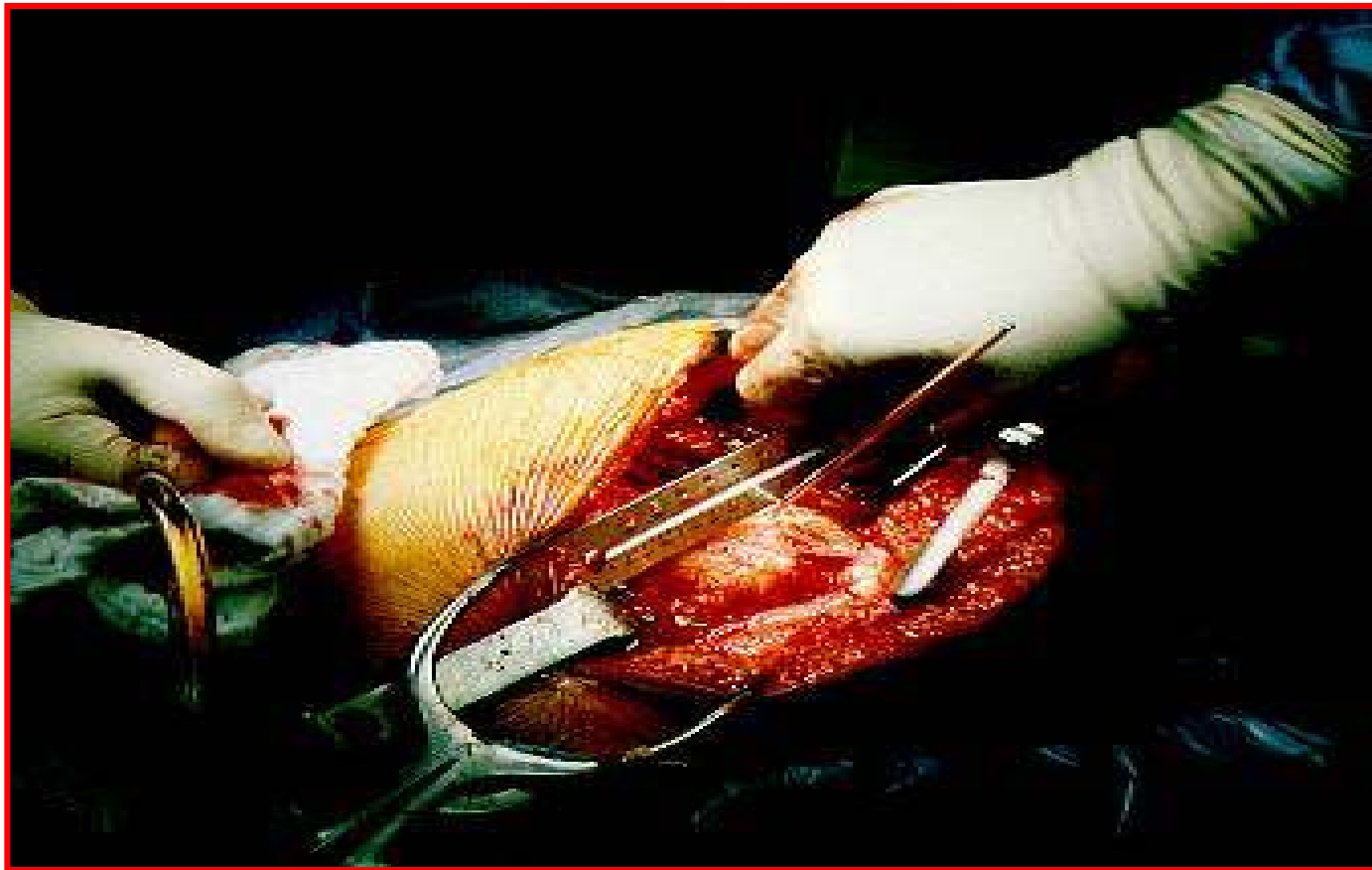
# TJA: Projections

- 2011:
  - >50% THA in <65 y.o.
  - >50% Rev TKA in <65 y.o.
- 2016:
  - > 50% TKA in <65y.o.
- 45-54 y.o. fastest growing group
  - 2005-30 TKA in this group will increase 17-fold
  - 2005-30 THA in this group will increase 6-fold

Show me the money!

# Standard Incision for the THR

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# Complications of a THA

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- Infection
  - Thromboembolic events
  - Leg-length inequality
  - Dislocation
- Limp
  - Pain
  - Medical Complications
    - MI
    - CVA



# Mitchell B Sheinkop, MD

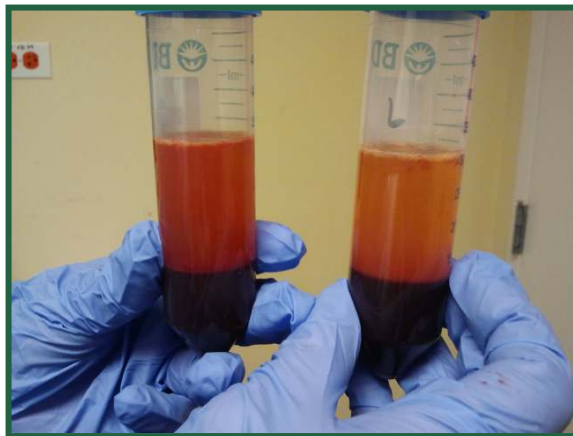
*Regenexx Network*

*Emeritus Professor of Orthopedic Surgery*

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# How does a Stem Cell Intervention Outcome Compare to a TJA

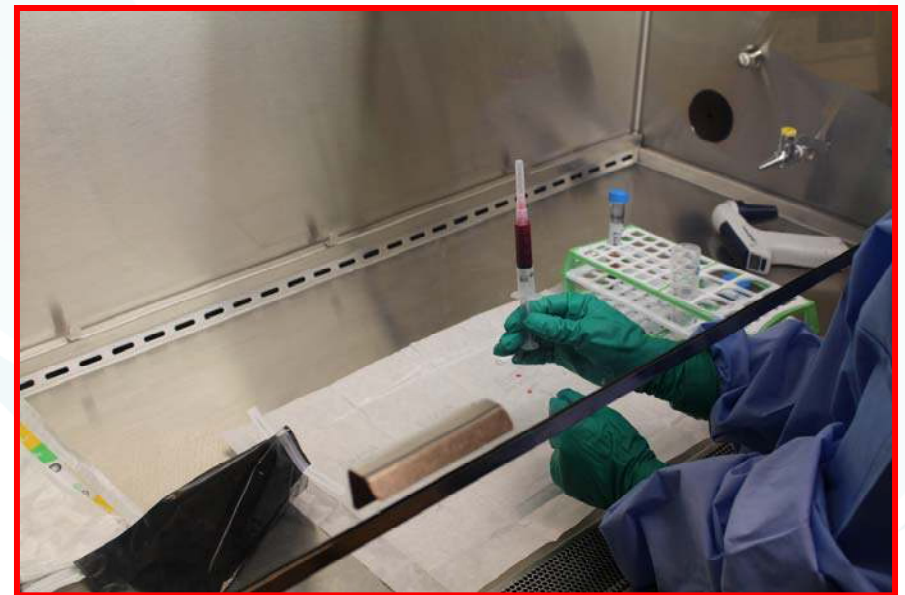
















# Osteoarthritis of the Hip



# Kellgren-Lawrence Grading Scale of the Hip

- **Grade 1**
  - Doubtful narrowing of jt space, poss osteophytic lipping
- **Grade 2**
  - Definite osteophytes & narrowing jt space
- **Grade 3**
  - Mod mult osteophytes, jt space narrowing, some sclerosis & poss deformity of bone contour
- **Grade 4**
  - Lg osteophytes, marked narrowing jt space, severe sclerosis & deformity of bone contour



# Hip Demographics

- 94 THA in 2007\*
  - Mean age of 62.22
  - Mean BMI of 30.18
- 28 BMAC Hip interventions in 2012
  - Mean age of 51.44
  - Mean BMI of 26.40



# Available for follow-up at one year

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- THR (24) 14 Males/ 10 Females
- BMAC at Hip (18) 12 Males/6 Females





# Orthopaedic Scores

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<u>REGION</u>	<u>Clinician Completed</u>	<u>Patient Completed</u>
Hip	Harris Hip Score	Oxford Hip Score HOOS WOMAC
Knee	Knee Society Score (KSS) Physician Global Assessment	Oxford Knee Score KOOS WOMAC IKDC

# Harris Hip Score (100 points)

- Pain
- Distance walked
- Activities-shoes, socks
- Public transportation
- Motion
  - Degrees of flexion
  - Degrees of Abduction
  - Degrees of Ext. Rot
  - Degrees of Adduction
- Support
- Limp
- Stairs
- Sitting

Name \_\_\_\_\_ Date \_\_\_\_\_

**MODIFIED HARRIS HIP SCORE**

Please answer the following questions as they pertain to your hip.

**Pain**

☐ None/able to ignore it  
☐ Slight, occasional, no compromise in activity  
☐ Mild, no effect on ordinary activity, pain after usual activity, use aspirin/ibuprofen/tylenol  
☐ Moderate, intolerable, makes concessions, occasional narcotic  
☐ Marked, serious limitations  
☐ Totally disabled

**Function: Gait**

**Limp**

☐ None  
☐ Slight  
☐ Moderate  
☐ Severe  
☐ Unable to walk

**Functional Activities**

**Stairs**

☐ Can go up/down normally  
☐ Can go up/down normally with banister  
☐ Any method  
☐ Not able

**Support**

☐ None  
☐ Can't for long walks  
☐ Can't all the time  
☐ Cane  
☐ 2 canes  
☐ 2 crutches  
☐ Unable to walk

**Distance Walked**

☐ Unlimited  
☐ 4 blocks  
☐ 2-3 blocks  
☐ Indoors only  
☐ Bed and chair

**Socks/Shoes**

☐ With ease  
☐ With difficulty  
☐ Unable

**Sitting**

☐ Any chair, 1 hour  
☐ High chair, 1/2 hour  
☐ Unable to sit, 1/2 hour, any chair

**Public Transportation**

☐ Able to enter public transportation  
☐ Unable to use public transportation (such as bus, or airport transportation)

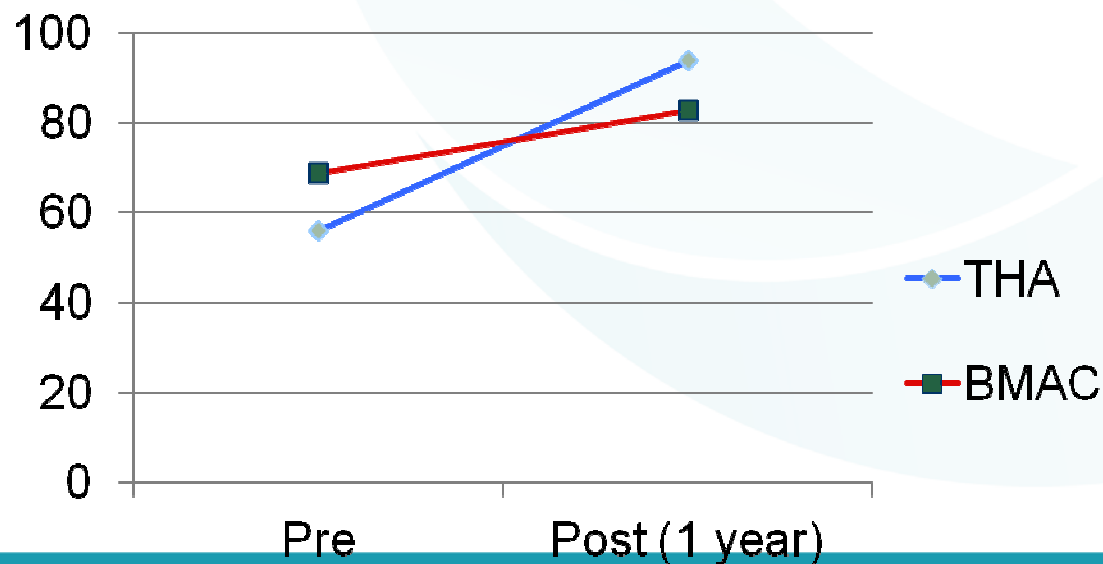
# Grading for the Harris Hip Score

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- Successful result:
  - Post operative + in HHS of >20 points
    - Or
      - <70 Poor
      - 70-79 Fair
      - 80-89 Good
      - 90-100 Excellent

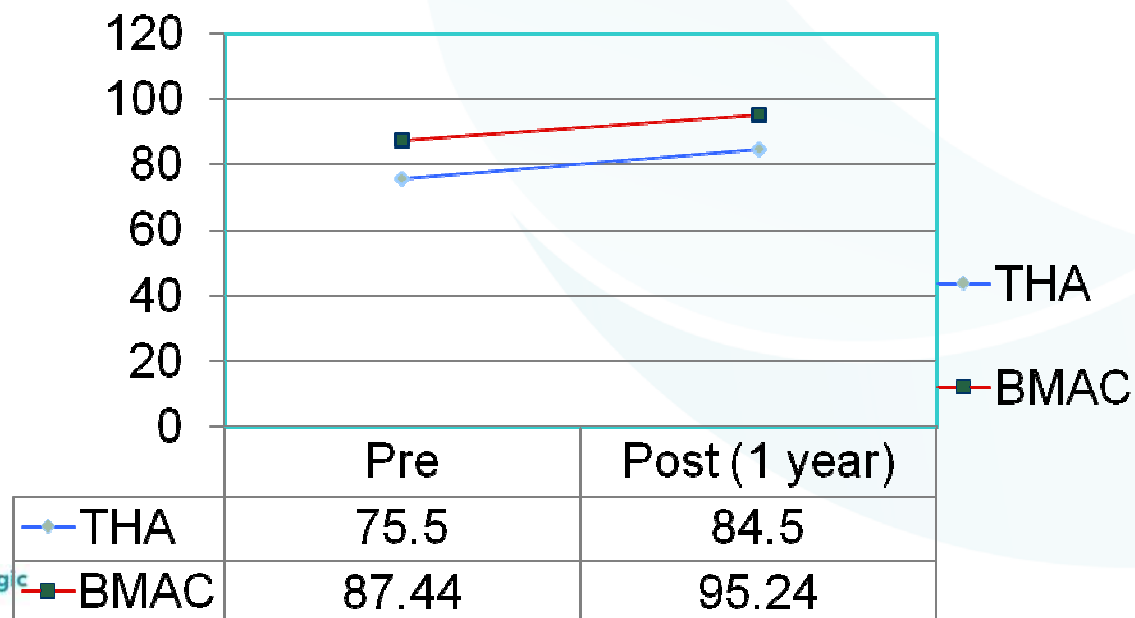
## Mean Harris Hip Score

- **THA** Preop (101) 56
- **THA** Post(24) 94
- **BMAC** Preop (28) 68.75
- Post **BMAC** (18) 82.89



## Average Hip ROM (Ext ▶ Flex)

- **THA** Preop 75.5°
- **THA** Post op 84.5°
- **BMAC** Pre 87.44°
- **BMAC** Post op 95.24°



# Harris Hip Pain Score

- **THA**

Pre op

Mod to marked: 77%

Post op

None: 80.0%

- **BMAC**

Pre op

Moderate: 93%

Post op

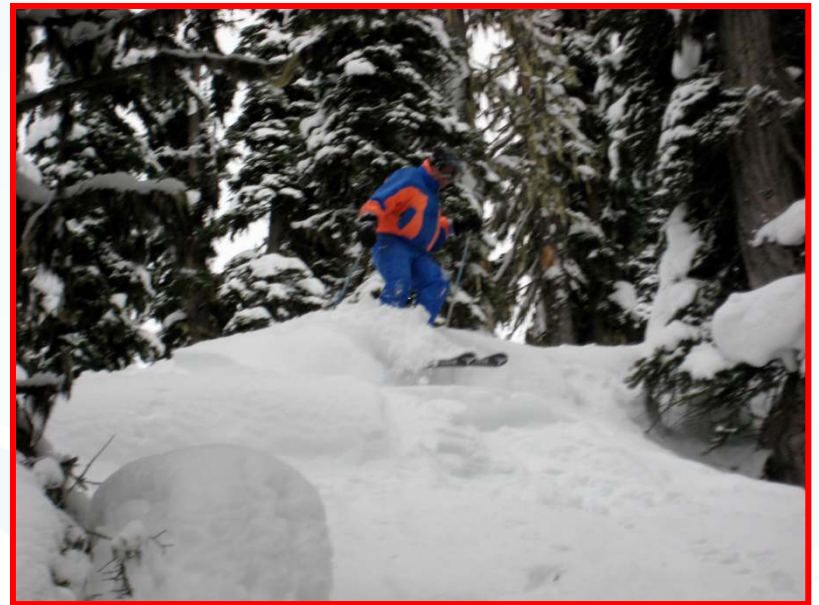
None: 25%

Slight: 50%

Moderate: 25%

# Activity Level

- 73% of BMAC Hip recipients returned to sporting activities



# Osteoarthritis of the Knee





# Total Knee Replacement

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Complications are common.

**Infection is the most common problem.**



# Kellgren-Lawrence Knee OA Grading Scale

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- Grade 1
- Grade 2
- Grade 3
- Grade 4

# Orthopaedic Scores

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<u>REGION</u>	<u>Clinician Completed</u>	<u>Patient Completed</u>
Hip	Harris Hip Score (HHS)	Oxford Hip Score HOOS WOMAC
Knee	Knee Society Score (KSS) Physician Global Assessment	Oxford Knee Score KOOS WOMAC IKDC

# Knee Society Score (knee & function)

- Pain
- Total Range of Flexion
- Flexion Contracture
- Extension Lag
- Stability
  - Antero-posterior
  - Mediolateral
- Alignment (varus/valgus)
- Walking
- Stairs
- Walking aids used



The image shows a form titled "Knee Society Score" used for clinical assessment. It includes sections for patient information, a table for recording scores across various categories (Pain, Flexion, Extension, Stability, Alignment, Walking, Stairs, Walking aids), and a section for the examiner's name and date. The form is designed to be filled out by a healthcare professional to document a patient's knee health and functional status.

# Grading for Knee Society Score (Knee Score & Function Score)

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- Score 80-100      Excellent
- Score 70-79      Good
- Score 60-69      Fair
- Score below 60      Poor

# Knee Demographics

- Age

TKA\*

- (111) 67.05 y/o

BMAC

- (37) 55.35 y/o

- BMI

TKA

- (53) 31.99

BMAC

- (37) 27.17

## Available for follow-up at one year

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- TKA (N=71) 43 Males/28 Females
- BMAC at Knee (N=26) 15 Males/11 Females

# Knee Society Assessment Score

- TKA

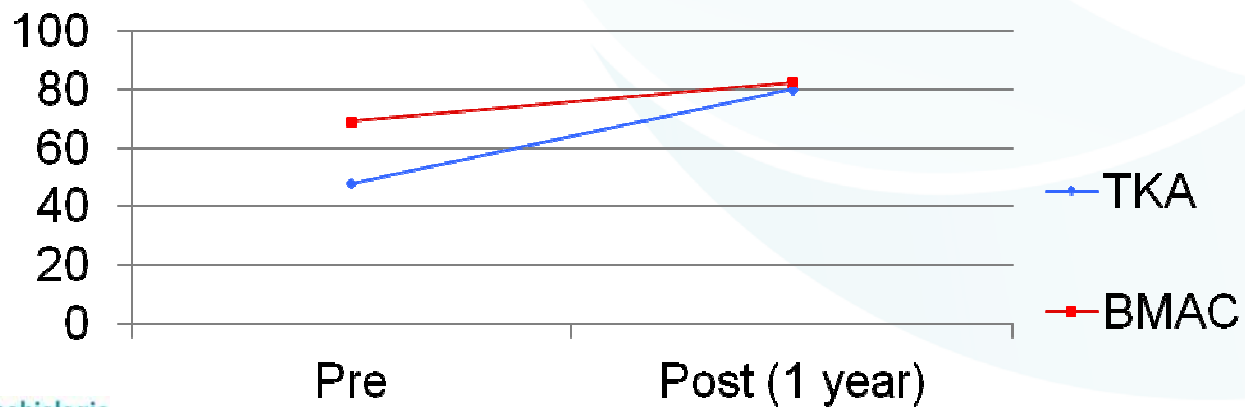
— Pre op 48

— Post op 80

- BMAC

— Pre op 69.08

— Post op 82.44





# Knee Society Function Score

- TKA

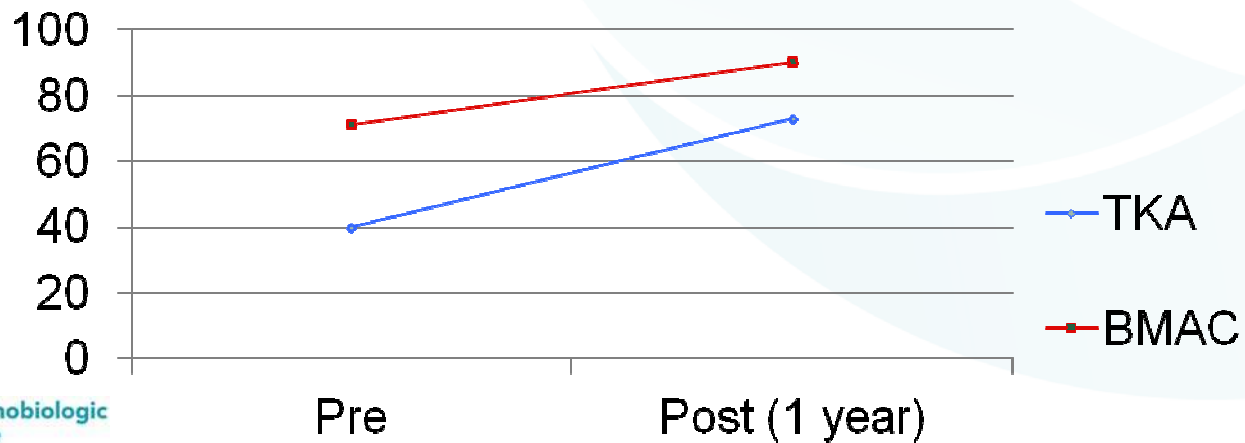
— Pre op 40

— Post op 73

- BMAC

— Pre op 71.15

— Post op 90.31



# Knee Range of Motion

- TKA

- Pre op 108°
- Post op 113°

- BMAC

- Pre op 123°
- Post op 124°



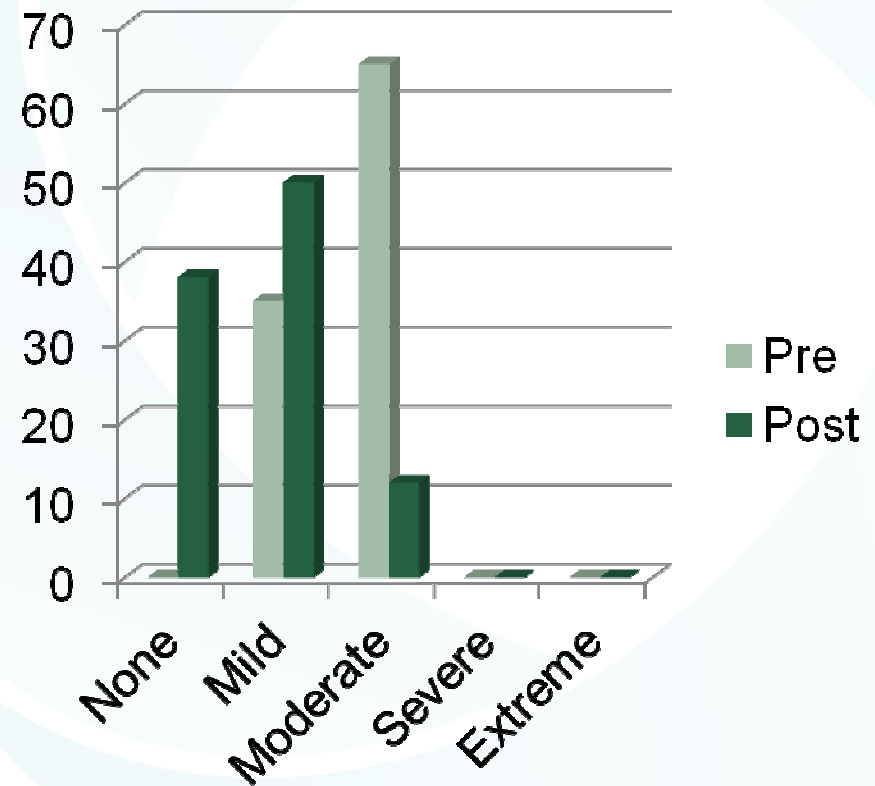
# Physicians Global Assessment of the Knee

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- **None:** no pain, no symptoms and no limitation of function
- **Mild:** mild pain, mild symptoms and mild limitation of function
- **Moderate:** moderate pain, moderate symptoms and moderate limitation of function
- **Severe:** severe pain, severe symptoms and severe limitation of function
- **Extreme:** extreme pain, extreme symptoms and extreme limitation of function

# Physician Global Assessment of the Knee

	Pre BMAC	Post BMAC
• None	0%	38%
• Mild	35%	50%
• Moderate	65%	12%
• Severe	0%	0%
• Extreme	0%	0%



# Patient Factors in Sports After a TJA

Only 65% of patients active in sports prior to a TJA are able to return to sports

## Source: Arthritis and Rheumatism March 4, 2013

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- Joint pain, function not always better after joint replacement surgery!

(Between 1996-2011 479TJR /202 analyzed)

- **By year two after surgery, average was 10-point improvement in pain and disability score. A 9-point improvement is considered “minimal important difference”. Reached in only 54%**

# TJA and Sports

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- High activity level post TKA associated with:
  - Worse long term results, patient dissatisfaction, higher revision rates, lower implant survivorship  
Kilgus et al., CORR
- Increased risk of failure
  - Age <60yrs
  - Excessive loading
  - High intensity activity

# Athletics After TJA

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- Return to exercise does not necessarily imply return to sports
- Most pts after TJA pursue lower-intensity, lower impact activities (e.g., golf, walking)
- Our patient population is interested in higher intensity, high-impact sports (e.g., skiing, running, basketball, cycling, fly fishing)



## Summary:

*1) In general, patients decrease athletic participation, intensity, and diminish types of activity after TJA*

*2) Patients restore and increase athletic participation, intensity after BMAC*

