What is Boomeritis?

- Describes wear and tear changes, vulnerabilities and injuries that most of us have or will develop with our musculoskeletal system
  
- Baby boomers have a desire to remain active despite age-related changes
  
- Boomers are born between 1946 and 1964

Nicholas DiNubile, MD
Life expectancy increases

- 1900 46 years
- 2007 80 years

Life expectancy increases while the durability on our frame and joints remains unchanged.

Wear and tear is predictable with age.
Age-related Cartilage Changes

- Older cartilage is less cellular
- Cartilage cells do not reproduce after growth plates close
- Chondrocytes only in lower layers
- Water content decreases
Age-related Cartilage Changes

- Proteoglycans change
  - Chondroitin decreases
  - Keratin increases
  - PG chains become shorted and retain less water
  - Decreased PG levels leads to decreased cartilage function
Grading Cartilage Wear

Outerbridge Classification

- Stage I Soft discolored superficial fibrillation
- Stage II Fragmentation < 1.3 cm²
- Stage III Fragmentation > 1.3 cm²
- Stage IV Erosion to subchondral bone (eburnation)
Grading Cartilage Wear
Osteoarthritis

- 43 million American adults have doctor-diagnosed arthritis
- 100 different types
- Osteoarthritis – “wear-and-tear arthritis” – is the most common
- Exact causes are unknown
- Researchers say genetics may play a role in 40-65 percent of knee osteoarthritis cases
Age-related Muscle Changes

“Senile Sarcopenia”
- Muscle mass decreases by 1/3 between 50 and 85

Loss of strength is a major cause of falls

Sarcopenia is not diffuse atrophy
- Loss of muscle mass, fiber number, and specific force reduced
- Shift toward slow twitch fibers
Age-related Ligament Changes

Ligaments become weaker and are more likely to tear in midsubstance rather than pull away from the bone as in younger stronger ligaments.
Age-related Tendon Changes

- Older tendon contains fewer fibroblasts, decreased tendon fibril diameter, decreased stiffness
- Tendon can be partially restored to strength (65%) and elasticity (69%) with eccentric exercises
Age-related Meniscus Changes

- Blood supply decreases with age
  - 100% at birth
  - 33% at 30
  - 25% at 50
- MRI’s show positive tears in 40% asymptomatic knees > 50 years old
- Collagen cross-linking changes with age
- Proteoglycans decrease with age
  - Chondroitin decreases, keratin increases
Exercise as a Prescription

- Too little exercise can have negative effects
- Incorrect exercise can result in injuries
- Good nutrition combined with the right dose of balanced well designed exercises can lead to a healthy frame and joints
Weak Links

Must accommodate the weak links
- Old injury
- Musculoskeletal imbalance
- Incomplete rehab syndrome
- Alignment and anatomy
- Genetics
- Aging effects
- Mindset / attitude
- Exercise program design / technique
Glucosamine

- Involved in maintenance and repair of joint cartilage
- Stimulates production of synovial fluid, proteoglycans, and glycosaminoglycans
- Anti-inflammatory
- 1200 – 2000 mg/day
- Higher doses
  - Obesity
  - GERD
  - Diuretic use
Glucosamine

- Proteoglycans form the ground substance of the extracellular matrix in cartilage.
- Of these, glycosaminoglycan hyaluronic acid is vital for the structure and function of cartilage.
- Decrease incidence of severe joint space narrowing by 60%.
- Treatment for >12 months reduces risk for TKR by 73% at 5 years.

Pavelka, Am Coll Rheum 2004
Chondroitin Sulfate

- Influences synthesis and metabolism of glycosaminoglycans
- Increases total proteoglycan production
- Inhibits collagen breakdown by chondrocytes
- Increased production of synovial fluid
- Anti-inflammatory
- Chondroprotective
- 600-1500 mg per day
Glucosamine / Chondroitin

- Multiple conflicting studies
- No problems with side effects on liver or kidney
- No affect on diabetes
- Mild infrequent GI upset
- Seems to help moderate to severe OA
- Must be taken for 1-3 months to see effects
Nonsteroidal Anti-inflammatories

- Affect the inflammatory mechanism
- NSAIDS may cause
  - Gastric ulceration
  - Renal insufficiency
  - Prolonged bleeding time
- Patients >60 may have 4-5 X risk of
  - GI ulceration and bleeding
  - Renal failure requiring hospitalization
NSAIDs

High risk individuals
- >60
- h/o peptic ulcer disease
- Anticipated duration of treatment over 3 months
- Moderate to higher doses
- Concurrent oral steroid use
Corticosteroids

- Very effective in acute flairs
- Most effective in first 1-3 weeks
- Less effective than viscosupplements from 6 weeks - 6 months
- No more than 3 times per year
Common Shoulder Problems

- Rotator Cuff
  - Tendinitis, Bursitis, Partial and complete tears
- Arthritis
  - Wearing out of the joint cartilage
- Stiffness
  - Adhesive capsulitis
The Shoulder Complex

- Deltoid Muscle
- Clavicle (Collar Bone)
- Pectoralis
The Shoulder Complex

Deltoid muscle removed
The Shoulder Complex
Rotator Cuff

- **Supraspinatus**
  - Active in any elevation of the arm
  - **Stabilizes** the shoulder joint
Rotator Cuff

- Infraspinatus
  - Depressor of the humeral head
- Stabilizer of the back of the shoulder
Rotator Cuff

- Teres Minor
  - Rotates the shoulder out from the side
Rotator Cuff

- Subscapularis
  - Stabilizes the front of the shoulder
  - Rotates the arm inward
Bursa

- Subacromial and subdeltoid bursa
  - Thin sac-like structure
  - Lubricate motion between rotator cuff and overlying CA arch
Rotator Cuff Balance

Proper function depends upon balance between all muscle and ligament forces around the shoulder.

Net Humeral Joint Reaction Force Vector
Matsen Fig. 3-02
Why Tears Occur

- Tendon connective tissue weakens with age and disuse
  - Weakened tendons require less force to disrupt
- Repetitive and/or substantial loads
Tendon Degeneration

- Age-related changes
  - Decreased vascularity at the tendon attachment to the bone
  - Leads to weak tendon that tears easily

[Diagram of tendon with labels: SS, A, Humeral Head, Deltoid]
Rotator Cuff Tears

- Tears begin where the stresses are the greatest
  - Tendon fibers fail a few at a time or all at once
  - Arm may be at rest
  - Torn fibers retract when torn

Partial Supraspinatus Tear
Consequences of rupture

- Increasing loads applied to the intact fibers
- Muscle fibers become detached from the bone resulting in weakness
Consequences of rupture

- Retracted cuff fibers place additional tension on remaining microcirculation compromising cuff viability
- Increasing amounts of tendon are exposed to joint fluid which prevents tendon healing
Full Thickness Tears

- Loads are concentrated at the margins of the tear
- Further tearing occurs with smaller loads
- Partial tears become complete
- Smaller tears become large
- Large tears eventually become unfixable
Progressive Tearing

- Spacer effect of the cuff is lost
- Humeral head displaces superiorly
- Biceps tendon eventually ruptures
Early Cuff Failure

Compression of the humeral head is less effective
  - Deltoid pulls head upward
  - Upward pull of the deltoid results in cuff abrasion & further cuff damage
Chronic Cuff Failure

- Humeral head forms a joint with the arch above
- Secondary joint disease occurs called *cuff tear arthropathy*
Chronic Cuff Tears

- Muscle atrophy
- Fatty infiltration of muscle belly
- Tendon retraction
- Bone osteoporosis
- Loss of muscle and tendon excursion
- Irreversible
- Progressively worse

Fatty infiltration with muscle wasting

Healthy muscle, no fat stripes
Prevalence of Rotator Cuff Tears

- Cadaver studies: 7-40%
- MRI & Ultrasound studies:
  - 34% of asymptomatic individuals
  - 54% of asymptomatic individuals over 60y
- Ultrasound study:
  - 13% of asymptomatic individuals: 50-59y
  - 51% of asymptomatic individuals: over 80y
Prevalence of Rotator Cuff Tears

- 40%: no history of strenuous physical labor
- 50%: no history of trauma
- Frequently bilateral
- Many heavy laborers never get cuff tears
Healing Potential

- None without surgery
  - Cuff tears never heal spontaneously
  - Without a blood supply, there is never any chance a cuff healing spontaneously
- 40% progress to larger tears
- 51% of asymptomatic RCT become symptomatic
Patient History

Important things to know
- Chronic symptoms or acute exacerbation
- Stiffness, loss of motion
- Weakness (when)
- Functional impairment
- Catching, crepitus, grinding
- Treatments and response
Shoulder Pain with Cuff Tears

Rotator cuff pain
- Constant ache
- Varies with activity
- Night pain
- Wake up with position change
- May be severe
- Constant or intermittent
Rotator Cuff Shoulder Pain

Deep, dull, diffuse ache

The pain from rotator cuff pathology is often referred to the outer part of the arm. Sometimes as far as the elbow.
Non Rotator Cuff Shoulder Pain

- Pain to the *back* of shoulder upper back or neck
- Pain to top of shoulder
  - Think arthritis of the neck
- Pain *beyond* the elbow
  - Think pinched nerve in the neck
Timing of Pain

- **Rest Pain** (constant)
  - Synovitis
    - (Inflammation of the joint)

- Calcific tendinitis or bursitis (constant and intense)
Timing of Pain

- Pain in mid range of motion
  - Arthritis - Damaged joint surface
  - Inflamed irregular joint surface
  - Inflamed tissues
Timing of Pain

- Pain at the end of the range of motion
  - Impingement pain
  - Bone spurs
  - Pinched and stretched tissues around the shoulder joint

Frayed rotator cuff tendon
Radiographs

- Acromial shape
- Position of humeral head
- AC arthritis
- Calcific tendinitis
- Glenohumeral arthritis
- Destructive lesions
1 & 2: AP in Scapular Plane

- 2 Views: IR, ER
- Calcium deposits
- Greater tuberosities: excrescences, cysts
1 & 2: AP in Scapular Plane

2 Views: IR, ER
Calcium deposits
Greater tuberosities: excrescences, cysts

Moderate osteoarthritis
Severe osteoarthritis
3: Axillary View

- Evaluate GH joint & tuberosities
- Glenoid version
- Joint space narrowing
- Os acromiale
  - This is an anatomic variation best seen on this special view
4: Outlet View

- Evaluate subacromial space
- Acromial shape and thickness
5: 30° Caudal Tilt View

- AP view with a 30° caudal tilt
- Demonstrates anterior acromial projection

spur
Tendon Imaging

MRI
- 90% accurate in diagnosing *complete* RC tears
- 70% accurate in diagnosing *partial* RC tears
- These data may vary. It depends on who is reading the MRI.

This spur is pushing on the rotator cuff causing “impingement”.
Nonoperative Treatment

- Helpful in ~50% (33-92%)
- Acute rupture
  - 75% may have reduced pain with therapy
  - But the tendon tear will never heal without surgery.
- Chronic pain (>6 months)
  - poor response with therapy
My Approach

Chronic pain, no or minimal weakness

- PT for 3-6 weeks
- MRI if not improving in 4-6 weeks
- MRI after 6 weeks if improving but @ plateau
- MRI if still in pain but patient does not want surgery
My Approach

- Acute pain, weakness
  - Office evaluation
  - X-rays
  - Injection
  - MRI

May be age dependent
Analyzing the Data

- If the weakness and pain are inconsistent with MRI findings
  - Look for other causes
    - C spine, nerve injuries
  - Consider multiple causes
    - Older patients with dislocations
    - Concurrent cuff tears, brachial plexus injuries, or axillary nerve injuries
Surgical Indications

- Patient dependent
- Impingement syndrome & Partial tears
  - Pain with functional impairments
  - Failure to respond to nonoperative treatment
- Chronic tears
  - Consider 3-4 months of nonsurgical treatment
- Acute tears
  - Best results if repaired within 3 weeks
Arthroscopic Acromioplasty

- Relieves impingement between the CA arch & the cuff
- Performed with arthroscopic or mini-open cuff repair
Technique of Arthroscopic Acromioplasty

Bone spurs can be removed through small arthroscopic incisions by using a motorized burr.
Post-op Arthroscopic Acromioplasty

- Sling for 1-2 days
- Begin active motion immediately
- Advance as tolerated
Post-op Arthroscopic Acromioplasty

Anticipated post-op goals

- 1 month: Full motion (range 1-4 weeks)
- 12 weeks: 75% functional recovery
- 6 months: Full recovery
Surgery for Partial Thickness Tears

- Debridement alone
- Debridement and acromioplasty
- Acromioplasty, excision of damaged tendon with primary repair
Partial RCT: Debridement Alone

- Young athletes and workers
- Failed nonoperative therapy
- Tears related to overuse not impingement
- 80-85% success
Partial Tendon: Debridement & Acromioplasty

- Older patients
- Partial tear is debrided if <50% tendon thickness
  - Remove free flaps of torn tendon edge
- Remove the bone spurs
  - Performed arthroscopically
Partial Tendon Tears: Acromioplasty, Excise and 1° Repair

- For tears >50% tendon thickness
- Post-op treat same as a full thickness RC repair
Full Thickness Cuff Tears

- Arthroscopic repairs
- Mini-open repairs
- Open repairs
Arthroscopic Cuff Repair

- Arthroscopy allows for a more complete evaluation of the joint and tendon
- Removal of bone spurs
- Rotator cuff repair using anchors
Arthroscopic Cuff Repair

- Improved joint assessment, incl. biceps
- Improved tendon mobilization
- Decreased surgical trauma to deltoid
- Faster rehabilitation (in first 3 months)
Arthroscopic Cuff Repair

Advantages

- Earlier return to function
  - 6 weeks to heal, 6 months for overhead work

- Less Pain
  - No evidence of this

- Shorter hospitalization
  - Every cuff repair goes home the day of surgery

- Cosmetic
  - Multiple smaller incisions vs. one incision
Arthroscopic Cuff Repair

Disadvantages

- Longer operative time
- Cannot place tendon gripping sutures
- Anchors less secure in weak bone
- Anchors are costly
- No studies have proven the long term results to be superior to open or mini-open repairs
Arthroscopic Cuff Repair
Arthroscopic Cuff Repair
Arthroscopic Cuff Repair
Arthroscopic Cuff Repair
Mini-open Cuff Repair

- Arthroscopic joint and tendon evaluation
- Arthroscopic bone spur removal
- Cuff repaired through 3 cm skin incision
- Deltoid fibers are split, not detached
- Cuff repaired with “tendon gripping” sutures
- *Double row repair* of tendon to bone using anchors and bone tunnels
Mini-open Cuff Repair

- Gold standard
- Allows double row repair
- Suture anchors with bone tunnels provide strongest repair with best restoration of RC footprint (Andrews AJSM, 2003)
Suture Anchor Fixation

- Dependent on the quality of bone
- Anchors have a limited pull-out strength from bone
This osteoporosis is common in older patients, larger chronic tears and may not provide strong tendon repairs.
Post-op RC Repair

- Usually 6 weeks of limited arm use regardless of repair method
- Often require 2-4 months of formal physical therapy followed by home exercises
- Can take 12-18 months to reach maximum improvement
Rotator Cuff Repair Results

- **Good to excellent**
  - 85% - 95%

- **Good-excellent pain relief**
  - 78%

- **Risk of rerupture**
  - Large (2+ tendon tears)
    - 40%
  - Smaller tears
    - 10-20%
  - Severely retracted tears
    - 66%

This man is 7 weeks following and arthroscopic cuff repair.
Factors Affecting Outcomes

- Tear size (most important)
  - Affects recovery of strength (85-90% recovery)
- Age (>65)
- Pre-op function (inability to abduct > 100°)
- Larger tears and chronic retracted tears are more likely to rerupture
Complications of Cuff Repair

- Rerupture
- Stiffness
- Infection
- Deltoid detachment
- Nerve injury
  - Weakness, numbness

"I think you should be more explicit here in step two."
Arthroscopy Without Repair

- Arthroscopic cuff debridement & limited acromioplasty
- Smaller tears get better pain relief
- No improvement with overhead activity and strength
- Beneficial in older low demand patients
Open Surgery Without Repair

- Open cuff debridement
- Better results with intact biceps, deltoid and no prior surgery
- 50-80% Improved comfort and function
- Preserve the CA arch
  - Avoids humeral head escape
Why Preserve the CA Arch?

If the CA arch is disrupted, the head of the humerus escapes up through the defect and pain and limited motion result.
Biceps Tenotomy

- Indicated in older low demand patients with irreparable cuff tears
- Unconcerned about biceps bulge
- Relieves pain from the impinged or dislocated biceps
- Minimally invasive, palliative, minimal rehab
The Stiff Shoulder

- Not associated with cuff tears alone

- Consider
  - Adhesive capsulitis / Frozen shoulder
  - Shoulder arthritis
  - Missed shoulder dislocation
  - Fracture or post traumatic deformity
The Stiff Shoulder

- Frozen Shoulder = Adhesive Capsulitis
- Cause is Unknown
  - May be autoimmune
  - May occur after injury, fracture or surgery
  - Related to intense inflammation causing pain and decreased use of the shoulder leading to stiffness
The Stiff Shoulder

- Reduced motion even with help lifting the arm
  - As if the motion is “blocked”
- Pain at night and with daily activities
- X-rays and MRI usually normal
Shoulder Stiffness

- Not associated with cuff tears alone
- Full active and/or passive motion is present even if painful
- Consider
  - Adhesive capsulitis / Frozen shoulder
  - Glenohumeral arthritis
  - Missed posterior dislocation
  - Fracture or post traumatic deformity
Frozen Shoulder

- Recovery is slow – May take many months
- Anti-inflammatory meds and stretching exercises
- May benefit from cortisone injections
- Surgical treatment may help and involves arthroscopy to remove the scarred joint capsule
Shoulder Replacement

Arthritis
- Wear and tear
- Multiple dislocations
- Rheumatoid arthritis

Osteoarthritis

©MMG 2001
Shoulder Replacement

Fractures

Four-Part Humeral Fracture
Shoulder Replacement

- Humeral component
- Glenoid component
- Stem

©MMG 2002
Shoulder Replacement
Shoulder Replacement
Shoulder Replacement
Shoulder Replacement

Arthritic Humeral Head
Reverse shoulder replacements are helpful when treating arthritis associated with irreparable rotator cuff tears in patients unable to lift the arm due to tendon tears.
Reverse Shoulder Replacements
Complications of Surgery

- Always part of pre-op discussion
- Nerve damage
  - Weakness, numbness
- Bleeding
- Infection
- Tendon rupture
- Stiffness
- Continued pain and impairment
- Stretched repair and recurrent instability
Goals of Treating Knee Osteoarthritis

- Control pain
- Optimize function including the impact of osteoarthritis on mobility and the activities of daily living
- Educate patients and families about the disease and treatment options for osteoarthritis
Lifestyle Changes

- Weight loss
- Exercise to reduce weight, improve strength and endurance
- Exercise improves sense of well being
Assistive Devices

- Orthotics (Lateral heel wedges)
- Shock absorbing shoes
- Cane
- Knee bracing (Unloader)
Cartilage Anti-aging Strategies

- Glucosamine and proteoglycan replacement
- Viscosupplementation
- Microfracture and “The package”
- Joint replacements
Viscosupplementation

Hyaluronan
- Increases cartilage synthesis
- Increases chondrocyte growth and collagen biosynthesis
- Decreases cartilage degradation
- Coats nociceptors (pain generating nerve endings)
- Anti-inflammatory
Viscosupplementation

- Injection of hyaluronic acid (substance found naturally in the joint) to increase lubrication
- Mild to moderate OA: 70-80% improvement
- Severe OA: 50%
- Require 3-5 weekly injections
- May last 6+ months
- May be repeated
Physical Therapy

- Resistance training
  - Over 186 studies in mature athletes
  - Enhances strength as in younger athletes
  - Better than endurance training for joint function
  - Reduced risk of falls and hip fractures
  - Eccentric loading & proper technique necessary
Orthopedic Evaluation

- History
  - Nature of pain, timing
- Treatment
- Medical and surgical history
- Medications
- Allergies, side effects
Orthopedic Evaluation

- Activity level
- Expectations & Goals
- Symptoms
- Examination
  - Alignment
  - Hip exam
  - Knee Exam
    - ROM
    - Meniscal signs
    - Patellar mobility
Radiographic Evaluation

- Standing AP
- 45° flexion PA
- Lateral
- Patellofemoral
X-Rays: Standing Films - AP
X-Rays: Standing Films- PA w/ Flexion
X-rays: Standing Films
X-Rays
MRI: Meniscus Tear / Baker’s Cyst
MRI: ACL Tear

FEMUR
ACL
PCL
TIBIA
Surgical Options

- Arthroscopy
  - Meniscectomy
  - Ligament reconstruction
  - Debridement
- Osteotomy
- Joint replacement
Knee Arthroscopy

Must address the pathology

- Meniscus tears
- Arthritis
- Synovitis
- Stiffness
- Spurring
Knee Arthroscopy: Meniscectomy
Knee Arthroscopy

Bucket Handle Tear

Torn Flap
Knee Arthroscopy
Knee Arthroscopy
Knee Arthroscopy: Microfracture

- Full thickness joint cartilage defects
- Unstable full thickness lesions
- Osteoarthritis with proper knee alignment
- Not for partial thickness defects
Knee Arthroscopy
Knee Arthroscopy
Knee Arthroscopy

Grade IV defect
Knee Arthroscopy

3-4 mm bridge

45° awl

Mesenchymal clot

90°
Results of Microfracture

- Significant improvement, 11 years follow up (Arthroscopy, 2003)
- Compared to ACI (Cartilage reimplantation)
  - No difference in cartilage histologically
  - ACI had higher failure rate due to higher re-operation rate
Microfracture: Predictors of Outcome

- Poorer results in certain patients
  - Increased age
  - Malalignment
  - Higher BMI (obesity)
  - Rim height (condition of adjacent cartilage)
  - Proper technique and rehabilitation
Autogenous Cartilage Implantation

- Focal cartilage defects
- Intact meniscus
  - Meniscus transplant
- Normal alignment
Autogenous Cartilage Implantation
Goals of Surgery

- Relief of joint pain and symptoms
- Improved range of motion
- Elimination of mechanical symptoms
- Be realistic: Better not perfect
- Accept longer recovery
- Accept need for PT, NSAIDs, Viscosupplementation
- Buy time before the total knee replacement
Arthroscopy & Microfracture in the Degenerative Knee

Different than in non-degenerative knees
- Surrounding cartilage is thinned
- Dense, sclerotic bone
- Joint scarring and contractures
- Synovitis
- Osteophytes (Bone Spurs)
Knee Arthroscopy: Treatment “Package”

- Insufflation
- Removal of unstable cartilage
  - Meniscus tears
  - Flaps from joint surface
- Removal of infrapatellar and suprapatellar plica or scar
- Synovectomy
- Open spaces to restore biomechanics
- Removal of osteophytes to improve ROM
- Avoid microfracture in DJD with malalignment
Knee “Package” Results

- 60-70% of patients see improvement
- 30-40% see little to no improvement
- Results may depend on
  - Degree extent of arthritis
  - Body mass index (obesity)
  - Alignment
  - Age and activity
  - Rehab program
Total Knee Replacement

- >50% of patients over 65 have at least one joint with OA
- Over 250,000 TKA performed annually
- Excellent survival and function in >90% at 10-20 years
Total Knee Replacement

Benefits to continuing exercise after total knee replacement

– Bone health
– Reduced obesity
– Psychological health
– Cardiovascular health
Total Knee Replacement

- Risk of excess activity
  - Increased wear of polyethylene
  - Increased rate of early revision
Recommended Activity after TKR

- Light aerobics
- Stationary cycling
- Bowling
- Croquet
- Ballroom dancing
- Jazz dancing
- Walking
- Square dancing
- Golf
- Horseshoes
- Shooting
- Shuffleboard
- Swimming
Recommended Activities with Experience after TKR

- Cycling (road)
- Canoeing
- Hiking
- Rowing
- Speed walking
- Skiing (cross country & stationary)
- Tennis (doubles)
- Weight machines
Not Recommended Activities after TKR

- Aerobics (high impact)
- Baseball and softball
- Basketball and Football
- Gymnastics
- Handball
- Hockey
- Volleyball
- Jogging
- Racquetball
- Squash
- Rock climbing
- Soccer
- Tennis (singles)
Knee Osteoarthritis – What does it look like?

Healthy Knee

Knee with Osteoarthritis

Femur (thigh bone)

Cartilage

Tibia (shin bone)
Partial Knee Replacement
Partial Knee Replacement

Ideal Candidate

- Low demand patient
  - Poorer results in younger or active patients
- Minimal loss of motion (<15° flexion contracture)
- No varus or valgus malalignment, or easily correctable malalignment
- Minimal or no degenerative arthritis in other compartment or patellofemoral joint
Partial Knee Replacement

*Potential advantages*
- Less invasive
- Faster recovery
- Improved function

Some studies support good long term results
Other studies point to results inferior to TKR
Long term survivorship analysis comparing TKR to UKR are not available
Knee Implants

- High-Flex Knee Implants
  - Zimmer High-Flex implants
  - Allows $155^\circ$ of flexion, rather than typical $125^\circ$
  - Activities require good range of motion – climbing stairs, gardening, golfing, and kneeling for prayer
When to Consider a Knee Replacement

- You have frequent knee pain, swelling and stiffness
- Pain interferes with daily life/mobility/sleeping
- You regularly take pain relievers
- You may/may not use a cane or walker to get around
- You sometimes limp when you walk
- Knee joint damage is visible on x-ray
- You can no longer live with your pain and limitations
- All else has been tried and failed
Knee Replacement Surgery

- Considered when nonsurgical interventions aren’t alleviating pain
- The only long-term solution to knee pain
Women and Arthritis of the Knee

- Women account for more than 60 percent of doctor-diagnosed cases of arthritis.
- Women are three times less likely than men to undergo knee replacement even though they suffer from more knee pain and resulting disability.
Gender Specific Knee Differences

- Improved Patellar tracking
  - Designed to accommodate the different tracking angle and function and move more like a woman’s natural knee when bending and walking.
Gender Specific Knee

Knee prostheses were based on male-female average dimensions.
Gender Specific Knee Differences

- Thinner profile
  - Knee replacement feels more natural

Traditional Knee
Zimmer Gender Solutions Knee
Gender Specific Knee Differences

- Contoured shape
  - More closely match the narrower anatomy of a woman’s knee
  - Helps prevent the implant from overhanging the bone and potentially pressing on, or irritating, surrounding ligaments and tendons
Total Knee Replacement

- Unicompartmental osteoarthritis in older patients
- All patients with bicompartmental and tricompartmental osteoarthritis
- Inflammatory arthritis
Total Knee Replacement in Younger Patients

- 1977 – 1992
- Patients < 55 years
- 94% survivorship at 18 years

Total Knee Replacement in Young, Active Patients. Long-Term Follow-up and Functional Outcome
Diduch, D, et. al., JBJS, 79:575-82 (1997)
Total Knee Replacement
Total Knee Replacement
Total Knee Replacement
Complications of Surgery

- Wound complications
  - Necrosis / dehiscence
- Nerve injury: peroneal nerve ~0.58%
- Vascular injury
- Infection 2%
- Deep venous thrombosis 20-40%
- Stiffness (< -10° to 90°)
- Laxity
Complication of Surgery

- Extensor mechanism problems
  - Patellofemoral instability
  - Patellar fracture
  - Patellar component loosening
  - Tendon rupture (0.17%-2.5%)
- Fractures
- Bleeding
Thank You

Be careful out there.