



Degenerative changes and joint pain

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10/12/2022

Objectives

Explain the general anatomy of the knee including the muscular and skeletal systems

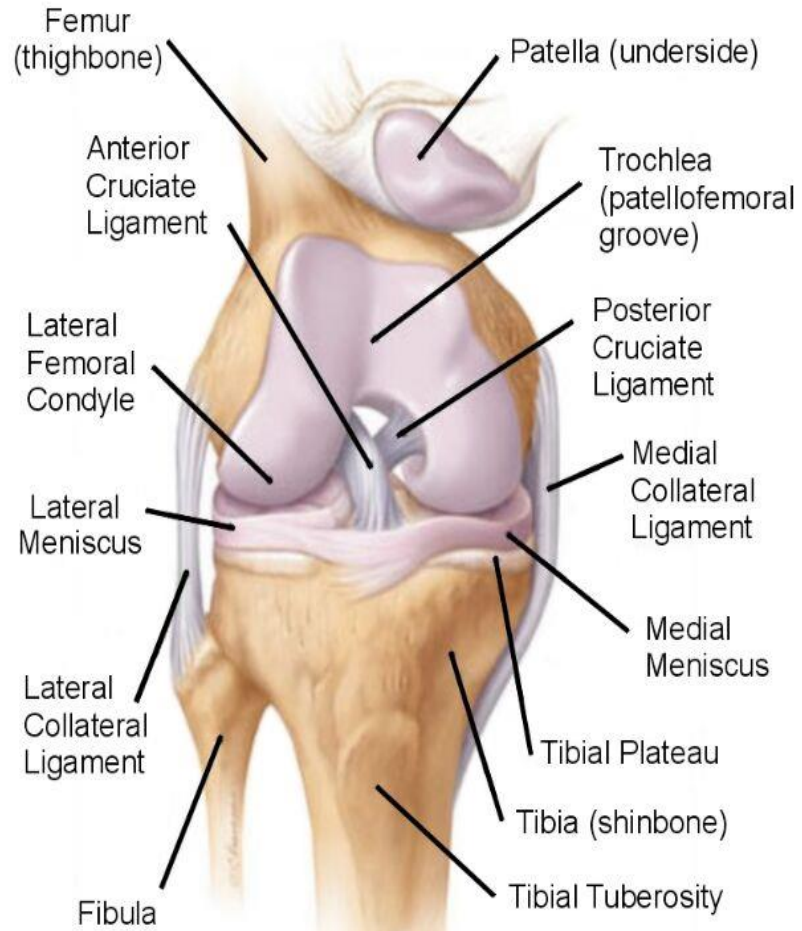
Review common degenerative changes that affect the knee

Demonstrate and explain common stretching and strengthening exercises to help improve symptoms

Review non-operative treatments

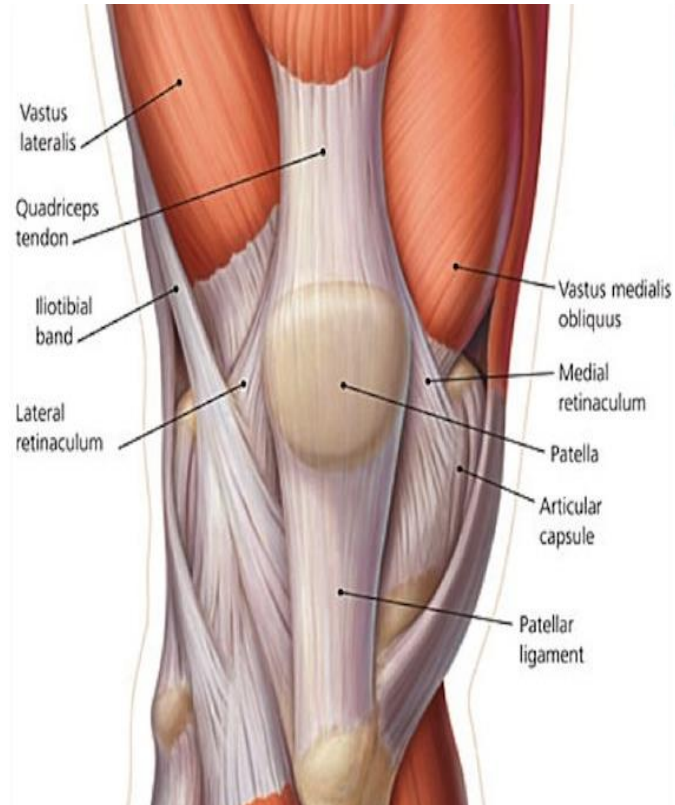
Review total joint arthroplasty procedures

Knee Anatomy



<https://www.anatomynote.com/human-anatomy/knee-anatomy/frontal-view-of-right-knee-with-patella-reflected/>

Connective Tissue
Holds everything together
Provides some cushioning



https://www.asismassage.edu/workshops/workshops.php?wd_id=347&campus=Prescott

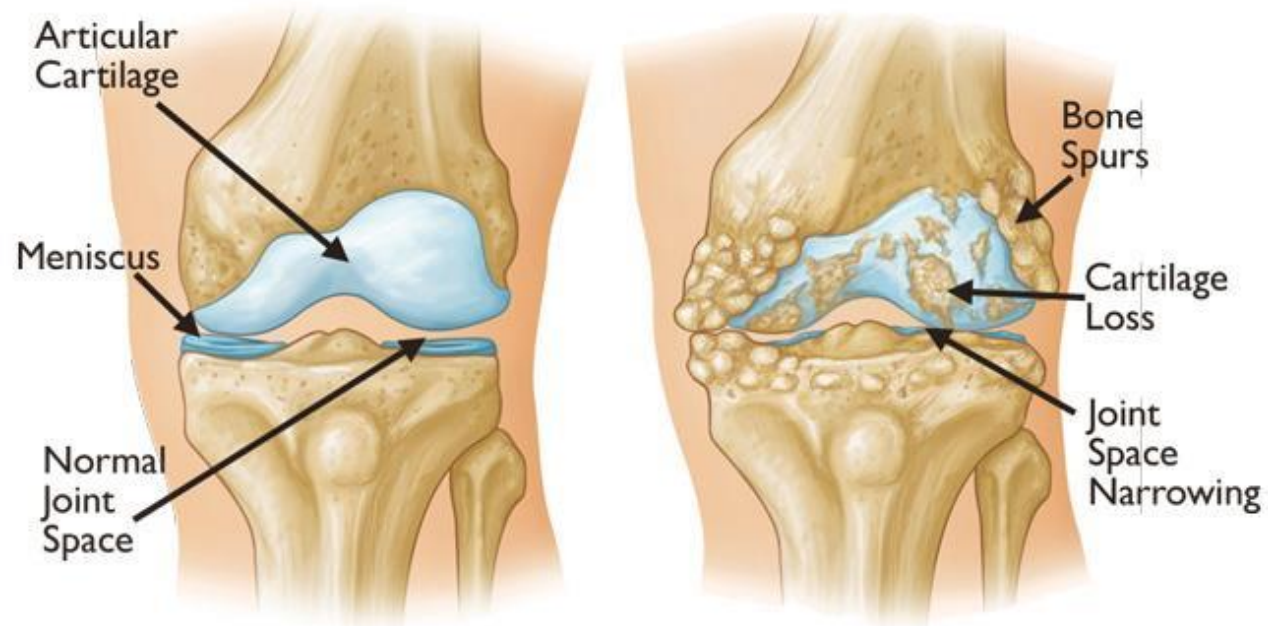
Degenerative Changes

Occurs normally as part of the aging process but affects people differently

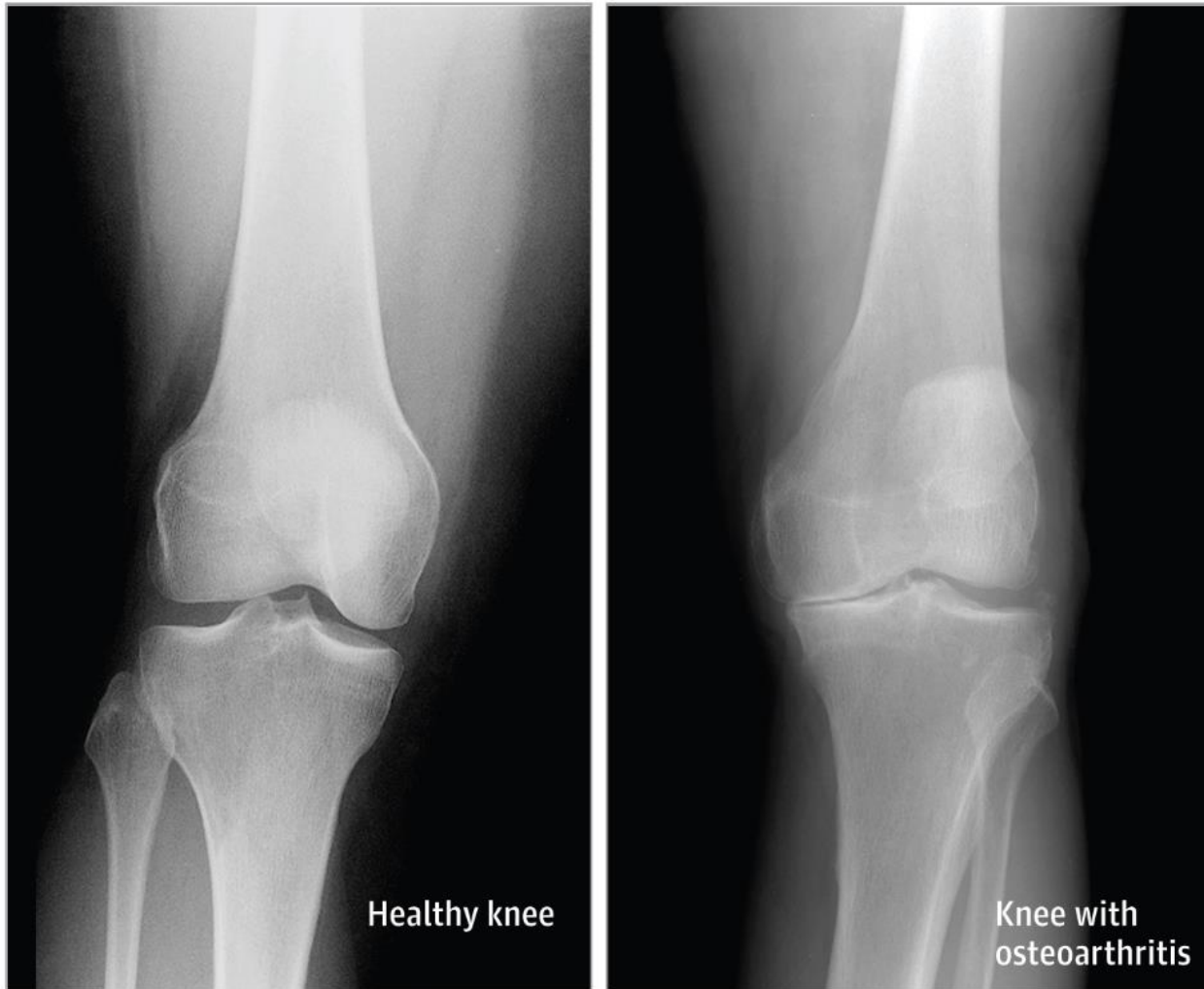
- Degenerative changes to the articular cartilage
- Osteophyte formation
- Narrowing of the joint space

Pain Presentation:

- Sharp pain with weight bearing and with movement of the knee
- Depends on degree of degenerative changes



<https://orthoinfo.aaos.org/globalassets/figures/a00389f02.jpg>

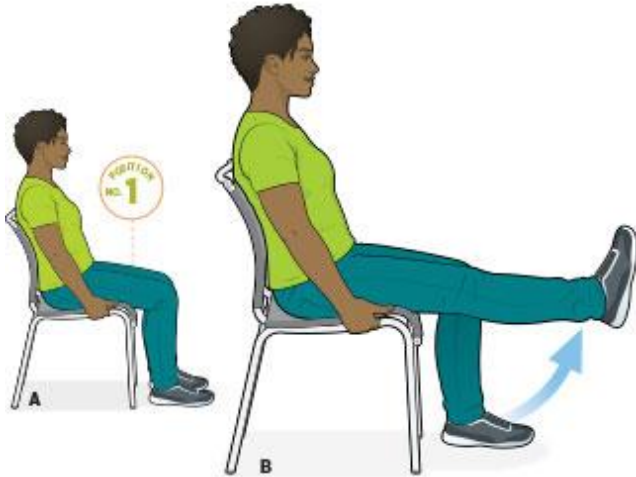


<https://jamanetwork.com/data/Journals/JAMA/936626/jmn170058fa.png>

Non-surgical arthritis treatments

- **Exercise / Conditioning**
- **Strengthening**
- **Medications**
 - Tylenol
 - **Anti-Inflammatory Medications**
(Advil, Motrin, Celebrex)
- **Injections:**
 - Steroids
 - Synvisc / Hyalgan
- **Bracing**
- **Acupuncture**
- **Weight Loss**
- **Activity Modification**

Knee Extension



<http://www.diabetesforecast.org/2017/mar-apr/10-exercises-to-get-you-fit.html>



<https://www.medbridgeeducation.com/h/hep-recommended-meniscus-exercises>

- Focused strengthening for the quadriceps muscles
- Proper form and sequence
 - Start seated with knees bent and feet on floor
 - Squeeze your core
 - Straighten out your knee as straight as you can
 - Hold for 1-2 seconds then return to starting position
- Progression: Add weight or resistance around ankle

Hamstring Curls



- Focused strengthening for the hamstrings, promotes knee flexion
- Proper form and sequence
 - Stand holding onto something stable (chair, kitchen counter)
 - Keep your knee back then raise your heel toward your bottom
- Progression: Put a resistance band around your ankles/feet or a weight around the ankle being lifted

Squats/Sit to Stands



Chair Squat

- Generalized strengthening for the lower extremities
- Proper form and sequence
 - Stand with a chair behind you
 - Keep your core strong and hinge your hips so your bottom is over the chair
 - Slowly lower until you touch or are sitting in the chair
 - Keep core strong, squeeze glutes and stand back up driving your weight through your heels
- Progression: Put a resistance band around your knees or hold onto a weight

Quadriceps Stretching

- Purpose: reduce tone through muscles that cross the knee to improve knee range of motion
- Start in whichever position is safest and most effective to perform stretch – try different positions
- Bend your knee using either you hand or a belt/strap
- Keep the hip extended (straight) and pull ankle toward hip
- Hold for 20 – 30 seconds, performs 2-3 times
- Should feel a deep stretch through the front of the thigh – NO PAIN!!



<https://www.knee-pain-explained.com/quadricep-stretches.html>

Hamstring Stretching

- Purpose: reduce tone through muscles that cross the knee to improve knee range of motion
- Prop your leg in front of you with your heel on the ground/stool and toes pointing toward the ceiling
- Sit up straight, engage your core and keep your back straight throughout the stretch
- Lean forward by pivoting at the hip
- You should feel this on the backside of the thigh for the leg that is straight out in front of you
- Hold for 20 – 30 seconds and perform 2-3 times on each side



http://kumu.brocku.ca/images/kine4p22d022015/c/cf/Seated_Hamstring_Stretch_.jpg



<https://www.popsugar.com/fitness/photo-gallery/1983373/image/20673116/Standing-Hamstring-Stretch>

Surgical arthritis treatments

- Arthroscopy
- Osteotomy
- Total Joint Replacement



Total knee replacement patient outcomes



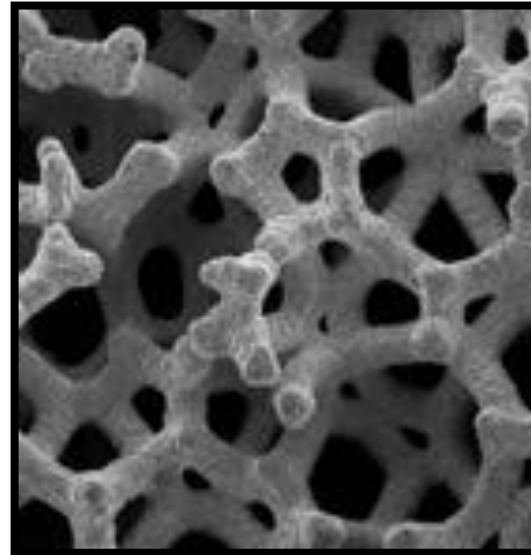
- ~1 day in hospital
- Outpatient or Home physical therapy for 2-4 weeks
- 95% last 20 years or more

What's new?

- **Improved Biologic Materials**
- **Improved Bearing Surfaces**
- **Joint Preservation**
- **Computer Navigation and Smart Implants**
- **Minimally Invasive Surgery**
- **Rapid Rehab Protocols**
- **Improved Perioperative Pain Management**
- **Robotic-Assisted Joint Replacement**

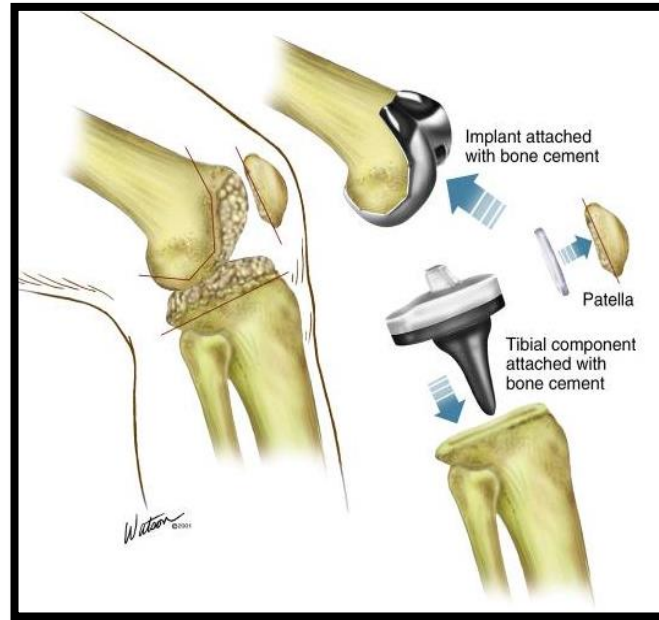
New biologic materials

- Highly porous metals
- Mechanical properties similar to bone



Joint preservation: knee

- Preserving the bone, cartilage and ligaments you were born with
- A total knee replacement replaces all 3 parts
- A partial knee replaces one



Benefits of partial knee replacement

- Preservation of bone stock
- Preservation of cartilage/ligaments
- Faster rehab
- Shorter hospital stay
- Near-normal knee function
- Easy conversion to full knee replacement



Robotic technology

- **Mako[®] Robotic Arm - Assisted Surgery System**
- **Allows for precise implant position**
- **Better soft tissue balance**
- **Greater control both before and during the operation**



Robotic technology

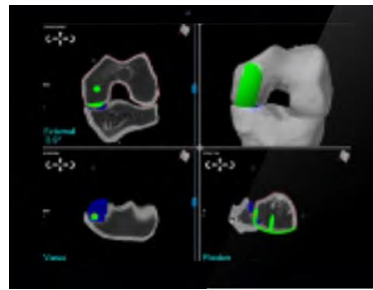


Data has shown

- Less pain
- Quicker recovery
- More precise implant position
- Better ligament balance
- Improved functional outcomes

Robotic technology

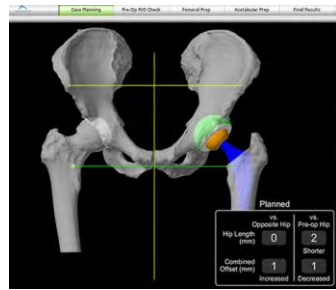
Patient-specific implant placement as a result of the three unique steps of the Mako procedure



Enhanced planning

Patient-specific pre-operative plan enables more accurate implant positioning.²¹⁻²⁵ CT data is segmented to create a 3D model of the patient's bony anatomy.

An individualized pre-operative plan is created and reviewed with the surgeon prior to the Mako procedure.



Joint balancing

Surgeon-controlled intra-operative adjustments can be made to optimize implant placement. Kinematic and soft tissue data are collected intraoperatively and applied to the virtual CT model.

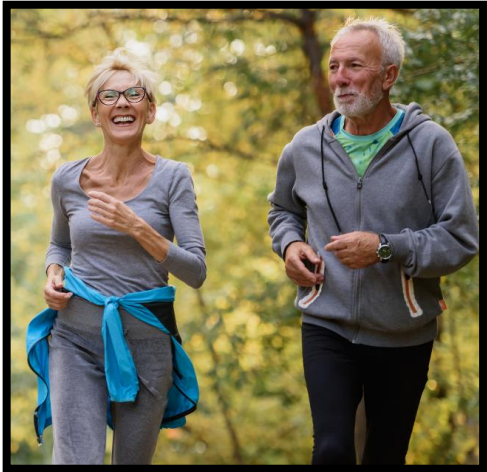
The surgeon reviews the pre-op plan and can modify it if necessary based on the intra-operative data.



Robotic-arm assisted bone preparation

The surgeon then executes the individualized intra-operative plan using robotic-arm assisted bone preparation to achieve functional implant positioning.

Preoperative process and recovery



- **Select Surgery Date**
- **2-3 weeks prior to Surgery**
 - **Medical clearance**
 - **Joint Class**
- **Office manages pre-authorization and pre-registration**
- **Clinic follow-up visits at 2 weeks and 6 weeks after surgery**

Thank You

Contact SSMBrandSupport@ssmhealth.com with any questions about this template.

