Musculoskeletal Disorders in Elderly

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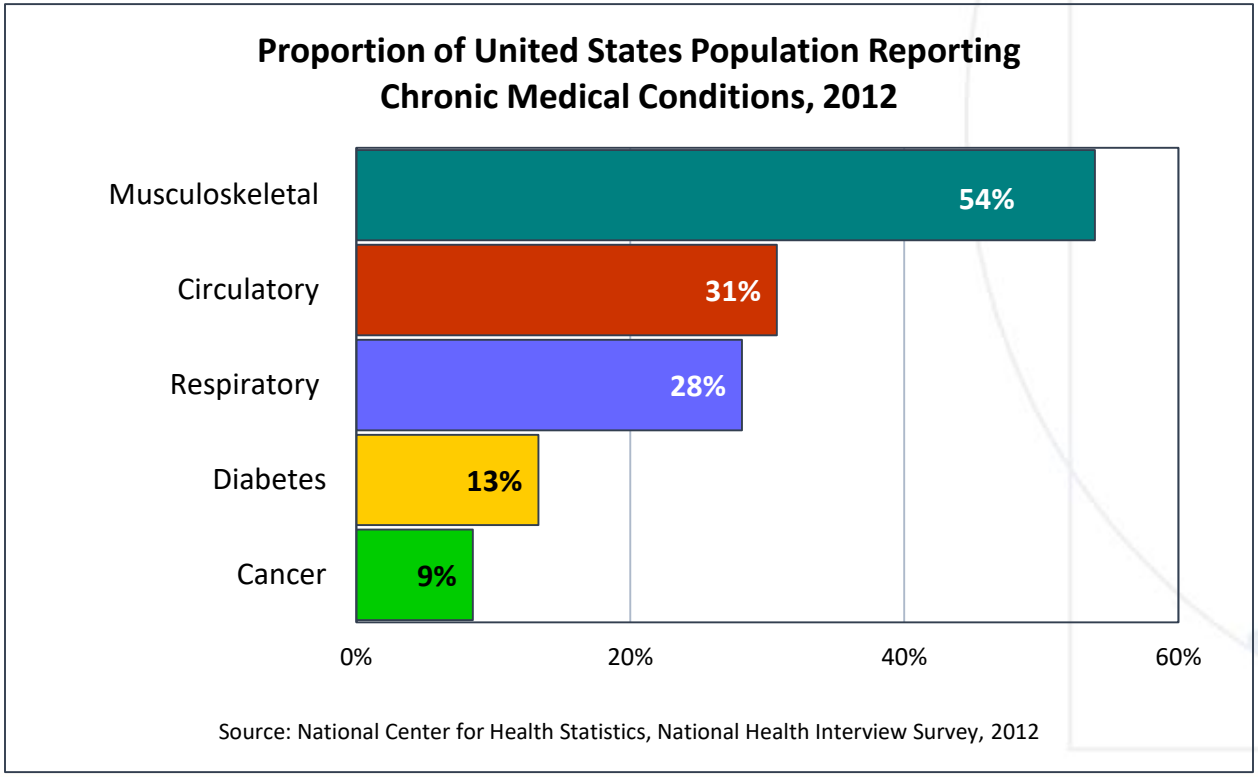
Musculoskeletal Diseases and Demographic Characteristics

- **Low Back and Neck Pain**
- **Spinal Deformity**
- **Arthritis and Related Conditions**
- **Osteoporosis and Bone Health**
- **Injuries – Traumatic, Workplace, Sports, Military**
- **Children and Adolescents**
- **Tumors of Bones and Joints, Muscles and Tissues**
- **Rare Bone Diseases**
- **Neuromuscular Disorders**
- **Diseases of the Muscles**
- **Aging**
- **Sex and Gender**

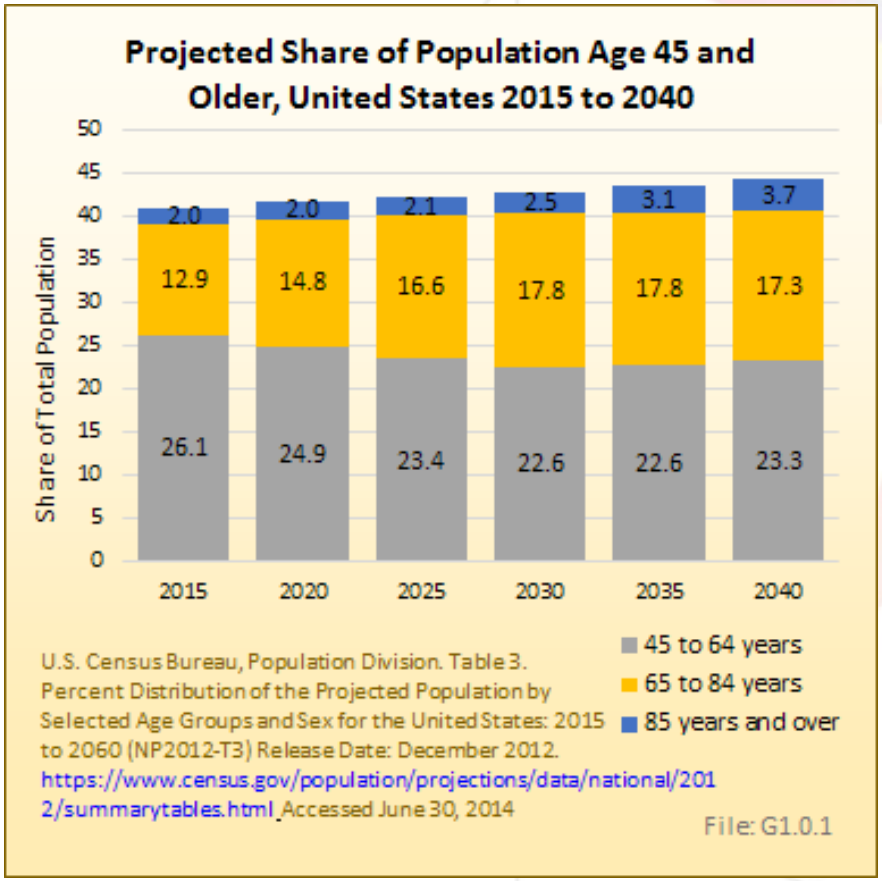
Prevalence of Musculoskeletal Diseases

- **1 in 2** (126.6 million) adults are affected, twice the rate of chronic heart and lung conditions



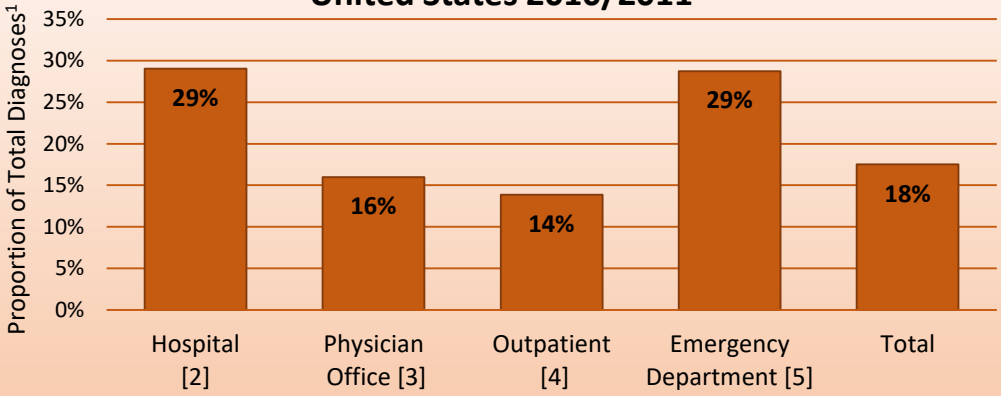
- **Disproportionately affect older persons, accounting for >50% of all chronic conditions in people older than 50 years**
- **Age 65 and older population to nearly double in next 25 years**

In 2040, persons age 65 and older will constitute 21% of US population, equal to the share who are 18 and under.



Health Care Visits for Musculoskeletal Diseases

- **18%** of all health care visits in 2010/2011 had a musculoskeletal condition diagnosis listed
  - **29%** of hospital discharges
  - **16%** of physician visits
  - **14%** of outpatient visits
  - **29%** of emergency department visits



[1] Includes all possible diagnoses. The number of diagnosis variables varies in the databases (NIS up to 25; NAMCS up to 15; NHAMCS_OP up to 3, NEDS up to 15).
[2] **Source**: HCUP Nationwide Inpatient Sample (NIS). Healthcare Cost and Utilization Project (HCUP). 2011. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/nisoverview.jsp
[3] **Source**: National Ambulatory Medical Care Survey (NAMCS), 2010. www.cdc.gov/nchs/ahcd/ahcd_questionnaires.htm April 23, 2013.
[4] **Source**: National Hospital Ambulatory Medical Care Survey_Outpatient Department (NHAMCS_OP), 2010. www.cdc.gov/nchs/ahcd/ahcd_questionnaires.htm April 23, 2013.
[5] **Source**: HCUP Nationwide Emergency Department Sample (NEDS). Healthcare Cost and Utilization Project (HCUP). 2010. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/nedsoverview.jsp

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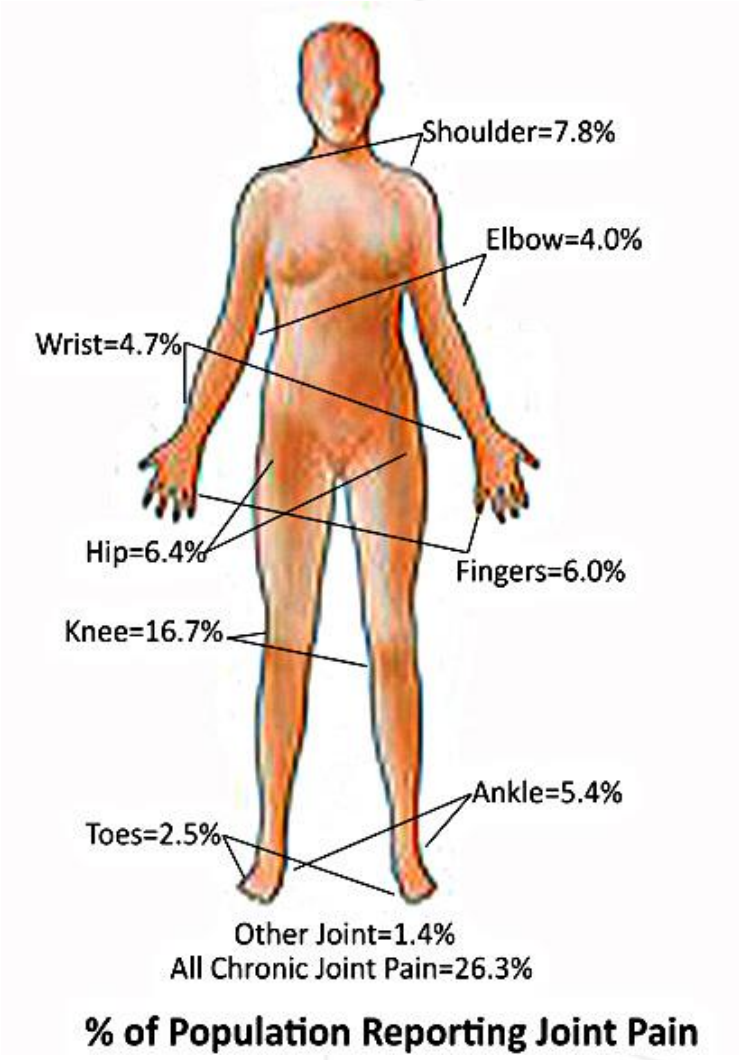
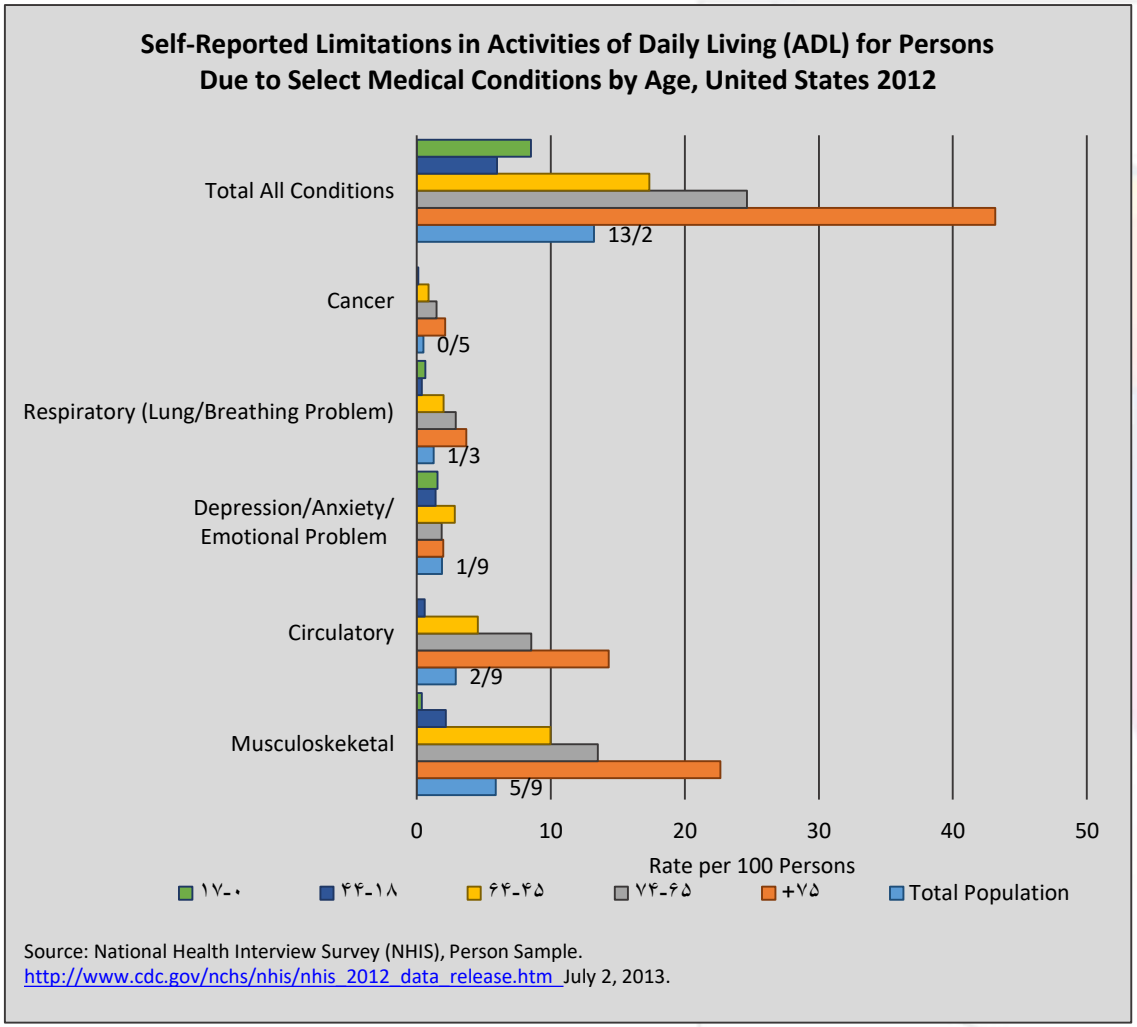
Chronic Pain of Musculoskeletal Diseases

- **1 in 4** persons over age of 18 report chronic joint pain in at least one joint
  - **Knee** is the most frequent site (17%)
  - **Shoulder** is 2nd most frequent site (8%)
  - **Hip** is 3rd most frequent site (6%)
- **40%** = percentage of persons over age 65 with chronic joint pain



Limitations due to Musculoskeletal Diseases

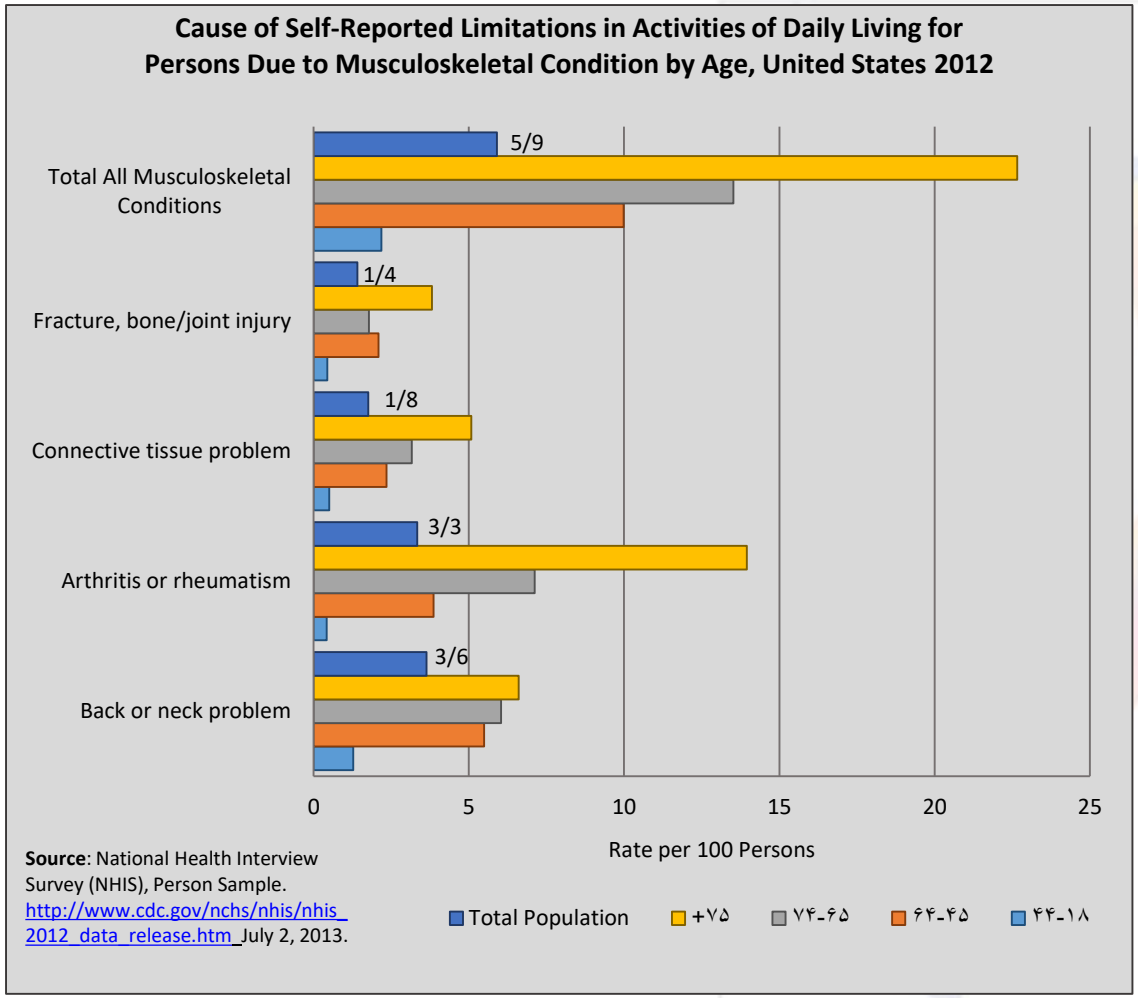
- **6%** of population reports limitations carrying out common activities of daily living (eating, dressing, bathing) due to musculoskeletal diseases
- **14%** ages 65-75 report limitations due to musculoskeletal condition
- **23%** age 75 and older
- **Twice the rate** of circulatory (heart conditions), the second highest cause of limitations



Source: National Health Interview Survey (NHIS), Person Sample.
http://www.cdc.gov/nchs/nhis/nhis_2012_data_release.htm July 2, 2013.

Limitations due to Specific MSK Diseases

- **5%-6%** of population over age 18 report limitations carrying out common activities of daily living are **due to back or neck problems**
- **14%** age 75 and older have limitations due to **arthritis**
- **For all musculoskeletal** diseases, the rate of limitations increases sharply as population ages



Osteoarthritis of The Knee

I. Overview
   - ❖ Definition
   - ❖ Risk Factors

II. Clinical Approach to Knee Pain

III. Differential Diagnosis

IV. Diagnosis of Knee OA

V. Management
   - ❖ Lifestyle
   - ❖ Medical
   - ❖ Surgical

Overview: Definition

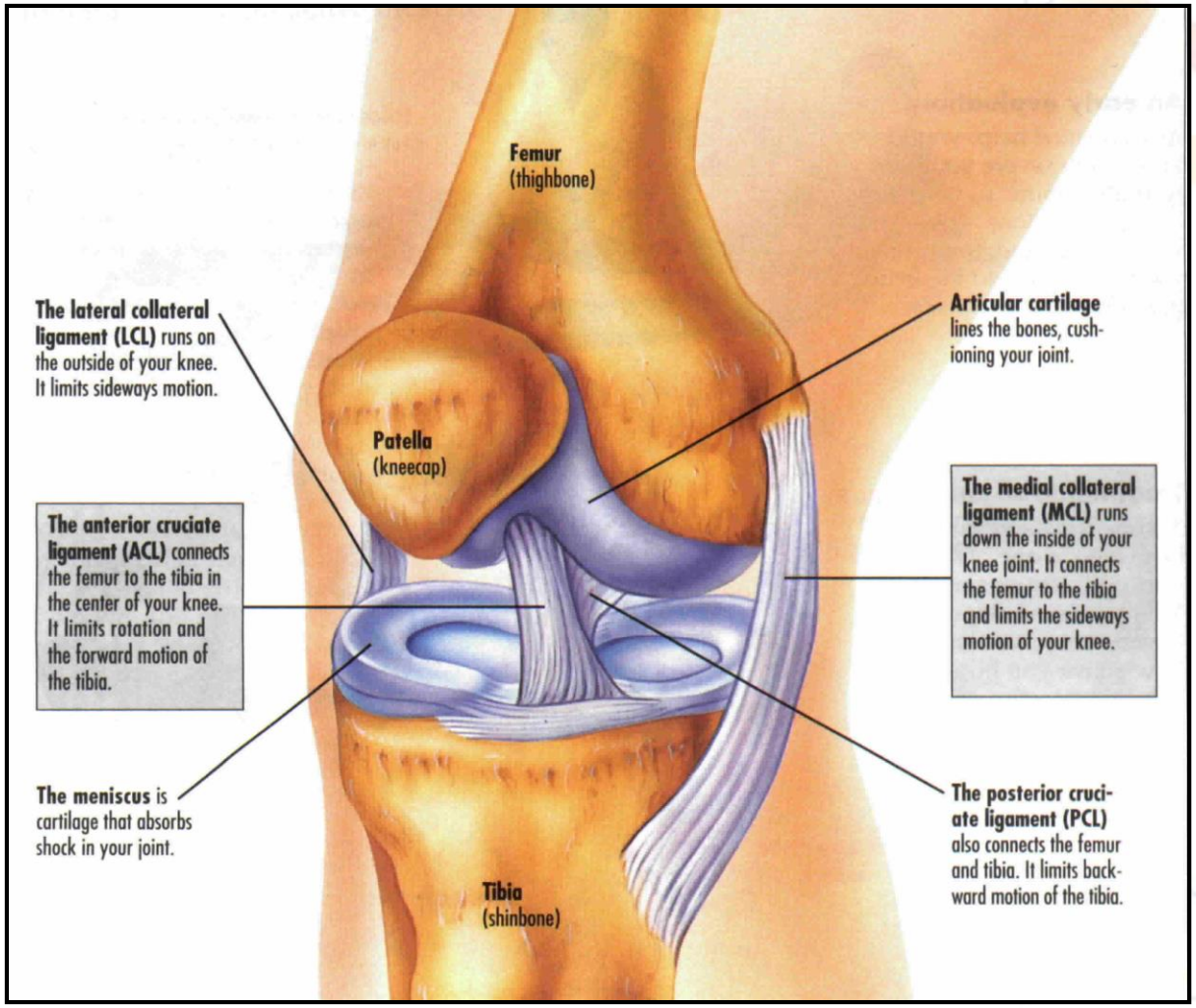
Arthritis vs. Arthrosis

Gradual loss of articular cartilage in the knee joint

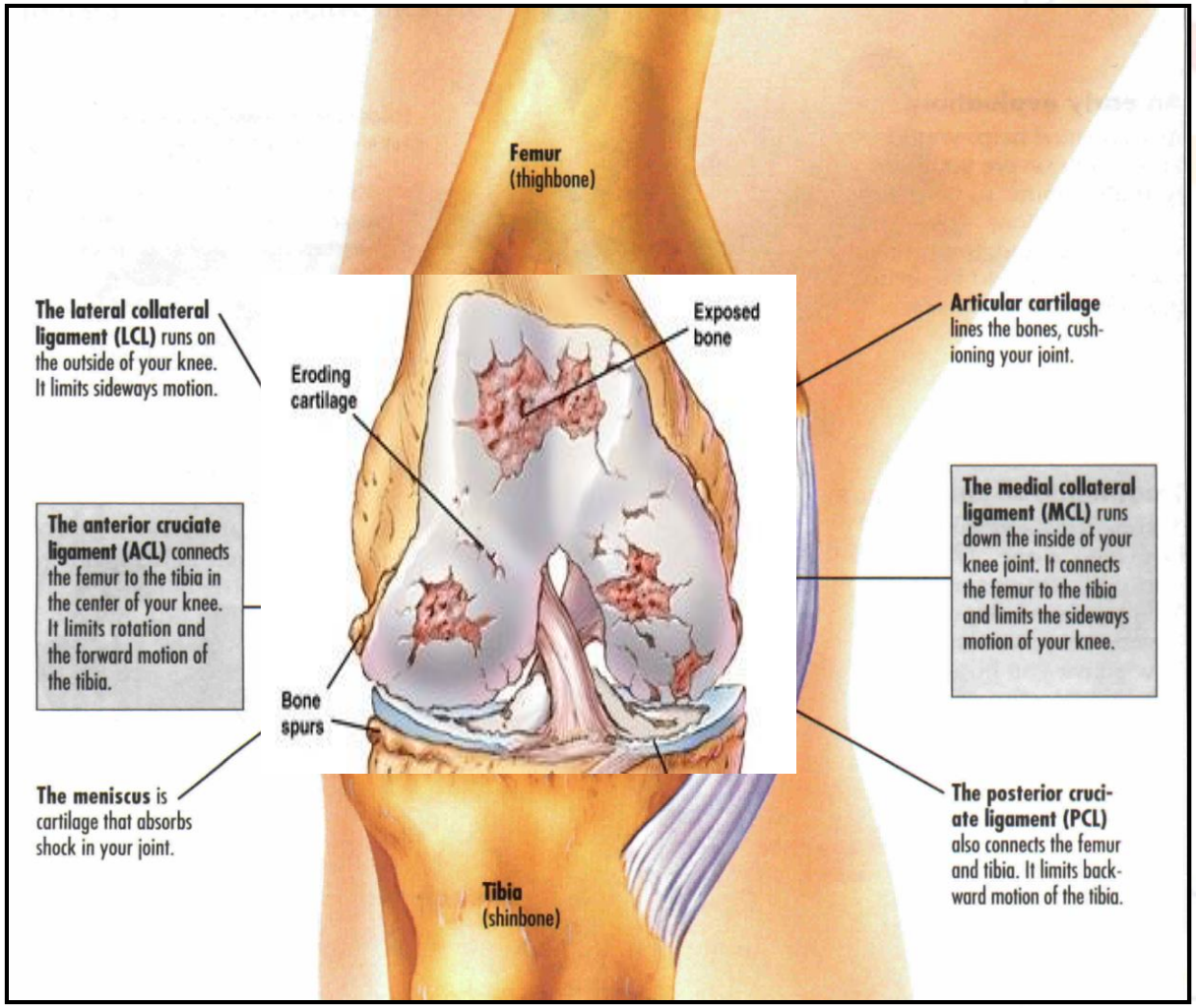
- **3 articulations:**
  1) **Lateral condyles of the femur and tibia**
  2) **Medial condyles of the femur and tibia**
  3) **Patellofemoral joint**

Damage caused by a complex interplay of joint integrity, biochemical processes, genetics, and mechanical forces

Anatomy of The Knee



Anatomy of The Knee



Overview: Risk Factors

- Age [3]
- Female
- Obesity
- Previous knee injury
- Lower extremity malalignment
- Repetitive knee bending
- High impact activities
- Muscle weakness [4]

Clinical Approach to Knee Pain

"Hey Doc, my knee's been hurting!"

History

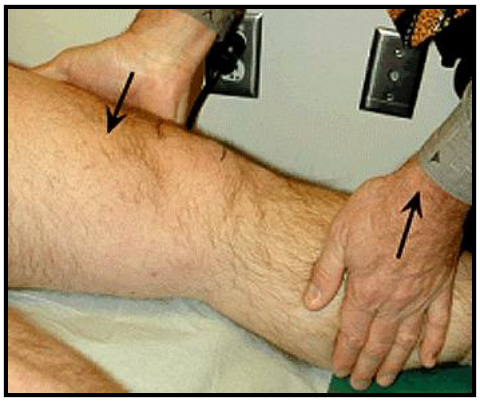
- **SOCRATES pain questions**
- **Inflammatory sx e.g. fever, hot joint**
- **History of trauma or surgery**
- **Instability**
- **Functional loss**
- **Prior treatment**

Clinical Approach to Knee Pain

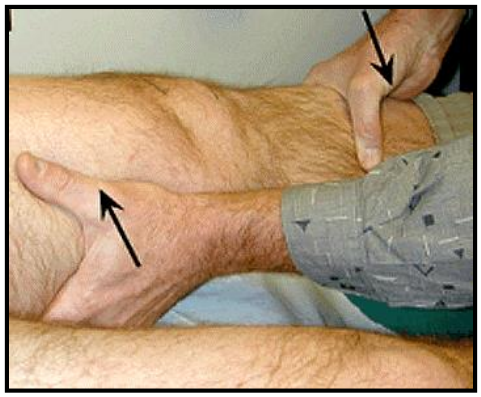
Physical Exam

- **Vitals, BMI**
- **Palpation: isolate tenderness, effusion, crepitus**
- **ROM: measure degree of flexion**
- **Stability: ligaments, menisci**
- **Alignment: genu varus or valgus**
- **Function: gait, duck waddle**

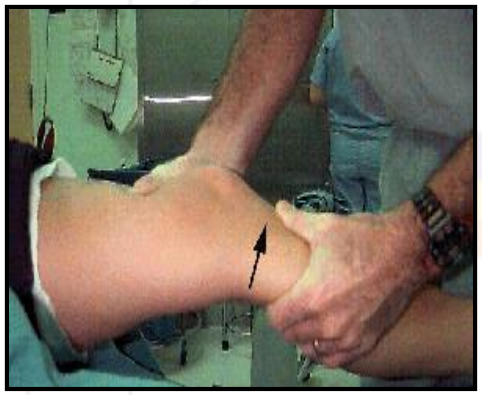
Clinical Approach to Knee Pain



Valgus Test (MCL)



Varus Test (LCL)



Lachman Test (ACL)

McMurray Maneuver
(menisci)

Duck Waddle
(stability)

Differential Diagnosis of Knee Pain

Medial Pain

- OA
- MCL
- Meniscus
- Bursitis

Lateral Pain

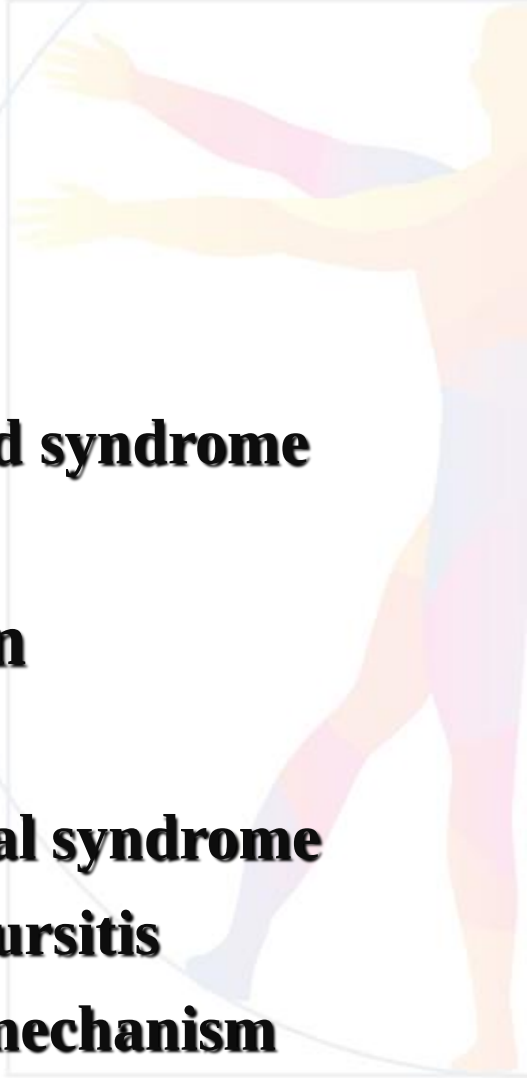
- OA
- LCL
- Meniscus
- Iliotibial band syndrome

Diffuse Pain

- OA
- Infectious arthritis
- Gout, pseudogout
- RA

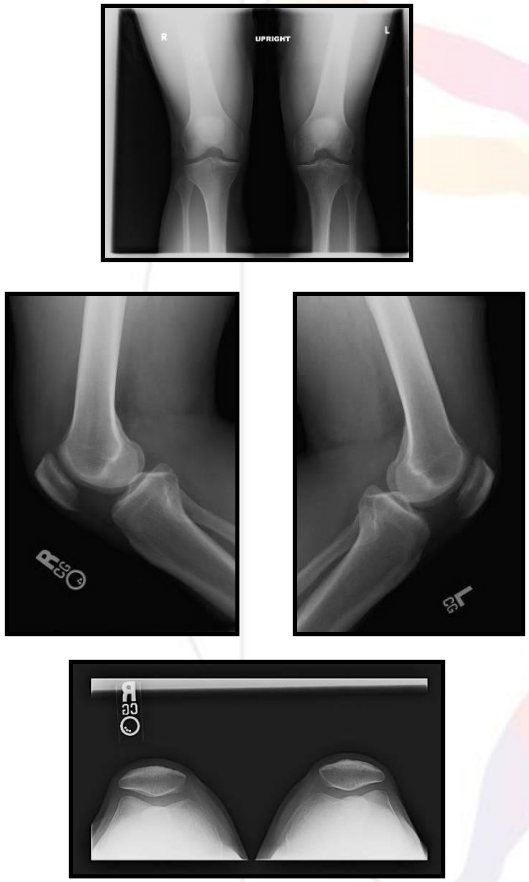
Anterior Pain

- OA
- Patellofemoral syndrome
- Prepateller bursitis
- Quadriceps mechanism



Para- Clinic

- CBC, ESR, RF
- Arthrocentesis
- X-rays (3 views)
  - Weight-bearing AP
  - Lateral
  - Tangential Patellar (Sunrise)
- MRI



Diagnosis of Knee OA

Classic Clinical Criteria

- established by ACR, 1981
- sensitivity 95%, specificity 69%

➢ **knee pain** plus at least 3 of 6 characteristics:

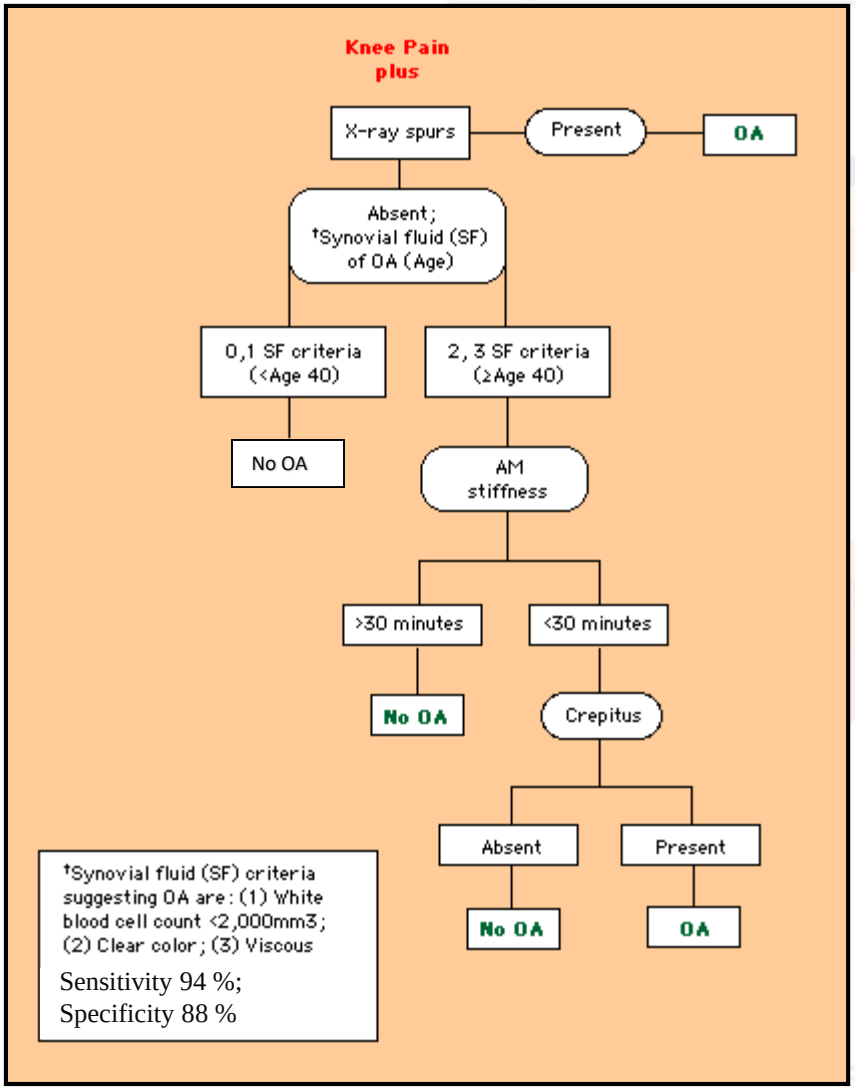
- > 50 yo
- Morning stiffness < 30 min
- Crepitus
- Bony tenderness
- Bony enlargement
- No palpable warmth [5]

Diagnosis of Knee OA

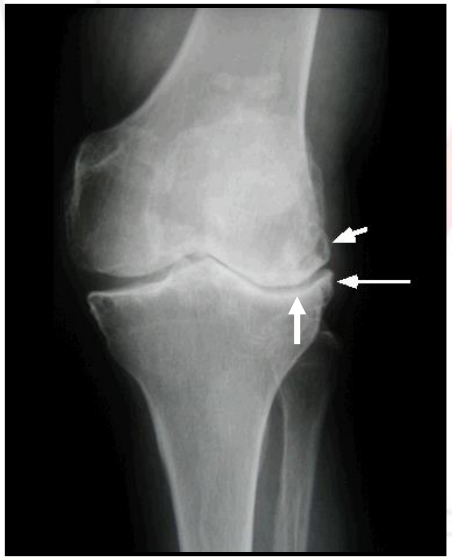
Classification Tree

- **Clinical symptoms**
- **Synovial fluid**
  1. **WBC<2000/mm^3**
  2. **Clear color**
  3. **High Viscosity**
- **X-rays**
  1. **Osteophytes**
  2. **Loss of joint space**
  3. **Subchondral sclerosis**
  4. **Subchondral cysts**

➢ Confirmed by arthroscopy (gold standard) [6]



Diagnosis of Knee OA



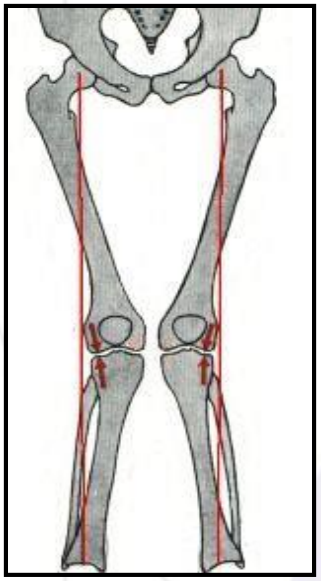
Management: Lifestyle

- Weight loss
  - Nutrition referral
- Exercise Program
  - PT referral
  - Quadriceps strengthening
  - ROM exercises
  - Low impact activities e.g. swimming, biking [7]
- Ambulatory assist devices
  - Cane
  - Walker
- Insoles
- Unloader knee braces

Management: Lifestyle

Varus (bowlegged) vs Valgus (knock-kneed)

G2 Unloader Brace



Management: Medical

- Glucosamine/Chondroitin
- Acetaminophen
- NSAIDs
- Cox-2 inhibitors
- Opioids
- Intraarticular injections
  - Glucocorticoids
  - Hyaluronans

Management: Medical

- Glucosamine/Chondroitin
  - 1500 mg/1200 mg daily ($40-50/month)
  - Glucosamine: building block for glycosaminoglycans
  - Chondroitin: glycosaminoglycan in articular cartilage
    - For mild OA, not better than placebo
    - For moderate-severe OA, combination showed benefit [8]
  - Patient satisfaction

Management: Medical

- **Acetaminophen**
  - **Indication: mild-moderate pain**
  - **1000 mg Q6h PRN**
  - **Better than placebo but less efficacious than NSAIDs [9]**
  - **Caution in advanced hepatic disease**

- **NSAIDs**
  - **Indication: moderate-severe pain, failed acetaminophen**
  - **GI/renal/hepatic toxicity, fluid retention**
  - **If risk of GIB, use anti-ulcer agents concurrently**
  - **Agents have highly variable efficacy and toxicity**

Management: Medical

- **NSAIDs**

Dose and Cost of Nonsteroidal Antiinflammatory Drugs

Agent	Brand name(s)	Dosing	Daily dose	Specific benefits	Cost
Salicylates					
Aspirin		BID-QID	500-4000 mg	Titrate dose by serum levels	$
Choline magnesium trisalicylate	Trilisate	BID-QID	975-3600 mg	Decreased GI toxicity, titrate dose by serum levels	$$$$
Salsalate	Disalcid, Salflex, Monogesic	BID-QID	975-3600 mg	Decreased GI toxicity, titrate dose by serum levels	$$$$
Short half-life NSAID					
Fenoprofen calcium	Nalfon	TID-QID	900-2400 mg		$$
Ibuprofen	Motrin, Advil, Midol, Nuprin	TID-QID	600-3600 mg	Generally fewer side effects	$
Indomethacin	Indocin	TID-QID	75-200 mg	Excellent efficacy if tolerated	$$
Ketoprofen	Orudis	TID-QID	75-300 mg	Dialyzable	$
Meclofenamate sodium	Meclomen	TID-QID	150-400 mg		$$
Tolmetin	Tolectin	TID-QID	600-2000 mg		$
Intermediate half-life NSAID					
Diclofenac	Cataflam, Voltaren	BID-QID	100-200 mg		$
Etodolac	Lodine	BID-QID	400-1200 mg		$$$
Flurbiprofen	Ansaid	BID-QID	100-300 mg		$$$
Naproxen	Naproxyn, Napron X	BID-TID	500-1500 mg		$
Naproxen-sodium	Anaprox, Aleve	BID-TID	550-1650 mg		$
Sulindac	Clinoril	BID	150-400 mg	Decreased renal prostaglandin effect	$$
Diflunisal	Dolobid	BID	500-1000 mg	Most uricosuric NSAID	$$$$
Long half-life NSAID					
Nabumetone	Relafen	QD-BID	1000-2000 mg	Decreased GI side effects	$$$
Oxaprozin	Daypro	QD-BID	600-1800 mg		$
Piroxicam	Feldene	QD	10-20 mg		$

Management: Medical

- Cox-2 inhibitors
  - Indication: mod-severe pain, failed NSAID, risk of GIB
  - OA pain relief similar to NSAIDs
  - Fewer GI events e.g. symptomatic ulcers, GIB
  - Celecoxib 200 mg daily
  - GI/renal toxicity, fluid retention
  - Increased risk of CV events?
    - APC Trial: 700 pts each assigned to placebo, 200 BID, 400 BID
      - Increased risk at higher doses [11]
    - CLASS Trial: 8,000 pts compared Celecoxib vs Ibuprofen
      - Similar risk to Ibuprofen [12]

Management: Medical

- Opioid Analgesics
  - Indication:
    - Moderate-severe pain
    - Acute exacerbations
    - NSAIDs/Cox-2 inhibitors failed or contraindicated
  - Oxycodone synergistic w/ NSAIDs [13]
  - Tramadol/acetaminophen vs codeine/acetaminophen
    - Similar pain relief [14]
  - Avoid long-term use
  - Caution in elderly
    - Confusion, sedation, constipation

Management: Medical

Intraarticular Injections

- Glucocorticoids
  - Indication: pain persists despite oral analgesics
  - 40 mg/mL triamcinolone (kenalog-40)
  - Solution: 5 mL (lidocaine 4 mL + kenalog 1 mL)
  - Limit to Q3months, up to 2 yrs
  - Effective for short-term pain relief < 12 wks
  - Acute flare w/in 48 hrs post-injection [15]

Management: Medical

Intraarticular Injections

- Hyaluronans (e.g. Synvisc)
  - Indication: pain persists despite other agents
  - Synthetic joint fluid
  - Pain relief similar to steroid injections
  - 2 mL injection Qwk x 3, $560-760/series
  - Medicare reimburses 80%, Medi-cal $455.90
  - 60-70% patients respond, relief up to 6 months
  - Patient satisfaction [16, 17]

Management: Medical

Intraarticular Injections

- Technique
  - 22 gauge 1.5 inch needle
  - Approach accuracy:
    - Lateral mid-patellar 93% [18]
  - Patient supine
  - Leg straight
  - Manipulate patella
  - Angle needle slightly posteriorly
  - Inject after drop in resistance or fluid aspirated

Management: Algorithm

Lifestyle Modifications

Acetaminophen PRN

NSAIDs PRN

Celecoxib

Steroid Injections

Opioids PRN

Hyaluronan Injections

Surgical Referral

Management: Surgical

When to Refer

- Knee pain or functional status has failed to improve with non-operative management

Types of Procedures

- Arthroscopic Irrigation
- Arthroscopic Debridement
- High Tibial Osteotomy
- Partial Knee Arthroplasty
- Total Knee Arthroplasty

Management: Surgical

High Tibial Osteotomy

- **Indication:**
  - **Unicompartmental arthritis**
  - **Genu varus or valgus**
- **Realign mechanical axis**
- **Age < 60yo**
- **< 15 degrees deformity[19]**

Management: Surgical

Partial Knee Arthroplasty

- Indication:
  - Unicompartmental arthritis
- Ligaments spared
- Increased ROM
- Faster recovery
- Prosthesis 10-yr survival: 84% [20]

Management: Surgical

Total Knee Arthroplasty

- **Indication:**
  - **Diffuse arthritis**
  - **Severe pain**
  - **Functional impairment**
- **Pain relief > functional gain**
- **ACL sacrificed**
- **PCL also may be sacrificed**
- **Prosthesis 10-yr survival: 90%** [21]