Ray Marks

Executive Editor
Journal of Aging Science

Biography

- Dr. Ray Marks has expertise in several areas: childhood obesity; health literacy; health promotion and practice; social marketing; social policy and prevention; and self-efficacy and chronic disease prevention. She has a book entitled Health Literacy in Schools (2013, Emerald Press).She has served as the Director (2005 - present) of the Center for Health Promotion, School of Health and Behavioral Sciences, City University of New York, York College—a non-profit Public Health Education Center with a 20 year history of serving the local community. She is Founding Director of the Osteoarthritis Research Center, Canada.

Research Interest

- Causes, consequences, and treatment of osteoarthritis
- Chronic Disease prevention
- Depression and its treatment
- Falls injury prevention
- Healthy aging
- Hip fractures, causes, and prevention
- Obesity prevention
- Pain and its causes and control
- Physical activity and health
- Orthopedic Physical Therapy
- Orthopedic Rehabilitation

Recent Publications

- Marks R, Ok H, Joung H, Allegrante JP (2010) Perceptions about collaborative decisions: perceived provider effectiveness among 2003 and 2007 Health Information National Trends Survey (HINTS) respondents. J Health Commun 15 Suppl 3: 135-146.
- Marks R (2010) Hip fracture epidemiological trends, outcomes, and risk factors, 1970-2009. Int J Gen Med 3: 1-17.
- Marks R (2009) Body mass characteristics of hip osteoarthritis patients experiencing aseptic loosening, periprosthetic fractures, dislocation, and infections after total hip replacement. Clinicoecon Outcomes Res 1: 7-16.
- Marks R (2009) Comorbid depression and anxiety impact hip osteoarthritis disability. Disabil Health J 2: 27-35.
- Marks R (2007) Physical and psychological correlates of disability among a cohort of individuals with knee osteoarthritis. Can J Aging 26: 367-377.
- Marks R (2008) Hip surgery candidates: a comparative study of hip osteoarthritis and prior hip fracture patient characteristics. Open Orthop J 2: 79-85.
- Marks R (2014) Depression and Osteoarthritis: Impact on Disability. Aging Sci 2: 126. doi:10.4172/2329-8847.1000126

Osteoarthritis

- Most common form of arthritis
- Also known as **degenerative arthritis** or **degenerative joint disease** or **osteoarthrosis**
- Occurs when the protective cartilage on the ends of the bones wears down over time
- Cartilage is the slippery tissue that covers the ends of bones in a joint
- Healthy cartilage absorbs the shock of movement. When cartilage is lost, the bones rub together and over time this can permanently damage the joint.
- Reasons for loss of cartilage-hereditary, developmental, metabolic and mechanical deficits
- Most commonly affects joints in your hands, knees, hips and spine

Cartilage

- Tough but flexible connective tissue
- Cushions bones at joints between bones, the rib cage, and the intervertebral discs
- Gives shape and support to other parts of the body, such as the ears, nose and windpipe
- Not as hard and rigid as bone, but, is stiffer and less flexible than muscle
- Composed of specialized cells called **chondrocytes** that produce a large amount of extracellular matrix composed of collagen fibers, abundant ground substance rich in proteoglycan, and elastin fibers
- Does not contain blood vessels
- The chondrocytes are supplied by diffusion and the pumping action generated by compression of the articular cartilage or flexion of the elastic cartilage. Thus, cartilage grows and repairs more slowly.

Properties of Cartilage:

Mechanical properties:

- load bearing joints
- response in frictional, compressive, shear and tensile loading
- displays viscoelastic properties

Frictional properties:

- Lubricin: glycoprotein abundant in cartilage and synovial fluid, play a major role in bio-lubrication and wear protection of cartilage

Types of Cartilage:

- Three types:

Hyaline cartilage

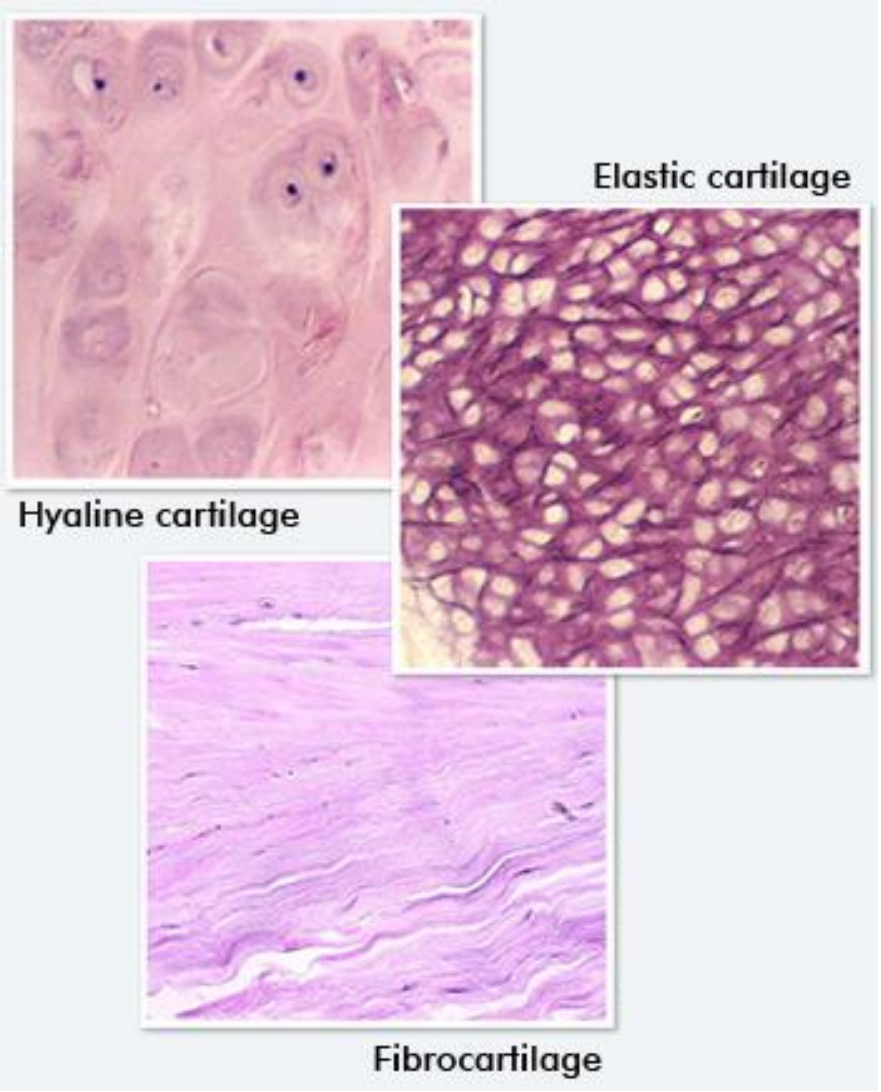
- low-friction and wear-resistant tissue
- present within joints
- designed to bear and distribute weight
- strong, rubbery, flexible tissue but has a poor regenerative capacity

Elastic cartilage

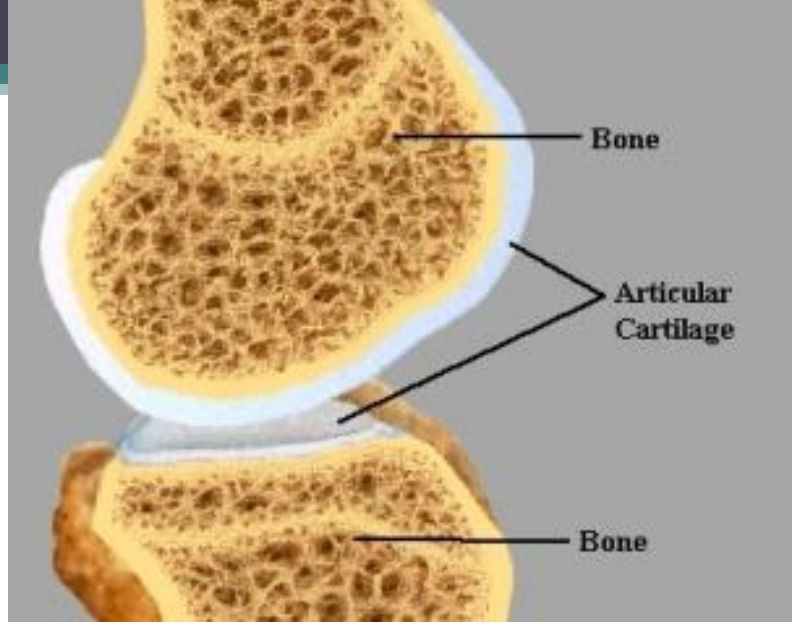
- more flexible that hyaline cartilage
- present in the ear, larynx and epiglottis

Fibrocartilage

- tough and inflexible form of cartilage
- found in the knee and between vertebrae



Articular cartilage



- Hyaline cartilage that lies on the surface of bones
- Often described in terms of four zones :

1. The surface or superficial tangential zone

- ✓ Covers the articular surface
- ✓ Smooth contour
- ✓ Allows gliding of the ends of the bones and resists shear
- ✓ Forms around 10% to 20% of articular cartilage thickness
- ✓ Highest collagen content of all the zones
- ✓ Collagen fibrils are densely packed and are aligned in a highly organized manner parallel to the articular surface
- ✓ Chondrocytes in this zone are elongated in shape.

2. The middle (or transitional) zone

- ✓ Makes up 40% to 60% of the articular cartilage volume
- ✓ Collagen fibrils are thicker and aligned loosely and not in parallel to the surface
- ✓ Chondrocytes in this layer are more rounded

3. The deep zone

- ✓ Makes up 30% of the cartilage
- ✓ Collagen fibrils are large in diameter and aligned perpendicular to the articular surface has the highest proportion of proteoglycan and lowest concentration of water
- ✓ Chondrocytes are arranged in a columnar fashion, parallel to the collagen fibers

4. The calcified zone

- ✓ Lies directly on the subchondral bone
- ✓ Contains small cells in a chondroid matrix that has apatitic salts scattered through it

Types of Osteoarthritis

- 2 main types of osteoarthritis - different causes:
- **Idiopathic osteoarthritis**
- No identifiable cause
- May be localized (confined to one or two joints) or generalized (present in three or more joints)
- **Secondary osteoarthritis**
- Caused by an underlying condition: joint injury, accumulation of calcium inside the joint, other bone and joint conditions (eg, rheumatoid arthritis), or a medical condition, such as diabetes

Symptoms of osteoarthritis

- Joint pain
- Tenderness
- Swelling
- Stiffness
- Locking
- Sometimes an effusion
- Reduced motion
- Decreased movement can lead to pain, regional muscles may atrophy, and ligaments may become more lax

Diagnosis

- Diagnosis is made with reasonable certainty based on history and clinical examination
- No single test can diagnose osteoarthritis
- Most doctors use methods that include medical history, a physical exam, x-rays, or lab tests
- Different types of arthritis need different treatments

The diagnosis of osteoarthritis includes 3 major stages:

1. Patient history analysis
2. Physical examination
3. Imaging and Laboratory tests

Patient history analysis

- The diagnosis begins with medical history, or information about :

✓ Patient's health background

✓ Conditions running in the family as some disorders are inherited

✓ Symptoms that prompts a patient to seek medical attention

Physical Examination

- Based on the symptoms and the physical signs found when examining the joints. The doctor checks for:
- joint tenderness
- creaking or grating (crepitus) sounds
- bony swelling
- excess fluid
- reduced movement
- joint instability
- muscle thinning

Imaging and Laboratory Tests

Imaging Tests:

- X-ray
- Magnetic Resonance Imaging (MRI)
- Arthroscopy

Laboratory Tests:

- Blood tests
- Joint Fluid Analysis/Joint aspiration

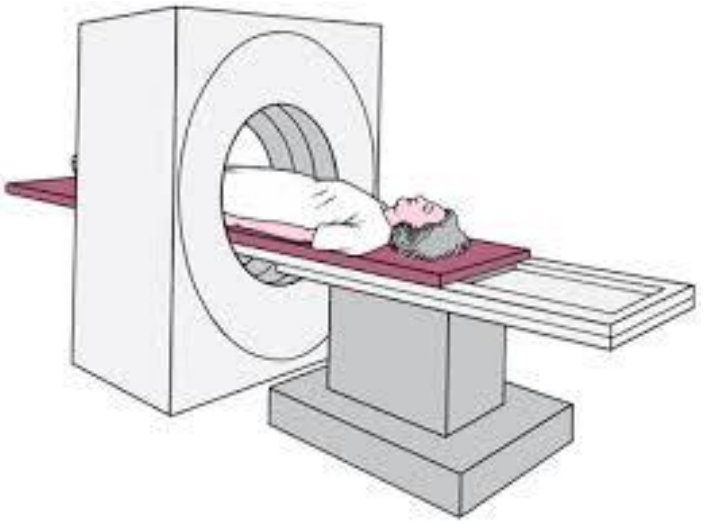
Imaging Tests

X-ray

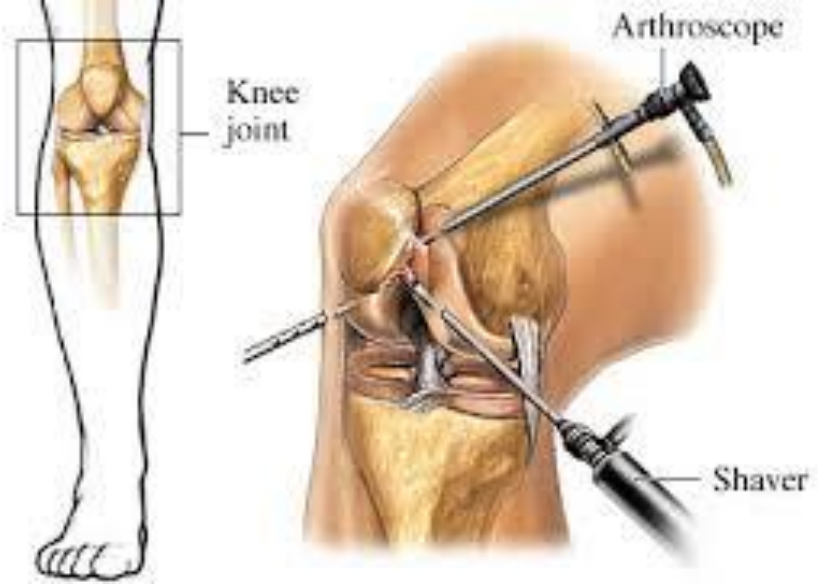
- Most useful test to confirm osteoarthritis
- Cartilage doesn't show up on X-ray images
- Cartilage loss is revealed by a narrowing of the space between the bones in your joint
- Bone spurs may be observed around a joint.
- Patients may have X-ray evidence of osteoarthritis before experiencing any symptoms
- Detect calcium settling in joints

Magnetic resonance imaging (MRI)

- Uses radio waves and a strong magnetic field to produce detailed images of bone and soft tissues, including cartilage
- Not commonly needed for diagnosis, but, may help provide more information in complex cases
- Expensive than X-ray
- Does not involve radiation risk
- Provides 2-D view resulting in better images



Arthroscopy



- Minimally invasive surgical procedure
- An Arthroscope is inserted into the joint area through small incisions to find or even repair damage done to the joint
- Reduced recovery time
- High success rate due to less damage done to connective issue
- Less scarring
- Advantageous to athletes

Laboratory Tests

Blood test

- No blood test for osteoarthritis as such
- Suggested to rule out other types of arthritis e.g. rheumatoid arthritis

Joint Fluid Analysis/Joint aspiration

- A needle is used to draw fluid out of the affected joint after the administration of anesthesia
- Examination and testing of the fluid to determine presence of inflammation , crystals or joint deterioration

Treatment and Management

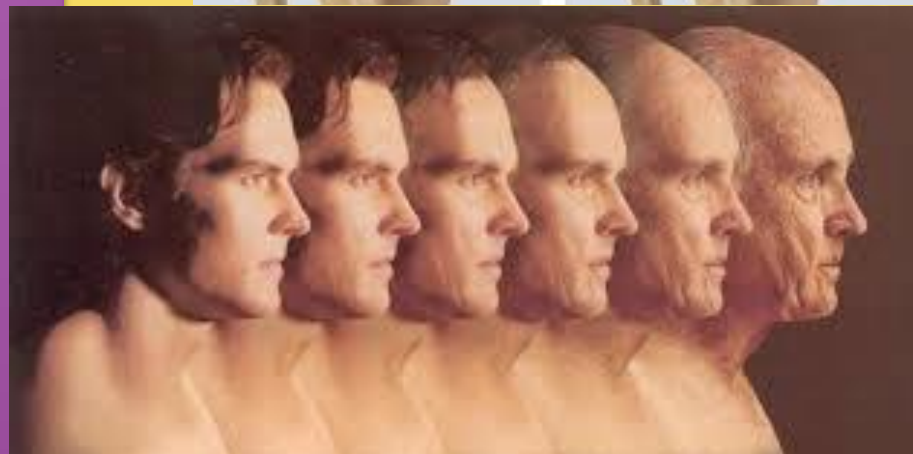
- Osteoarthritis often gradually worsens, and no cure exists
- Staying active, maintaining a healthy weight and other treatments may slow progression of the disease and help improve pain and joint function

Experts like:

- A physiatrist may help in formulating a non-pharmacologic management plan for the patient with osteoarthritis, and
- A nutritionist may help the patient to lose weight
- Orthopedic surgeon may be necessary if the osteoarthritis fails to respond to a medical management plan
- Surgical procedures for osteoarthritis include arthroscopy, osteotomy, and (particularly with knee or hip osteoarthritis) arthroplasty

Aging Science Related Journals

- Anaplastology
- Journal of clinical & experimental Dermatology Reasearch



Aging Science
Related Conferences

- 5th International Conference on Clinical & Experimental Dermatology

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