Osteoarthritis, Sports, and Physical Activity: Recognizing the Role of the Athletic Trainer

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Disclosure

The views and opinions expressed are those of the presenter and do not reflect the official policy of the Department of the Army, the Department of Defense, or the U.S. Government.

Overview

- What is osteoarthritis (OA) and what is the impact of OA?
- What are the risk factors for OA?
- Why should athletic trainers (ATs) care about OA?
- Review the chronic disease management model for OA.
- Discuss potential roles ATs might have in the prevention and management of OA.
- Review EBP Recommendations for OA Management and the CDC Public Health Agenda for OA.

What is Osteoarthritis?

Osteoarthritis (OA) is caused by a combination of genetic, local mechanical stresses, and/or systemic factors that lead to joint cartilage loss, bony overgrowth and other bone changes, and alterations in ligaments, menisci and muscles.

The Impact of OA

- Arthritis is the leading cause of disability in the U.S.
- OA is the most common form of arthritis and over 27 million Americans are affected by this chronic condition.
- An estimated 632,000 joint replacements due to OA are performed annually costing $30 billion.
- OA results in over 11 million outpatient visits annually.
- Estimated that OA results in over $13 billion in lost productivity annually.

What are the Risk Factors?

Non Modifiable Risk Factors

- Sex
- Age
- Genetics
- Bone Shape

Modifiable Risk Factors

- Joint Trauma
- Malalignment
- Occupation
- Obesity / Diet
- Dynamic Alignment
- Bone Density
- Muscle Strength

OA Only Affects Old People

- OA prevalence starts rising sharply at age 45, affecting the large working age population.

- Early onset OA can develop within ten years of a major joint injury (PTOA).

- A teenager injured at age 15 could have PTOA as early as age 25 or 30. *(Roos. Osteoarthritis Cartilage. 1995)*

What is PTOA?

- Post-traumatic osteoarthritis (PTOA) is a unique form of OA that is associated with acute traumatic joint injury.
- The disease is likely to follow a shorter time course because of the more rapid progression in disease observed following injury.
- PTOA typically affects people at a much younger age.

The Impact of PTOA

- **Estimated 12% of OA due to post-traumatic onset** ***(Brown et al. J Ortho Trauma. 2012)***

- **Lower extremity PTOA costs ~$3 billion/year in direct health care expenses.**

- **Indirect costs and disability adjusted life years are significantly higher.**

- **Increased risk for early primary and revision total joint replacement surgery.**

OA and the AT

Why should athletic trainers be concerned about OA?

Link et al., 2003

Joint Injuries and OA

Acute Traumatic Joint Injuries are a Common Problem

Jonathan Daniel - Getty Images

PTOA IS A COMMON OUTCOME

Joint Injuries and OA

- **Nearly 33% of shoulders examined with CT prior to initial shoulder stabilization had signs of OA, with the number of prior instability events being associated with degenerative changes. (Ogawa et al, J Shoulder Elbow Surg; 2006;15(1):23-29)**

- **Individuals in The Clearwater Osteoarthritis Study were 7.4 (95% CI: 5.9, 9.4) times more likely to develop OA during follow-up.** ***(Wilder et al, Osteoarthritis Cartilage. 2002;10:611-16)***

- **Among female soccer players, 82% had radiographic changes in the knee 12 years following ACL injury and 51% had OA by age 31.** ***(Lohmander et al, Arthritis Rheum. 2004;50(10):3145-52)***

Sports and OA Risk

- **Most sports are safe or even protective for OA.** ***(Urquhart DM et al., Med Sci Sports Exerc, 2011)***

- **Men in soccer and certain high-level sports may be at increased risk for hip or knee OA.** ***(Driban et al, J Athl Train. 2014; Michaelsson et al. PLOSOne. 2011; Tveit et al. Am J Sports Med. 2012)***

Former athletes with more knee OA	Increase in odds of having knee OA
Elite male competitive weightlifting	6.9 (3.3, 14.5)
Elite male wrestling	3.8 (1.8, 8.0)
Elite and non-elite male soccer	3.5 (2.5, 4.8)
Elite male long-distance running	3.3 (1.4, 7.5)

Sports and OA Risk

- **High level long-distance skiers are at high risk for knee or hip OA.** ***(Michaelsson et al. PLOSOne. 2011)***

- **Is it the sport, the amount of training, high volume repetitive loading, injuries, or a combination of factors?**

- **There is a lack of data among female athletes.**

- **There is a lack of data among former college and HS athletes.**

Physical Activity and OA Risk

- **Most physical activities are safe or even protective for OA.**
  (*Urquhart DM et al., Med Sci Sports Exerc, 2011)*
- **Physical activities with high volume repetitive loading may increase the risk of OA, specifically in the presence of other risk factors.**
- **There is a lack of data on military service members.**

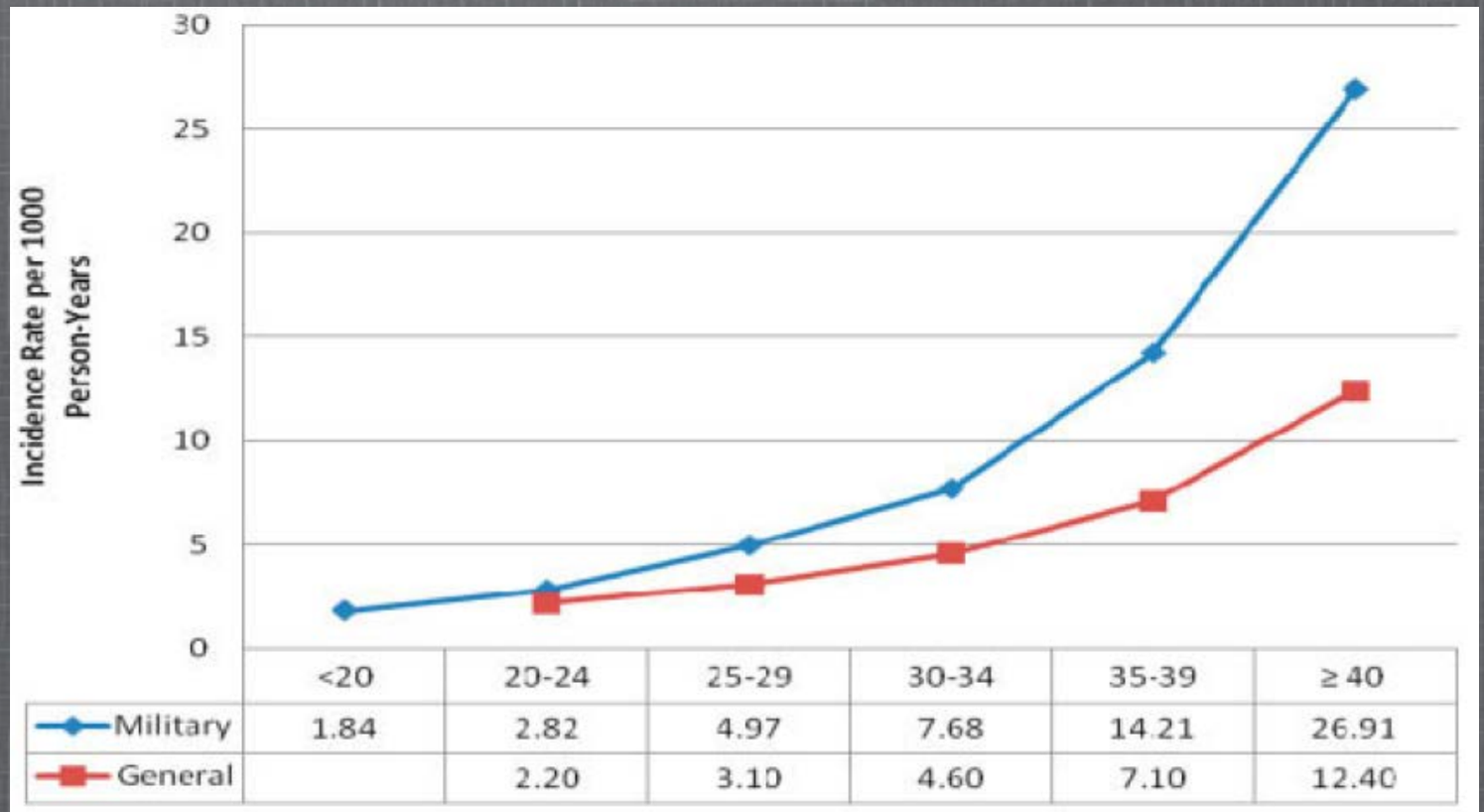
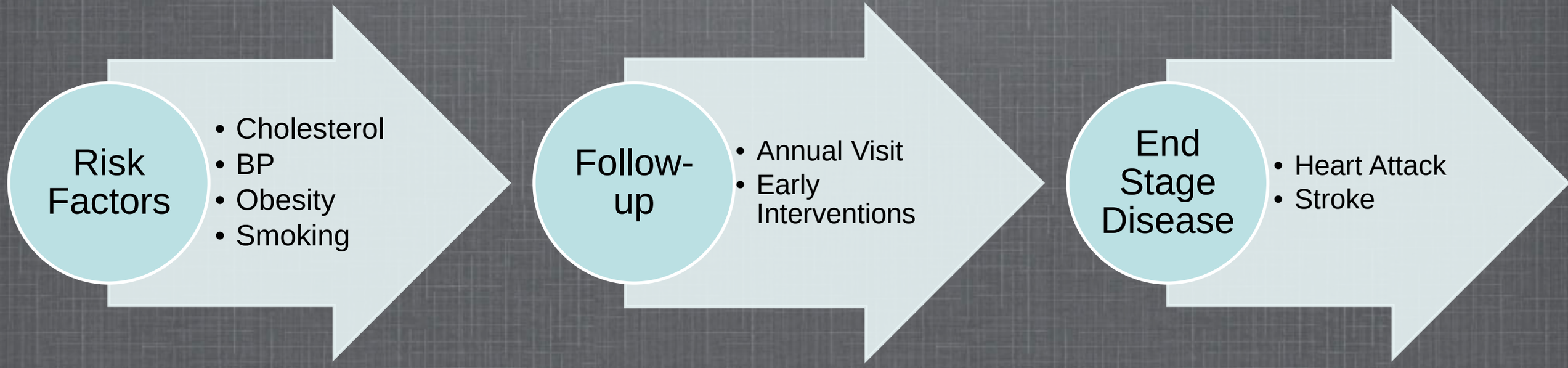


Figure 2. Comparison of unadjusted incidence rates for osteoarthritis between military and general populations by age. Incidence rate data for the 40–44-year and 45–49-year age groups in the general population studied by Kopec et al (6) were combined for the ≥40-year age group.

Managing Chronic Disease

The Chronic Disease Management Model for CVD

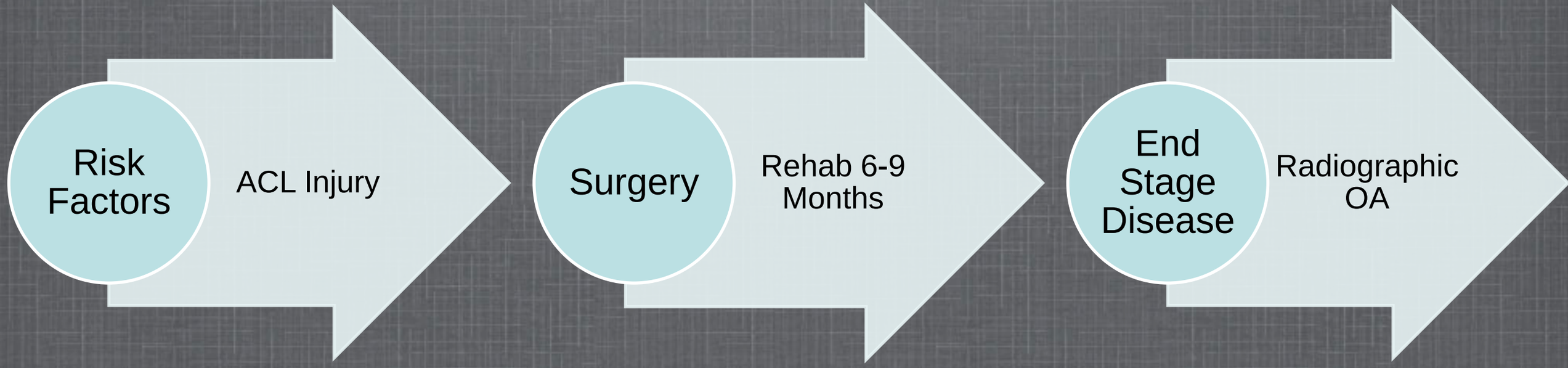
Nurse Case Manager



Opportunity for Early Intervention

Managing Chronic Disease

The Chronic Disease Management Model for PTOA



Come back and see me when you need your knee replacement

Traditional Management Model

- Traditionally, the management of acute traumatic joint injuries has terminated when patients are deemed fit to return to activity.

- Treatment has focused on restoring anatomic structures and initial functional capabilities through surgical repair, and patients without complications are typically discharged from follow-up care at 6-9 months post-surgery.

- However, these injuries are the starting point for a cascade of progressive degenerative joint changes that, over the course of several years, lead to chronic pain and loss of function, resulting in physical limitations that affect both physical performance and activities of daily living.

The Clinical Course of PTOA

OA STAGE	MOLECULAR	PRERADIOGRAPHIC	RADIOGRAPHIC
	BIOMARKERS →	BONE SCAN MRI US →	XRAYS →

TIME

DISEASE INITIATION
JOINT INJURY
(SILENT)

Kraus et al, Osteoarthritis Cartilage. 2011;19(5):515-542

A New Vision for Chronic Osteoarthritis Management

Bone and Joint Initiative USA

A Call to Action from the Chronic Osteoarthritis Management Initiative (COAMI)

September 2012

Missed Opportunities to Detect and Treat Osteoarthritis (OA)

Imagine if the trigger for treating heart disease were a first heart attack, or for treating hypertension, a stroke. For some patients, these debilitating and often deadly symptoms are indeed the first signs of trouble. However, the treatment goals for these and other chronic conditions is to detect and modify risk factors early, before symptoms appear, so that the disease's devastating outcomes can be prevented altogether.

Not every case of Osteoarthritis (OA) can be prevented, but the Chronic OA Management Initiative (COAMI) believes that a significant degree of the pain and disability caused by OA can and should be prevented or ameliorated.

Secondary Prevention

http://www.usbji.org/sites/default/files/COAMI%20Call%20to%20action.pdf

Managing Chronic Disease

The Chronic Disease Management Model for PTOA

Athletic Trainer as Case Manager/Gatekeeper

Risk Factors
- ACL Injury
- Meniscus Injury

Follow-up
- Annual Visits
- Monitor Joint Health
- Monitor Weight

End Stage Disease
- Radiographic OA
- TKA

Opportunity for Early Intervention

Nelson et al. Sem Arthritis Rheum. 2014.

- **Education & Self-Management**
- **Low Impact Aerobic Exercise**
- **Weight Management**

Evidence-Based Practice

Seminars in Arthritis and Rheumatism 43 (2014) 701–712

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A systematic review of recommendations and guidelines for the management of osteoarthritis: The Chronic Osteoarthritis Management Initiative of the U.S. Bone and Joint Initiative

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Summary Recommendations

“Provide or refer patients to self-management programs; provide education, regular contact to promote self-care, joint protection strategies, and individualized treatment plans to patients with OA.”

Nelson et al, Seminars in Arthritis and Rheumatism. 2014;43(5):701-712

Summary Recommendations

“Patients should be advised to engage in low-impact aerobic exercise (land or water based), and if overweight to lose weight; consideration can be given to range of motion/flexibility exercises, exercise in combination with manual therapy, endurance strengthening exercises, and physical/occupational therapy referral.”

Nelson et al, Seminars in Arthritis and Rheumatism. 2014;43(5):701-712

Summary Recommendations

“Walking aids and other assistive devices to improve activities of daily living are recommended for OA patients as needed. Based on current guidelines, there is inconclusive evidence for bracing or medial or lateral heel wedges for knee OA, and splints for thumb base OA.”

Nelson et al, Seminars in Arthritis and Rheumatism. 2014;43(5):701-712

Summary Recommendations

“Thermal modalities are recommended for hand, knee, and hip OA, therapeutic ultrasound is not recommended for use, and insufficient evidence currently exists to provide a general recommendation regarding acupuncture, Tai Chi, or TENS.”

Nelson et al, Seminars in Arthritis and Rheumatism. 2014;43(5):701-712

Summary Recommendations

“Joint replacement is recommended for appropriate patients with knee or hip OA. Arthroscopy with debridement is not recommended for the management of symptomatic knee OA.”

Nelson et al, Seminars in Arthritis and Rheumatism. 2014;43(5):701-712

Summary Recommendations

“Acetaminophen/paracetamol should be used as first-line therapy in symptomatic OA. Second-line agents should include topical agents (capsaicin and topical NSAIDs) and oral NSAIDs (with appropriate risk stratification and employment of gastroprotective strategies). For refractory symptoms, tramadol is recommended, and consideration can be given to opioids or possibly duloxetine.”

Nelson et al, Seminars in Arthritis and Rheumatism. 2014;43(5):701-712

Summary Recommendations

“Intra-articular corticosteroids are recommended for knee and hip OA; insufficient evidence currently exists to provide a general recommendation regarding intra-articular hyaluronans.”

Nelson et al, Seminars in Arthritis and Rheumatism. 2014;43(5):701-712

Evidence-Based Practice

“There is essential agreement on many recommendations for OA management across multiple societies making such recommendations. There is not a lack of quality guidelines, but rather a deficit in dissemination and implementation of the recommendations.”

Nelson et al, Seminars in Arthritis and Rheumatism. 2014;43(5):701-712

A National Public Health Agenda for

OSTEOARTHRITIS

2010

ARTHRITIS FOUNDATION®
Take Control. We Can Help.™

CDC
Centers for Disease Control and Prevention

CDC, 2010. http://www.cdc.gov/arthritis/docs/oaagenda.pdf

A National Public Health Agenda for Osteoarthritis

Ten Recommendations

1. Self management education should be expanded as a community-based intervention for people with symptomatic OA.
2. Low impact, moderate intensity aerobic physical activity and muscle strengthening exercise should be promoted widely as a public health intervention for adults with OA of the hip and/or knee.
3. Existing policies and interventions that have been shown to reduce OA-related joint injuries should be promoted, implemented and enforced.
4. Weight management should be promoted for the prevention and treatment of OA, and national nutrition and dietary guidelines for the general population should be followed by adults with OA so they select a quality diet while staying within their calorie requirements.
5. A national policy platform for OA should be established to improve the nation's health through evidence-based clinical and community prevention and disease control activities, including core public health infrastructure improvement activities.
6. Systems to deliver evidence-based interventions should be expanded.
7. Quality of and equal access to evidence-based interventions for OA should be assured.
8. Workplace environments should be improved by adopting policies and interventions that prevent onset and progression of OA.
9. A well designed communication strategy should be initiated and sustained to enhance understanding and change attitudes and behavior among consumers, healthcare providers, policy makers, employers and the business community, and community organizations.
10. Research and evaluation should be pursued to enhance surveillance, better understand risk factors, refine recommended intervention strategies, evaluate workplace interventions, and examine emerging evidence on additional promising interventions.

CDC. 2010

OA & The Role of The AT

- **Primary prevention**
  - ***Movement assessment***
  - ***ACL and lower-extremity injury prevention.***
  - ***Weight management/Exercise prescription***
  - ***Advocacy***
- **Secondary prevention (Following traumatic joint injury)**
  - **AT as case manager/gatekeeper**
  - **Monitor joint health over time**
  - **Education/Self-management**
  - ***Weight management/Exercise prescription***
  - ***Therapeutic modalities***
  - ***Monitor compliance***

Summary

- OA places a significant burden on the U.S. population.
- 12% of all OA cases are attributable to traumatic joint injury.
- Innovative chronic management models for OA (e.g., COAMI) are beginning to emerge and ATs have the potential to play a critical role in developing and implementing these models and systems of care.
- There is no lack of consensus on management strategies for OA across professional organizations; however, these guidelines are not consistently disseminated or implemented clinically.
- ATs can play a significant role implementing and advancing the 2010 National Public Health Agenda for OA.

Thank You

Questions