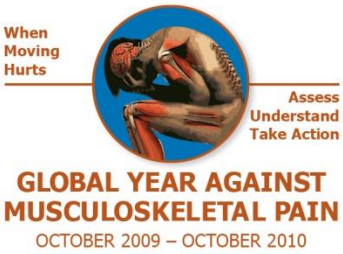

• **FACT SHEET No. 8**

Exercise in Management of Musculoskeletal Pain

Introduction

Exercise is frequently used in rehabilitation as an integral component of pain management. The exercise type and dosage to best manage pain are not clear, which is likely related to the specific pain condition and patient tolerance.

Background: Healthy Adults

- Multiple types of exercise (isometric, aerobic, dynamic resistance) produce hypoalgesia across the lifespan.
- The magnitude of exercise-induced hypoalgesia is related to the type, intensity, and duration of exercise.
- Fatigue is not required to produce hypoalgesia.
- Hypoalgesia is not localized to the exercising body part; although greater hypoalgesia may occur at the exercising limb compared with distal sites.
- Hypoalgesia following a single exercise session tends to be of short duration.

Background: Musculoskeletal Pain

- Physically active individuals are less likely to develop chronic musculoskeletal pain compared with those who are sedentary, potentially via macrophage and cytokine regulation.
- Exercise training is beneficial for the majority of musculoskeletal pain conditions including chronic neck disorders, osteoarthritis, fibromyalgia, myofascial pain, and chronic low back pain.
- Due to the systemic effects, exercising nonpainful muscles can produce pain relief for individuals with a regional chronic pain condition. Exercising painful muscles is also beneficial due to the peripheral and central therapeutic effects.
- Optimal exercise type and dosage are not known for most pain conditions.
- Following a single exercise training, there is considerable variability in the pain response for individuals with chronic pain. The acute response to exercise, including increases or

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decreases in pain, at the initiation of an exercise program do not parallel the long-term response. For example, individuals may experience an increase in pain at the start of an exercise program which progresses to a decrease in pain over time.

- How an individual responds to exercise may be related to his/her endogenous pain modulation. Thus, incorporating quantitative sensory testing as a baseline measure of endogenous pain modulation may help guide exercise prescription and be used as a measure of progression.
- Emerging research suggests that psychosocial variables such as family environment, pain catastrophizing, and mood states can affect both pain sensitivity and the ability to modulate pain through exercise-induced hypoalgesia.
- The long-term prescription of exercise in pain management is not well-understood, including exercise progression and addressing compliance issues. Supervised physical therapy and booster exercise sessions improve adherence.

Mechanisms

- Exercise affects all aspects of the biopsychosocial model of pain, thereby impacting how an individual reports pain.
- The most studied mechanism is activation of the opioid system. Some of the strongest evidence is with animal models of chronic pain. Blockade of opioid receptors systemically and centrally prevents analgesia produced by regular exercise in these models. Furthermore, animal research shows a cross-tolerance between endogenous (e.g., long-term voluntary exercise) and exogenous (e.g., morphine administration) activation of the opioid system.
- Other mechanisms include regulation of the immune system, reversing autonomic dysfunction, activation of endocannabinoids, and central inhibitory effects.
- Exercise may be prescribed to increase overall physical activity and/or decreasing sedentary behavior with the goal of influencing endogenous pain modulation (enhance descending pain inhibition and reduce pain facilitation).

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