

Subjects with Knee Osteoarthritis Exhibit Widespread Hyperalgesia to Pressure and Cold

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Abstract

Hyperalgesia to mechanical and thermal stimuli are characteristics of a range of disorders such as tennis elbow, whiplash and fibromyalgia. This study evaluated the presence of mechanical and thermal hyperalgesia in individuals with knee osteoarthritis (OA), compared to healthy control subjects.

Twenty-three subjects with knee OA and 23 healthy controls, matched for age, gender and BMI, were recruited for the study. Volunteers with any additional chronic pain conditions were excluded. Pain thresholds to pressure (PPT), cold (CPT) and heat (HPT) were tested at the knee, ipsilateral heel and elbow, in randomized order, using standardised methodology. Significant between-groups differences for PPT and CPT were found: OA subjects demonstrated significantly increased sensitivity to both pressure ($p=0.018$) and cold ($p=0.003$), but not to heat ($p=0.167$) stimuli, compared with controls. A similar pattern of results extended to the pain-free ipsilateral ankle and elbow indicating widespread pressure and cold hyperalgesia. This study found widespread elevated pain thresholds in subjects with painful knee OA, suggesting that altered nociceptive system processing may play a role in ongoing arthritic pain for some patients.

Keywords:

Introduction

Chronic pain is a global health problem, affecting approximately 20% of the population [1]. Pain is a complex phenomenon, involving both sensory and affective components. The sensory component of pain is the result of nociceptive system processing, which is influenced by a variety of factors, including tissue damage, inflammation, and central sensitization. In individuals with chronic pain, the nociceptive system is often sensitized, leading to an exaggerated response to stimuli that would normally be considered non-painful. This sensitization can occur at the peripheral level, where there is an increase in the number and sensitivity of nociceptors, and at the central level, where there is an increase in the excitability of nociceptive neurons in the spinal cord and brain. The result is a state of hyperalgesia, where the pain threshold is lowered and the pain response is amplified. This hyperalgesia can be mechanical, thermal, or chemical in nature, and it is a common feature of a wide range of chronic pain conditions, including osteoarthritis, fibromyalgia, and chronic headache. In individuals with knee osteoarthritis (OA), hyperalgesia to mechanical and thermal stimuli is a well-documented phenomenon, and it is thought to contribute to the ongoing pain and disability associated with the condition. This study evaluated the presence of mechanical and thermal hyperalgesia in individuals with knee OA, compared to healthy control subjects. The results of this study suggest that altered nociceptive system processing may play a role in ongoing arthritic pain for some patients.

... A. B. ... 19 ... A, ... 15,17 ... 20 ... 21 ... 22 ... A. ... 13

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Cold hyperalgesia

β = 0.03, β = 2.18, β = 2.25, β = 3.47, β = 0.001 (F = 3.26, β = 0.002).
 A, G, C, A, H, 2 C

Heat hyperalgesia

β = -0.586, β = 0.56, β = -1.49, β = 0.14 (F = 3), β = -0.584, β = 0.56.
 A, H, 2 C

β = 0.037, β = 0.265, β = 0.11, β = -0.381, β = -0.381.
 G, AC, AC

Discrimination

β = 0.037, β = 0.265, β = 0.11, β = -0.381, β = -0.381.
 G, AC, AC

OA subject h Red & de + ead + e + e h + a ge a

A, 13-15, A, 20%, 13-15, I, 14, A, 33, A, 15, A

✖

A, ✖

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