OSTEOARTHRITIS

New knee raises pain threshold

Patients with symptomatic knee osteoarthritis (OA) are more sensitive to various pain stimuli, new data confirm, but the good news is that joint replacement can normalize the pain response. The study, by Thomas Graven-Nielsen and colleagues, published in *Arthritis & Rheumatism*, provides new insight into the alteration of centralized response mechanisms by chronic peripheral pain.

“We wanted to understand more about the sensitization processes of the pain systems in OA patients,” begins Graven-Nielsen. “The OA patient is a very interesting clinical model of how the pain system will be sensitized after a prolonged time of well described pain from the joint structure.”

The researchers enrolled 48 patients with OA, of whom 20 were scheduled for a joint replacement. “We used advanced quantitative sensory testing targeting specific pain mechanisms such as hyperalgesia around the joint structures and widespread hyperalgesia away from the affected joint, reflecting peripheral and central sensitization, respectively,” explains Graven-Nielsen.

Patients with OA had significantly reduced pressure pain thresholds at

all tested sites (symptomatic and non-symptomatic knees, plus two control sites, $P < 0.0001$), and these thresholds correlated modestly with the intensity of knee pain. This hyperesthesia is thought to result from excessive neuronal input to the central nervous system from the symptomatic joint, causing gradual sensitization of adjacent neurons.

The patients also had enhanced spatial summation of pain, characterized by increased perception of pain from a large area of stimulus (assessed using lower leg pressure cuffs). Finally, conditioned pain modulation (CPM)—the response whereby the perception of pain from a given stimulus can be reduced by a separate painful stimulus—was also impaired in these patients.

Knee replacement reduced localized and generalized hyperesthesia in all recipients of a new joint, and CPM was restored. “The widespread hyperalgesia and the normalization or reduction of the widespread hyperalgesia following knee replacement are highly novel findings,” says Graven-Nielsen. The symptomatic joint acts, he explains, as a pain ‘generator’, driving the central sensitization responsible for the widespread hypersensitivity. Tackling the pain that

emanates from this generator will be key to preventing hypersensitivity.

To further understand nociceptive processing in patients with OA, the researchers will now investigate other central mechanisms, such as temporal summation of pain, before and after knee joint replacement.

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Original article Graven-Nielsen, T. et al. Normalisation of widespread hyperesthesia and facilitated spatial summation of deep-tissue pain in knee osteoarthritis patients after knee replacement. *Arthritis Rheum.* doi:10.1002/art.34466