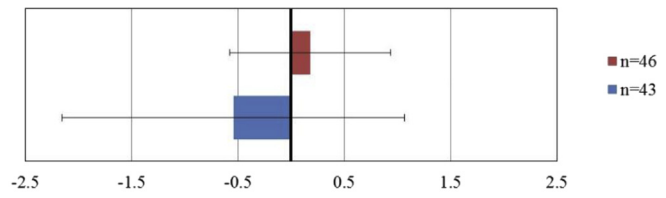
from being statistically significant (p=0.52; table 2). Further, no significant differences were observed in IPFP surface area, depth and MRI signal (Table 2).



Legend: Infra-patellar fat pad (IPFP) volume (cm³) differences and 95% CI of cases versus controls in a within person (n=46) and a between person (n=43) design

Figure 1. Infra-patellar fat volume [cm^3].

Conclusions: This is the first study to comprehensively address the relationship of human IPFP morphometry and MRI signal with knee pain. Although the sample size was limited, we obtained consistent results using a between-knee, within persons design, and a between person design with strict inclusion criteria of chronic pain and precise matching with painless participants. Although the IPFP has been shown to be a source and mediator of intra-articular inflammation, which is thought to be associated with pain, our results do not suggest a relationship between IPFP morphometry and MRI signal in human knee OA.

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FUNCTIONAL MAGNETIC RESONANCE IMAGING EVALUATION OF PAIN CENTRAL SENSITIZATION PHENOMENA IN SUBJECTS WITH KNEE OSTEOARTHRITIS

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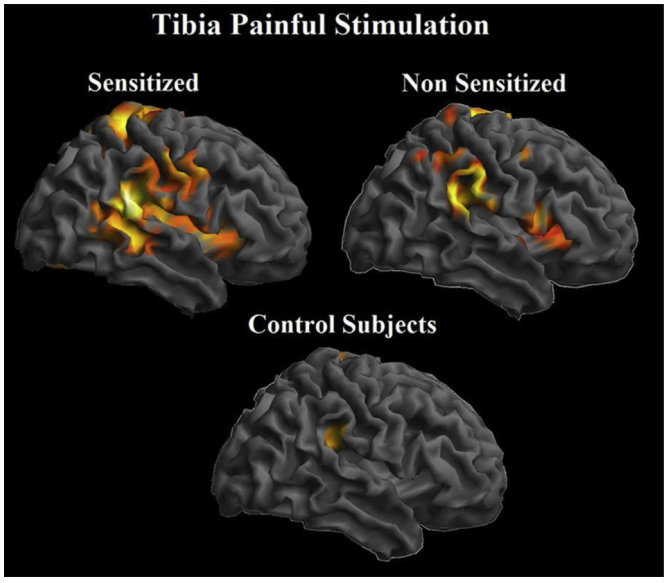
Purpose: The aim of this study was to characterize brain changes related to pain sensitization by functional magnetic resonance imaging (fMRI) in patients suffering from chronic osteoarthritis (OA) of the knee.
Methods: A cross-sectional, single blind study comparing fMRI activation in OA patients (clinical and radiological ACR criteria) vs. healthy controls was designed. Participants were consecutive recruited in follow-up clinical visits during a period of 18 months in the reference OA Unit at the Hospital del Mar in Barcelona. Presence of central sensitization was assessed in OA group. Central sensitization was clinically defined based on the evidence of regional spread of pain (spreading sensitization assessed by an extended version of the Arendt-Nielsen peripatellar map) and increased pain response to repeated stimulation (temporal summation). The fMRI paradigm included 3 painful test: direct painful stimulation of the knee (articular interline) using a pressure of 2.5kg/cm2, painful stimulation on the anterior tibial surface of the leg (sensitized site) by exerting a pressure of 4kg/cm2, and painful heat stimulation on the volar forearm using 45° Celsius peaks.
Results: A total of 60 patients (66.7 +/- 7.8 years) were included in the study along with a reference group of 30 healthy subjects (62.8 +/- 7.7 years). Thirty-three (55%) patients showed clinical evidence of sensitization, and 19 (32%) of them fulfilled strict experimental criteria of central sensitization to pain. fMRI response to articular (interline) painful stimulation was robust in both patients groups. Sensitized and non sensitized patients, however, did not differ as to brain activation during the interline test. By contrast, brain response to tibial pressure in sensitized patients was greater than in non-sensitized patients in several regions including the cortical representation of the leg (peak coordinates at x,y,z=-4,-42,60; t=3.31 and x,y,z=16,-38,64; t=3.74), the supramarginal gyrus (-48,-66,18; t= 3.24 and 52,-48,18 t= 3.42) and the right lower sensorimotor cortex (62,-8,40; t= 4.25).



Correlation maps between brain activation and pain sensitization measurements (the sum of the minimal pressure evoking pain for each tender point around the knee and the number of tender points) additionally showed the involvement of anterior brain regions, as the anterior cingulate gyrus (12,8,48; t=4.38) and mainly the ventral putamen bilaterally (-18,4,-8; t=3.7 and 20,18,-8; t=3.99). The painful heat stimulation on the volar forearm evoked similar subjective pain (no significant differences) and brain activation in both sensitized and non sensitized patients.
Conclusions: The presence of pain central sensitization in chronic knee OA patients was very common. As expected, the pressure at medial interline has shown not to be an appropriate test to discriminate sensitized patients, since it is a maneuver with direct impact on the damaged structures in the disease. Pressure stimulation on the (non-articular) anterior tibial surface of the leg, however, produced relevant clinical pain in sensitized patients and increased brain response. Pain brain sensitization was related to a widespread activation of sensory cortices suggesting that sensitization is expressed mostly as an enhanced sensory phenomenon. In addition, the changes in fronto-subcortical structures seen at correlation maps may speculatively suggest that pain central sensitization also involves alterations of elements implicated in associative pain-related learning (e.g., associations of pain with everyday contexts). Finally, negative results in the painful heat stimulation test suggest that sensitization is not a general phenomenon that may not implicate superior limbs or the processing of heat-elicited pain.

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MOVEMENT CHARACTERISTICS ASSOCIATED WITH THE DEVELOPMENT OF CHRONIC KNEE PAIN

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Purpose: Substantial evidence suggests that previous knee injury is a risk factor for the development of knee osteoarthritis (KOA). Patellofemoral pain (PFP) is a chronic knee condition commonly caused by overuse injury, which is theorized to be associated with the development of KOA. While a direct link between PFP and KOA has yet to be established, there has been increased interest in this association in recent years. Gaining an understanding of the risk factors associated with the development of this chronic overuse injury may prove to be useful in the primary prevention of PFP, which may in turn reduce the occurrence of KOA. The aim of this study was to prospectively identify the baseline pre-injury movement patterns (e.g., kinematics) associated with the development of PFP.
Methods: We conducted a prospective cohort study that consisted of 4418 subjects (1662 females, 2756 males: 18.8±0.9yrs, 173.4±9.2cm,