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Expectation of pain intensity does not influence neuromuscular performance but does influence pain perception during a maximal isometric knee extension task.

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Background: Experimentally induced pain can decrease maximal muscular force (Ervilha et al., 2004: Exp Brain Res, 156, 174-182) with reductions in muscular force and motor unit firing rate related to perceived pain intensity when pain is induced either invasively via hypertonic saline injections (Farina et al., 2005: Clin Neurophysiol, 116, 1558-1565) or from a non-invasive gross pressure device (GPD) (Wing et al., 2011: The severity of experimentally induced pain influences muscular performance during maximal voluntary isometric knee extensor contractions, 16th Annual Congress of the ECSS, Liverpool, United Kingdom). **Purpose**: The aim of the present study was to examine whether varying expectation of pain intensity influenced pain perception and neuromuscular performance during an isometric knee extensor task. **Methods**: Twenty-nine healthy male participants (mean; age = 22.8 ± 5.5 yr, height = 1.7 ± 0.2 m, mass = 84.1 ± 19.2 kg) volunteered for the study after giving written, informed consent following institutional ethical approval. Isometric knee extensor joint moment, electromyographic (EMG) activity of the vastus lateralis and semitendinosus muscles, and perception of pain intensity using a visual analogue scale (VAS) were measured during maximal voluntary isometric contractions during three experimental conditions. After pain perception threshold was determined, the participants were advised to expect 100%, 200% and 300% of pain perception threshold; however in all three conditions 200% of pain perception threshold was induced using a GPD. Repeated measures ANOVAs were used to investigate differences in VAS, joint moment and EMG activity between conditions. Significance was accepted at $p<0.05$ for all tests. **Results**: There was no difference between the three conditions in joint moment ($p=0.804$) or EMG ($p=0.436$). However, VAS data showed a difference ($p<0.001$) in perceived pain intensity between the 100% (46.2%), 200% (55.5%) and 300% (67.4%) conditions. **Discussion**: Expectation of varying pain intensity following identical trials did not result in any significant difference in joint moment or EMG activity despite a significant difference in pain perception being detected. Although a concomitant reduction in neuromuscular performance has recently been reported with increasing intensity and perception of pain (Wing et al., 2011), the present data suggest that while pain perception can be influenced by expectation, physical performance remained unchanged following an identical pain stimulus. **Conclusion**: The results suggest that physical pain stimulus induced via a GDP, rather than an individual's perception of pain intensity, influences maximal neuromuscular performance.