

Distinct brain mechanisms related to dental pain relief

March 12 2015

Today at the 93rd General Session and Exhibition of the International Association for Dental Research, researcher Michael L. Meier, Center for Dental Medicine, University of Zürich, Switzerland, will present a study titled "Distinct Brain Mechanisms Related to Dental Pain Relief." The IADR General Session is being held in conjunction with the 44th Annual Meeting of the American Association for Dental Research and the 39th Annual Meeting of the Canadian Association for Dental Research.

Local anesthesia has made life more comfortable for dental patients since 1884. However, little is known about brain mechanisms related to [dental pain](#) relief. In this study, the researchers aimed to investigate task related brain activity and functional connectivity patterns following onset of a regional anesthetic nerve block during continuous noxious dental stimulation.

For this placebo-controlled and age-matched functional magnetic resonance imaging study a total of 28 subjects were included (only males, mean age = 27.09, SD \pm 7.06). Repetitive electric stimuli evoking an intensity perception of five on an 11-point numeric intensity rating scale were applied to the left mandibular canine. The experiment was divided into two phases: Phase 1 (30 stimuli; duration 5 min) was followed by a submucosal injection of the anaesthetic articaine 4% (group A) or 0.9% NaCl as placebo (group P) at the left mental foramen. Electric tooth stimulation continued for 16 min (phase 2) during which subjects indicated pain offset by pressing an alarm ball. Task-related

activation and connectivity analysis was performed using SPM8 and context-dependent psychophysical interactions (PPI). In group A, pain relief was reported 4.5 minutes after the injection whereas in group P, no subject reported pain relief. Between-group analysis of phase 2 demonstrated a significant activation cluster in the ipsilateral posterior insula (pIns) in group P. Using the pIns as a seed region the PPI analysis yielded a significant enhanced coupling to the midbrain (periaqueductal grey/ventral tegmental area) after analgesia onset in group A only.

The novel paradigm applied in this study demonstrated that dental [pain relief](#) was accompanied by a significant activity reduction in the posterior insula and an enhanced connectivity to the midbrain. This data suggest a distinct role of these brain regions in dental pain and its relief.

This is a summary of abstract #0537 titled "Distinct Brain Mechanisms Related to Dental Pain Relief," to be presented by Michael L. Meier on Thursday, March 12, 2015, from 3:30 p.m. - 4:45 p.m. as part of the session titled "Sleep Disorders and Imaging in Pain States" in Hall B of the Hynes Convention Center.

Provided by International & American Associations for Dental Research

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