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Letter to the Editor

Freiburg, 9 May 1985

re., Two separate components of pain produced by the submaximal effort tourniquet technique

Dear Editor,

In Vol. 20 of this journal, Pertovaara, Nurmikko and Pöntinen [1] showed that a mechanical component should be delineated from an ischemic component in the pain induced by the submaximal effort tourniquet technique (SETT). We have made similar observations. To achieve this segregation of effects, two manometer cuffs were positioned on the non-preferred arm. The first cuff occluded blood flow and the second cuff applied pressure to the ischemic tissue (see Fig. 1).

Patients were requested to perform a hand-grip exercise subsequent to occlusion of blood flow to the arm. By varying the pressure of cuff I and the extent of exercise (i.e., frequency, resistance of dynanometer), the magnitude of ischemia can be manipulated. The extent of anoxia in the forearm cutaneous tissue was monitored non-invasively by determining the transcutaneous pO_2 value [2]. By further varying the pressure of cuff II (Fig. 1) from 60 to 220 mm Hg in steps of 40 mm Hg the effect of mechanical stimulation to the ischemic tissue can be quantified.

Our first results with this method showed that the interaction of ischemic and

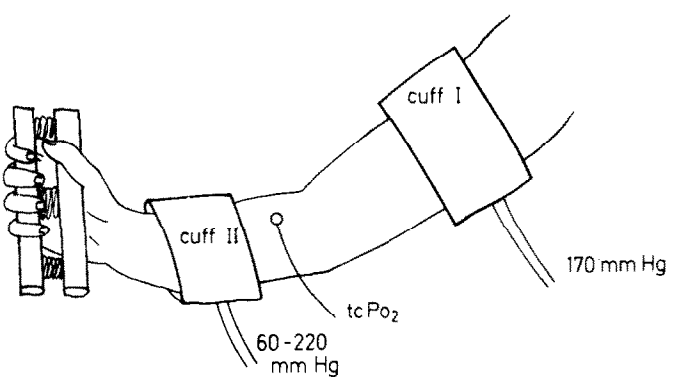

Fig. 1. Schematic illustration of the experimental procedure used to isolate ischemic and mechanical components of pain induced in the submaximal effort tourniquet technique. Cuff I is inflated to 170 mm Hg, thus totally occluding arterial blood flow to forearm. Subjects then initiate hand-grip exercise at a rate of 40 beats/min. At designated intervals, cuff II is inflated (from 60 to 220 mm Hg). Subjects are requested to rate the pain experienced before and after inflation of cuff II using a rating scale. T_cpO_2 electrode is attached to skin surface between cuff I and cuff II and gives a non-invasive estimate of tissue pO_2 levels.

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mechanical stimulation determines the occurrence of pain in the working muscle. This has been shown elsewhere in animal and human subjects [3,4] with different methods. Our method enables us to elicit sufficiently various levels of ischemic and mechanical stimulation. The resulting various levels of stimulation allow signal detection methods to be employed. To our knowledge this has as yet not been accomplished with the submaximal effort tourniquet technique.

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