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DETECTION OF THE UTERINE CORPUS AND CERVIX EMG ACTIVITY DURING LABOUR

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Electromyographic activity of the uterine corpus and especially of the cervix has been only poorly explored. The few available results of measurements performed so far are scarcely comparable because of the various techniques of EMG signal detection. An intrauterine surface detection /1/, a transabdominal detection by needle electrodes /2/ and a surface abdominal detection of the uterine corpus activity have been reported. Only one attempt to detect the cervical EMG activity has been found in the literature /3/. For that reason, at the Hospital of Obstetrics and Gynecology of Kranj, together with the Faculty of Electrical Engineering of Ljubljana; a new measuring equipment was designed for a precise detection of the EMG activity of the uterine smooth muscles simultaneously with measuring the intrauterine pressure.

The preliminary measurements were performed by suitable laboratory equipment for measuring and recording voltage potentials of several tens of microvolts. This equipment enabled us to determine the optimal measuring conditions and parameters in the clinical setting. For a surface abdominal differential detection of the uterine corpus EMG above the right and left horn of the uterus , Ag-AgCl disc electrodes were used. For a differential, and in most cases unipolar detection of the cervical EMG activity the so-called spiral electrodes were adapted. These electrodes are otherwise used during labour to measure the fetal ECG be cardiotocoqraph HP 8030 A /4/, manufactured by Hewlett-Packard. It is a combined device for measuring fetal heart pulse and uterine contractions and is nowadays a standard measurillq equipment of delivery rooms in Yugoslavia. In the next phase, a miniature two-channel differential EMC preamplifier with the amplification magnitude A=1000 was designed, and in a separate casing a two-channel amplifier with an adjustable amplification, the DC level and the necessary filters. As a recorder, the two-channel paper-tape recorder of the above-mentioned cardiotocograph was used, adapted in such a way that it was possible to select between recordinq the EMG activity on both channels and recording a combination of the EMG activity and the intrauterine pressure.

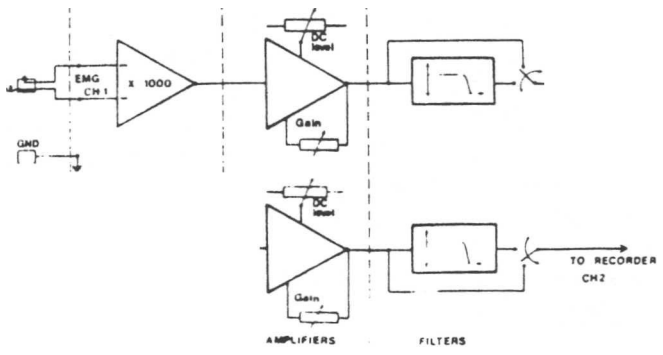

Figure 1.Block diagram of the two channel amplifier system for detection of the uterine corpus and cervix EMG activity added to HP cardiotocograph. for detection of the uterine corpus and cervix EMG activity added to HP cardiotocograph .

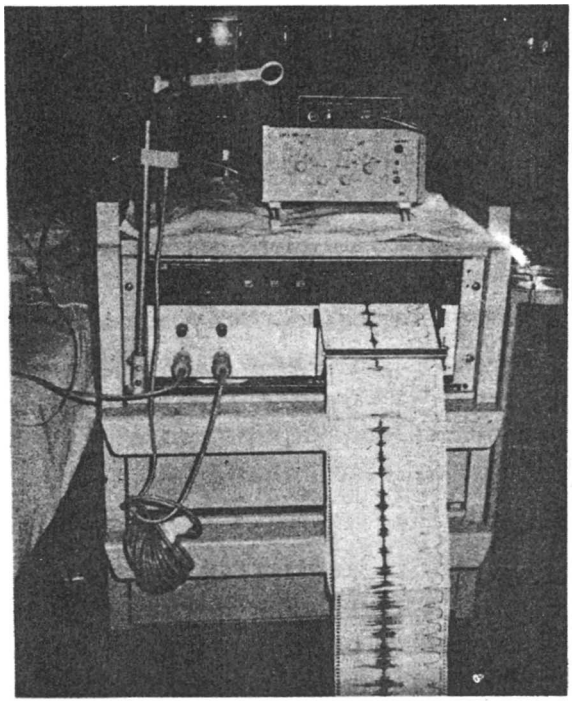

Fig. 2 Complete recording and measuring set-up together wi th cardiotocograph HP 8030 A used as a twochannel recorder and intr auterine pressure measuring instrument.

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This relatively simple measuring equipment was used to follow the uterine corpus and cervix EMG activity in 20 labours. The recordings obtained yield some interesting findings, which are presented in a separate paper /5/.

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