A Simple Transitory Electrode Device For Rapid Electrocardiography During Exercise

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Introduction

Radio telemetric techniques for obtaining field measures of exercise heart rates have the disadvantages of high cost and the limitation of testing being confined to one subject per test session, since usually only one set of telemetry equipment is available. For group activities such as team games, gymnastics or dance periods, considerable time must therefore be spent in obtaining sufficient data on which to base statements of the group response to a particular regimen of training or performance situation.

Until now standard direct wire electrocardiography has contained similar limitations due to the time taken to attach the electrodes to the subject. This time lag results in both a reduction of the heart rate from activity level to eventual recorded level and also to restriction of the subject continuing physical activity.

The present paper reports a very simple piece of apparatus which, used in conjunction with a direct wire portable electrocardiograph, permits the recording of activity heart rates for large groups of subjects with only slight time lag or interruption of activity.

Method

Two standard German silver clinical electrode plates (6.0 cms. x 3.5 cms.) are attached, as shown in Fig. 1, to the ends of a piece of pliable tubing approximately 75 cms. long (flexible plastic garden hose-pipe, 1.7 cms. external diameter, is ideal). The plates are connected to the ecg leads required in the usual manner and are liberally smeared with electrode jelly (a third arm for the earth could be added - we have not needed one).

Fig. 1. The electrodes on holder.

As the subjects exercise freely, they are called individually to the tester who holds the tubing with two hands and directs it to press the electrodes firmly to the chest wall of the subject, as shown in Fig. 2, for 5 to 10 seconds, (we use lead I, with electrodes at the sternal angle and the sixth rib in the left midclavicular line).

Fig. 2. The transitory electrode drive in position on the chest wall.

Results

A clean ecg trace can be recorded directly on the electrocardiograph paper as shown in Fig. 3.

The direct comparability of this technique, with traces obtained simultaneously by direct wire and radio telemetry, is shown in the three traces in Fig. 4. These traces were obtained by use of three adjacent channels of the A.E.I. 8 channel Polygraph Recorder.

We also note the arrhythmia shown in Fig. 3. This was obtained during a survey of a small group of male students (18 - 22 years of age) engaged in a leisure time Volley Ball Session.

Discussion

The disadvantage of the technique is that observations are not made at the instant the activity is performed. However, they can be made frequently within 4-5 seconds of the performance and in comparison with

Fig. 3. Arrhythmic eeg recorded with transitory electrodes during Volleyball session.

Transitory electrode

Fig. 4. The eeg of one subject recorded simultaneously by Transitory Electrodes, Radio Telemetry and Direct Wire to a common recorder (A.E.I. Polygraph).

the radio telemetred eeg there are the major advantages of (a) rapid sampling of a number of subjects, and (b) minimal expenditure. Using three electrocardiographs we recently obtained, with ease, 141 recordings from twenty young children taking part in a fifty minute gymnastics lesson. The technique would also appear to be suited to the screening or surveying of middle-age groups taking leisure physical activity, to determine the physiological

loads of the pursuits, or to obtain early indications of clinically abnormal exercise eeg's.

Conclusion

Simplicity, rapidity, comparability and low cost commend this device as suitable for the large scale monitoring of exercise heart rates and ECG wave forms.

THIRD SKI-WORLD-CUP FOR DOCTORS

The Third Ski World-Cup for Doctors will take place on March 17th and 18th, 1972, in the ALPE d'HUEZ (France)

This meeting is intended for all doctors, whatever their degree in ski experience may be - Big Slalom in 2 heats - 3 categories Men under 40 years of age - Men above 40 years and women doctors.

On Friday, March 17th at 17 o'clock* the doctors will meet at a round table conference, having "Ski Medicine" as subject, where they can explain and compare their experience about this problem which concerns all those who practise this sport. * 5 p.m.

A meeting for the wives of doctors is foreseen.

The Doctors who want to receive the programme of these various events can from now on write to the:-

Secretariat de la C.M.S.M., La Balandrie, 08 Balan, France.