

# RULER FOR CALCULATING TEMPORAL CORRELATIONS OF POLYGRAPHIC RECORDS

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The suggested ruler enables temporal correlations between records made on different channels of a recording instrument to be determined with an accuracy of up to 0.1 mm. The ruler can eliminate errors due to nonalignment of records with the isoline or to malpositioning of the stylus, because it takes the curvilinearity of the record into consideration.

Accuracy of calculation of temporal correlations between polygraphic records can be influenced by instability of the speed of the tape-winding mechanism of the recorder, but under normal conditions this instability does not exceed 1-3%.

A much greater error arises during processing of the data. For example, if the sphygmogram is recorded from central points of blood vessels, respiratory waves and also waves of the third order are present, and they displace the whole record upward or downward from the isoline. In such cases, the subsequent calculation is meaningless, because an error of 0.5-1 mm arises through curvilinearity of the record. If delay of the peripheral wave relative to the central wave in the upper limbs amounts to 1-2 mm, the error will be 25-50%. Moreover, calculation with an accuracy of 0.5-1 mm is very approximate and is unsatisfactory for estimation of the velocity of spread of the pulse wave.

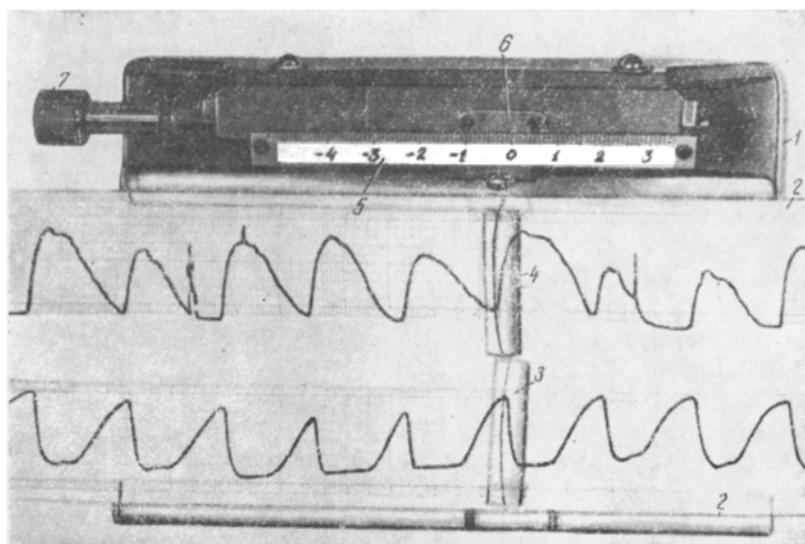


Fig. 1. Ruler for calculating temporal correlations of polygraphic records (explanation in text).

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Increasing the speed of the tape-winding mechanism to 50 and 100 mm/sec increases the consumption of graph paper and because of the increased length and reduced steepness of the curves, it makes determination of the points where the sphygmogram starts to rise more difficult.

Because of the inaccuracy and laboriousness of processing of polygraphic records, the writers have designed a ruler for analysis of such records on a two-channel electrocardiograph (Fig. 1). The ruler has a base (1) with guides (2) along which the graph paper moves. The stationary sighting device (3) of one channel corresponds to the zero point of the vernier scale (6). The moving sighting device (4) of the other channel is connected to the main scale (5), graduated on both sides of zero. The moving sighting device is operated by a micrometer screw (7). Lines are drawn on the sighting devices, their curvature corresponding to the radius of the cardiograph pen. By means of the vernier, the accuracy of measurement can be increased to 0.1 mm, i.e., by 5-10 times.

To determine the time of delay of the pulse wave, graph paper is placed in the guides so that the beginning of the sphygmogram on the first channel coincides with the line on the stationary sighting device (Fig. 1). The moving sighting device is moved by the micrometer screw until its line coincides with the start of the wave in the second channel. Retardation of one sphygmogram relative to the other is determined in millimeters by the scale, allowing for the vernier readings. If the speed of the tape-winding mechanism is constant, the scale can be graduated in seconds. A ruler of this type can be adapted for calculating temporal correlations on any type of polygraphic records.