

YOUNGER AT HEART: A STUDY OF THE P-R INTERVAL

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ABSTRACT: With advancing age, the electrocardiographic P-R interval lengthens. The question arises as to whether this characteristic of the aging process can be regarded as *normal* or as *physiologic*. Two hundred and fifty dentists and their wives were studied, before and after an improved dietary regimen. Comparisons were made with Lepeschkin's data on 872 "normal" persons. On the assumption that normal is synonymous with average, there is normally an increase in the length of the P-R interval. However, the data in this report suggest that a progressively longer P-R interval with time is not physiologic. Moreover, the trend can be reversed by dietary means. Thus people can be made "younger at heart."

The literature is replete with analyses of the relationship of age to standard electrocardiographic variables (1). There is an increasing body of facts to show that electrocardiographic characteristics are related to dietary factors and can be altered by dietary means (2). The specific purpose of this report is to examine four questions:

1. What changes occur in the P-R interval in Lead I with age in so-called normal persons?
2. How does the pattern observed in normal subjects compare with the pattern observed in a group of presumably healthy dentists and their wives?
3. What happens to the P-R interval in Lead I after a group of dentists and their wives attend a series of lectures on diet?
4. What is the significance of these data?

MATERIAL AND METHODS

For baseline purposes, we employed the data of Lepeschkin, who studied the P-R interval with age in 872 presumably normal subjects (1). Also included in our investigation were observations on 250 dentists and their wives, who were participants in a multiple testing program: 1) in Florida under the auspices of the Southern Academy of Clinical Nutrition, 2) in Los Angeles under the aegis of the

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Southern California Academy of Nutritional Research, and 3) in Columbus under the sponsorship of the Ohio Academy of Clinical Nutrition.

A standard three-lead electrocardiogram was obtained. The P-R interval was measured twice at different times under magnification; the mean score derived was expressed in milliseconds to three digits. The reproducibility of this technique has already been described (3).

The Florida contingent, comprising approximately one-fourth of the entire sample, has been studied for five years. The Ohio and California contingents, comprising the majority (three-fourths), have been under investigation for one year.

After the initial studies, the groups were exposed to a series of lectures describing their existing diets, the merits and shortcomings of their food intake, and how the diet could be improved, based upon published reports (4). Electrocardiographic and dietary surveys were repeated almost annually, thus providing an opportunity to ascertain the changes in dietary habits and the electrocardiogram.

RESULTS

Question One: Figure 1 shows the baseline information obtained from Lepschkin's study of the P-R interval in 872 normal persons. It is clear that, with advancing age, the P-R interval lengthens (1). Specifically, when infants are compared with subjects over age 60, there is a 63 per cent lengthening of the P-R interval.

Question Two: Figure 2 shows the baseline Lepschkin data for allegedly healthy persons (gray columns) compared with the findings for the group of 250 seemingly healthy dentists and their wives (black columns). It may be seen that in the dental group there was a lengthening of the P-R interval with age; this is consistent with the general observation. However, the mean value at each temporal point was lower for the dentists and their wives than for the general public.

Question Three: After the initial observations, the dietary habits of the group were discussed. It was found that, in general, the refined-carbohydrate intake was high, the protein intake low, and the vitamin-mineral intake suboptimal when compared with the Recommended Dietary Allowances

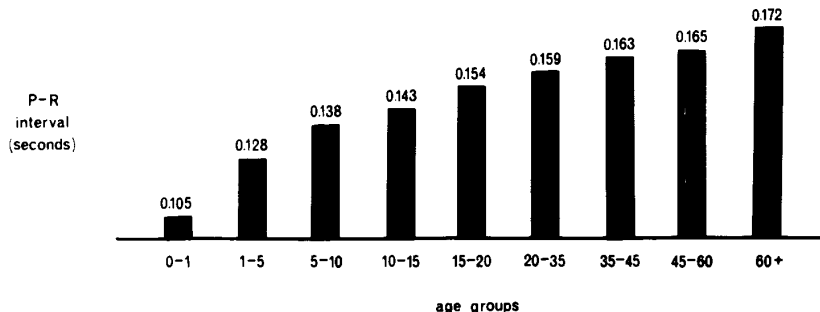


FIG. 1. The relationship of the electrocardiographic P-R interval (seconds) to age in 872 normal persons. [Data from Lepschkin (1).]

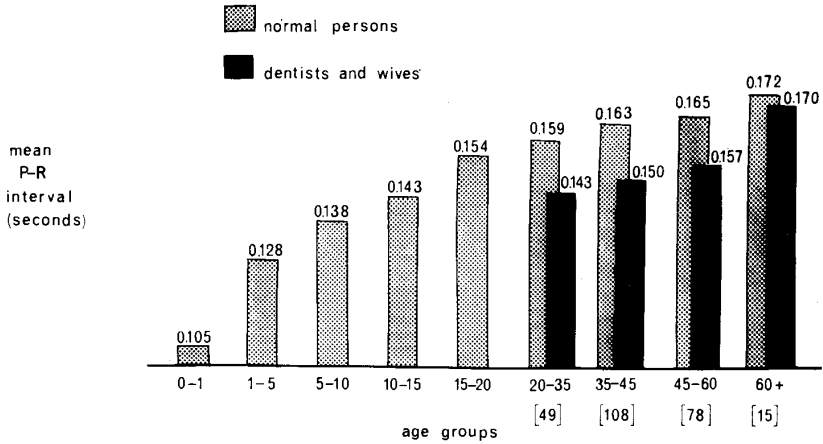


FIG. 2. The relationship of age and the electrocardiographic P-R interval in normal persons (Lepeschkin data) compared with a group of 250 dentists and their wives.

outlined by the Food and Nutrition Board of the National Research Council (5). These defects were pointed out to the group and discussions were held as to how to improve the dietary regimen. Subsequent dietary surveys demonstrated that a significant segment of the group had altered their food intake significantly, as judged by a lower intake of refined-carbohydrate

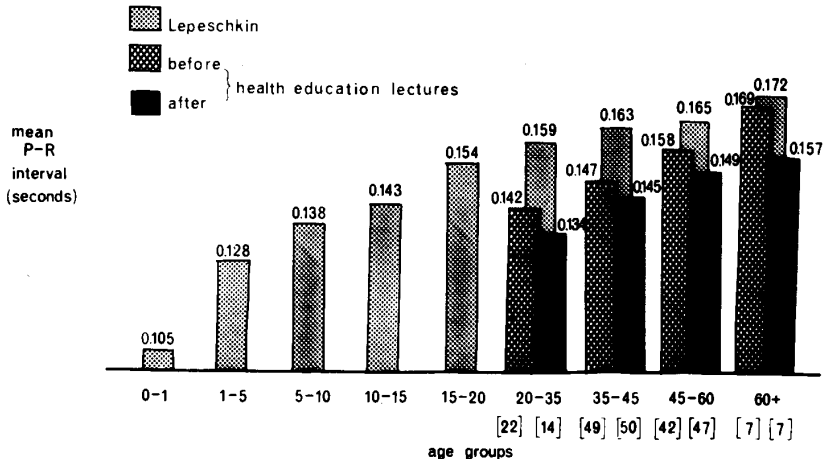


FIG. 3. Relationship of age and the electrocardiographic P-R interval in normal persons (Lepeschkin data), and in 238 dentists and their wives before and after dietary changes. (Sample sizes shown in brackets.)

foodstuffs, a greater intake of protein, and a greater intake of vitamins and minerals.

Figure 3 shows the baseline data of Lepeschkin (gray columns); superimposed are cross-hatched columns showing the mean P-R interval values for the dental group at the start of the experimental (Fig. 2). It is evident that initially the P-R interval increased with age; the values of 0.142, 0.147, 0.158, and 0.169 second underscore this point. The black columns show the mean P-R intervals for the dental group following the dietary lecture series. Two items should be emphasized: 1) with aging, the P-R interval lengthened, as indicated by the values of 0.134, 0.145, 0.149, and 0.157 second, and 2) at each temporal point, the mean P-R interval was less after dietary instructions than before.

Question Four: The prevalent assumption is that *normal* and *physiologic* are synonymous. By definition, *normal* is *average*. In contrast, *physiologic* is *healthy*.

The data show that it is *normal* for the P-R interval to lengthen with age. The question is whether it is *physiologic* for the P-R interval to lengthen

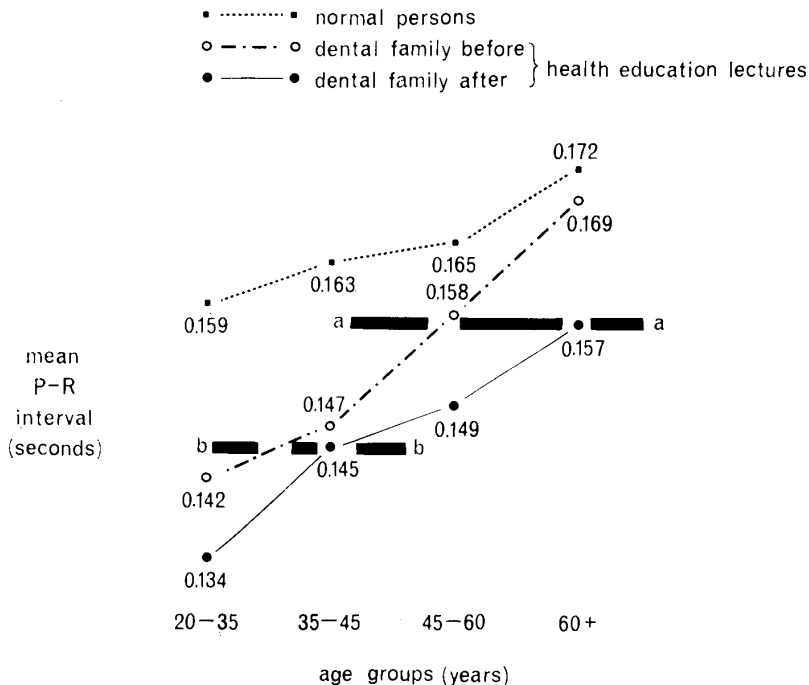


FIG. 4. The heavy black lines show that, after dietary instructions, the mean P-R interval for the dental group was shortened. This suggests that, as the group became chronologically older, it became electrocardiographically younger.

with time. If one grants that normal and physiologic are synonymous, then the answer is in the affirmative. However, it is possible that normal and physiologic may not be synonymous. For example, it is normal to have dental decay, since 95 per cent of Americans do. But, it is physiologic to have no dental caries!

The P-R intervals for the dentists and their wives were better (shorter) than for so-called normal people—probably due to the fact that it is the health-conscious dentist who tends to participate in a health evaluation program. The data shown here also suggest that the P-R interval may be lowered even more following a series of dietary lectures, as portrayed in Figure 4. For the oldest group of subjects [60+ years], after health education lectures, the mean P-R interval was 0.157 second. This was less than the P-R interval of 0.158 second prior to health education instruction for the 45–60 year group. There was a similar reversal of the trend for the 35–45 group versus the 20–35 group.

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