

February 7, 1977

MEMORANDUM

TO: Art Leon

FROM: Henry Blackburn

Many thanks for your January 7 memo and your bibliography of the effects of exercise on blood pressure. I could suggest the addition of articles by Taylor on the physical activity program, showing no change of blood pressure, and the article by Sannerstedt from Werko's group, Clinical Science and Molecular Medicine 45:145, 1973. The latter article was in mild hypertensives, the P.A. study was in high risk men.

My own evaluation of the article by Kral on hypotensive effect of physical activity, is that this study is badly designed and probably means nothing, either for short or longterm changes, because of the lack of proper control. I would be happy to have your more detailed evaluation of their data, but it's obviously hard to make anything out of a totally uncontrolled study. The 1967 abstract of George Mann's is shocking in that there is mention of an untreated group but no evidence that there was any random assignment and no actual data on the comparison values between a control and treatment group. The study by Berkson in this same abstract was also totally uncontrolled. The 1970 JAMA article by Boyer and Kasch is totally uncontrolled.

If this is the totality of the evidence, which surprises me, I am forced to conclude that there is no good evidence at all that physical training programs lower blood pressure in high risk, or hypertensive, or normotensive subjects, other than a possible acute effect. Even if these studies were controlled in regard to exercise, there is rarely mention of weight change. Thus if we were able to claim that a long term exercise program was associated with a longterm reduction in blood pressure, we would still have the problem of weight and salt intake being uncontrolled. I am hoping you can enlighten me concerning more reliable studies in this area.

My evaluation of the Clauson, Naughton and Hellerstein exercise studies in coronary patients is that there is no evidence or inadequate data to determine whether there is evidence of a blood pressure lowering effect due to physical conditioning of these patients. The Naughton study was controlled but there were too few in number and the changes in blood pressure were trivial. Clauson's study had inadequate numbers, Hellerstein's study had adequate numbers but no controls, and the number of subjects in the only table providing blood pressure information and showing an 8 mm diastolic lowering does not give the standard deviation, nor the number of subjects involved, nor the results for control.

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I'm forced to conclude that the results in normal men and in hypertensive men and in coronary patients are inadequate to come to any reasonable conclusions concerning the effect or the effective of indirect or direct of exercise conditioning on blood pressure in man. I guess I am not particularly interested in the effects of exercise on normatensive rats. The Fletcher-Canfield study on infarct patients is completely uncontrolled. My summary of these data, would be that we should say nothing about the effect of exercise on blood pressure until we've done some decent studies on hypertensive patients using the carefully controlled and cross-over design. It would also seem to me that we have an enormous amount of data on blood pressure responses to exercise, and this might be worth the work of a very unusually good graduate student to dissect the relationship between resting blood pressure and exercise blood pressure and hypertension in trained and untrained individuals.

HB:jp