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COMMENTARY

Professor Roy Shephard's Influence on the Development of the Toronto Rehabilitation Centre's Post-coronary Exercise Program

Terence Kavanagh[1]

Abstract

This article outlines the invaluable contribution that Professor Roy Shephard made to the development and operation of the Toronto Rehabilitation Centre's Cardiac Rehab Program.

Introduction

I am honoured to be asked to comment on the immense contribution Roy Shephard has made and continues to make to the field of exercise physiology. On a personal level I have to thank him for the very substantial part he played in the success of the Toronto Rehabilitation Centre's post-coronary exercise program. Not only that, but like most medical students of my era the curriculum included only "pure physiology", and I am indebted to Roy for an on the job education in applied physiology.

My association with Roy Shephard goes back to 1968. In June of the previous year I had taken up the position of Medical Director of the Toronto Rehabilitation Centre (TRC) on Rumsey Road. Apart from the programs already in existence in the Centre, there was a need for one that attended to the requirements of patients who had suffered a non-fatal myocardial infarction. At that time the only formal cardiac rehabilitation program in Toronto was offered at the YMHA on Spadina Avenue by the cardiologist Dr. Heller and a physical educator Bert Life. Unfortunately this folded when Dr. Heller retired and Bert Life passed away. As for the rest of Ontario, only London was fortunate in having a large viable program which was instituted some years previously by Dr. Peter Rechnitzer, a pioneer in the field.

However, no matter how desirable an exercise-based cardiac rehabilitation program might be, it seemed beyond the reach of a free-standing outpatient community health centre such as the TRC then was. In order to prescribe a training regimen which was both safe and effective we needed to have access to an exercise testing laboratory. This led me to Roy Shephard, Professor of Applied Physiology, Department of Preventive Medicine and Biostatistics, Faculty of Medicine, at the University of Toronto, and an internationally recognized authority in the field . As we discussed the Centre's needs and the University's requirements we agreed on a project that

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From the [1]Toronto Rehabilitation Institute, Room 306, 901 Lawrence Avenue West, Toronto, Ontario M6A 1C3, Canada. Email: terence.kavanagh@utoronto.ca

would be mutually advantageous. Roy would set up and staff the exercise testing laboratory in the Centre, and we would provide a clinical outlet for his MSc and PhD students to pursue their various research endeavours.

It was agreed that all post-coronary patients would undergo exercise testing at entry and at regular intervals throughout the program. The test would include the collection and analysis of expired air for determination of oxygen intake – a fertile research field for Roy's graduate students. We chose the cycle ergometer for a number of reasons. Firstly, it had been the method of choice for many years in Europe and therefore one from which we could draw a rich source of data. Secondly it facilitated the collection of expired air, a cumbersome procedure in those days, involving large glass syringes and the deft transfer of a measured volume of air from a sequence of meterological balloons to the gas analyser. Finally, it seemed to us that cycle ergometry was a safer procedure, in that the patient could merely stop pedalling voluntarily at the onset of symptoms or marked fatigue.

However, just as we were about to close the deal, Roy played his trump card. Put simply, there was a quid pro quo! Roy would provide the testing equipment and technicians provided we could bring ourselves to add an ST-averaging device – a very new piece of equipment only available from the United States, at the princely sum of $10,000.00! Of course, he put it more diplomatically than that. My Medical Advisory Committee, previously in full agreement with the plans for a cardiac rehab program, were a little taken aback with my request for $10,000.00 from the Capital Budget, particularly as after checking around with cardiologists in the area, they found that no other institution had such an advanced piece of equipment. It took all my negotiating skills together with much emphasis on Roy's undoubted pre-eminence in this field to convince them of the importance of purchasing this new technology.

I well recall that first exercise laboratory. The ergometer was a large metal structure that required the addition and subtraction of a series of weights to achieve the desired workload. A mass spectrometer occupied more space than two present-day modern metabolic carts! To operate this equipment Roy provided us with his chief technician, Salah Qureshi, and a graduate student, Robin Campbell, both of whom eventually joined the full-time senior staff of the TRC, where they remained until the Centre was amalgamated with the Toronto Rehabilitation Institute in 1998.

Having settled on the details and protocols of the exercise test, I asked Roy if he could come and observe a test to ensure it was being carried out correctly. He found time out of his busy schedule to do this and arrived one afternoon just prior to the last test. As it happened, he was watching the test and at the same time, as was his usual wont, drafting the outline of a future article, when the patient developed sustained angina, and had to be transferred immediately to Sunnybrook Hospital (where he recovered without ill-effect). If my memory serves me, Roy had a revised exercise test emergency protocol drafted and delivered by 4:00pm the following day!

We then addressed the question of program design. The aim was to improve endurance fitness (Shephard, 1969), and we felt this could best be achieved by a program of walking, progressing to jogging, and increasing the distance from one to three miles. We agreed that the

classes should be held at night. This would enable those who had returned to work or who hoped to do so to attend. We also felt strongly that we needed to be able to keep the patients attending long enough to encourage them to change their lifestyle, but at the same time avoid them becoming overly dependent on the Centre. We settled on a protocol which required patients to attend the structured class once weekly, and to carry out a prescribed workout four times away from the Centre, documenting this by completing a weekly exercise diary. This turned out to be highly successful.

We were indebted to Dr. Art Chisholm from Sunnybrook Hospital who referred our first twenty or so post-coronary patients. From that beginning new referral rates escalated necessitating an increase in weekly classes from two to eleven with 50-60 patients per class as well as the expansion of our human performance laboratory, now under the direction of Dr. Don Mertens. This was in part due to the publicity aroused when in 1973 seven of our trained post-coronary patients finished the Boston Marathon, and in 1985 when one of our heart transplant patients achieved a similar feat. While Roy personally supported me in these public relation endeavours, it was his scientific input that enabled us to obtain interesting data regarding weight loss and dehydration in marathon runners (Kavanagh et al., 1974; Kavanagh and Shephard, 1975); intensive exercise in cardiac rehabilitation (Kavanagh et al., 1973). To some degree, our research in this field contributed to the decision of those responsible for organizing marathons to add a first water stop at the three-mile mark, as opposed to the ten-mile mark. We made presentations on this matter to the Canadian Olympic Committee and the International Olympic Committee during the 1976 Olympics in Montreal.

Small wonder that with such a large clinical base we were able to publish articles covering subjects as diverse as exercise versus hypnotherapy (Kavanagh et al., 1970), testing the elderly amputee (Kavanagh and Shephard, 1973); a cold-weather jogging mask (Kavanagh, 1970); antecedents of myocardial infarction (Kavanagh and Shephard, 1973); depression after myocardial infarction (Kavanagh et al., 1975); exercise training in the elderly (Kavanagh and Shephard, 1977); exercise for cardiac transplant patients (Kavanagh et al., 1986); effects of 12 months training in CHF patients (Kavanagh et al., 1996); prediction of prognosis and long –term follow-up of more than 12,000 male patients (Kavanagh et al., 2002) and more than 2000 female patients, (Kavanagh et al., 2003); among many others too numerous to cite here.

At presentations we made together to lay audiences I think we made a good team. Roy presented the scientific data supporting the cause for exercise – I followed with a simple translation! All of which attests to the invaluable contribution that Roy made to the success of the Toronto Rehabilitation Centre's cardiac exercise program and its reputation both nationally and internationally.

I feel very privileged not only to have worked with Roy professionally, but to count him and his wife, Muriel as close friends.

Sincerely,

Terence Kavanagh

Qualifications

The author's qualifications are as follows: Terence Kavanagh, MD, FRCPC, FACC, DSc(Hon)

References

Hamm, L. F., and Kavanagh, T. (2000). The Toronto Cardiac Rehabilitation and Secondary Prevention Program: 1968 into the new millennium. *J Cardiopulmonary Rehabil,* 20, 16-22.

Kavanagh, T., Shephard, R. J., Pandit, V., and Doney, H. (1970). Exercise and hypnotherapy in the rehabilitation of the coronary patient. *Arch Phys Med Rehabil,* 55, 578-587.

Kavanagh, T. (1970). A cold weather "jogging mask" for angina patients. *Can Med Assoc J*, 103, 1920-1291.

Kavanagh, T., and Shephard, R. J. (1973). The application of exercise testing to the elderly amputee. *Can Med Assoc J*, 108, 314-317.

Kavanagh, T., Shephard, R. J., Doney, H., and Pandit, V. (1973). Intensive exercise in coronary rehabilitation. *Med Sci Sports,* 5(1), 34-39.

Kavanagh, T., and Shephard, R. J. (1973). The immediate antecedents of myocardial infarction in active men. *Can Med Assoc J*, 109, 19-22.

Kavanagh, T., Shephard, R. J., and Pandit, V. (1974). Marathon running after myocardial Infarction. *JAMA*, 229(12), 1602-1605.

Kavanagh, T., and Shephard, R.T. (1975). Maintenance of hydration in "post-coronary" marathon runners. *Br J Sports Med,* 9(3), 130-135.

Kavanagh, T. (1980). The Healthy Heart Program Van Nostrand Reinhold Ltd. Toronto.

Kavanagh, T., Yacoub, M. H., Mertens, D. J., Kennedy, J., Campbell, R. B., and Sawyer, P. (1988). Cardio-respiratory responses to exercise training after orthotopic cardiac transplantation. *Circulation*, 1, 162-171.

Kavanagh, T., Myers, M. G., Baigrie, R. S., Mertens, D. J., Sawyer, P., and Shephard, R. J., (1996) Quality of life and cardiorespiratory function in chronic heart failure: effects of 12 months aerobic training. *Heart*. 76: 42-49.

Kavanagh, T., Mertens, D. J. Hamm, L. F., Beyene,, J. Kennedy, J., Corey, P., and Shephard, R. J. (2002). Prediction of Long-Term Prognosis in 12,169 Men Referred for Cardiac Rehabilitation. *Circulation*, 106, 666-671.

Kavanagh, T., Mertens, D. J., Hamm, L. F., Beyene, J., Kennedy, J., Corey, P, and Shephard, R. J. (2003). Peak Oxygen Intake and Cardiac Mortality in Women Referred for Cardiac Rehabilitation. *JACC*, 42(12), 2139-2143.

Shephard, R. J. (1969). Endurance Fitness. University of Toronto Press, Toronto.