

The Evolution of Physical Activity and Recommendations for Patients with Coronary Heart Disease



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Introduction

Research published by Rogerson et al. in this issue of *Heart Lung and Circulation* [1] prompts consideration of the evolution of physical activity recommendations and cardiovascular disease (CVD) management. In their manuscript, Rogerson et al. found that sedentary behaviour was associated with increased risk of all-cause mortality in people with CVD. This represents a 180-degree shift in our understanding of physical activity and associated recommendations compared to 60 years ago. The purpose of this article is to provide a historical overview of the evolution of physical activity recommendations and associated strategies for patients with coronary heart disease (CHD).

Cardiovascular disease, including CHD, is a leading cause of morbidity and mortality globally [2]. In recent decades, mortality associated with CHD has decreased substantially in developed countries due to improving pharmacological therapies, revascularisation procedures and prevention programs [3]. However, patients with prior CHD are at high risk of recurrent events and around one-quarter will be readmitted to hospital within one year of an index event [3]. In 2010, more than 25,000 Australian hospital separations were associated with repeat admissions at a cost of more than \$600 million in direct costs alone [4]. The good news is that modern cardiology has seen significant advancements in diagnosis, revascularisation, pharmacotherapy and overall more successful treatment during the past 100 years. The associated challenge is that more people are surviving

cardiovascular events, hospital stays are becoming much shorter and ultimately there are growing numbers of people living with CVD and requiring ongoing secondary prevention [5].

Physical Activity Recommendations for Patients Post-myocardial Infarction in the First Half of the 20th Century

A previous Editorial by Denniss (2013) published in *Heart Lung and Circulation* summarised the management of myocardial infarction (MI) [6]. The clinical characteristics of MI and its associated mechanisms were first described in the early 20th century [7]. Since that time, when it became evident that people could survive a MI, attention has been drawn to potential treatment and ultimately prevention. In 1912, James Herrick established the importance of prescribing 'rest' in post-MI recovery [8]. Consequently, for the first half of the 20th century patients who survived a MI were required to stay bedridden for around six weeks and were forbidden to move or to feed themselves during the first two weeks [8]. Continued and severely limited physical activity was prescribed after hospital discharge with stair-climbing often prohibited for up to a year [9]. Also during this time, follow-up medical management gave little advice to patients regarding exercise capacity, stress management and

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education about CVD and its limitations [9]. Overall, the traditional medical management of MI included physical *inactivity*, for more than half of the 20th century.

Physical Activity Recommendations for Patients Post-myocardial Infarction in 1960s and 1970s

By the 1950s, MI was known to be a major cause of death in developed countries and a major public health problem with the risk of deep venous thrombosis, pulmonary embolism and severe deconditioning being exaggerated by prolonged bed-rest [8]. In 1952, Levine and Lown openly questioned the need for enforced bed-rest and prolonged inactivity and they proposed the concept of “armchair” treatment [10]. So-called “Armchair” treatment started with the patient initially sitting out of bed for one to two hours per day [10]; it was considered radical at the time and provoked heated discussion [8]. Eventually this change in treatment led to recommendations that patients could leave their beds and walk [7]. By the 1960s, numerous studies demonstrated that early activity after an MI safely negated the adverse effects associated with prolonged bed-rest [8]. Research related to immobility and associated deconditioning was also expanding and in 1968, Saltin and colleagues reported that the functional capacity of normal subjects confined to bed for three weeks decreased approximately 33% and that a program of three months of twice-daily rigorous exercise returned subjects’ functional capacity to normal levels [11].

In the 1960s and 1970s, the concept of “rehabilitation” for patients with heart disease was born. Researchers and clinicians began exploring the potential and safety associated with physical activity after MI [7]. Pharmacological management also evolved, and the need for intense fluid replacement and oxygen use was recommended during activity [8]. In the mid-1960s, a then controversial study demonstrated that cardiac patients (n=200) could benefit physiologically from progressive exercise and enjoy improved psychological confidence without worsening mortality or morbidity [12]. The demonstrated success of this supervised program offered a new dimension to care and eventually evolved into what is still often referred to today as outpatient or traditional “cardiac rehabilitation” [12]. Programs then became more widespread and involved supervised reconditioning post-MI and physical activity required low-level oxygen demand. The protocol for “rehabilitation” around this time had an emphasis on three areas: graded physical exercises, activities of daily living, and educational activities [13]. Programs were important given the ongoing physical activity restrictions placed on patients after MI and over time the concept of group-based and supervised physical activity as a part of a program of “rehabilitation” became usual practice (Figure 1).

Also around this time the concept of risk factors and their management in the prevention of CVD was becoming understood as a result of the Framingham Heart Study [14]. The study aimed to identify common factors or modifiable characteristics that contributed to CVD by following its development over a long period of time in a large group of participants [14]. Over the years, the Framingham Study led to the identification of the major CVD risk factors such

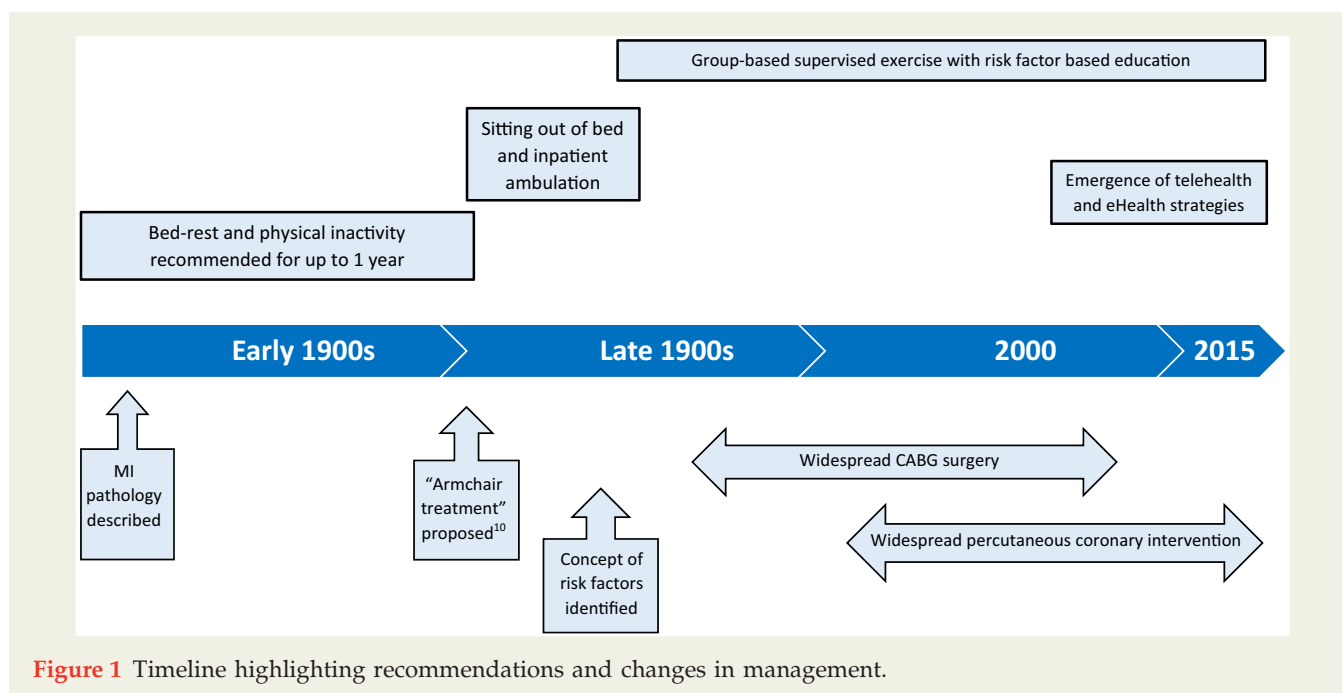


Figure 1 Timeline highlighting recommendations and changes in management.

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