

# **A.C.P.I.C.R.**



**Association of  
Chartered Physiotherapists  
in Cardiac Rehabilitation**

***Early Activity  
After Cardiac Surgery***

**2016**

**Key messages:**

- There are many benefits for patients who engage in early activity after cardiac surgery
- New evidence is emerging that an alternative approach to typically conservative sternal precautions will enable patients to be more independent earlier in their recovery
- There is a need for further research in this field to enable healthcare professionals to provide effective and safe early cardiac rehabilitation.

**Aims**

This document intends to:

- Give an overview of the available literature with regards to early activity following cardiac surgery
- Report on a survey of the current practice of physiotherapists working in UK cardiothoracic centres

**Background and literature review**

Cardiac surgery is defined as any surgery that involves opening the pericardium (The Society for Cardiothoracic Surgery in Great Britain and Ireland, 2015). The most common procedures performed are coronary artery bypass grafts and valve surgery.

Early cardiac rehabilitation (CR) following cardiac surgery both whilst the patient is in hospital, and in the immediate post discharge period aims to minimise the effects of restriction to bed (De Macedo et al, 2011) and has been shown to reduce the risk of post-operative complications, improve autonomic cardiac function at discharge (Mendes et al, 2010) and reduce length of hospital stay (Wynne, 2004 & Herdy et al, 2008).

The patient population undergoing cardiac surgery is known to have increasingly complex histories with co-morbidities increasing which may adversely have the potential to slowdown recovery and increase the likelihood of in-hospital mortality (Clough et al, 2002). It should also be considered that there is an increase in the number and proportion of older people in the UK. By 2035 it is projected that those aged 65 and over will account for 23 percent of the total population (Office for National Statistics, 2012). Therefore, the importance of encouraging and prescribing appropriate physical activity in the post-operative period has never been higher.

The responsibility for early activity after cardiac surgery is shared by members of the multi-disciplinary team, but ward-based physiotherapy teams often take the lead. CR professionals (both physiotherapists and nurses) may also be involved, especially in advising on activity immediately after discharge from hospital.

The most recent guidelines from the National Audit of Cardiac Rehabilitation (NACR) and the Commissioning Tool (Department of Health, 2010) suggest that CR professionals should

carry out an assessment within 10 days of discharge. If this were the case, then indeed the CR professional would be providing some form of early activity programming and advice for each patient to meet the aforementioned requirements and suggestions. The CR services (16 programmes) who participated in the BACPR Pilot Accreditation Scheme 2014-2015 achieved on average their first patient assessment around 30 days post discharge (all cardiac conditions rather than focussing on surgical patients) which is 20 days short of the target and certainly does not encompass what the authors above describe as 'early cardiac rehabilitation'. This highlights the importance of patients receiving adequate activity advice whilst they are still inpatients.

There is limited published data available to guide physical activity in the post-operative period following cardiac surgery with scarce evidence as to the optimal intensity, timing and choice of exercises. Many inpatient protocols for physical activity following heart surgery are based on guidelines set out by the American College of Sports Medicine (Thompson et al, 2010) which recommend:

- Mobilising 3-4 times a day on days 1-3 post surgery
- Mobilising 1-2 times a day from day 4 post surgery
- Intermittent bouts of exercise lasting 3-5 minutes with rest periods
- Using the Rate of Perceived Exertion (aim for less than 13 on the 6-20 scale) and Heart Rate (resting HR plus 30 beats) to dictate intensity. (*We are not sure how betablockade was accounted for in this study*).

Following these guidelines, and historically as passed down as expert opinion, many inpatient exercise programmes are based solely on a progressive walking regime which is increased in terms of distance and intensity. Hirschhorn et al (2008) reported that those patients who mobilise more frequently and for a greater duration achieve functional milestones more quickly. Their physiotherapy-supervised 'moderate intensity' walking programme improved walking capacity at discharge. The benefits were however short-lived, with there being no significant difference in walking distance between the intervention groups at four weeks post discharge. As most surgical patients do not start the out-patient exercise-based cardiac rehabilitation programme in the United Kingdom (known as Phase III) until around 6 weeks post procedure, Hirschhorn et al's study highlights a potential interval of approximately four weeks or more in the continuity of an exercise regime between discharge and the commencement of a comprehensive Phase III programme.

De Macedo et al (2011) criticise the ACSM guidelines stating that determining exercise intensity by RPE and HR is subjective and not sufficiently individualised. The authors comment that physical activity in the early post-operative period should be based on the three basic principles of exercise prescription and progression: specificity, overload and reversibility. Applying such principles from sports training programmes and respecting the different levels of physical aptitude of patients during the hospital phase of cardiac rehabilitation (Phase 1) may help to improve the quality of exercise prescription.

Opasich et al (2010) conducted a study offering a more personalised programme for elderly (over 70 years) patients who had undergone cardiac surgery by first stratifying the patients in terms of functional frailty, then using the results to prescribe the exercise programme. All

patients undertook activities such as walking, strengthening exercises and use of the stationary bicycle or treadmill, but those in the intervention group had these activities prescribed and progressed according to their frailty level. Patients on the personalised programme had a shorter length of stay and significantly greater improvements in mobility and independence compared with those in the usual care arm of the study.

One area of post cardiac surgery rehabilitation that has least evidence base is upper limb exercise and restrictions regarding lifting and carrying. Because of concern regarding the impact of upper limb activity on sternal wound healing, guidance is often very conservative with patient being advised to avoid anything more than very light upper limb activity. Adams et al (2008) argue that these restrictions can lead to patients becoming fearful and inactive unnecessarily. They conducted a small study examining the impact of simulated lawn-mowing in 13 subjects 3-7 weeks after coronary artery bypass surgery and found that there were no negative effects on ECG findings, blood pressure or heart rate. Chest radiographs performed after the protocol completion showed stable sternal wires and no evidence of sternal dehiscence.

The same authors have since published guidance on an alternative approach to prescribing sternal precautions after median sternotomy that they call 'Keep your move in the tube' (Adams et al, 2016). Moving away from load and time restrictions, this approach is based on the ergonomics that shorten the length of the outstretched arm (lever arm reduction) which then allows patients to perform previously contraindicated movements. By keeping their upper arms close to their body, as if they were in an imaginary truncal tube, they can perform load-bearing movements but avoid excessive sternal stresses. For non-load bearing activities patients are allowed to move their arms out of 'the tube'.

Filbay et al (2012) conducted a survey of Cardiothoracic Physiotherapists working in Australia and New Zealand to investigate current interventions in use for patients following uncomplicated Coronary Artery Bypass Surgery (CABG). Physiotherapist experience was perceived as the most influential factor in determining post-operative practice, and the authors were concerned that many physiotherapists were continuing to use interventions that are not supported by the best available evidence. They comment that a clinical care pathway does not ensure best practice if it implements non-evidence based practices. If the pathway has been in place for some period of time, it may fail to reflect the most current literature. They conclude there is a pressing need for a set of evidence-based guidelines for use with routine uncomplicated CABG patients.

Sanger (2015), as part of a wider service review, conducted a benchmarking exercise which surveyed 25 UK cardiothoracic centres about their current physiotherapy practice with patients post cardiac surgery. Centres were asked 'Is Physiotherapy offered as routine care following cardiac surgery?' Of the 17 who responded ten centres routinely offered physiotherapy to all patients following cardiac surgery. Of the seven who did not, five used a screening tool and two offered physiotherapy on referral only. It was not specified whether this was for respiratory physiotherapy, mobility and activity advice or both.

In summary, there is a significant lack of evidence regarding physical activity and mobility post cardiac surgery. Most advice given is based on expert opinion and uses anecdotal

rather than direct evidence. Consequently advice given varies widely between hospitals and rehabilitation centres around the country and indeed the world. There is a pressing need for research in this field to enable healthcare professionals to provide effective and safe early cardiac rehabilitation.

### **A survey of current practice**

There are 33 hospitals in the UK which have cardiothoracic centres performing cardiac surgery. Between August and December 2015 these centres were contacted and the physiotherapists based on the cardiothoracic wards were invited to participate in this survey. Responses were gained from 22 centres and participants were asked about their current practice regarding early activity for patients following cardiac surgery.

Only a small proportion (six centres) had physiotherapists providing input into pre-operative clinics or seeing patients pre-operatively, with an additional four centres seeing only high risk patients pre-operatively. The majority of centres provide some advice on mobility via a pre-op booklet.

Twelve centres reported seeing all patients day one post-operatively and the remainder screen patients and only see 'high risk' patients that require physiotherapy. Five centres use a screening tool they have created to support this screening process. In those centres where only high risk patients are seen on day one, the early mobility of the remaining patients is the responsibility of the nursing staff.

The majority of centres then progress mobility 'as the patient is able'. Some have distance targets and these ranged from 50-200m.

Guidance centres give patients on lifting post-operatively vary hugely - from 'no lifting at all' to a bag of sugar, a box of cereal, 1/2 a kettle, a full kettle, 1kg and 5kg.

Upper limb range of movement advice also varied. Some encourage full active range of movement, some encourage bilateral arm movement and some encourage unilateral movement.

In two-thirds of centres, physiotherapists practice the stairs with everyone pre-discharge, in the remainder stairs are only practised if indicated.

In all centres patients are given exercise advice on discharge either verbally or by a discharge booklet or a combination. Advice varies but most give advice about gradually increasing walking distance or duration with a goal of being able to walk for 30 minutes a day by 6 weeks. Many centres spoke about advising patients on the use of the rate of perceived exertion scales (Borg, 1998) both when in hospital and once exercising independently at home.

## Writing group

Helen Alexander  
Nicola Cooper  
Sally Turner  
Michelle Wright

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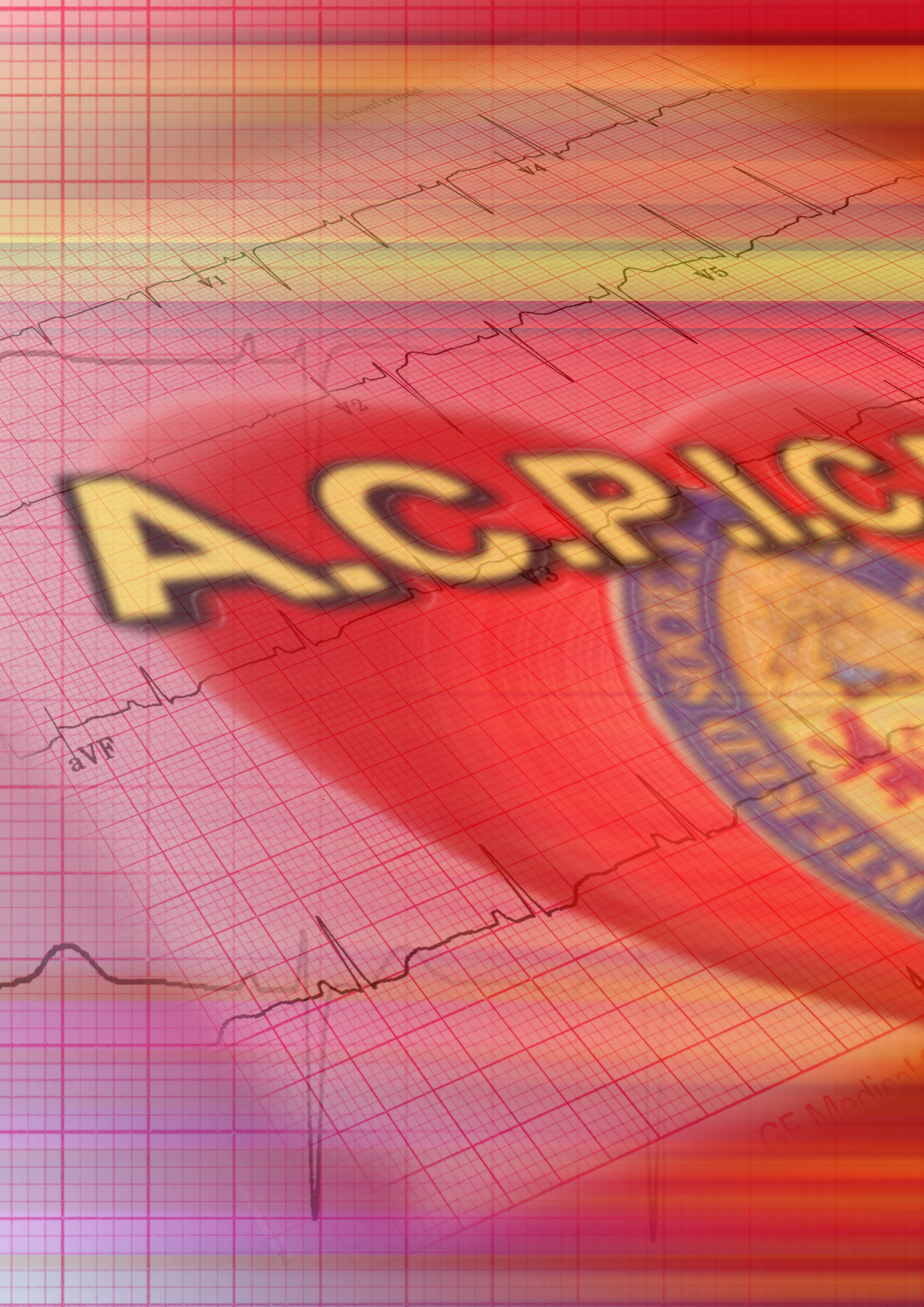
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## Notes



## Notes



Uncertain

V1

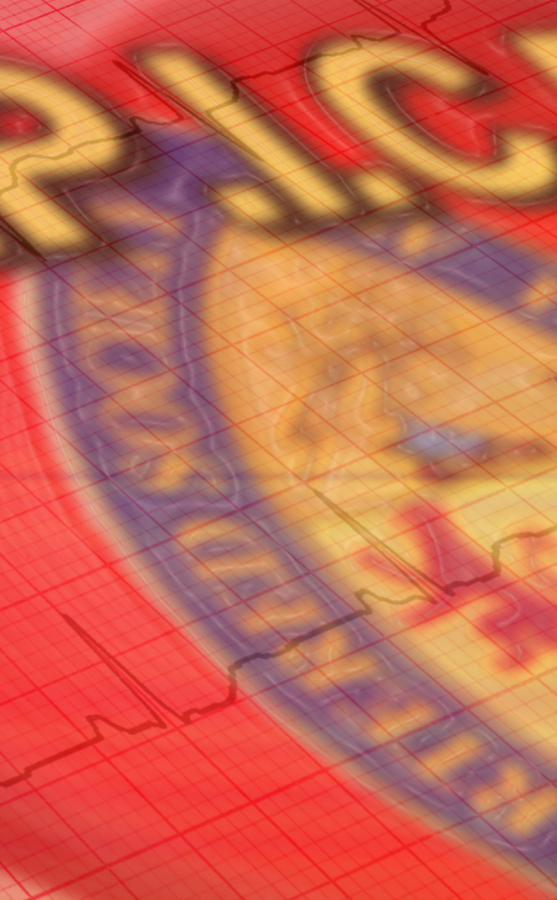
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