The EAPC EXPERT tool

Interactive training and decision support to optimize exercise prescription in cardiovascular disease: the European Association of Preventive Cardiology (EAPC) EXercise Prescription in Everyday practice & Rehabilitative Training (EXPERT) tool

Background

As part of multidisciplinary rehabilitation, exercise training is important as it independently leads to improvements in cardiovascular disease (CVD) risk, endurance exercise capacity, muscle strength, quality of life and prognosis in patients with CVD (risk)\(^1-4\). As a result, exercise training is considered a Class 1A intervention in the (secondary) prevention of CVD.\(^5,6\)

According to European recommendations CVD (risk), patients should execute >150 min of endurance exercise training per week at a moderate intensity, ideally spread over 3–5 days per week, eliciting an energy expenditure of 1000–2000 kcal per week.\(^5,6\) Moreover, endurance exercise training should be complemented by resistance exercise training two times per week at a moderate exercise intensity.\(^5,6\)

Problem statement

These European recommendations provide a relevant guideline in how to prescribe exercise to CVD (risk) patients for clinicians, but must not lead to a one-size-fits-all approach in CV rehabilitation. On the contrary, evidence is accumulating that a different exercise prescription is required according to the severity and type of CVD (risk), and ideally, this should persuade clinicians to target different goals during CV rehabilitation (i.e. reducing fat mass, improving blood lipid profile, exercise tolerance, glycaemic control, etc.).\(^7\) Tailoring the exercise intervention to each single patient according to his/her specificity is a crucial aspect in this endeavour.

However, properly prescribing exercise in different combinations of CVDs and risk factors within the same patient is difficult as this requires integration and prioritization of different exercise recommendations. Indeed, a large heterogeneity in exercise prescription (exercise type, frequency, volume, intensity, session, and programme duration) has been observed between and within different CV rehabilitation units.\(^8-15\) Clinicians involved in CV rehabilitation are in need of an instrument that assists them in exercise prescription, thereby leading to personalized medicine and better standardisation of exercise intervention.

Interactive training and decision support system for exercise prescription in cardiovascular disease (risk): the EAPC EXPERT tool

With this in mind, the EAPC, together with Hasselt University (Belgium), constructed an interactive training and decision support system for exercise prescription in patients with CVD (risk): the EAPC EXPERT tool.\(^16\)

In 2010–2011, the first initiatives to create a CV rehabilitation decision support scheme were launched in Jessa hospital at Hasselt, as clinicians felt that variance in exercise prescription due to personal preferences, should be minimized. However, it was soon realized that such a decisive support scheme should be digitalized and that an enormous amount of data had to be collected, to be able to prescribe exercise in all CVD’s and risk factors that clinicians encounter in rehabilitation programmes.

As a result, in 2013, >30 CV rehabilitation experts (EXPERT working group, based on scientific and clinical expertise) from 11 European countries agreed to collaborate and to deliver state-of-the-art exercise recommendations (based on guidelines and evidence) for CVD (risk). These data were then used to construct an algorithm within an interactive training and decision support system by computer scientists (from the Expertise Centre of Digital Media (EDM) of Hasselt University). Several prototypes with different functions were tested and discussed with the EXPERT working group.

Functions of the EAPC EXPERT tool

This EAPC EXPERT tool supports two application modes: a recommendation centre and a training centre.

In the EXPERT recommendation centre (see Figures 1 and 2) exercise recommendations are available for ten primary indications for rehabilitation (i.e. coronary artery disease (with or without percutaneous coronary intervention or coronary artery bypass graft surgery), heart failure, cardiomyopathy, intermittent claudication,
**Figure 1** EAPC EXPERT tool recommendation centre.

**Figure 2** EAPC EXPERT tool exercise recommendation.

**Figure 3** EAPC EXPERT tool training centre.
Opportunities for the cardiovascular rehabilitation community

By use of the EXPERT tool in clinical practice, certain opportunities for the CV rehabilitation community may emerge, but it will be studied further to verify these hypotheses:

- Greater clinical effectiveness of CV rehabilitation.
- Enhanced medical safety of CV rehabilitation.
- Improved adherence to, or getting to know better, the European exercise prescription recommendations for CVD (risk), leading to lower variance in exercise prescription between different clinicians.

Future of the EAPC EXPERT tool

The EXPERT tool is now available via the EAPC website (https://www.escardio.org/Education/Practice-Tools/CVD-prevention-toolbox/EXPERT-Tool) and can be accessed after paying a licence fee. It is hoped that this tool becomes, next to other digital ESC tools, a standard instrument in the cardiology community. The EXPERT tool is updated regularly according to new guidelines or important findings from clinical studies. In addition, new functionalities will be added to the tool and a substantial acceptance rate by healthcare professionals is strived for.

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