

## Supplementary Materials

### Data S1:

#### Classification of scientific evidence according to SIGN

Ref.: Scottish Intercollegiate Guidelines Network, SIGN 50, "A guideline developer's handbook". <https://www.sign.ac.uk/pdf/sign50.pdf>

#### Levels of evidence

- 1 ++** High quality meta-analyses, systematic reviews of RCTs or RCTs with a very low risk of bias
- 1 +** Well conducted meta-analyses, systematic reviews or RCTs with a low risk of bias
- 1 -** Meta-analyses, systematic reviews or RCTs with a high risk of bias
- 2 ++** High quality systematic reviews of case control or cohort studies. High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
- 2 +** Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
- 2 -** Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
- 3** Non-analytic studies, e.g. case reports, case series
- 4** Expert opinion

**Table S1.** Absolute and relative contraindications to physical activity and exercise training within cardiac rehabilitation (adapted from (2, 6, 37, 350)).

Note: the list of contraindications given below does not claim to be exhaustive and does not relieve the responsible physician of his or her own responsibility for clinical examination and decision-making	
Absolute contraindications	<ul style="list-style-type: none"> <li>• acute coronary syndrome (ACS) &lt; 48 hours</li> <li>• known untreated and clinically relevant main stem stenosis</li> <li>• uncontrolled cardiac arrhythmias at rest or during exercise</li> <li>• severe aortic valve stenosis or other severe valvular heart disease</li> <li>• decompensated heart failure</li> <li>• acute pulmonary embolism or pulmonary infarction</li> <li>• acute aortic dissection</li> <li>• acute non-cardiac conditions that limit exercise capacity or are worsened by physical exertion (e.g., infection, sepsis, hyperthyroidism/ hypothyroidism)</li> <li>• acute deep vein thrombosis</li> <li>• acute myocarditis or pericarditis</li> <li>• active endocarditis</li> <li>• recent stroke or TIA</li> <li>• physical disability that prevents safe and appropriately dosed exercise training</li> <li>• other clinical situations that worsen under physical exertion</li> </ul>
Relative contraindications	<ul style="list-style-type: none"> <li>• significant anemia</li> <li>• severe, disease-relevant electrolytic derailments</li> <li>• therapeutically uncontrolled tachy- or bradycardia/arrhythmias, e.g.               <ul style="list-style-type: none"> <li>- untreated sick sinus syndrome</li> <li>- untreated, higher-grade AV blockages</li> <li>- atrial fibrillation with uncontrolled ventricular rate</li> </ul> </li> <li>• HOCM with maximum resting LVOT gradient &gt; 25 mmHg</li> <li>• known aortic dissection (Stanford B type, stable)</li> <li>• severe arterial hypertension at rest (systolic blood pressure ≥ 180 mm Hg and diastolic blood pressure ≥ 110 mmHg)</li> <li>• blood pressure drop of systolic ≥ 20 mmHg during exercise</li> <li>• uncontrolled diabetes mellitus</li> <li>• cognitive impairment that prevents/significantly limits cooperation during exercise testing and</li> </ul>

	training <ul style="list-style-type: none"> <li>• relevant pericardial effusion</li> </ul>
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**Table S2.** Content of LL-KardReha-DACH and levels of evidence generation in its original form in German language

1. General information	<ul style="list-style-type: none"> <li>- Initiation of the guideline and responsibilities</li> <li>- Development, methods and internal reviewing processes</li> </ul>
2. Introduction	<ul style="list-style-type: none"> <li>- Aims of cardiac rehabilitation</li> <li>- Definition of cardiac rehabilitation</li> <li>- Legal regulations and CR-structures in Germany, Austria and Switzerland</li> </ul>
3. General objectives of CR	<ul style="list-style-type: none"> <li>- Goals and conflicting goals (NER)</li> <li>- Cardiovascular prevention (NER)</li> <li>- Psychosocial goals and tasks (NER)</li> <li>- Social and vocational reintegration of patients (NER)</li> </ul>
4. Indications for CR initiation and participation	<ul style="list-style-type: none"> <li>- <b>after acute coronary syndrome (S3)</b></li> <li>- <b>after coronary bypass surgery (S3)</b></li> <li>- with chronic coronary syndrome (S2k)</li> <li>- with high CV-risk (S2k)</li> <li>- <b>with chronic heart failure (S3)</b></li> <li>- after surgical or interventional valve repair (S2k)</li> <li>- after ICD/CRT implantation (S2k)</li> <li>- with ventricular assist device (S2k)</li> <li>- after heart transplantation (S2k)</li> <li>- after surgical/interventional repair of the aorta (S2k)</li> <li>- with chronic peripheral arterial disease (S2k)</li> <li>- after pulmonary embolism (S2k)</li> <li>- with chronic pulmonary hypertension (S2k)</li> <li>- after myocarditis (S2k)</li> <li>- adults with congenital heart disease (S2k)</li> </ul>
5. CR-specific contents and interventions	<ul style="list-style-type: none"> <li>- Medical supervision and nursing (S2k)</li> <li>- Physical exercise modalities as adapted to the individually underlying cardiovascular diseases (S2k)</li> <li>- <b>Psychological interventions (S3)</b></li> <li>- Smoking cessation (S2k)</li> <li>- Nutrition (S2k)</li> <li>- Ergotherapy (S2k)</li> <li>- Social interventions (S2k)</li> <li>- Information, education and training for lifestyle changes (S2k)</li> </ul>
6. CV risk diseases and co-morbidities	<ul style="list-style-type: none"> <li>- Hypertension (NER)</li> <li>- Hyperlipidemia (NER)</li> <li>- Diabetes and metabolic syndrome (NER)</li> <li>- Adipositas (NER)</li> <li>- Chronic renal disease (NER)</li> <li>- Chronic obstructive lung disease (NER)</li> <li>- Orthopaedic disorders (NER)</li> <li>- Rheumatic diseases (NER)</li> <li>- Psychiatric and neurological diseases (NER)</li> </ul>
7. Special groups of patients in CR	<ul style="list-style-type: none"> <li>- Old and frail patients (S2k)</li> <li>- Young patients (S2k)</li> <li>- Gender specialities (S2k)</li> <li>- Migrants (S2k)</li> </ul>
8. Medical aftercare, prevention programs	<ul style="list-style-type: none"> <li>- Phase 3 programs (S2k)</li> <li>- Integrated ambulatory health care and disease management programs (S2k)</li> </ul>
9. Special concepts	<ul style="list-style-type: none"> <li>- Work related prevention programs (S2k)</li> <li>- Work related rehabilitation programs (S2k)</li> <li>- Tele-rehabilitation and home-based rehabilitation (S2k)</li> </ul>
10. Quality measurement	<ul style="list-style-type: none"> <li>- Evidence – based quality assurance in CR (S2k)</li> </ul>
<b>S3</b> = highest level of scientific evidence based on newly performed structured reviews and meta-analyses (text in bold); <b>S2k</b> = medium level of scientific evidence based on semi-structured literature searches and evaluation without performing meta-analyses; <b>NER</b> = Narrative evidence reporting based on the most actual topic-related international guidelines	