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S2k-Guideline – Sports Pre-Participation Evaluation of the German Society of Sports Medicine and Prevention

S2k-Leitlinie – Sportmedizinische Vorsorgeuntersuchung der Deutschen Gesellschaft für Sportmedizin und Prävention

SHORT REPORT

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Summary

- **The purpose of this derivative version** is to highlight and disseminate the core recommendations to clinicians, sports practitioners, and policy makers in the German-speaking health and sports sector.The benefits of physical activity are undisputed. However, adverse events can occur in rare cases, particularly during high-intensity or prolonged exercise.
- **During physical activity,** at-risk patients can experience major cardiac events, whereas adverse events affecting the musculoskeletal system are more common but less severe. A sports pre-participation evaluation (PPE) is designed to detect at-risk individuals and prevent potentially fatal events in apparently healthy adults.
- **Therefore, a new guideline for conducting PPEs** was developed through a consensus process involving 16 medical societies and sports associations based on previously published guidelines and consensus papers. Sports medicine physicians and potential participants were surveyed to assess the content, feasibility, and acceptability of the recommendations.
- **Based on 20 recommendations** developed and agreed upon by these entities, the PPE includes taking individuals' personal, family, and sports histories, as well as a physical examination. The need for additional examinations (e.g., laboratory parameters, echocardiography, or stress tests) is determined based on the findings. The effect of implementing this guideline should be examined in future research.

KEY WORDS:
Health, Recommendations, Pre-Participation Examination, Diagnostics, Screening

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3. ALTIUS SWISS SPORTMED CENTER, *Rheinfelden, Switzerland*
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In Collaboration with 16 Medical Societies and Sports Associations

Introduction

This article is based on the original publication in Sports Medicine: Joisten C, Hirschmüller A,et al. Sports Preparticipation Evaluation for Healthy Adults: A Consensus-Based German Guideline. Sports Med (2025). https://doi.org/10.1007/s40279-025-02230-5 (9).

The health benefits of physical activity for all ages and genders are undisputed including the prevention and treatment of chronic diseases (3, 13). However, people with pre-existing conditions or undiagnosed illnesses, especially those taking part in unfamiliar, high-intensity, and/or prolonged physical activities, may be at risk for health problems, such as sports injuries and, less commonly, cardiac events (5, 12, 14). Therefore, a sports pre-participation evaluation (PPE) is recommended before starting or resuming physical activity. The goal is to identify individuals at risk and maximize their safety during exercise. Additionally, a PPE can provide the basis for training-related advices according to the FITT-VP principle (frequency, intensity, time, type, and scope of training, as well as progression), or it can be used to assess cardiorespiratory and muscular fitness in order to evaluate performance or health status (6, 10).

Currently, few guidelines exist for recreational athletes, beginners, and those returning to exercise. To address this gap, the German Society for Sports Medicine and Prevention (Deutsche Gesellschaft für Sportmedizin und Prävention, DGSP) developed a consensus-based guideline (7, 9). The guideline is intended for healthy adults both disabled and non-disabled, who exercise or wish to begin (or resume) exercising. This includes individuals who have recovered from illnesses such as cancer and/or joint injuries. Considering the relevant recommendations, the PPE can also be used to advise individuals with chronic conditions, such as type 1 diabetes or rheumatoid arthritis. However, these guidelines are not intended for competitive athletes or children/adolescents.

The rationale for developing the guideline was therefore twofold: First, to improve the safety when participating in sports by providing physicians with a structured evaluation process to identify individuals at an increased risk of adverse events exercise-relates, particularly cardiovascular incidents. Secondly, to ensure feasibility and acceptance, the focus was on a pragmatic, resource-sensitive and consensus-based approach that can be applied in primary care and sports medicine practices (9).
The recommendations are based on a systematic review of 35 existing guidelines and consensus statements comprising 305 recommendations. Of these, only 12.8% were directly supported by primary study evidence (55 studies, mostly of levels 3–4), with the majority being expert-based. This evidence gap highlights the need for a formal, transparent consensus process involving a wide range of medical specialties. The process was contributed to by German medical societies and sports ›

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Box 1

Guideline Development Group.

GUIDELINE DEVELOPMENT GROUP
Steering Group: Christine Joisten and Anja Hirschmüller (DGSP, Guideline Chairs), Käthe Goossen and Alina Weise (IFOM, Institute for Research in Operative Medicine, Guideline Methodologists)
Methodology Consultant: Monika Nothacker (Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften e. V., AWMF)
Participating Specialist Societies and Organizations appointing Delegates to represent them (1 vote each):
German Society for Sports Medicine and Prevention (Deutsche Gesellschaft für Sportmedizin und Prävention [DGSP])
German Society for General Practice and Family Medicine (Deutsche Gesellschaft für Allgemeinmedizin und Familienmedizin [DEGAM])
German Society for Internal Medicine (Deutsche Gesellschaft für Innere Medizin [DGIM])
German Diabetes Society (Deutsche Diabetes Gesellschaft [DDG])
German Society for Physical and Rehabilitative Medicine (Deutsche Gesellschaft für Physikalische und Rehabilitative Medizin [DGPRM])
German Society for Cardiology – Cardiovascular Research (Deutsche Gesellschaft für Kardiologie – Herz- und Kreislaufforschung [DGK])
German Society for Prevention and Rehabilitation of Cardiovascular Diseases (Deutsche Gesellschaft für Prävention und Rehabilitation von Herz-Kreislauferkrankungen [DGPR])
German Society for Angiology – Society for Vascular Medicine (Deutsche Gesellschaft für Angiologie – Gesellschaft für Gefäßmedizin [DGA])
German Hypertension League (Deutsche Hochdruckliga [DHL])
German Society for Pneumology and Respiratory Medicine (Deutsche Gesellschaft für Pneumologie und Beatmungsmedizin [DGP])
German Society for Orthopaedics and Trauma Surgery (Deutsche Gesellschaft für Orthopädie und Unfallchirurgie [DGOU])
German Obesity Society (Deutsche Adipositas-Gesellschaft [DAG])
Society for Orthopaedic-Traumatological Sports Medicine (Gesellschaft für Orthopädisch-Traumatologische Sportmedizin [GOTS])
German Olympic Sports Confederation (Deutscher Olympischer Sportbund [DOSB])
German Disabled Sports Association and National Paralympic Committee (Deutscher Behindertensportverband und Nationales Paralympisches Komitee [DBS])
German Association for Health-Related Physical Activity and Exercise Therapy (Deutscher Verband für Gesundheitssport und Sporttherapie [DVGS])
Participating experts nominated by the DGSP executive and scientific advisory boards covered the following areas of expertise (no voting rights): Neurology, Psychiatry, Ophthalmology, Internal Medicine or Cardiology, Pulmonology, Orthopedics/Trauma Surgery, Nutrition, and Sports Medicine or Science

associations, representing specialties such as cardiology, internal medicine, orthopaedics, pulmonology, general practice and sports medicine. Additionally, feedback from two large online surveys of physicians and potential participants informed the feasibility and acceptability of the recommendations, ensuring that the guideline reflects expert knowledge and user perspectives (7). All recommendations were developed using the structured AWMF S2k classification and formal consensus procedures, ensuring strong or moderate agreement among the participating societies (14). This inclusive approach is particularly relevant given the ongoing debate on the cost-effectiveness and clinical utility of PPEs for adults. The resulting guideline is therefore a unique, interdisciplinary and practical contribution to preventive sports medicine.

By integrating evidence, expert consensus and stakeholder perspectives, this guideline addresses a critical gap in preventive care. It provides physicians with a clear, practical framework for PPEs in apparently healthy adults, aiming to reduce exercise-related risks and support long-term engagement in physical activity, which is a cornerstone of health promotion.

For this publication, we have summarized and abridged the overall guideline (9), the guideline report and publications derived from it (7, 9, 14).

Methods

These guidelines were developed using the methodology based on the AWMF guidelines (8, 14). A detailed description can be found in the guideline report (https://register.awmf.org/de/leitlinien/detail/066-002). The participating professional societies are listed in Box 1. The following aspects were considered when assigning recommendation grades: clinical expertise of the guideline group, quality of identified evidence, benefit-risk assessment, cost-benefit assessment, and views of affected citizens (i.e., study participants) and sports physicians, as collected through surveys. The assessment of the strength or degree of consensus is summarized in Table 1. The extensive rationale behind the strength of a recommendation can be found in the background texts of the publications (7, 9, 14), and in the full version at https://register.awmf.org/de/leitlinien/detail/066-002 . On pages 207-210 of this Short Communication, the recommendations of the guideline are presented in tabular form.

Discussion

The benefits of regular physical activity far outweigh the risks (2, 4, 15). However, participating in sports is associated with an increased short-term risk of injuries and cardiovascular complications. Nevertheless, fatal events, such as sudden cardiac death or acute myocardial infarction, are rare, but possible (2, 12). Therefore, a preparticipation examination (PPE) aims to identify individuals at risk and prevent serious events during or after exercise. While existing guidelines primarily focus on examining (elite) athletes, this consensus-based guideline is designed to assess healthy adults who wish to (re)start intense exercise or training. However, there is currently insufficient robust or specific evidence on the positive effects of such examinations on patient-relevant outcomes or their optimal sensitivity/specificity, this guideline attempts to reconcile expert knowledge,

Table 1

Grades of recommendations and classifications of consensus strength. Recommendation may be for or against an intervention. [b]=Eligible votes consisted of one vote per specialist society/organization, excluding delegates with moderate or strong conflicts of interest.

GRADE OF RECOMMENDATION	CORRESPONDING ACC/AHA CLASS [25]	TIME	EXAMPLE
Strong Recommendation	Class I (strong) or Class III: harm (strong)	↑↑ verb in the imperative tense	A net benefit is expected for most individuals, and no relevant groups who would not benefit are known.
Moderate Recommendation	Class IIa (moderate) or Class III: no benefit (moderate)	↑ modal verb "should"	A net benefit is expected for many individuals, but relevant groups who would not benefit are known. Or: The expected benefit is estimated to be small.
Weak Recommendation	Class II[b] (weak)	↔ modal verb "can"	Uncertain net benefit. Or: A net benefit is expected only for specific individuals, or the intervention is not recommended as a standard of care.
CONSENSUS STRENGTH	**APPROVAL RATE[a]**	**CONSEQUENCE**	
Strong Consensus	≥95% of eligible votes[b]	The recommendation was approved.	
Moderate Consensus	>75–95% of eligible votes[b]	The recommendation was approved and diverging views were documented alongside the recommendation or in the background text.	
Majority Agreement	50-75% of eligible votes[b]	The recommendation was revised to account for diverging views, followed by a repeat vote.	
No Majority Agreement	<50% of eligible votes[b]	The recommendation was rejected.	

feasibility in medical practice, and available evidence.

Additionally, the content of PPEs should inform exercise counseling (e.g., FITT-VP) to promote meaningful physical activity. Physical fitness is also an important factor in assessing health status (10, 11). In addition to general exercise counseling, preventive advice on avoiding stress-related damage and injuries can be given. This approach aims to enable safe and inclusive access, rather than creating additional barriers to participation in sports.

The challenge in introducing PPEs to a broader population lies in the requirement of the need for knowledge and skills in various medical disciplines. For instance, the musculoskeletal and cardiovascular systems of the individual must be examined. Although the EU includes sports medicine specialization in its physician guidelines, this qualification is generally unavailable. In Germany, sports medicine knowledge is primarily taught through a course system and, to a lesser extent, at sports medicine institutes.

Strengths and Limitations

A key strength of this guideline is that its recommendations are based on a summary of numerous professional societies' and associations' guidelines and consensus papers. Surveying healthcare professionals and potential participants/patients provided a user perspective and enriched the discussions.

A major limitation of this guideline was the scarcity of available data. The available literature primarily refers to elite-le- ›

Table 2

Recommended components of the physical examination. RED-S = relative energy deficit in sport, COPD = chronic obstructive pulmonary disease, PAD = peripheral artery disease.

EXAMINATION	EXEMPLARY ENTITIES
Collect anthropometric data (measure height, body weight, and waist circumference; calculate body mass index, body mass changes, and waist-to-height ratio) and record body fat percentage and fat-free mass	Assess body mass status (e.g., indications of RED-S), obesity, body mass changes, and body composition (e.g., sarcopenia and fat distribution pattern)
Measure heart rate and blood pressure (at least once on both sides)	Arrhythmia, arterial hypertension, and aortic isthmus stenosis
Examine the heart and lungs (sitting, standing, lying)	Vitium cordis (e.g., patent foramen ovale or mitral valve prolapse), COPD, and pulmonary fibrosis
Assess vascular status	PAD and evidence of aneurysm
Examine the abdomen	Fatty liver, hernias, and portal hypertension
Examine the musculoskeletal system, including the range of motion and stability of the large joints, spinal mobility and pain on motion and palpation, and muscle status (including flexibility, function, and tone)	Increased risk of injury (e.g., joint instability) and reduced risk of overload
Examine the nervous system (e.g., gait pattern, reflex status, sensitivity, and cranial nerve status if necessary)	Tendency to fall, impaired coordination, and protective reflexes
Examine the sensory organs, including a visual acuity test with eye charts	Impaired hearing and/or vision
Inspect the skin and mucous membranes	Infectious diseases, anemia, eczema, and malignancies
Inspect the oral cavity and record dental status	Status quo, chronic gingivitis, and bulimia nervosa
Assess lymph node status	Acute infection and systemic disease

vel athletes and is based on expert opinions, recommendations not controlled trials. Additionally, there are no intervention studies supporting injury risk screening (1). Currently, no cost-benefit analyses or number needed to prevent (NNP) have been conducted for this PPE. Such evidence is only available in the context of competitive sports. Therefore, population-based studies are urgently needed to demonstrate the benefits of PPE in identifying and registries at-risk individuals and in promoting and advising physical activity in the general population.

Conclusion

This consensus-based guideline has been developed to provide a solid foundation for evidence-based PPE. The recommendations are intended to help physicians identify individuals at risk of injury or fatal events before they participate in intense physical activity. If abnormalities identified, the relevant specialists (e.g., orthopedists and sports cardiologists) should be consulted. These examinations can also document a person's health status and facilitate counseling results of these according to the FITT principle. Future studies should investigate the feasibility of this guideline in different regions, including those with limited resources, and its effectiveness in preventing harmful or potentially fatal events.

Acknowledgement

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Contributors

CJ conceived the idea for the consensus statement. CJ, AH, AN and BW formed the consensus groups. CJ, BW, AN, AH, AC, CR, KK led the working groups. KG and AW ensured compliance with the predefined guideline methodology. All authors were included in the development of the recommendations. They contributed to reviewing and giving feedback on each iteration of the consensus draft. All authors read and approved the final version of the manuscript.

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Data Availability Statement

The data presented in this study are available on reasonable request from the corresponding author.

Competing Interests

Information on the management of potential conflicts of interest are listed in the supplementary material (S1). Below, only relevant competing interests are listed: CJ, BW, AN, TS are members of the DGSP executive board. CK is the head of the DGSP office. AH, MC, TK, KR, AN, FM, HS, CR, FM, KK, PP, AC are members of the DGSP scientific board/experts. KR is owner of a software company for metabolic endurance diagnostics (Ergonizer Software e.K., Germany). TS received research funding from an ergometer manufacturer (Ergoline GmbH, Germany).
All other authors declare that they have no competing interests.

Patient Consent for Publication

Not applicable.

Ethics Approval

Not applicable.

Abbreviations

ACSM: American College of Sports Medicine
AWMF: Association of Scientific Medical Societies in Germany (Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften)
Arriba: Define the task jointly, subjective risk, objective risk, information about prevention options, assessing the options, agreeing on how to proceed (Aufgabe gemeinsam definieren, Risiko subjektiv, Risiko objektiv, Information über Präventionsmöglichkeiten, Bewertung der Möglichkeiten, Absprache über weiteres Vorgehen)
COPD: Chronic obstructive pulmonary disease
CPET: Cardiopulmonary exercise testing
DEGAM: German Society for General Practice and Family Medicine (Deutsche Gesellschaft für Allgemeinmedizin und Familienmedizin)
DGSP: German Society of Sports Medicine and Prevention (Deutsche Gesellschaft für Sportmedizin und Prävention)
ECG: Electrocardiogram
IFOM: Institute for Research in Operative Medicine
MET: Metabolic equivalent
PAD: Peripheral artery disease
PPE: Sports pre-participation evaluation
RED-S: Relative energy deficit in sport
TTE: Transthoracic echocardiography

Summary Box

A new guideline for sports pre-participation evaluation (PPE) was developed by 16 medical societies awnd sports associations to identify at-risk individuals and prevent severe events during physical activity.

The guideline is based on 20 recommendations covering personal, family, and sports history, physical examination, and – if indicated – further diagnostics such as lab tests, echocardiography, or exercise testing.

The aim is to enhance the safety of physically active individuals, with future studies needed to evaluate the guideline's effectiveness.

Recommendation 1: Population and General Advice

A PPE should be offered to adults practicing or intending to start sports.

RECOMMENDATION
Recommendation Grade: Moderate ↑
Strength of Consensus: 85% (Moderate)
Justification: The available outcome data are insufficient to offer every adult an appropriate examination, especially for light- to moderate-intensity sporting activities. The idea that every sporting activity entails increased risks should be avoided. However, the Guideline Development Group assumes that the benefits of an examination outweigh the risks because it can prevent exercise-related adverse events. In addition, the examination results can be used to motivate individuals to adopt active lifestyles.
*DEGAM diverging view: A PPE can be offered to adults practicing or intending to start sports.
There is insufficient evidence about this recommendation's benefits and harms. While the Guideline Development Group assumed a main benefit, in the opinion of the DEGAM, the potential harm and the impact on care were insufficiently recognized. First, such an offer would entail a considerable commitment of human resources, which are currently—and will increasingly be—lacking, worsening care for the rest of the population or overburdening existing healthcare staff. Second, a "should" (moderate) recommendation means considerable uncertainty for those involved: Should sports be started and continued only after a comprehensive preventive medical check-up? Such a recommendation could discourage individuals from starting or maintaining physical activity. After all, a repeat examination is recommended every 1–5 years. Also, whether a specific fitness level for sports can be certified on the sole basis of such an examination, given insufficient evidence, remains in question, which the DEGAM clearly rejects.

Recommendation 2: Population and General Advice

A PPE should be conducted when starting an intense sport or exercise program.

Recommendation Grade: Moderate ↑
Strength of Consensus: 100% (Strong)
Justification: The available data are insufficient to link sports medicine screening to a specific degree of intensity or volume because subjective assessment findings can vary between individuals. In principle, however, physical activity at higher intensities defined by METs is assumed to be associated with greater risk, particularly for sedentary individuals and/or those with preexisting conditions.

Recommendation 3: Population and General Advice

A PPE should be offered at 1–5-year intervals, depending on the individual's risk profile, performance level, sport type, and intensity.

Recommendation Grade: Moderate ↑
Strength of Consensus: 100% (Strong)
Justification: The available data are insufficient to determine specific time intervals between examinations. The consensus group assumes that such a recommendation depends on individual risk factors, such as age and fitness level (especially cardiorespiratory fitness level). Furthermore, it concluded that annual screening is not sensible, feasible, or deserving of prioritization.

Recommendation 4: Population and General Advice

Use the PPE results to derive individualized exercise and training recommendations.

Recommendation Grade: Strong ↑ ↑
Strength of Consensus: 100% (Strong)
Justification: The Guideline Development Group agrees that a strong recommendation is appropriate here, especially as PPE results can be used for individual counseling.

Recommendation 5: Population and General Advice

Techniques to support behavioral change should be used when communicating exercise recommendations.

Recommendation Grade: Moderate ↑
Strength of Consensus: 100% (Strong)
Justification: Increasing evidence shows that communication techniques to support behavioral change are important in the medical field. However, no gold standards are currently available as the techniques and applications examined in the literature are heterogeneous. Therefore, medical practitioners could use PPEs to motivate individuals to adopt active lifestyles by adopting behavioral change techniques. Although this may appear to contradict the primary focus of this guideline, the Guideline Development Group decided to include this recommendation.

Recommendation 6: Population and General Advice

A PPE should be conducted by a specialized physician with an additional qualification in sports medicine.

Recommendation Grade: Moderate ↑

Strength of Consensus: 80% (Moderate)

Justification: The available data are insufficient to specify a specific qualification as a prerequisite for conducting a PPE. However, due to the interdisciplinary nature of the corresponding examination, the Guideline Development Group assumes that in addition to the specialist knowledge associated with a "sports medicine" qualification, it guarantees a higher level of quality and expertise in conducting such screenings. This notion applies especially to cases where individuals plan to increase their physical activity levels, as knowledge of sports medicine appears necessary to properly assess individuals' levels of physical exertion and resilience.

Recommendation 7: Medical History and Physical Examination

A standardized medical history form should be used in the PPE. It should include: Personal and family medical history, sports history, individual risk-factor profile, medication history, nutritional history, gynecological history, vaccination status, participation and results of previous check-ups, previous injuries and/or surgeries.

Recommendation Grade: Moderate ↑

Strength of Consensus: 100% (Strong)

Justification: The (predominantly indirect) evidence and the benefit–harm–cost balance support a moderate recommendation for a standardized medical history form.

Recommendation 8: Medical History and Physical Examination

Use a validated score (e.g., Arriba and SCORE2) to assess cardiovascular risk from the age of 35 years.

Recommendation Grade: Strong ↑↑

Strength of Consensus: 100% (Strong)

Justification: The evidence and benefit–harm balance support a strong recommendation. The use of a validated instrument also objectifies the risk assessment; however, the available data are insufficient to recommend one gold standard among the validated scores.

Recommendation 9: Medical History and Physical Examination

A sports history should include questions about the following factors: Frequency, intensity, time, and type (FITT), previous sporting experience, goals of the physical activity, environmental conditions during the sport (e.g., heat, cold, or altitude), complaints at rest and during exercise, individual sport-related risk profile, aids (e.g., visual aids) or mobility restrictions.

Recommendation Grade: Moderate ↑

Strength of Consensus: 100% (Strong)

Justification: There is no robust evidence in the literature on the specific structure of a patient's "sports history." However, the Guideline Development Group assumes these aspects are relevant in the context of risk assessment and counseling.

Recommendation 10: Medical History and Physical Examination

Determine whole-body status as part of the PPE, which should be based on the recommendations in Table 2.

Recommendation Grade: Strong ↑↑

Strength of Consensus: 100% (Strong)

Justification: The evidence and benefit–harm balance support a strong recommendation, although the individual examination components are supported to varying degrees.

Recommendation 11: Medical History and Physical Examination

Patients with joint swelling, joint pain, relevant range-of-motion restrictions or large joint instability, as well as movement or knocking pain in the spine (with or without neurological deficits), should be referred to a specialist for further evaluation (preferably a specialist in orthopedics/trauma surgery or physical and rehabilitative medicine).

Recommendation Grade: Moderate ↑

Strength of Consensus: 100% (Strong)

Justification: There is insufficient evidence for a strong recommendation. However, the benefits appear to outweigh the risks and effort involved. Furthermore, an orthopedically experienced sports physician who feels confident in performing an orthopedic examination and clarification should not be denied this opportunity.

Recommendation 12: Medical History and Physical Examination

Individuals with arthroplasties or serious injuries in their medical history (e.g., vertebral fractures or severe/recurrent joint injuries) should be regularly monitored by a specialist, preferably in orthopedics/trauma surgery or physical and rehabilitative medicine.

Recommendation Grade: Moderate ↑

Strength of Consensus: 91% (Strong)

Justification: There is insufficient evidence for a strong recommendation. Presumably, most individuals benefit from this recommendation because the advice regarding their physical activity will be based on a thorough examination and important information from their medical history.

Recommendation 13: Further Examinations and Laboratory Tests

If necessary, a blood count, plasma glucose, HbA1c and lipid status, liver/kidney values, electrolyte concentration, and urine status can be determined as part of a PPE.

Recommendation Grade: Weak ↔

Strength of Consensus: 100% (Strong)

Justification: The available data are insufficient to recommend specific laboratory tests. In principle, however, the Guideline Development Group assumes that the mentioned parameters are helpful if there are corresponding indications or risk constellations. In addition, lipid status is required to determine some scores. However, this is often available from other examinations, particularly the general health examination.

Recommendation 14: Further Examinations and Cardiovascular Examinations

A 12-lead resting ECG should be performed as part of each PPE.

Recommendation Grade: Moderate ↑

Strength of Consensus: 100% (Strong)

Justification: The limited evidence, cost–benefit analysis, and considerations of likely consequences (e.g., follow-up examinations after false-positive findings) support a moderate recommendation. Therefore, a resting ECG should be performed if no recent resting ECG is available or the medical history and/or physical examination indicate one.

Recommendation 15: Further Examinations and Cardiovascular Examinations

Perform an echocardiogram as part of a PPE if there is reason to suspect structural heart disease.

Recommendation Grade: Strong ↑ ↑

Strength of Consensus: 90% (Moderate)

Justification: The Guideline Development Group believes the cost–benefit analysis supports a moderate recommendation.

Recommendation 16: Further Examinations and Cardiovascular Examinations

An exercise ECG should be performed as part of a PPE if warranted by the PPE findings, the individual risk profile, possible exercise-induced symptoms, the type of sport in question, and the performance level and intensity.

Recommendation Grade: Moderate ↑

Strength of Consensus: 100% (Strong)

Justification: The Guideline Development Group finds that the cost–benefit analysis and the limited evidence in the area of sports medicine screening support a moderate recommendation. However, the individual performance/fitness assessment is emphasized (see also Recommendation 17).

Recommendation 17: Determination of Physical Fitness

A CPET can be used to determine cardiorespiratory fitness and provide training recommendations/guidance as part of a PPE.

Recommendation Grade: Weak ↔

Strength of Consensus: 100% (Strong)

Justification: The Guideline Development Group agrees that the evidence is insufficient to recommend a CPET as standard. Nonetheless, such a test can provide helpful findings, especially for tailoring and managing training recommendations. Therefore, it is regarded as an optional component of a PPE.

Recommendation 18: Determination of Physical Fitness

Muscle strength can be determined to measure muscular fitness (e.g., hand grip strength) as part of a PPE.

Recommendation Grade: Weak ↔

Strength of Consensus: 100% (Strong)

Justification: The available data are insufficient to make a strong recommendation. In principle, however, the Guideline Development Group assumes that muscular fitness will play an increasingly important role over time as a general surrogate parameter and for specific training recommendations.

Recommendation 19: Additional Aspects

Perform laboratory and instrumental examinations as part of a PPE that go beyond Recommendations 13–18 only in justified individual cases.

Recommendation Grade: Strong ↑ ↑

Strength of Consensus: 100% (Strong)

Justification: The Guideline Development Group considers the evidence for investigative procedures other than those listed in Recommendations 13–18 insufficient to recommend them as standard for PPEs. In its opinion, besides the limited evidence, the benefit–harm–cost balance strongly supports performing them only in justified individual cases.

Recommendation 20: Additional Aspects

During the PPE and counseling, assess each individual's risk of danger to themselves and others and consider the possible worsening of previous injuries.

Recommendation Grade: Strong ↑ ↑

Strength of Consensus: 100% (Strong)

Justification: Given its objectives, assessment and counseling about the risk of danger to oneself and others is an essential part of the PPE. Therefore, the Guideline Development Group believes that the benefit–harm–cost balance supports a strong recommendation.

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