

# Sports Medicine: Present Time and Future. Change through Sports Medicine – Sports Medicine in Change

*Sportmedizin: Gegenwart und Zukunft.*

*Sportmedizin im Wandel – Wandel durch Sportmedizin*

**Sports medicine is a branch of medicine concerned about the effects of inactivity, physical activity, movement, exercise, sport and training on the human body at all ages in healthy and diseased subjects.**

The main aims of sports medicine are: i) prevention of diseases throughout physical activity; ii) prevention of sports-associated injuries; iii) recovering from diseases, surgery or other interventions in internal medicine and traumatology throughout rehabilitation by means of physical activity; iv) giving training recommendations to athletes of all categories ranging from casual athletes up to top athletes. The rapid development of science in sports medicine has produced new fields of activity in sports medicine.

## Genomics and Sports Medicine

There are many common aims of genomics and sports medicine. One hugely important aim is the diagnosis of occult genetic diseases potentially leading to sudden cardiac arrest or death, i.e., cardiomyopathies or electrical diseases such as Brugada syndrome, arrhythmogenic cardiomyopathy and long or short QT-syndrome, among others. The genomic diagnostic may be essential in saving athlete lives and/or their family members, even in postmortem molecular evaluations.

Employing genetic testing in identifying talented young athletes for special disciplines (endurance or strength) and predicting their eligibility is neither acceptable from ethical standpoints nor reliable from genomic science so far. However, since we are in the era of CRISPR/Cas9, this aspect might be a reality in the future (2).

As it has been previously suggested, the question about whether genomic analysis might be successfully used for anti-doping purposes is still under evaluation (4). If this is finally corroborated, its use should be strongly promoted by sports organizations such as the International Olympic Committee (IOC) or the World Anti-Doping Agency (WADA).

## Personalisation of Sports Medicine

The individualized approach for genetic diagnostics, and especially for gene therapy, has been widely underlined in recent investigations as a way to improve particular treatments. 'Exercise prescription for health' (EPH) is a developing program that gives individualized recommendations for regular physical

activity based on diseases and the type of training. These recommendations follow the FITT principle (Frequency, Intensity, Time and type of sports) extended by formulas facilitating the prescription on an individual basis. Such an approach is a significant step to individualize the training recommendation and may enhance the adherence to regular physical activity. Therefore, exercise prescription for health is a European wide initiative. In order to avoid harmful effects for the athlete, the standardized preparticipation examination developed by the European Federation of Sports Medicine Associations (EFSMA) is firmly recommended for all exercisers and performed by specialized physicians in sports. Accordingly, EFSMA may become a frontrunner of individualized, personalized, or precision medicine (5).

## Digitisation and Sports Medicine

There is no doubt that digitization is currently one of the most significant developments in relevant areas such as the economy and medicine. EFSMA (European Federation of Sports Medicine Association), therefore, tries to introduce digitization by means of digitizing a complete history, physical examination and electrocardiogram (ECG) recorded of all athletes in all European countries. The next step then would be the acquisition of an affordable central data storage system either by browser or by cloud. With this approach, EFSMA could establish a large database which would allow prospective evaluations for each country, but especially for prospective studies with a large number of participants in exercise research. For example, there is an analysis on young athletes recruited in Switzerland with excellent results (1).

This also enables EFSMA to develop a system supervised by experts that European sports physicians can access to help them in the interpretation of particular and/or difficult cases, such as the interpretation of a certain athlete's ECG and/or other findings via the secretary of EFSMA as a second opinion.

## Sports Medicine as Mother for Physical Activity in other Medical Disciplines

A meticulous observation of all disciplines in internal medicine all over the world clearly reveals that physical activity is gaining a huge importance in not only sports cardiology, sports neurology or sports oncology, but in many clinical disciplines. In effect, sports medicine has also been introduced as part of psychiatry, pediatrics, obstetrics (sports in >

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Tabelle 1

Aetiology of congenital and acquired cardiac diseases Heart muscle diseases and electrical abnormalities as possible causes of cardiac arrest in athletes.

**CARDIAC MUSCLE DISEASES**

Cardiomyopathy

Dilative, hypertrophic with and without outflow tract obstruction

Arrhythmogenic right ventricular dysplasia or cardiomyopathy

Non-compaction cardiomyopathy

**ELECTRICAL DISEASES**

Long QT Syndrome

Short QT Syndrome

Brugada-Syndrom

Catecholaminergic polymorphic ventricular tachycardia

WPW-Syndrom

**FURTHER**

Marfan Syndrome

Coronary artery abnormality

pregnancy), pneumology as well as the already well-established disciplines of traumatology and orthopedics.

Another area under development that demands sports medicine support is preconditioning. For example, an increasing number of surgeons use exercise training before a surgical intervention, such as bypass surgery. Likewise, the early mobilization of inpatients, even starting physical activity within the hospital, demands the supervision of a sport physician. Sports physicians should also prescribe a personalized physical activity or exercise training protocol after discharging the patient, similar to drugs prescriptions.

Accordingly, the presence of a sports medicine consultancy in every single hospital should be highly considered. This would be a massive change in the treatment attitude of physicians in the near future. Last but not least, these new developments must be supported by ethical standards and statements that has been recently reported in the new declaration of Geneva (3).

## Sports Medicine Specialist as Clinical Consultant

Treatment and support of the inpatient has changed within the last years, but there is lack of sports medical aspects as a part of patients' treatment. Such a specialist in sports medicine must act as a consultant for all inpatients.

Not only should these specialists care for preconditioning, but also for training and activity recommendations as early as possible during inpatient stay: "Move the patients out of the bed"! The sports physician should also mandatory give an exercise prescription to every patient when leaving the hospital. These recommendations must be based on the FITT scheme, and is an essential part of outhospital treatment. This then also means that a sports medicine specialist with a clinical activity is needed in Germany. Sports medicine as a speciality has been introduced in 14 European countries. Therefore, such a sports medicine specialist is urgently needed to improve treatment of all patients with exercise recommendations and changes of lifestyle for the benefit of all patients, inpatient and for patients after discharge. ■

*„Patients with newly detected diabetes mellitus must be treated primarily with training. Not prescribing exercise to these patients is malpractice“ (Walton H, AHA Congress 2013)*

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