

# Health and Medicine in the Future: Change through Sports Medicine – Sports Medicine in Change

## Salud y Medicina en el futuro: Cambio a través de la medicina deportiva - Medicina deportiva en el cambio

Herbert Löllgen<sup>1</sup>, Ruth Löllgen<sup>2</sup>

<sup>1</sup>Cardiology, Sportsmedicine Practice. <sup>2</sup>Consultant Pediatric Emergency Physician. Pediatric Emergency Department. Switzerland. Clinical Lecturer (University of Sydney).

---

Sports Medicine is a branch of medicine concerned about effects of inactivity, physical activity, movement, exercise, sports and training on the human body at all ages, in healthy and diseased subjects. The main objectives of sports medicine include prevention of many diseases, especially of cardiovascular diseases by physical activity but also prevention of sports injuries, the therapeutic use of physical activity as therapy of different diseases and in rehabilitation after recovery from diseases, surgery or other interventions in internal medicine and traumatology.

Sports medicine is also concerned with providing training recommendations to athletes of all categories ranging from leisure time to top athletes.

The rapid development of science in sports medicine has revealed new fields of activity which will broaden the spectrum of sports medicine.

### Genomics and sports medicine

There are many aspects of genomics and sports medicine. For instance, the diagnosis of occult genetic diseases potentially leading to sudden cardiac arrest or death is of great importance. Genetic diseases include heart muscle diseases such as cardiomyopathies or electrical diseases such as abnormalities e.g. long QT-syndrom. Diagnostic testing for genomic abnormalities may be essential and life saving in athletes and their family members, even if conducted as postmortal molecular autopsy.

The prediction of eligibility, endurance or strength and the search for talents among young athletes in certain sports disciplines based on genomic diagnostic examination such as genomics or DNA analysis is neither acceptable from an ethical point of view nor reliable from a genomic scientific point of view to date.

However, in times of *Crispr/Cas9*<sup>1</sup> this aspect should be carefully observed in the future.

A question which remains unanswered is whether genomic analysis may be successful in the search for doping as has been suggested<sup>2</sup>. If this comes true, genomic testing should be strongly promoted by sports organisations such as the IOC or WADA.

### Personalisation of sports medicine

A trend towards individual diagnostic testing and more importantly, therapy tailored to the individual has widely emerged in recent research and practical medicine as a way to improve treatment in an individual sports person or patient.

The development of the *exercise prescription for health* (EPH) project has shown to enable individualized recommendations for regular physical activity tailored to existing diseases and type of training.

EPH recommendations follow the FITTprinciple (Frequency; Intensity, Time, Type of sports) extended by formulas facilitating the prescription on an individual basis. Such an approach is a significant step towards individualizing the training recommendation and may enhance adherence to regular physical activity. Therefore, exercise prescription for health is a Europe-wide initiative with a strong motivational component. To avoid any harm to the athlete, a standardized preparticipation examination as developed by the EFSMA is strongly recommended for all sports physicians. This EFSMA recommendation may therefore be a forerunner for personalised medicine<sup>3</sup>.

### Digitization and sports medicine

There is no doubt that digitization is one of the most significant developments in all areas of economy and medicine to date. The EFSMA therefore tries to introduce digitization by means of digitized ECG recording in all European countries together with digitized history and physical examination of all athletes. The next step is to implement a

---

**Correspondence:** Prof. Dr. H. Löllgen  
E-mail: herbert.loellgen@gmx.de

central data storage either by browser or by cloud. By this approach and given the cooperation of all European federations, a large database can be established. This will allow prospective evaluations for each country but especially for prospective studies with large numbers in sports medicine. There is still such analysis on early detection of inborn diseases in young recruits from Switzerland with excellent results<sup>4</sup>. Such a database may also enable all sports physician in Europe to obtain expert information regarding difficult interpretation of athlete's ECG and other findings via the secretary of EFSMA as a kind of second opinion.

## Sports medicine as a mother for physical activity in other medical disciplines

A meticulous observation of all internal medicine disciplines across the world clearly reveal that physical activity is gaining huge importance in most disciplines, e.g. but not only sports cardiology, sports neurology or sports oncology.

Besides the established disciplines of traumatology and orthopaedics, sports medicine has also been introduced as part of the treatment pillars in psychiatry, paediatrics, obstetrics (sports in pregnancy) as well as pneumology. Furthermore, pre-conditioning, another current development may demand sports medicine support. More and more physicians use exercise training as a pre-treatment prior to surgery, e.g.

bypass surgery, but also in other fields of interventional medicine. In addition, early mobilization of inpatients starting with physical training already while still in hospital demands treatment by a sports physician. Accordingly, the presence of a sports medicine consultancy in every single hospital should be highly considered. This physician should also recommend physical activity after discharge of the patient by an exercise prescription similar to prescription of medication or other measures.

Last but not least, these portrayed new developments must be supported by ethical standards and official sport society statements. This especially concerns athletes of all categories as has been stated by the new declaration of Geneva<sup>5</sup>.

## References

1. Doudna JA, Charpentier E. The new frontier of genome engineering with CRISPR-Cas9. *Science*. 2014;346(6213):1258096.
2. Pitsiladis Y, Ferriani I, Geistlinger M, de Hon O, Bosch A, Pigozzi F. A Holistic Antidoping Approach for a Fairer Future for Sport. *Curr Sports Med Rep*. 2017;16(14):222-4.
3. Zupet P, Löllgen H for EFSMA: Exercise prescription for health and training recommendations. [www.efsma-scientific.eu](http://www.efsma-scientific.eu)
4. Abächerli R, Schmid R, Kobza R, Frey F, Schmid JJ. Erne Preparticipating ECG Screening preventing SCD – Insight from the Swiss Army. Annual Meeting of Heart Rhythm Society. San Francisco; 2014, # 5719.
5. Parsa-Parsi Ramin Walter. The Revised Declaration of Geneva. A Modern-Day Physician's Pledge. *JAMA*. 2017;318(20):1971-18.