

Referat Nr. 229, Sitzung Oncology and Exercise (2012-10-05 14:00):

Physical activity and cancer prevention

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In recent years, research interest in the association between physical activity and cancer has grown considerably. A large body of epidemiologic studies now shows that physical activity is convincingly related to decreased risks of colon, breast and endometrial cancers. For lung and prostate cancers, the evidence for a beneficial effect of physical activity is less convincing. There is only weak evidence for an apparent protective effect of physical activity on gastric, ovarian, and renal cancers, and there is no clear association between physical activity and rectal, bladder, and testicular cancers. Although the relation of physical activity to cancer risk has been studied extensively, a number of critical research gaps persist. First, more detailed knowledge is needed regarding which type, intensity, frequency, and duration of physical activity is necessary to reduce cancer risk. Second, the etiologically relevant time period of exposure to physical activity during life that potentially counteracts cancer risk remains unclear. Third, the etiologic pathways underlying the relation of physical activity to cancer risk remain insufficiently understood. Biological mechanisms putatively related to both physical activity and carcinogenesis include insulin resistance, inflammatory cytokines, growth factors, and steroid hormones. Fourth, the methods for assessing physical activity has varied substantially across studies, rendering pooled analyses or meta-analyses difficult to interpret. Fifth, only few studies have assessed physical activity using objective measures such as accelerometers, which bear the potential for providing more accurate assessments of physical activity than self-report assessment methods. Sixth, there are only sparse data regarding estimates of the population attributable risk of physical inactivity within and across societies. Such information is relevant for health policy planning with regards to cancer prevention. Finally, an exercise intervention trial for cancer prevention has not yet been conducted and direct evidence linking increased physical activity to decreased cancer risk has been derived solely from observational epidemiologic research.

Referat Nr. 231, Sitzung Oncology and Exercise (2012-10-05 15:00):

Pre-training risk assessment and training prescription for cancer patients

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The emergence of exercise therapy as an important adjunct therapy following a cancer diagnosis dramatically increases the need for oncology professionals to inform and advise cancer patients on this modality. Exercise therapy is recommended and beneficial for all asymptomatic persons and for persons with chronic diseases. However, exercise participation of persons with certain chronic disease conditions or constraints may need to be restricted. To guide clinical practice and ensure optimal safety and efficacy, oncology-specific evidence-based practice recommendations are required. Accordingly, the purpose of this presentation will be to provide evidence-based risk assessment and recommendations for exercise for patients diagnosed with cancer. The objectives of this paper are to provide: (1) a comprehensive overview of absolute and relative contraindications to exercise based on published trials, and cancer etiology and therapy, (2) overview feasible decision trees to facilitate clinical decision-making and pre-exercise screening, and (3) clinical practice exercise recommendations for curative-intent cancer patients both during and following adjuvant therapy. This presentation will provide important guidance to oncology and other health professionals giving exercise counseling to individuals with cancer.

Referat Nr. 230, Sitzung Oncology and Exercise (2012-10-05 14:30):

Physical Activity and Cancer Control

Galvão D

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Historically, clinicians advised cancer patients to rest and to avoid activity; however, emerging research on exercise has challenged this recommendation. Over the past two decades, it has become increasingly clear that exercise plays a vital role in cancer prevention and control. Following cancer diagnosis, appropriately prescribed exercise can have beneficial effects on reducing symptoms experienced, managing the side effects of radiation and chemotherapy, improving psychological health, maintaining physical function, reducing fat gain, and attenuating the loss of muscle and bone. There is now evidence from large prospective studies that regular exercise post-diagnosis will actually increase survivorship by 50% with the strongest evidence currently for breast, colorectal and prostate cancers. In our work with prostate cancer patients, we have found that exercise can limit or even reverse some of the adverse effects that result from androgen deprivation therapy by increasing muscle mass, functional performance, and cardiorespiratory fitness without elevating testosterone levels. Hormone therapies for breast and prostate cancer can result in an alarmingly increased risk of cardiovascular disease, obesity, type 2 diabetes, osteoporosis, and sarcopenia. Increasingly, patients are questioning the benefit of some cancer treatments as the risk of morbidity and mortality from other chronic diseases begins to outweigh the initial cancer diagnosis. Based on current evidence it is now clear that exercise is a critical adjuvant therapy in the management of many cancers and will greatly enhance the therapeutic effects of traditional radiation and pharmaceutical treatments by increasing tolerance, reducing side effects, and lowering the risk of chronic diseases, even those not aggravated by cancer treatment. However, it is critical that the exercise prescription and management be tailored to the individual patient and that they are monitored by appropriately trained and professionally accredited exercise specialists.

Referat Nr. 232, Sitzung Physiology and Sports Medicine (2012-10-05 16:15):

Cardiovascular effects of exercise training: molecular mechanisms

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During the last years, it became more and more evident, that exercise training is a powerful tool in secondary prevention. Especially patients with chronic heart failure (CHF) or coronary artery disease exhibit a great benefit with respect to cardiovascular changes. With respect to vascular changes, exercise training programmes resulted in an improvement of endothelial function. At the molecular level several scenarios responsible for these beneficial effects are discussed.

1. Exercise training, due to an increased shear stress in the vessel, increases the bioavailability of nitric oxide (NO), the main regulator of vascular tone. With respect to elevated NO level, mechanisms like increased expression of endothelial nitric oxide synthase (eNOS), increased Akt-dependent activation (phosphorylation at residue Ser-1177) of the eNOS protein, as well as a reduction of reactive oxygen species, via a reduction of the NAD(P)H oxidase system are discussed.
2. The damage of the endothelial cell layer, leading to an altered endothelial function, is effectively repaired by exercise training due to the mobilization of endothelial progenitor cells (EPC). In recent year it became evident, that exercise training possesses the capability to mobilize EPCs from the bone marrow into the circulation. Via specific cell surface receptors the mobilized cells migrate to the area of tissue damage, and by integrating into the endothelial cell layer or by paracrine mechanisms, repair the damaged endothelial cell layer.
3. Exercise training modulates the functional capacity of HDL to stimulate the enzymatic activity of eNOS. In the last 2 year several reports demonstrate that HDL, besides its involvement in reverse cholesterol transport, has the capability to activate eNOS via the phosphorylation of specific amino acids. In recent set of experiments our group could demonstrate that the HDL-dependent activation of eNOS is impaired in patients with CHF and that exercise training reverses this effect. During the presentation all these molecular mechanisms will be discussed in detail, and examples from training studies will be given to underline the beneficial effect of exercise training.

Referat Nr. 233, Sitzung Physiology and Sports Medicine (2012-10-05 16:45):

Training influences on diabetes

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Kein Abstract verfügbar.

Referat Nr. 234, Sitzung Physiology and Sports Medicine (2012-10-05 17:15):

Protein availability and muscle hypertrophy

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Kein Abstract verfügbar.

Referat Nr. 235, Sitzung Cognitive Function and Physical Activity (2012-10-06 09:00):

The Interactive Actions of Exercise and Diet impact Brain Plasticity, Cognition, and Emotions

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I will discuss how exercise activates molecular systems that are crucial for brain plasticity and learning and memory, and how these events can make the brain more resistant to injury or disease. A culprit for the effects of exercise in the brain is BDNF, which is implicated in an array of functions such as maintenance of circuits, appetite, and cognition, while BDNF deficiency results in obesity, cognitive loss, depression, etc. We have recently reported that molecules involved with the regulation of cellular energy mediate the action of exercise and BDNF on hippocampal plasticity. The hypothalamus action on energy control seems integrated to the synthesis of hippocampal BDNF required for hippocampal plasticity and cognition. This information is crucial for understanding how exercise influences fundamental metabolic processes such as feeding in combination with mental health. New evidence indicates that exercise modulates BDNF at the transcriptional level using mechanisms of epigenetic regulation such as histone acetylation and methylation, which result in chromatin remodeling. Exercise also regulates BDNF function at the translational level involving the tissue plasminogen activator system. Epigenetic mechanisms allow for lasting modifications in the genome with important consequences on cognitive function and emotions, and the pathobiology of many diseases. In order to comprehensibly understand the action of exercise in the brain, it is important to assess its action in conjunction with other aspects of lifestyle such as feeding. Our new research indicates that the interaction between diet and exercise in brain plasticity and cognitive function involve similar mechanisms, and in many occasions the actions of diet and exercise are complementary. In particular, both influence mechanisms of cell energy metabolism and synaptic plasticity implicated in the function of neural circuits serving brain homeostasis and repair events. Accordingly, I will discuss how the interaction between exercise and dietary factors can influence brain function and mental health. Studies have been supported by NIH/NINDS.

Referat Nr. 236, Sitzung Cognitive Function and Physical Activity (2012-10-06 09:30):

Physical activity and the regulation of adult neurogenesis

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Why is activity "good for the brain"? That this is the case has been demonstrated in numerous studies but the underlying neurobiological mechanisms are hardly understood. The activity-dependent regulation of adult neurogenesis might be one of them.

In the adult hippocampus, a population of resident stem cells lifelong produces new neurons. "Adult hippocampal neurogenesis" as this process is termed, is an unusual example of brain plasticity, since new neurons and not just synapses are added to the network in an activity-dependent manner. Both physical and cognitive activity robustly induce adult neurogenesis. In animal experiments these two distinct types of activity can be investigated separately in paradigms such as voluntary wheel running and environmental enrichment. While both increase adult neurogenesis, the effect is due to different mechanisms at the cellular level. Movement primarily stimulates the proliferation of precursor cells, from which adult neurogenesis originates, whereas the more cognitive stimulus of environmental enrichment and learning "per se" predominantly promote the survival of immature newborn neurons, and thus acts upon the progeny of the proliferating precursor cells. These two effects are additive: boosting the potential for adult neurogenesis by physical activity increases the recruitment of cells following cognitive stimulation in an enriched environment. Why is that the case? The hypothesis discussed in this presentation is that locomotion triggers an intrinsic feedback mechanism that constantly signals back to the brain (and adult neurogenesis) that there is an increased likelihood of cognitive challenges. Those who move, see and experience more. Unlike while sitting in front of a TV set, in the wild there never is a separation of physical and cognitive activity. Physical activity thereby contributes to leading "an active life" by triggering an evolutionarily conserved mechanism, which is required to provide the brain and its systems of plastic adaptation with the appropriate regulatory inputs.

Referat Nr. 237, Sitzung Cognitive Function and Physical Activity (2012-10-06 10:00):

Physical activity influence structure and function of the brain

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There is a growing public health burden of inactivity among people of industrialized nations, which has implications for not only physical health, but for cognitive health as well. Despite decades of physical activity (PA) research demonstrating benefits to behavioral indices of psychomotor performance, evidence for a beneficial relation to brain structure and function has only been popularize recently. However, understanding the neural basis of PA on cognitive and brain health has expounded as a function of technological advances in human neuroimaging. For instance, research has demonstrated disproportionate increases in brain volume in the frontal, temporal, and parietal regions of the cortex as a function of PA. Other research has focused on subcortical regions of the brain such as the hippocampus and basal ganglia, and demonstrated that greater PA is related to more volume in these regions. Additional links have been made between PA and brain function. Neuroimaging techniques such as EEG (i.e., ERPs) and fMRI have proven valuable for understanding the nature of PA to functioning of the brain or specific neural networks. That is, ERP components have linked PA to specific cognitive processes that occur between stimulus engagement and response execution, and fMRI research has indicated that PA is linked to greater plasticity of the frontal-parietal network, which underlies cognitive control and attention. Importantly, the beneficial relation of PA to brain structure and function has been further linked to superior task performance, suggesting a neural basis for improvements in behavior. Such findings have been demonstrated mainly in older adults, but a growing literature has focused on children. Across the lifespan, findings have demonstrated that the prefrontal cortex and the hippocampus appear especially susceptible to PA intervention, which is important because these structures exhibit protracted development and early decay. Such findings are of further importance because these structures have been found to mediate cognitive control, learning, and memory; processes that are important for cognitive health and effective functioning.

Referat Nr. 239, Sitzung Ageing and Exercise (2012-10-06 11:45):

Mitochondrial and Autophagy Dysfunction in Muscles and Nerves with Age

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Muscle aging has been extensively studied in both human and animal models and we will present some of our recent findings. In contrast, little attention has been paid to the declining function of peripheral nerves with age. We recently showed in animals a drastic decline in the expression of glial and neuronal proteins in important myelinated peripheral nerves with age, which is significantly ameliorated by lifelong calorie restriction. We also noted an improvement in nerve architecture with caloric restriction due to a sustained expression of protein chaperones, markers of the autophagy-lysosomal pathway and marked reduction in oxidative stress and inflammation. In muscle of humans, we recently examined whether mitochondrial regulation differed in muscle from elderly subjects classified as high- or low-functioning, when compared to young subjects. Mitochondrial respiration rates, PGC-1 α , a mitochondrial regulator, Sirt3, a mitochondrial deacetylase, the mitochondrial fusion protein Opa1, were all markedly suppressed in both high and low functioning subjects compared to healthy controls. In addition, we will present data related to a human study in which we show that a combination of diet and exercise has a beneficial effects on protein quality control. Specifically, this study was to assess the effects of a 6-month weight loss program combined with moderate-intensity exercise on the cellular quality control mechanisms of autophagy and ubiquitin-proteasome, as well as mitochondrial function, in the skeletal muscle of older obese women. Taken together, the age-related decline in functional molecules benefitting mitochondrial function (and impaired mitochondrial regulatory pathways) and autophagy (including alterations in other cellular protein homeostatic mechanisms), play a major role to cellular dysfunction with age and provide us with biomarkers for intervention studies.

Referat Nr. 238, Sitzung Ageing and Exercise (2012-10-06 11:15):

Aging in Tendons and Connective Tissues

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The connective tissue (extracellular matrix (ECM)) is present in many load bearing structures like bone, cartilage, skeletal muscle, ligaments and tendons. As an example of an ECM rich tissue, tendons are designed to withstand considerable loads and it is shown that mechanical loading of tendon results in an up-regulation of collagen expression and an increased synthesis of collagen protein that is likely regulated by strain of the fibroblast. Both in young and elderly individuals, the exercise stimulated increase in collagen formation peaks around 24 hrs and remain elevated for about 3 days after exercise. The degradation of collagen proteins also rises after exercise, but appears to peak earlier. In addition to changes in collagen turnover, exercise also influences cross linking in the tendon structure, and some of these reactions appear faster than structural changes in collagen fibrils. Training increases the cross sectional area of the tendon, and tendons of elderly master athletes are thicker and more dense than in untrained counterparts. In old tendon the content of collagen is reduced, whereas the concentrations of both enzymatic and non-enzymatic cross links are increased. In skeletal muscle increased amounts of connective tissue with ageing represents a relative phenomenon due to loss of contractile musculature, and using active elderly the content of collagen in muscle is unchanged with age. On the other hand, the number of non-enzymatic cross links (advanced glycation end-products (AGE's)) is elevated with age and metabolic disease. Aging is associated with changes in mechanical properties of the ECM and the content of collagen and cross-links, but a large amount of these changes are related to changes in the physical activity level in elderly.

Referat Nr. 240, Sitzung Ageing and Exercise (2012-10-06 12:15):

Epidemiological Aspects of Aging

Keil U

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Kein Abstract verfügbar.

Referat Nr. 241, Sitzung Pediatrics and Exercise (2012-10-06 14:00):

Fetal Programming by disturbed intrauterine environment: What are fundamental mechanisms?

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For many years, health and diseases were generally perceived to be pre-programmed genetically. It is meanwhile accepted, however, that alterations of the intrauterine and early postnatal nutritional, metabolic, and hormonal environment may also 'program' disorders and diseases throughout life. Pathophysiological mechanisms responsible for nutritionally induced, perinatally acquired dispositions are a matter of intensive research.

For instance, gestational diabetes (GDM) is characterized by mixed overnutrition, especially fetal glucose overfeeding leading to fetal hyperinsulinism, which typically results in macrosomia at birth. Similar may occur through maternal overweight, maternal overnutrition and increased maternal weight gain during pregnancy. Notably, in parallel with the general 'diabesity' epidemics, GDM and overweight in pregnant women meanwhile reach dramatic prevalences while simultaneously mean birth weight and frequencies of 'fat babies' rise. Overweight at birth, however, predisposes to overweight in later life, which is the main risk factor of the metabolic syndrome, leading to an epigenetic vicious circle of 'diabesity' over succeeding generations of the maternal line.

Moreover, also rapid weight gain in neonatal and infant life is associated with later obesity risk, probably induced by causative neonatal overfeeding. Experimental data indicate that neonatal overfeeding may lead to nutritionally and hormonally induced, epigenomic malprogramming of key regulatory systems of body weight and metabolism, resulting in permanent disposition to obesity, diabetes, and the metabolic syndrome.

Therefore, universal screening and respective therapy of all types of diabetes during pregnancy, avoidance of maternal overweight and overnutrition during pregnancy as well as avoidance of neonatal and infant overfeeding may be effective approaches for a primary perinatal prevention of 'diabesity' and its cardiovascular consequences in terms of the metabolic syndrome for the long term.

Referat Nr. 242, Sitzung Pediatrics and Exercise (2012-10-06 14:30):

Accelerometry in childhood

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Given the limitations of self-report methods and the high cost and participant burden associated with other objective assessment methods, accelerometry has become the method of choice for measuring physical activity in children and adolescents. This presentation will overview key methodological issues related to the use of accelerometers in field based research. Key topics will include the number of days of monitoring required, the derivation of algorithms to convert accelerometer output into units of energy expenditure, comparison of intensity-related cut-points, and the use of accelerometers in toddlers. New developments in the science of accelerometry will be discussed, paying particular attention to the application of pattern recognition or machine learning data analytical approaches to measure physical activity type and energy expenditure in children and adolescents.

Referat Nr. 243, Sitzung Pediatrics and Exercise (2012-10-06 15:00):

European Youth Heart Study – Cardiovascular Disease Risk Factors in Children

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The European Youth Heart Study (EYHS) addresses the issue of cardiovascular disease (CVD) risk factors in children. It was initially designed as a cross-sectional survey of children conducted in four countries: Denmark (Odense), Estonia (Tartu), Norway (Oslo) and Portugal (Madeira). Iceland has been included as a 5th study location. A minimum of 1000 boys and girls ages 9 and 15 year were recruited from each study location. Samples of children were drawn in a similar fashion within each study location. A minimum of 20 schools at each study location were randomly selected within appropriate age, sex, and socioeconomic strata. Children were thereafter randomly selected within schools. The overall response rate was 73% and was similar across age and sex groups.

In Denmark and Norway the third follow up have been carried through turning the study into a longitudinal design. In Madeira, Estonia and Iceland the second follow ups have been made.

As examples of results can be mentioned:

- Physical activity, cardiorespiratory fitness (CRF) and obesity are separately and independently associated with individual and clustered metabolic risk factors in children. The association between CRF and clustered risk is partly mediated or confounded by adiposity, whereas the association between activity and clustered risk is independent of adiposity.
- Physical activity levels should be higher than the current international guidelines of at least 1 hour per day of physical activity of at least moderate intensity to prevent clustering of cardiovascular disease risk factors in children and youth.
- Moderate and moderately high tracking has been observed for physical fitness and body mass index, respectively. The development of social inequalities in the absolute prevalence of overweight and low physical fitness underline the need for broad preventive efforts targeting children of low socioeconomic status in early childhood.

Referat Nr. 244, Sitzung Ethische und legale Aspekte (2012-10-06 16:15):

Sportärztliche Entscheidungen aus rechtlicher Sicht

Vieweg K

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Der Sportarzt befindet sich – je nach beruflicher bzw. ehrenamtlicher Funktion – in einem Beziehungsgeflecht u. a. aus Verband, Verein, Versicherungen sowie Athleten und deren Beratern. Entscheidungsprobleme ergeben sich insbesondere aufgrund von Zielkonflikten (z. B. zwischen kurz- und langfristigen Nutzen einer ärztlichen Maßnahme) und aufgrund von Prognosenotwendigkeiten. Die rechtlichen Verhaltens- und Entscheidungsanforderungen unterscheiden sich zum einen nach der Art der Vertragsbeziehungen und der ehrenamtlichen Aufgabenwahrnehmung sowie zum anderen nach den sportartspezifischen Gegebenheiten. Diese sind ihrerseits maßgeblich für Art und Umfang einer etwaigen Haftung.

Referat Nr. 245, Sitzung Ethische und legale Aspekte (2012-10-06 16:45):

Doping und ärztliche Ethik

Birnbacher D

Heinrich Heine Universität Düsseldorf, Praktische Philosophie

Das Thema Doping hat den Sport von Anfang begleitet, ist aber gerade in den letzten Jahren zu einem Thema der medialen Öffentlichkeit geworden. Die dadurch provozierten Stellungnahmen sind überwiegend ablehnend, auch wenn vielfach Unklarheit darüber besteht, welche Gründe für das in Deutschland auch gesetzlich verankerte Dopingverbot letztlich ausschlaggebend sind. Unter Ärzten gilt Doping als ein Problem, mit dem sich vor allem Sportärzte auseinandersetzen müssen, die Leistungssportler betreuen. Dabei wird übersehen, dass jeder Arzt mit dem Thema Doping konfrontiert werden kann, insbesondere angesichts der nach wie vor erheblichen Verbreitung von Dopingpraktiken im Breitensport. Der Vortrag nimmt zu der Frage Stellung, wie sich ein Arzt, der mit Dopingpraktiken in Berührung kommt, im Rahmen des ärztlichen Berufsethos verhalten kann.

Referat Nr. 246, Sitzung Ethische und legale Aspekte (2012-10-06 17:15):

Die sachliche Legitimation der ärztlichen Sportbetreuung im Kontext der Dopingproblematik

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Die Betreuung von Sportlern, insbesondere von Leistungs- und Hochleistungssportlern setzt heutzutage die Kenntnis sämtlicher dopingrelevanter Fragestellungen voraus. Studien zum Doping im Leistungssport konnten zeigen, dass sich Doping nicht nur auf den internationalen Spitzensport beschränkt, sondern gerade ein relevantes Problem nachgeordneter Leistungsklassen darstellt.

Um sich als Sportmediziner nicht potentiellen straf- oder zivilrechtlichen Konsequenzen auszusetzen wäre eine Möglichkeit, sich aus der Betreuung von Leistungs- und Hochleistungs-sportlern gänzlich zurück zu ziehen. Auf der anderen Seite sind sportliche Höchstleistungen ohne jegliche medizinische Betreuung kaum vorstellbar. In wissenschaftlichen Studien konnte gezeigt werden, dass Sportmediziner für Leistungssportler nicht nur im Falle von Erkrankungen oder Verletzungen, sondern gerade in Bezug auf dopingrelevante Fragestellungen als wichtige Informationsquelle dienen. Athleten dürfen insoweit beim Sportarzt eine spezifische Fachkenntnis hinsichtlich zulässiger oder verbotener Medikamente, medizinischen Ausnahmegenehmigungen oder Nahrungsergänzungsmitteln erwarten.

Ein weiteres Problem stellt sich für die Sportmediziner, der gleichzeitig Spitzensportler betreuen und wissenschaftlich in der Anti-Doping Forschung oder administrativ im Anti-Doping-System tätig sind. Hier können sich verschiedenste Konstellationen ergeben, die in einem Interessenskonflikt stehen. Soweit sich dieser Interessenskonflikt nicht lösen lässt, bleibt dem betreffenden Sportmediziner letztlich nichts anderes übrig als eine der konfliktträchtigen Tätigkeiten aufzugeben.