Deutsche
Sporthochschule Köln
German Sport University Cologne

Der Nutzen von Sport/Bewegung

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Das erwartet Sie nun …

- Prolog – Was ist Sport?
- Allgemeiner Nutzen von Sport/Bewegung – auch im betrieblichen Setting
- Ausgewählte Mechanismen
- Allgemeine Empfehlungen und Umsetzung

Prolog – über was reden wir eigentlich? Oder was ist "SPOCHT"?

- **Körperliche Aktivität → muskuläre Aktivität mit Steigerung des Energieumsatzes/ Kalorienverbrauch (Beruflich, Freizeit etc.)**

- **"Exercise" → körperliche Aktivität mit dem Ziel, die Fitness zu steigern (Sport – Wettkampfcharakter)**

- **Fitness → körperliche Leistungsfähigkeit, z.B. VO_2max; metabolische Einheiten**

„Bewegung als/ist Medizin“

Scand J Med Sci Sports 2015: (Suppl. 3) 25: 1–72
doi: 10.1111/sms.12581

SCANDINAVIAN JOURNAL OF MEDICINE & SCIENCE IN SPORTS

Exercise as medicine – evidence for prescribing exercise as therapy in 26 different chronic diseases

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This review provides the reader with the up-to-date evidence-based basis for prescribing exercise as medicine in the treatment of 26 different diseases: psychiatric diseases (depression, anxiety, stress, schizophrenia); neurological diseases (dementia, Parkinson's disease, multiple sclerosis); metabolic diseases (obesity, hyperlipidemia, metabolic syndrome, polycystic ovarian syndrome, type 2 diabetes, type 1 diabetes); cardiovascular diseases (hypertension, coronary heart disease, heart failure, cerebral apoplexy, and claudication intermittent); pulmonary diseases (chronic obstructive pulmonary disease, asthma, cystic fibrosis); musculo-skeletal disorders (osteoarthritis, osteoporosis, back pain, rheumatoid arthritis); and cancer. The effect of exercise therapy on disease pathogenesis and symptoms are given and the possible mechanisms of action are discussed. We have interpreted the scientific literature and for each disease, we provide the reader with our best advice regarding the optimal type and dose for prescription of exercise.

für/gegen .... „quasi alles“:

1) Psychiatrische „Erkrankungen“ → Depression, Ängste, Stress, Schizophrenie

2) Neurologische Erkrankungen → Demenz, Parkinson, MS

3) Lungenerkrankungen → COPD, Asthma, zystische Fibrose

4) Muskulo-skeletale „Störungen“ → Osteoarthritis, Osteoporose, Rückenschmerzen, Rheumatoide Arthritis

5) Malignome

6) Metabolische Erkrankungen → Adipositas, HLP, METS, Polyzystische Ovarien, Typ1DM, Typ2DM

7) Kardiovaskuläre Erkrankungen → Hochdruck, KHK, Herzinsuffizienz, Apoplex, pAVK

… Bewegung am Arbeitsplatz …
Mehr oder weniger gut belegt …

- Steigerung der körperlichen Aktivität und Fitness

- Verbesserung/Prävention ausgewählter muskuloskletaler Beschwerden

- Senkung des BMIs
- Senkung Diabetesrisiko
- Verbesserung des Lipidprofils

- Abnahme der Schläfrigkeit am Tag

- Geringere Fehlzeiten, höhere Zufriedenheit, geringerer Job-Stress
- Verbesserung der Stimmung

u.a. Conn et al. Am J Prev Med. 2009; 37(4):330ff.; Ng et al. J Occup Environ Med. 2015;57(8):873-81

Macht aber keiner ....

RKI; GEDA - Gesundheit in Dtld. Aktuell (2014/15);
N=22959; w 42,6% (20,5%); m 48,0% (24,7%)

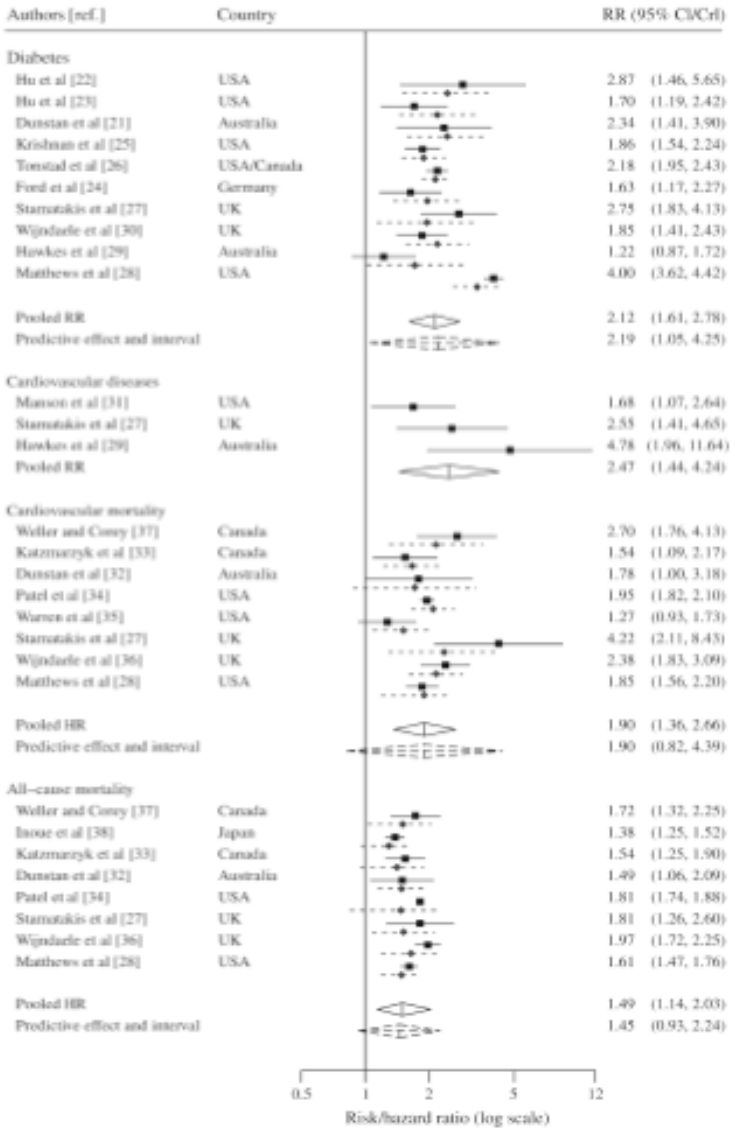
Krug et al. Bundesgesundheitsbl 2013; 56:765–771; Finger et al. Journal of Health Monitoring 2017; 2(2)

Auch im Betrieb nicht: * Robroek et al. Int J Behav Nutr Phys Act. 2009;6:26

Stattdessen:

"Physical inactivity is as important a modifiable risk factor for chronic diseases as obesity and tobacco"

The Lancet, 27July 2016



N=18 Studien (3 bis 20 J. Follow-up) mit 794,577 TN

... sitzen ist tatsächlich so gefährlich....

→112% mehr Diabetes

→ 147% mehr k.-v. Ereignisse

→ 90% höhere k.-v. Sterblichkeit

→ 49% höhere Gesamtsterblichkeit

Wilmot et al. Diabetologia 2012; 55:2895–2905

Sitzen und Sterben – SUN - Projekt

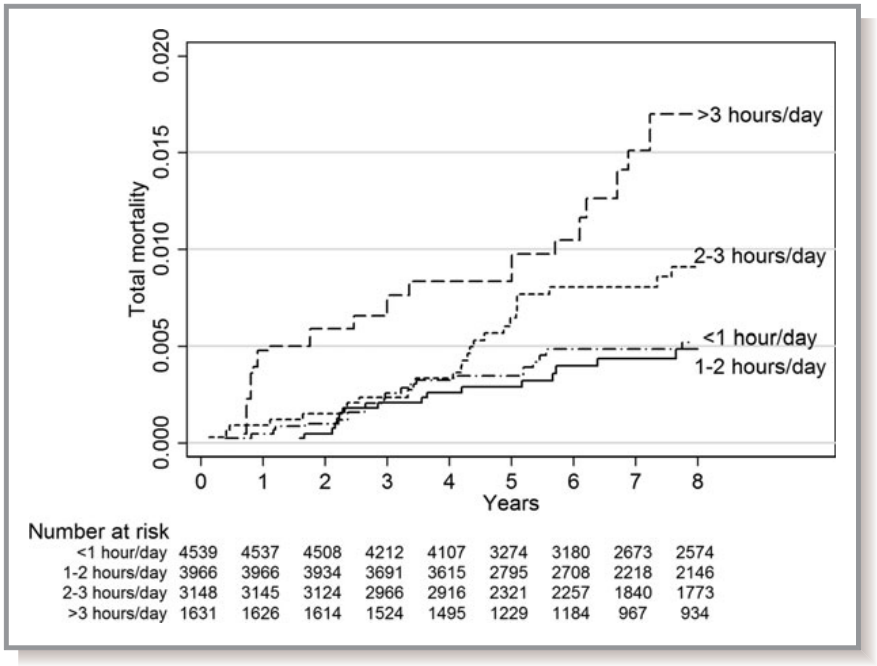


Figure 1. Nelson-Aalen estimates of total mortality according to categories of baseline television viewing. Adjusted for age (continuous), sex, smoking history (never, current, quit), total energy intake (continuous), Mediterranean diet adherence (continuous), baseline body mass index (continuous), physical activity (quartiles), computer use (continuous), time driving (continuous), using inverse probability weighting.

N=13 284 Hochschulabsolventen
37 J.
Follow-up Median 8.2 J.

Bewegung nimmt ab/Sitzzeit zu …

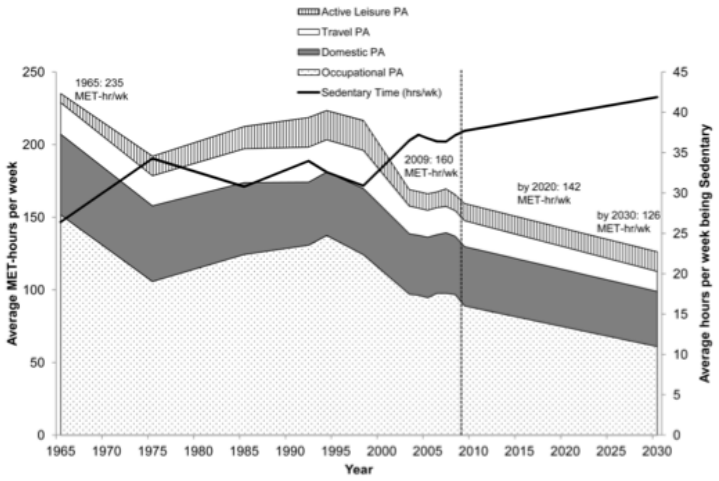


Figure 1.
US Adults MET-hours Per Week of All Physical Activity, and Hours/Week of Time in Sedentary Behavior: Measured for 1965–2009, Forecasted for 2010–2030
Source: Multinational Time Use Studies v.5.52 (1965, 1975, 1998) v.5.8 (1985, 1992, 1995), and American Time Use Survey 2003–2009; Applying Compendium of Physical Activity MET-intensity values based on reported time spent across 41 MTUS coded activities and by occupation. Forecasting for 2010–2030 based on 2003–2009 slopes.

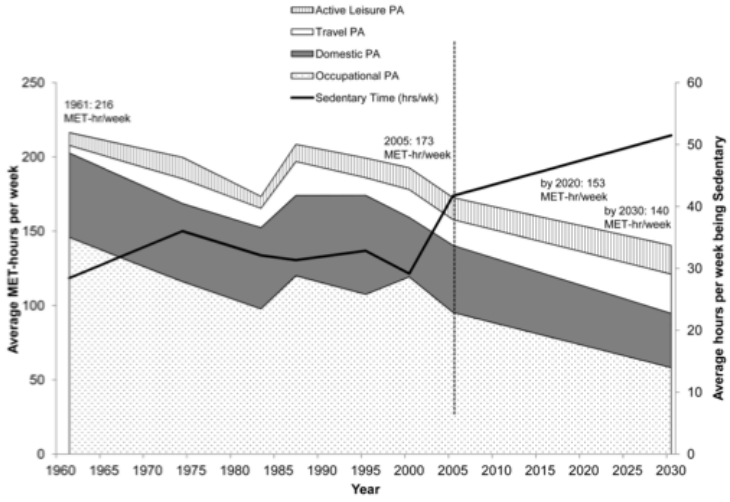
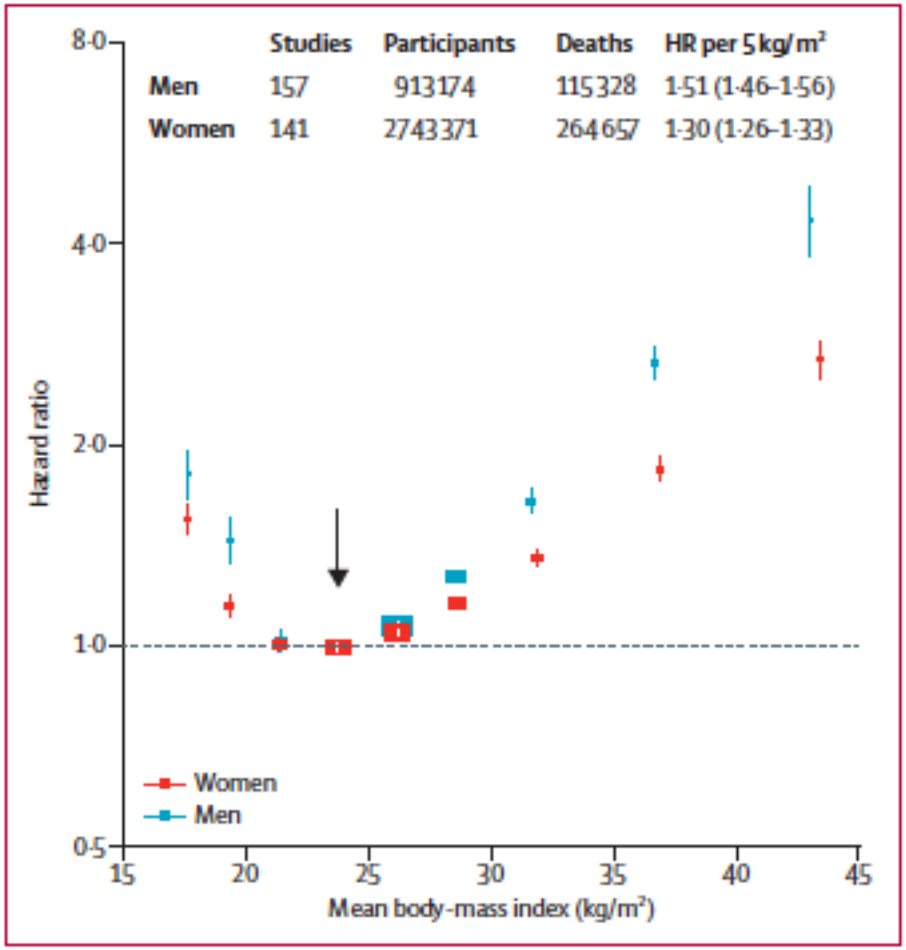


Figure 2.
UK Adults MET-hours Per Week of All Physical Activity, and Hours/Week of Time in Sedentary Behavior: Measured for 1961–2005, Forecasted for 2006–2030
Source: Multinational Time Use Studies v.5.52 (1961, 1983, 1987), and v.5.8 (1974, 1995, 2000, 2005); Applying the Compendium of Physical Activity MET-intensity values based on reported time spent across 41 MTUS coded activities and by occupation. Forecasting for 2006–2030 based on 1961–2005 slopes.

… und „tot“

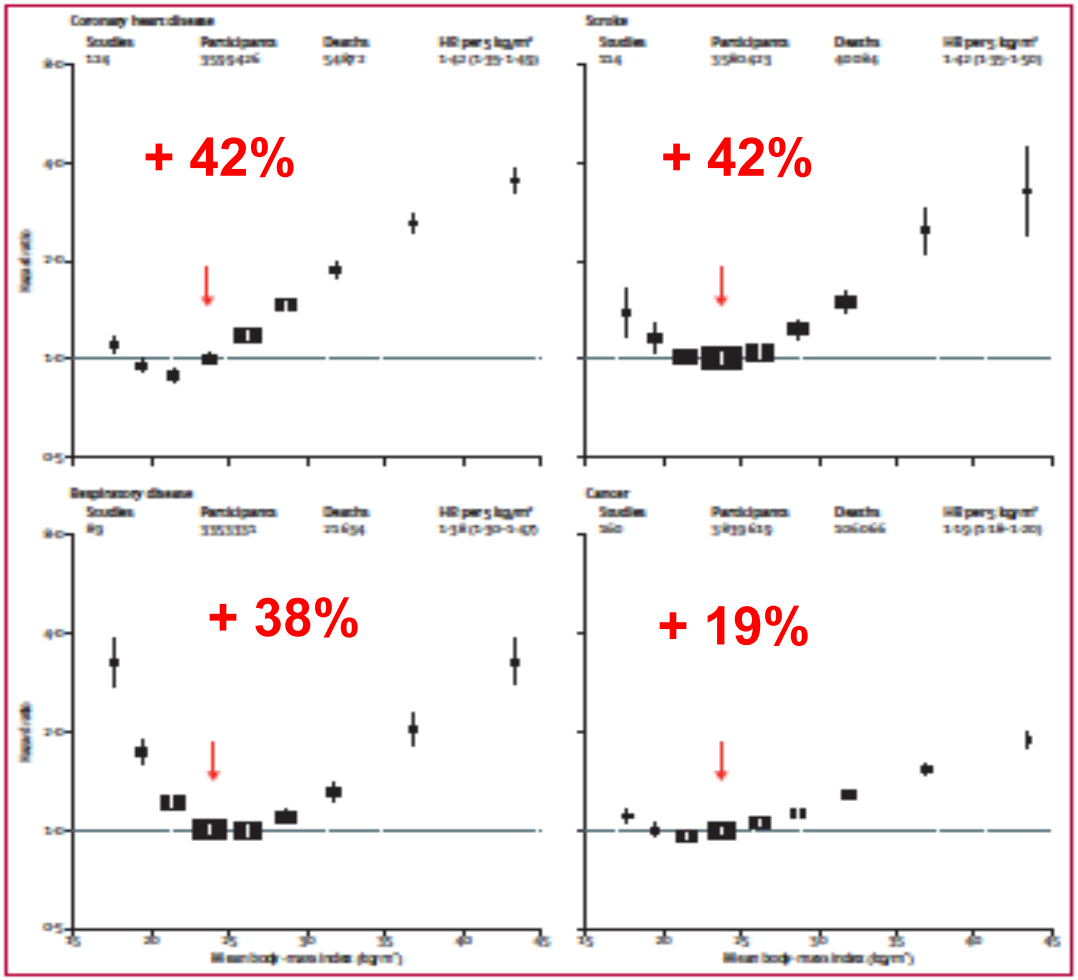


N = 10.625.411 Teilnehmer aus 239 prospektiven Kohortenstudien

Follow-up Median 13.7J.

Mortalität am geringsten zwischen 20 bis 25 kg/m²

BMI und NCDs → Anstieg pro 5 kg/m² plus



- ca. 120 % höheres Mortalitätsrisiko durch Diabetes (Analyse 2009)

The Global BMI Mortality Collaboration - Lancet 2016; 388: 776–86

BMI hoch wegen Muskelmasse? oderBauchfett – das „Böse“

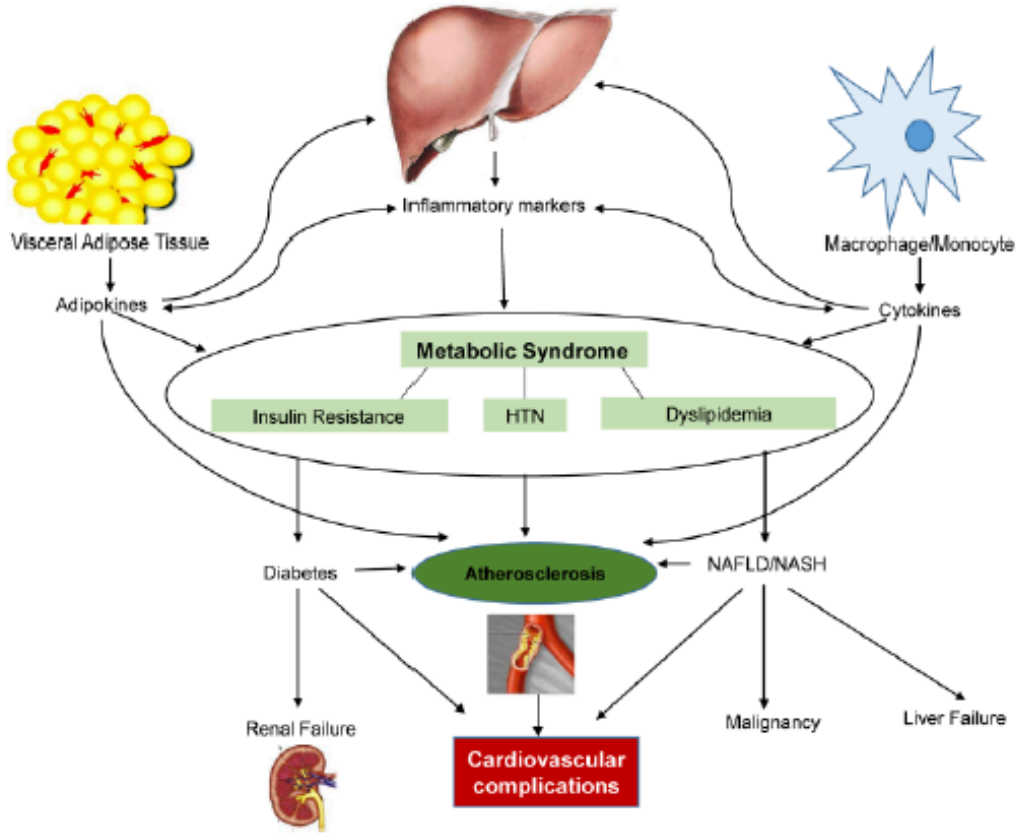
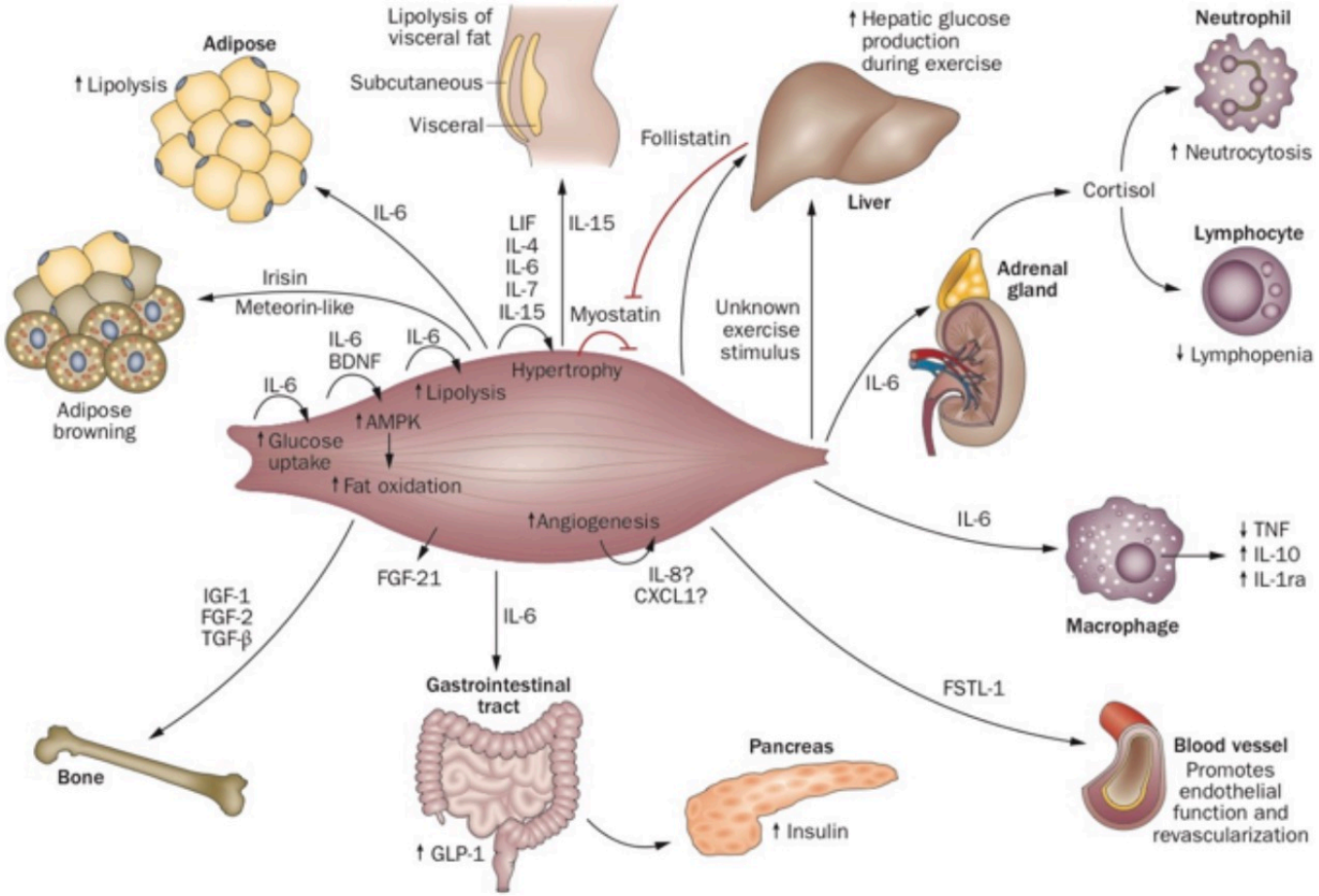


Figure 1: Interaction of adipokines, cytokines, and inflammatory markers that contribute to the development of metabolic syndrome and its complications. HTN-Hypertension, NAFLD/NASH- Nonalcoholic fatty liver disease/nonalcoholic steatohepatitis

Myokinom – das „Gute“



Vorteil Fitness → Überleben pro MET

Table 1. Sampling of Studies Expressing Exercise Capacity in Terms of Survival Benefit per MET

Reference (Year)	Population	Survival Benefit per MET	Key Findings
Blair et al (1995)[31]	9777 Men completing 2 health evaluations 5±4 y apart	16%	Survival increased in subjects who improved exercise capacity with serial testing
Dorn et al (1999)[32]	315 Post-MI men randomized to a 6-month exercise program	8%–14%	Increase in exercise capacity during cardiac rehabilitation had sustained benefits up to 19 y
Goraya et al (2000)[26]	Elderly (514) vs younger (2593) subjects referred for exercise testing	14% and 18%	14% and 18% survival benefit per MET for younger and elderly subjects, respectively
Myers et al (2002)[18]	6213 Clinically referred subjects	12%	Exercise capacity most powerful predictor of mortality
Gulati et al (2003)[23]	5721 Asymptomatic women in the St. James Women Take Heart Project	17%	Exercise capacity an independent predictor of mortality in women, higher than previously established in men
Mora et al (2003)[28]	2994 Asymptomatic women from the Lipid Research Clinics Prevalence Study	20%	Fitness-related variables more strongly associated with survival than other exercise test variables
Kavanagh et al (2003)[33]	2300 Women referred for rehabilitation	35%	Peak $\dot{V}o_2$ increase during cardiac rehabilitation
Balady et al (2004)[34]	3043 Asymptomatic men and women, Framingham study	13%	Reduction in risk of events per MET among high-risk men in Framingham Offspring Study
Myers et al (2004)[35]	>6000 Clinically referred subjects, VETS cohort	20%	1-MET increment in exercise capacity roughly equivalent to 1000 kcal/wk adulthood activity
Kokkinos et al (2008)[36]	15660 Clinically referred subjects	13%	Moderately fit had 50% lower mortality than those with low CRF
Myers et al (2011)[37]	3834 Subjects evaluated for changes in obesity	18%	Fitness was a strong predictor of outcomes irrespective of weight status
Kokkinos et al (2013)[19]	10043 Dyslipidemic subjects in VETS cohort	17% for those taking statins	Combination of statin treatment and higher fitness had lower mortality risk than either alone
Nes et al (2014)[38]	37112 Healthy subjects from HUNT cohort	21% for both sexes	Simple nonexercise algorithm for CRF identifies apparently healthy people at increased risk for premature CVD and all-cause mortality

AHA – Ross et al. Circulation. 2016; 134:e653-e699

... WAS DENN NU ....?

.... Kleiner Start nach dem „FITT“ Prinzip

- **Frequency** → Ausdauer- & Krafttraining; aktiver Alltag!!
- **Intensity** → langsam beginnen – knackig enden
- **Time** → plus 1 min; 1000 Schritte .... u.a. in 10-15 min Einheiten
- **Type** → Spaß!
- Wechsel der Positionen – Sitzen/Stehen ... (Coenen et al. 2017)

Mod. McInnis et al. Am Fam Physician 2003;67:1249ff. Jakicic et al. Med. Sci Sports Exerc 2001; 33:2145ff.
Donnelly et al. Med. Sci Sports Exerc 2009; 41:459ff.; Fletcher et al. Circulation 2013; 128:873ff.
Sharman et al. Am J Hypertens. 2015 Feb;28(2):147-58.; Rütten & Pfeiffer 2016; ADA 2017

Einsatz von Pedometern*

RESEARCH ARTICLE Open Access

Change in well-being amongst participants in a four-month pedometer-based workplace health program

Rosanne LA Freak-Poli[1,2,3*], Rory Wolfe[2], Evelyn Wong[1,2] and Anna Peeters[1,2]

Abstract

Background: There is increasing uptake of workplace physical activity programs to prevent chronic disease. While they are frequently evaluated for improvement in biomedical risk factors there has been little evaluation of additional benefits for psychosocial health. We aimed to evaluate whether participation in a four-month, team-based, pedometer-based workplace health program known to improve biomedical risk factors is associated with an improvement in well-being, immediately after the program and eight-months after program completion.

Methods: At baseline (2008), 762 adults (aged 40 ± 10 SD years, 42% male) employed in primarily sedentary occupations and voluntarily enrolled in a physical activity program were recruited from ten Australian worksites. Data was collected at baseline, at the completion of the four-month program and eight-months after program completion. The outcome was the WHO-Five Well-being Index (WHO-5), a self-administered five-item scale that can be dichotomised as 'poor' (less than 52%) or 'positive' (more than or equal to 52%) well-being.

Results: At baseline, 75% of participants had positive well-being (mean: 60 ± 19 SD WHO-5 units). On average, well-being improved immediately after the health program (+3.5 units, $p < 0.001$) and was sustained eight-months later (+3.4 units from baseline, $p < 0.001$). In the 25% with poor well-being at baseline, 49.5% moved into the positive well-being category immediately after program completion, sustained eight-months later ($p < 0.001$).

Conclusions: Clinically relevant immediate and sustained improvements in well-being were observed after participation in the health program. These results suggest that participation in workplace programs, such as the one evaluated here, also has the potential to improve well-being.

Keywords: Well-being, Happiness, Workplace, Intervention, Evaluation, Physical activity, Prevention

****Global Corporate Challenge**
7köpfige Teams
Mai bis September

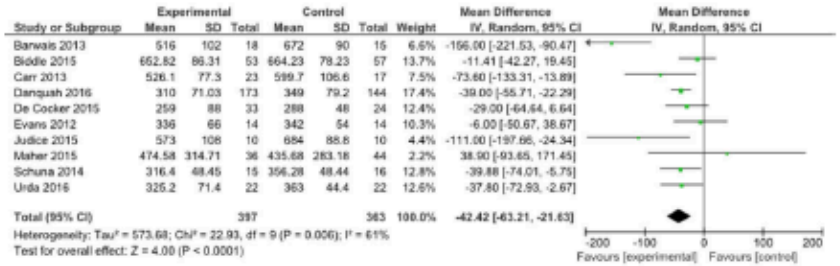
Ziel 10000 Schritte am Tag

N=407

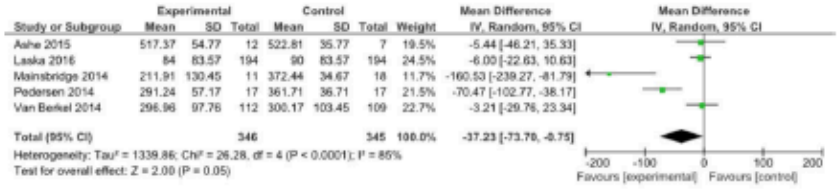
*Freak-Poli et al. Cochrane Database Syst Rev. 2013; **Freak-Poli et al. BMC Public Health. 2014;14:953

Reduktion der Sitzzeit durch technischen „SchnickSchnack“

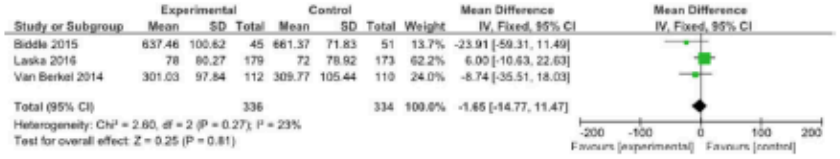
Short term follow up



Medium term follow up



Long term follow up



17 Studien → -41 min Sitzzeit

v.a. innerhalb der ersten 6 Monate

-> Strategien der Verhaltensänderung:

„kleine“ Hinweise/Erinnerungen
Zielsetzung
Monitoring

„weit denken“

A systematic review and meta-analysis of workplace intervention strategies to reduce sedentary time in white-collar workers

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Summary

Prolonged sedentary behaviour has been associated with various detrimental health risks. Workplace sitting is particularly important, providing it occupies majority of total daily sedentary behaviour among desk-based employees. The aim of this systematic review and meta-analysis was to examine the effectiveness of workplace interventions overall, and according to different intervention strategies (educational/behavioural, environmental and multi-component interventions) for reducing sitting among white-collar working adults. Articles published through December 2015 were identified in five online databases and manual searches. Twenty-six controlled intervention studies published between 2003 and 2015 of 4568 working adults were included. All 26 studies were presented qualitatively, and 21 studies with a control group without any intervention were included in the meta-analysis. The pooled intervention effect showed a significant workplace sitting reduction of −39.6 min/8-h workday (95% confidence interval [CI]: −51.7, −27.5), favouring the intervention group. Multi-component interventions reported the greatest workplace sitting reduction (−88.8 min/8-h workday; 95% CI: −132.7, −44.9), followed by environmental (−72.8 min/8-h workday; 95% CI: −104.9, −40.6) and educational/behavioural strategies −15.5 min/8-h workday (95% CI:−22.9,−8.2). Our study found consistent evidence for intervention effectiveness in reducing workplace sitting, particularly for multi-component and environmental strategies. Methodologically rigorous studies using standardized and objectively determined outcomes are warranted.

Keywords: Intervention studies, physical activity, sedentary behaviour, workplace.

obesity reviews (2016)

*** 21 Studien**
Interventionsdauer zwischen 5 Tagen bis zu 6 Monaten

Sitzzeit – 40 min

Am erfolgreichsten
- → **Multikomponenten-Ansatz (-89 min)**
- → **Verhältnispräventiv (-73 min)**

*** Chu et al. Obes Rev. 2016; 17(5):467-81; **Jirathananuwat & Pongpirul. A systematic meta-review. J Occup Health. 2017**

Rolle der „Betriebsmedizin“

*** Scoping Review**
14 Studien mit 10 Interventionen „promising“

→ Meistens Beratung von Individuen mit kardiovaskulären RF

→ „Intervention effects were reported for dietary behavior, physical activity, sedentary behavior, and biological risk factors“

Developing a practice guideline for the occupational health services by using a community of practice approach: a process evaluation of the development process

Lydia Kwak[1*], Charlotte Wåhlin[1,2], Kjerstin Stigmar[3,4] and Irene Jensen[1]

Abstract

Background: One way to facilitate the translation of research into the occupational health service practice is through clinical practice guidelines. To increase the implementability of guidelines it is important to include the end-users in the development, for example by a community of practice approach. This paper describes the development of an occupational health practice guideline aimed at the management of non-specific low back pain (LBP) by using a community of practice approach. The paper also includes a process evaluation of the development providing insight into the feasibility of the process.

Methods: A multidisciplinary community of practice group ($n = 16$) consisting of occupational nurses, occupational physicians, ergonomists/physical therapists, health and safety engineers, health educators, psychologists and researchers from different types of occupational health services and geographical regions within Sweden met eleven times (June 2012–December 2013) to develop the practice guideline following recommendations of guideline development handbooks. Process-outcomes recruitment, reach, context, satisfaction, feasibility and fidelity were assessed by questionnaire, observations and administrative data.

Results: Group members attended on average 7.5 out of 11 meetings. Half experienced support from their workplace for their involvement. Feasibility was rated as good, except for time-scheduling. Most group members were satisfied with the structure of the process (e.g. presentations, multidisciplinary group). Fidelity was rated as fairly high.

Conclusions: The described development process is a feasible process for guideline development. For future guideline development expectations of the work involved should be more clearly communicated, as well as the purpose and tasks of the CoP-group. Moreover, possibilities to improve support from managers and colleagues should be explored. This paper has important implications for future guideline development; it provides valuable information on how practitioners can be included in the development process, with the aim of increasing the implementability of the developed guidelines.

Keywords: Practice guidelines, Evaluation, Process measures

* Kwak et al. J Occup Environ Med. 2014; 56(1):35ff. Kwak et al. BMC Public Health. 2017;17(1):89ff.

Zusammengefasst Therapeutisches Ziel …

- **Frequency** → Ausdauer: 3 bis 5 Tage pro Woche – 30 bis 60 min ;
  Krafttraining 2 bis 3 Tage pro Woche – 30 bis 45 min

- **Intensity** → AT: 55 – 70% der HFmax oder 11–13 auf der Borgskala;
  → KT: 8 bis 10 verschiedene Übungen; 8 bis 12 Wiederholungen

- **Time** → Ziel 150 min!!! (bzw. 1000kcal/Woche – 10000 Schritte/Tag)
  – Adipositas (>300/420 min – 13000 Schritte/Tag)

- **Type** – ..... Spaß!

- Duschen am Arbeitsplatz (Nehme et al. 2017)

Mod. McInnis et al. Am Fam Physician 2003;67:1249ff. Jakicic et al. Med. Sci Sports Exerc 2001; 33:2145ff.
Donnelly et al. Med. Sci Sports Exerc 2009; 41:459ff.; Fletcher et al. Circulation 2013; 128:873ff.
Sharman et al. Am J Hypertens. 2015 Feb;28(2):147-58.; Rütten & Pfeifer 2016; ADA 2017