

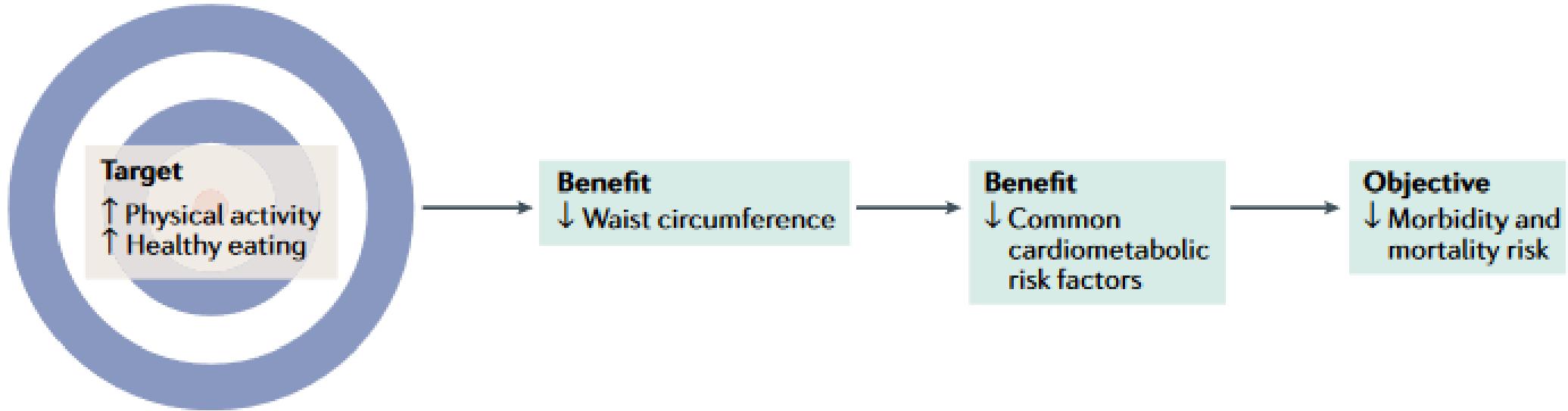
Sport und Bewegung bei Diabetes und Adipositas

14. Deutschschweizer Diabetikertag

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Lebensstil und Bauchumfang: Das Prinzip



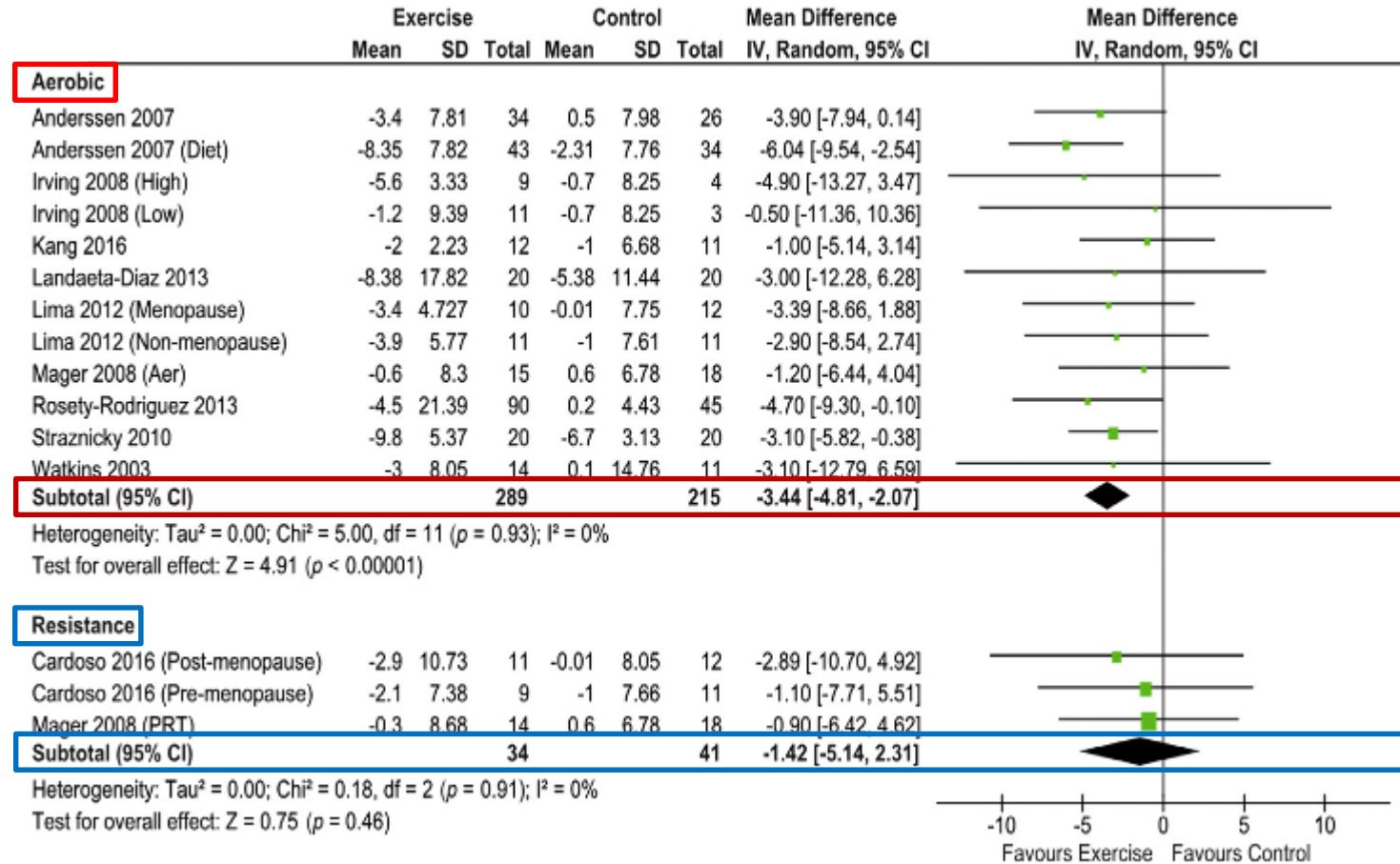
Ross et al., Nature Reviews Endocrinology 2020;16:177–189

Ausdauer- und Krafttraining zur Reduktion des Bauchumfangs bei Patienten mit MTS



Aerobic, resistance or combined training: A systematic review and meta-analysis of exercise to reduce cardiovascular risk in adults with metabolic syndrome

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Volumen vs. Intensität zur Reduktion der Fettmasse

Trainingsvolumen

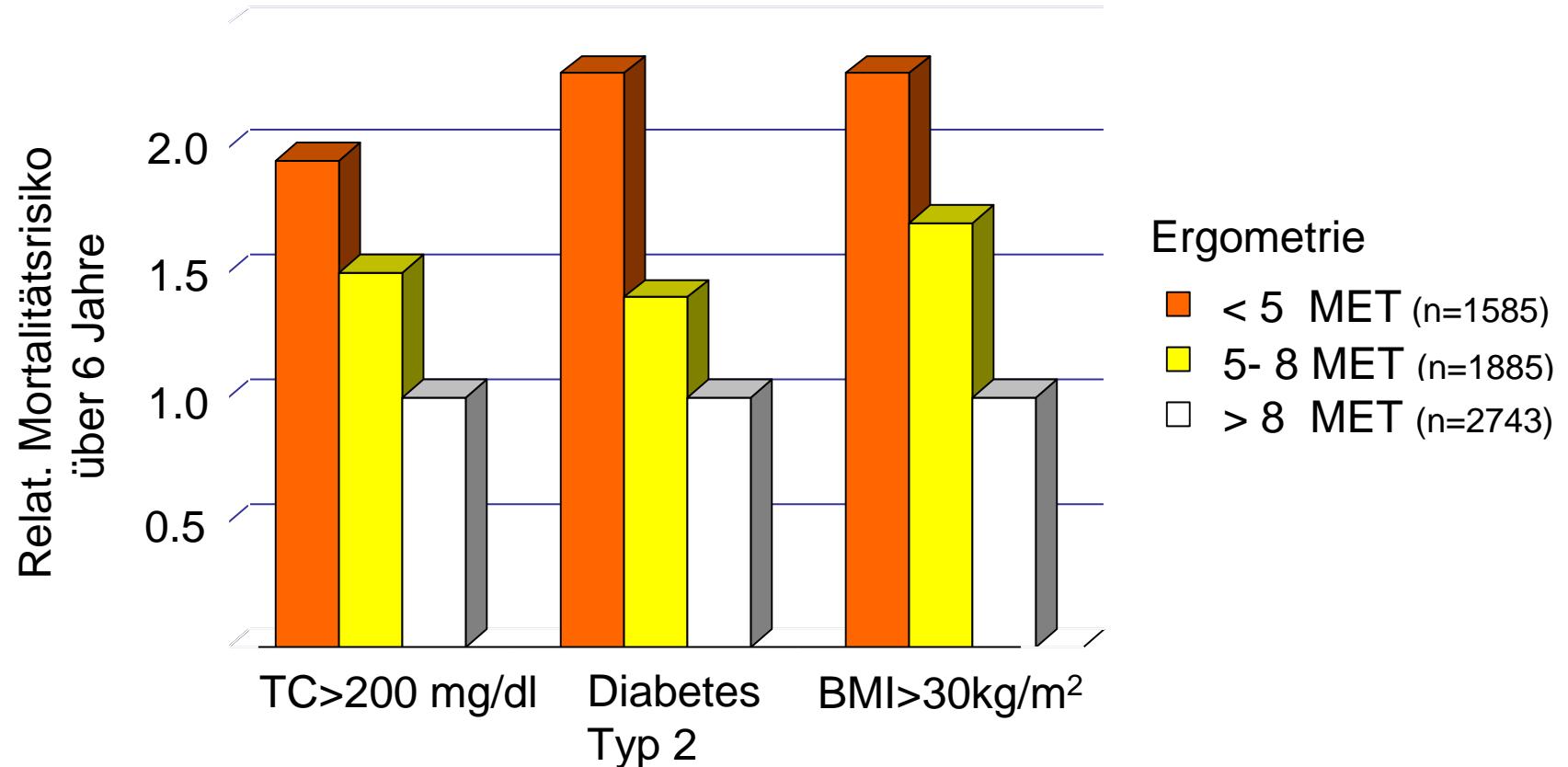
Study	Age (years)	No. of subjects	Subject characteristics	Effect parameter	Comparison	Effect
Wadden et al. ^[17]	43	29	Obesity patients	Adipose tissue mass	8 vs 24 vs 48 weeks (repeated assessment)	Greater reduction with longer duration
Van Loan et al. ^[76]	25	5	Obesity patients	Bodyweight	5 vs 8 vs 11 vs 24 weeks (repeated assessment)	Greater reduction with longer duration
van Dale and Saris ^[77]	33	7	Obesity patients	Adipose tissue mass	5 vs 14 weeks (repeated assessment)	Greater reduction with longer duration
Kukkonen et al. ^[78]	41	95	Obesity patients	Bodyweight	8 vs 20 vs 44 vs 68 weeks (repeated assessment)	Greater reduction with longer duration

Trainingsintensität

Study	Age (years)	No. of subjects	Subject characteristics	Effect parameter	Comparison	Effect
Ballor et al. ^[119]	NA	14 vs 13	Obesity patients	Adipose tissue mass	40–50% vs 80–90% $\dot{V}O_{2\text{peak}}$	Equal reduction
Leutholtz et al. ^[120]	43 vs 40	20 vs 20	Obesity patients	Adipose tissue mass	40% vs 60% HRR	Equal reduction
van Aggel-Leijssen et al. ^[121]	43 vs 40	12 vs 12	Obesity patients	Adipose tissue mass	40% vs 70% $\dot{V}O_{2\text{peak}}$	Equal reduction
Irving et al. ^[31]	51	15 vs 12	Metabolic syndrome patients	Adipose tissue mass	<LT vs >LT	Greater reduction in HI

Hansen et al., Sports Med. 2010; 40:921-940

Fitness, CV Risiko und Mortalität



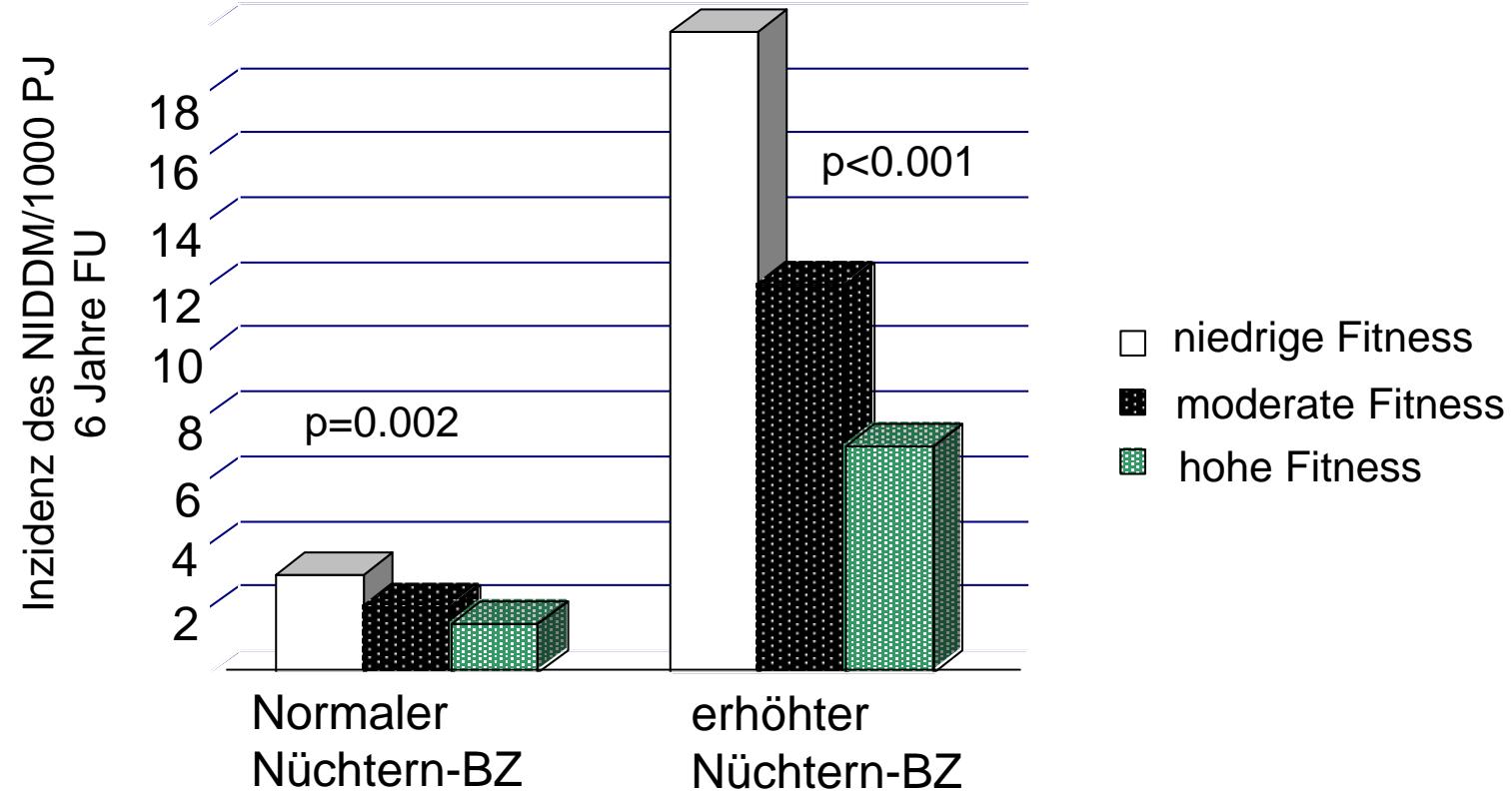
MET = Metabolisches Äquivalent

= Energieverbrauch während 1 Stunde in Ruhe

= 3.5 ml/min/kg VO₂-Aufnahme

Myers et al., N Engl J Med. (2002); 346:793-801

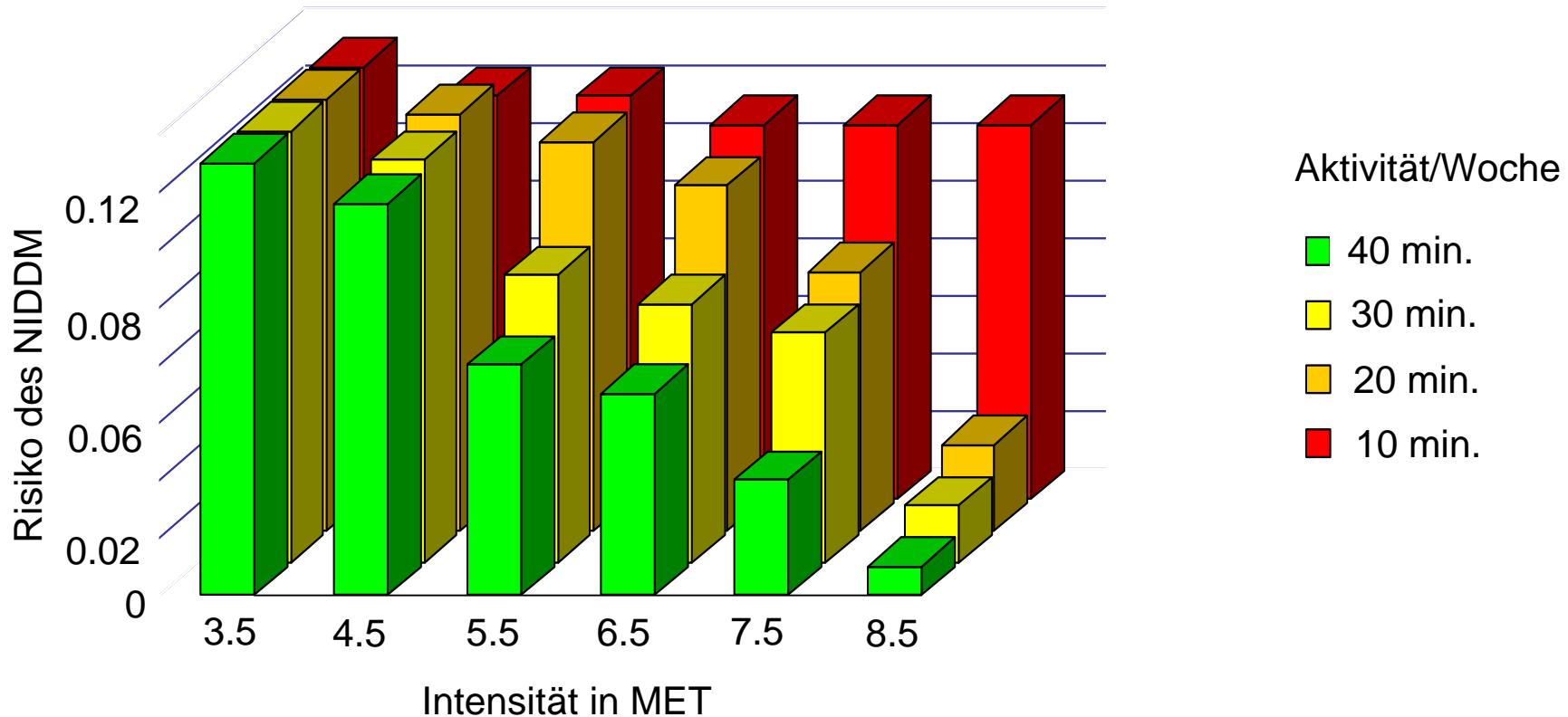
Inzidenz des Typ 2 Diabetes und körperliche Fitness



NIDDM= Non insulin-dependent diabetes mellitus

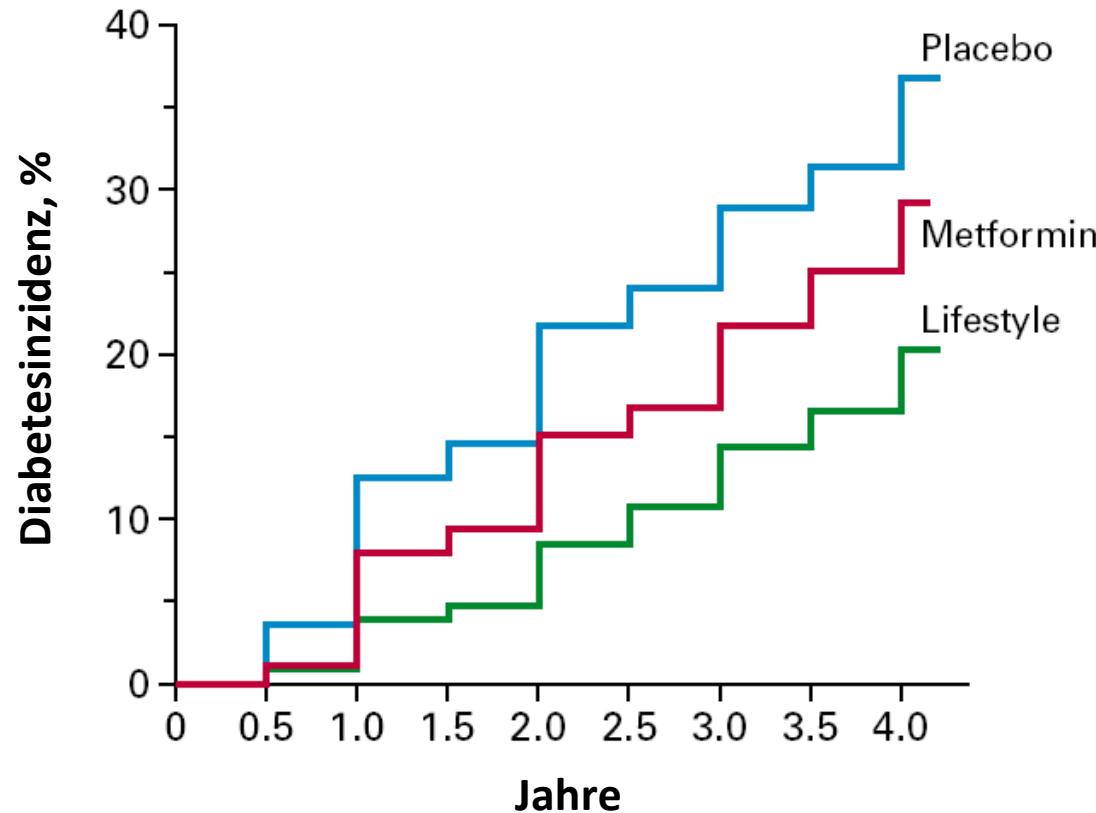
Wei et al., Ann Intern Med. 1999; 130:89-96

Typ 2 Diabetes in Abhängigkeit von Dauer und Intensität der Aktivität



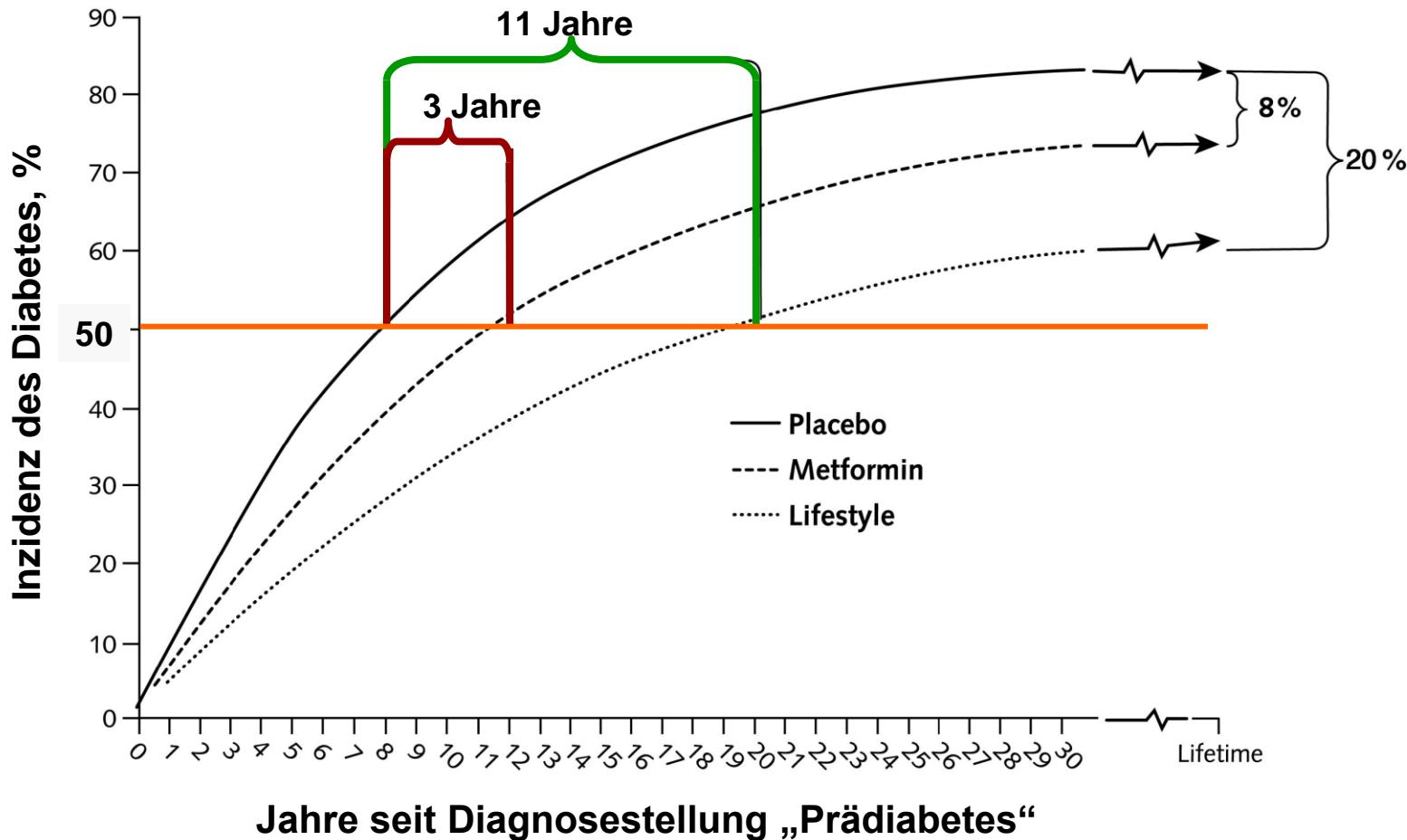
Lynch et al., Arch Intern Med. 1996; 156:1307

Das Diabetes Prevention Program (DPP)



DPP Research Group. NEJM 2002; 346:393-403

Das Diabetes Prevention Program (DPP)



Herman et al., Ann Intern Med. 2005;142:323-332

“Make Your Diabetic Patients Walk”

179 Typ 2 Diabetiker

Alter: 62 Jahre; Interventionsdauer: 2 Jahre

6 Gruppen mit unterschiedlicher körperlicher Aktivität



<u>Gruppe</u>	<u>Zügiges Walking</u>
1	0 h/Wo
2	1,5 h/Wo
3	4,0 h/Wo
4	5,5 h/Wo
5	7,5 h/Wo
6	12 h/Wo

Di Loreto et al., Diabetes Care 2005; 28:1295-1302

Spazierengehen, h/Woche						
	0	1,5	4	5,5	7,5	12
Körpergewicht, kg	+ 0.8	+ 0.6	+ 0.1	- 2.2	- 3.0	- 3.2
Bauchumfang, cm	+ 1.0	+ 1.0	- 0.9	- 3.8	- 5.5	- 7.1
HbA _{1c} , %	+ 0.03	- 0.06	- 0.44	- 0.88	- 1.11	- 1.19
RRsys, mmHg	- 1.8	- 1.5	- 6.4	- 5.5	- 6.6	- 9.2
RRdia, mmHg	- 4.6	- 2.4	- 2.9	- 4.8	- 5.3	- 7.1
Chol, mg/dl	- 3.8	- 5.6	- 10.2	- 10.7	- 7.4	- 10.9
LDL-Chol, mg/dl	- 4.5	- 7.1	- 3.4	- 5.3	- 6.3	- 7.7
HDL-Chol, mg/dl	+ 0.1	+ 1.1	+ 2.9	+ 5.6	+ 10.4	+ 6.3
TG, mg/dl	+ 3.4	+ 2.1	- 48.2	- 55.2	- 57.4	- 68.4
KHK-Risiko %	+ 0.1	- 0.3	- 2.6	- 3.7	- 4.8	- 4.3

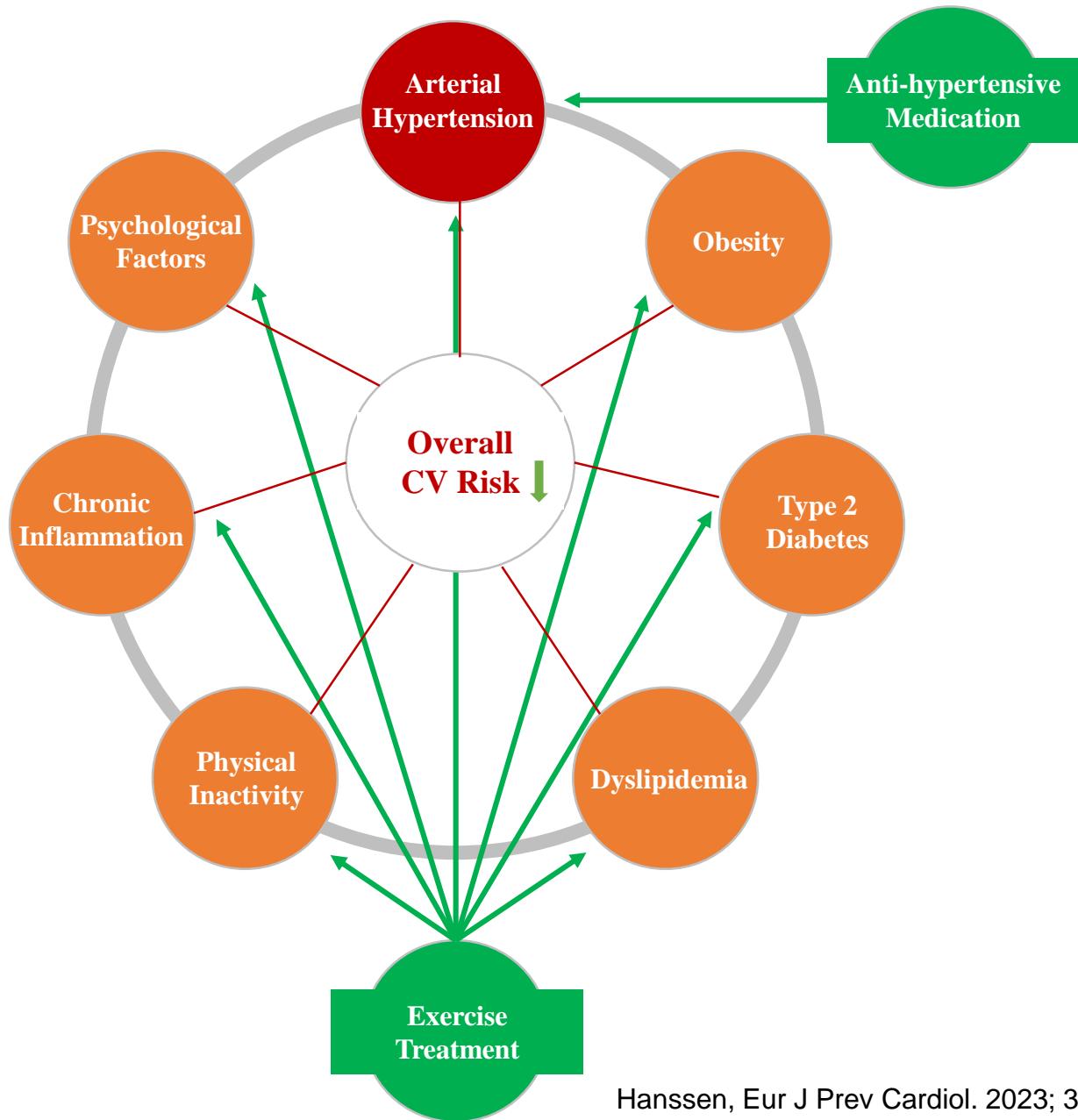
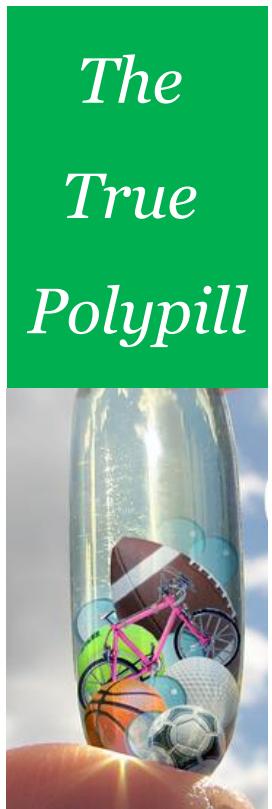
p<0.05

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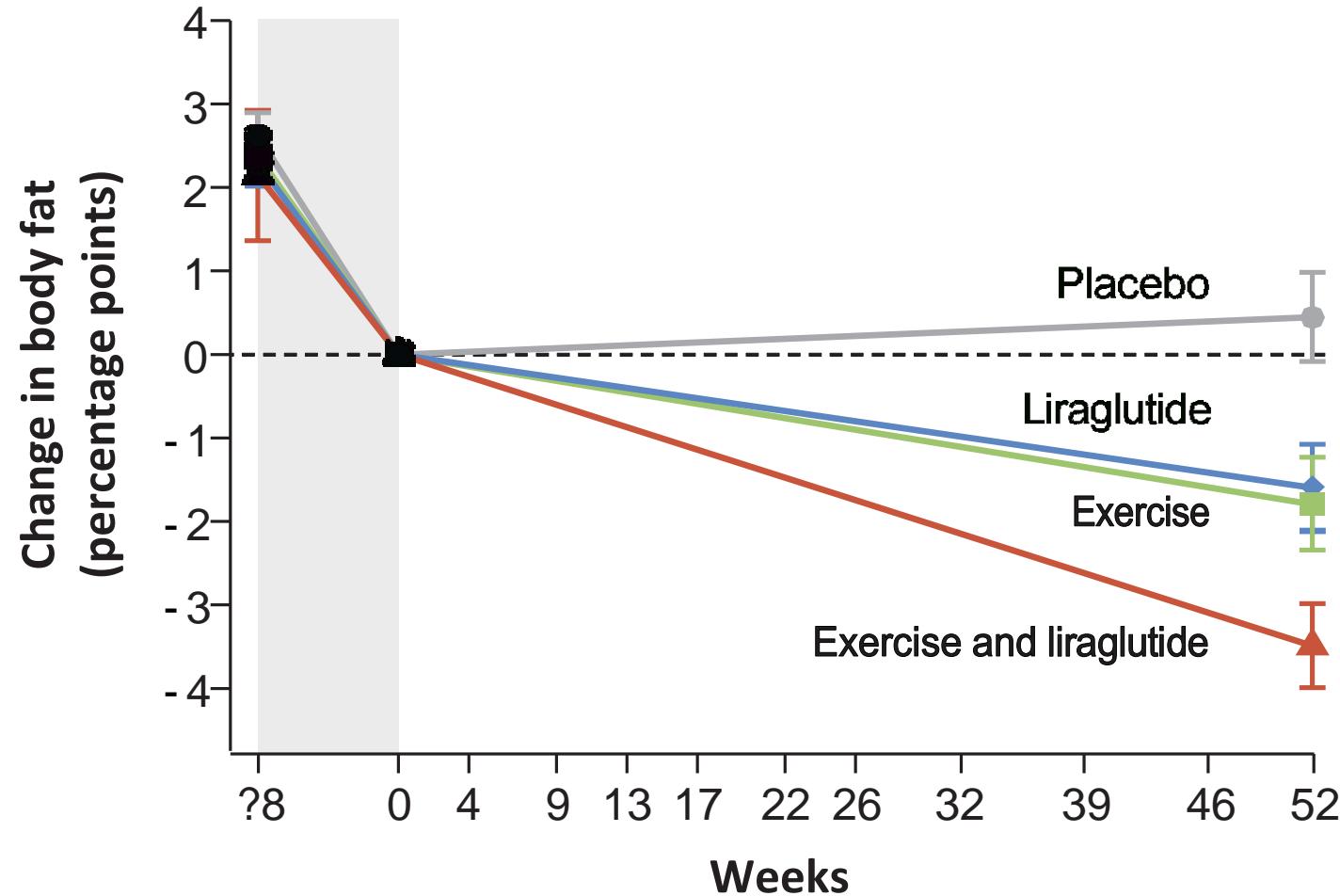
Bewegungstherapie des Gesamtrisikos

... personalized
exercise
prescription ...



Hanssen, Eur J Prev Cardiol. 2023; 30(1):95-97

Sport in Kombination mit Medikation: GLP-1 Analoga



Lundgren et al., NEJM 2021; 384:1719-1730

Exercise is Medicine

Adipositas, Bluthochdruck, und Diabetes

Recommendations in a nutshell:

- **Aerobic Exercise (FIT):**
 - Frequency: 5-7x/week
 - Intensity: moderate intensity (50-70% *HFmax*)
 - Time: 30 min
→ 150 min/week
- **Resistance Training:**
 - Frequency: 2-3x/week
 - Intensity: low-to-moderate (40-60% *1 repetition max.*)
 - Time: ca. 6 large muscle groups
3 Sets/15 repetitions

	Recommendations	Class ^a	Level ^b
Obesity	In obese individuals ($BMI > 30 \text{ kg/m}^2$ or a waist circumference $> 80 \text{ cm}$ for females or $> 94 \text{ cm}$ for males) resistance training ≥ 3 times per week, in addition to moderate or vigorous aerobic exercise (at least 30 min, 5–7 days per week) is recommended to reduce CVD risk. ¹²¹	I	A
Hypertension	In individuals with well-controlled hypertension, resistance training ≥ 3 times per week in addition to moderate or vigorous aerobic exercise (at least 30 min, 5–7 days per week) is recommended to reduce blood pressure and CVD risk. ¹³²	I	A
Diabetes	Among individuals with diabetes mellitus, resistance training ≥ 3 times per week in addition to moderate or vigorous aerobic exercise (at least 30 min, 5–7 days per week) is recommended to improve insulin sensitivity and achieve a better CVD risk profile. ^{176,178}	I	A
	Among adults with well-controlled hypertension but high risk and/or target organ damage, high-intensity resistance exercise is not recommended.	III	C
	In individuals with uncontrolled hypertension ($SBP > 160 \text{ mmHg}$) high-intensity exercise is not recommended until blood pressure has been controlled.	III	C

Sport auf Rezept: Wie umsetzen?

Sporttherapeutischer Bewegungsplan (3 Monate)

Departement für Sport, Bewegung und

Name..... Vorname..... Datum.....

1) Extensives Grundlagen-Ausdauertraining (niedrig-intensiv)

Individuelle Trainingsherzfrequenz:

Radfahren:-..... /Minute

Nordic Walking (langsam Joggen):-..... /Minute

.....
.....
.....

Steigerung des Trainingsumfangs:

Woche 1 - 4: x /Woche für min.

Woche 5 - 8: x /Woche für min.

Woche 9 -12: x /Woche für min.

2) Alltagsaktivität:

Individuelle Zielvorgabe:

Tägliche Schrittzahl (Umfang):

Zeit mit zügigem Gehen im Alltag: Minuten/Tag

Treppensteigen:x/Tag Stockwerke

.....
.....
.....

3) Gymnastik und Kräftigungsübungen:

Grosse Muskelgruppen des Körperstamms (Bauch- und Rückenmuskeln) sowie der oberen und unteren Extremitäten:

Zielvorgabe:x/Woche für 10 - 20 Minuten

ca.% der Maximalkraft, Sets à Wiederholungen

Take Home Message

Regelmässige moderat-intensive körperliche Aktivität ist eine effektive Therapie

.... zur Reduktion von:

- Gewicht
- Fettmasse
- Lipiden
- Glucose
- Blutdruck
- Systemischer Inflammation
- Kardiometabolischem Risiko
- Kardiometabolischer Mortalität

... zur Verbesserung der körperlichen Leistungsfähigkeit und Lebensqualität!

... Exercise is Medicine!



Vielen Dank!

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Switzerland



Kardiovaskuläre
Prävention
Im Blick!



Praktische Aspekte: Insulin & Sport

- Reduktion der Insulintagesdosis bei sportlich Aktiven:
um bis zu 50% (0.2-0.6 U/kg/Tag)
- Minimale Insulinanpassung geringer Aktivität (20-30 min <70% VO_2max)
- Moderate längere Belastung: 50% Reduktion der Dosis
- Hohe Intensität: 70-90% Reduktion
- Mehrstündiger Sport am Morgen: Reduktion morgendlicher (50%) und abendlicher Basalinsulindosis (20%) (Vermeidung nächtlicher Hypoglykämien)
- BZ-Kontrolle 90, 30 und 5 min vor und nach moderat-intensiver sportlicher Aktivität