Assessing, promoting and implementing physical activity and fitness in Basel-Stadt: A research driven translational approach

Prof. Dr. Lukas Zahner und Dr. Lars Donath

Departement für Sport, Bewegung und Gesundheit, Universität Basel
Our Kids – Our Future

Quelle: Zahner et al., 2004, Active Childhood
Status Quo - Early Physical (In)activity

at least 150 min / week moderate to vigorous physical activity (WHO 2010)
“Big Bang” before the Millennium

Focus:
Physical Activity & Health in Children (Information & Initiation)

BASPO-Project (ab 1998)

Partners:
- AXA insurance / Swiss Pediatric Society
- Swiss Olympic / University of Zurich & Basel
Timeline in Research

1998
2004 / 2006
2007 / 2008
2009-2011
2012-2013
2014-2016
2017-

- KISS Kinder- und Jugendsport Studie
- SNF-Projekt mit Uni Lausanne
- Die Kidz-Box
- Projekt „Talent Eye“
- suvaliv!
- hopp-La Generationen in Bewegung
The Situation (in Switzerland)

1. **Childhood obesity** has increased (20-30% affected kids)

2. **Fitness** has decreased (10% over the last 20 y)

3. Low fitness, low physical activity and increased body fat all independently predict **clustering of CVD risk factors in children**

4. **Atherosclerotic plaques** start to occur in **childhood** and are related to **CVRF**

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Study Design

Assessed for eligibility (n=1830 classes from 919 elementary schools)

Excluded (n=1640)

Eligible and consented to participate (n=190)

Classes randomly selected (n=28)

Randomisation

Intervention
16 classes from 9 schools
1st grade (n=8)
5th grade (n=8)

Control
12 classes from 6 schools
1st grade (n=6)
5th grade (n=6)

Zahner et al. 2006 BMC Public Health; Kriemler et al. 2010 BMJ
Intervention Program

Daily Physical Education

Short Activity Breaks

Physical Activity Homework

Recess tools

Education of Teachers
Informations for parents

Zahner et al. 2006 BMC Public Health; Kriemler et al. 2010 BMJ
Results

28 classes (n=502)

Intervention vs. Control

- Shuttle Run
- Sum of 4 skinfolds
- MVPA in school
- Quality of life
- BMC (whole body)
- BMD (whole body)

Deltas z-Score

- Cardiovascular Risk Score

- Deltas skinfolds (mm)
- Moderate-vigorous PA (min/day)
- Quality of life (Score)

Groups differences at 3 year Follow-up

-6% → ns
5% → 14%*
+18% → ns

-8% → ns
-5% → ns

% Body Fat
Aerobic Fitness
Physical Activity
Quality of Life
Cardiovascular Risk Score
Body Mass Index

Difference at Post-intervention
Difference at Follow-up

Group differences in z-score units
Discussion & Conclusion

The effects seem small...

1. Δ skinfolds 2 mm
2. Δ fitness 0.2 z-units
3. Δ MVPA 11 min/day
4. Δ CVR score 0.2 z-units
5. 6% difference of change in whole body BMC, but....

.....if you consider the Rose principle...

...and there is evidence that it works in childhood obesity prevention:
↓ of BMI by 0.3 z-score units of BMI for each child of the NHANES database -> reduction of overweight prevalence from 20 to 12%

Research development and translation into practice

Package: Active Childhood

Children’s Health Study (Funded by the Swiss National Research Foundation)

Preschool – PA and Health (SNF-Study)

Youth & Sports 10-20 j. to 5-20 j.

„Kidz Box“

DVD & Homepage „Moving Schools“
Timeline in Research

- 1998
- 2004 / 2006
- 2007 / 2008
- 2009-2011
- 2012-2013
- 2014-2016
- 2017-

Key projects and initiatives:
- KISS: Kinder- und Jugendsport-Studie
- fit4future
- SNF-Projekt mit Uni Lausanne
- BALLABEINA: Kinder im gleichgewicht/enfants en équilibre
- Suvaliv!
- Sportcheck
- hopp-La: Generationen in Bewegung
"No decline with age is more **dramatic** and **functionally significant** than the **decline in lean body mass**" (Rosenberg, 1989)

<table>
<thead>
<tr>
<th></th>
<th>men</th>
<th>women</th>
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</thead>
<tbody>
<tr>
<td><strong>annual muscle mass loss</strong></td>
<td>0.80 - 0.98%</td>
<td>0.64 - 0.70%</td>
</tr>
<tr>
<td><strong>annual strength loss</strong></td>
<td>3 - 4%</td>
<td>2.5 - 3%</td>
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Balance Training

Training consequences (ACSM):

- difficult postures with gradually reduced base of support (e.g., two-legged stand, semi-tandem stand, tandem stand, one-legged stand)
- movements that perturb center of gravity (e.g., tandem walk, circle turns)
- stress postural muscle groups (e.g., heel stands, toe stands) or
- reduce sensory input (e.g., standing with eyes closed)

(Chodzko-Zajko, 2009)
Balance Training and Fall rates


- 88 trials, 19,478 participants
- 21% fewer falls with exercise than control participants
- pooled rate ratio 0.79 [95% CI 0.73 to 0.85]
  - $I^2$ 47%
  - 69 comparisons

Exercise to prevent falls in older adults: an updated systematic review and meta-analysis

Catherine Sherrington, Zoe A Michaleff, Nicola Fairhall, Serene S Paul, Anne Tiedemann, Julie Whitney, Robert G Cumming, Robert D Herbert, Jacqueline G J Close, Stephen B Lord

high challenge to balance and >3h per week

0.61 [95% CI 0.52 to 0.71]
Wii-fit (Beispiel Exergaming)
Exergaming and balance performance

SMD: 1.25
(95% CI: 0.82 – 1.69)

SMD: 0.37
(95% CI: 0.14 – 0.59)

Donath et al. (2016): Sports Med
Exergaming and balance performance

SMD: -0.79
(95% CI: -2.18 – 0.60)

SMD: 0.11
(95% CI: -0.33 – 0.54)

Donath et al. (2016): Sports Med
Slackline training in Seniors

Abb. 1 Die Studienteilnehmer wurden in einem zweiarmigen, randomisiert-kontrollierten Studiendesign untersucht. Die Hälfte der Probanden nahm an der Intervention (INT) teil, während die andere als Kontrollgruppe (KON) diente. Nach der sechswöchigen Intervention fand der Post-Test statt.

3 times per week
6 weeks
Net-training time: 20’
1’ Training :2’ Pause
Slackline training Adaptations

<table>
<thead>
<tr>
<th>Group</th>
<th>p-value</th>
<th>η_p^2</th>
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<tr>
<td>children</td>
<td>0.006</td>
<td>0.22</td>
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<td>seniors</td>
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<td></td>
<td>0.10</td>
<td>0.11</td>
</tr>
</tbody>
</table>

Slackline & balance performance

Donath et al. (2016): Sports Med
Outlook for more insights:

Parallel 6: Assessing, promoting and implementing physical activity and fitness in Basel-Stadt: A research driven translational approach between players from university, cantonal and community levels

Chair: Lukas Zahner (Switzerland) and Lars Donath (Switzerland)

- Debora Wick (Switzerland), Lukas Zahner (Switzerland) and Alice Minghetti (Switzerland) Intergenerational approaches for physical activity and exercise
- Lars Donath (Switzerland) Early motor skill promotion in the kindergarten setting: The “Burzelbaum” concept of Basel
- Katharina Endes (Switzerland) Monitoring of physical fitness of all first grade schoolchildren in Basel-Stadt – the Sportcheck
Final and easy recommendation
Artificial Stairclimbing
What is in a flight of a stair?

-0.735 kcal
-0.630 kcal
-0.525 kcal
-0.420 kcal
-0.315 kcal
-0.210 kcal
-0.105 kcal
Attractive stair climbing
modes of stair climbing

8 weeks / 24 training sessions

• No changes in maximal & explosive force
• gait is not changed
• In favor of 2 stairs:
  • Resting heart rate (-8 beats/min)
  • Uphill walking (-11 beats/min)
  • Beam balancing

Intergeneration Teaser