Effects of highly mineralized water on weight and metabolism – a randomized controlled blinded trial in a pediatric hospital staff

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Background

The role of calcium intake in cardiovascular and metabolic risk is controversial.
Objectives: To examine the effect of highly mineralized natural water in lowering body weight, blood pressure, cholesterol and blood sugar and to assess health behaviour of the staff of a pediatric hospital.

Methods

Methods: Out of 650 pediatric hospital staff members, we examined
- 161 healthy subjects, aged 18-64 years, 77.5% women, 2 drop-outs,
- in a randomized, placebo-controlled blinded trial. Probands were aske not to change food and activity habits during study. After randomization (**T0**, start),
- 77 drank 1.5L of mineral water (Ca 519 mg/L, Mg 117 mg/L, Sulfate 1445 mg/L, $HCO3^-$ 278 mg/L);
- 82 natural water (40, 5, 6.2 and 10 mg/L, resp.) during 3 weeks (**T1**, end).
- At T0 &T1, we assessed nutrition and activity by standardized questionnaires
- weight, height, blood pressure, waist and hip circumference,
- hydration by bioimpedance as well as
- fasting morning serum calcium, sodium, total-, LDL-, HDL-cholesterol, triglycerides, glucose, creatinine
- and, in the 2nd morning spot urine, calcium/creatinine ratio.

Results

- No group significant differences were found between the groups drinking highly mineralized water and controls => Results are reported in the total group.
- 26% were overweight & 6.8% obese (Swiss average: 33% & 11%, resp.)

	T0	T1
• **No** significant changes before vs after drinking water		
- BMI, kg/m2	23.5±3.2	23.5±3.2
- blood pressure, mmHg sys./diast.	110/70	110/70
- triglycerides, mmol/L	1.08±0.52	1.01±0.51
- calcium, mmol/L	2.3±0.08	2.3±0.0
- sodium, mmol/L	139±2.5	139±2.5
- urea, mmol/L	4.15±1.14	4.05±1.03
- urinary calcium/ creatinin, mmolar	0.18±0.15	0.17±0.15
• Significant **decreases** in		
- physical activity, h/week (national recommendation 3.5h)	4.1 (0-17)	**4.0 (0-15)**
- waist circumference, cm	83.8±10.0	**83.2±10.**0
- Glucose , mmol/L (Fig. 3)	4.95±0.6	**4.54±0.6**
- Creatinine, umol/L	76.5±13.0	**72.7±12.1**
- HDL-cholesterol, mmol/L	1.73±0.45	**1.62±0.4**
• Significant **increases** in		
- water intake, L/d	0.8±0.3	**1.6±0.7**
- BIA-phase-angle ° (Fig. 2)	5.8±0.6	**6.0±0.6**
- LDL-cholesterol, mmol/L	2.90±0.8	**2.95±0.9**

Results: Figures 1 to 3

Fig.1

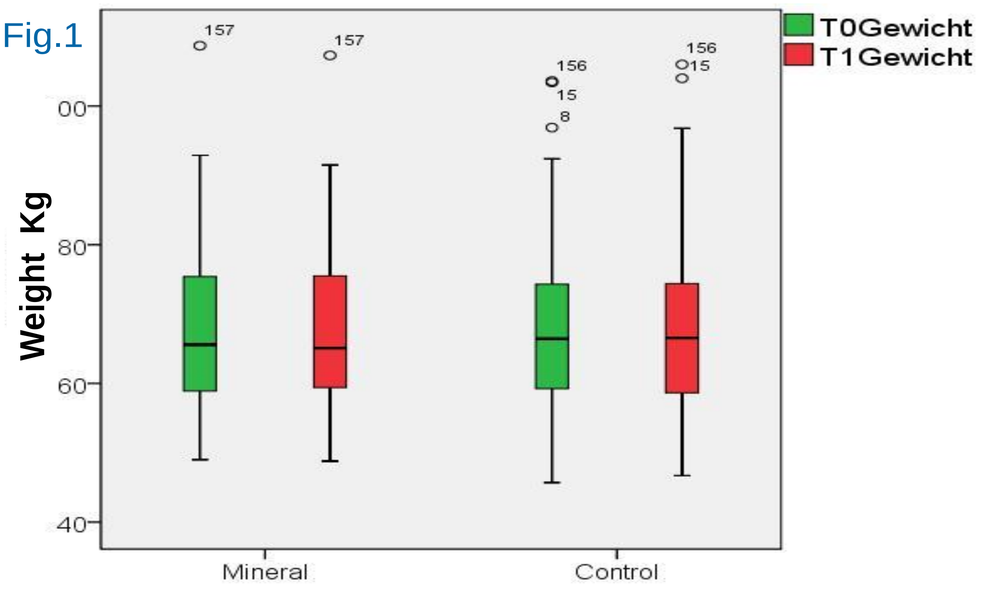


Fig.2

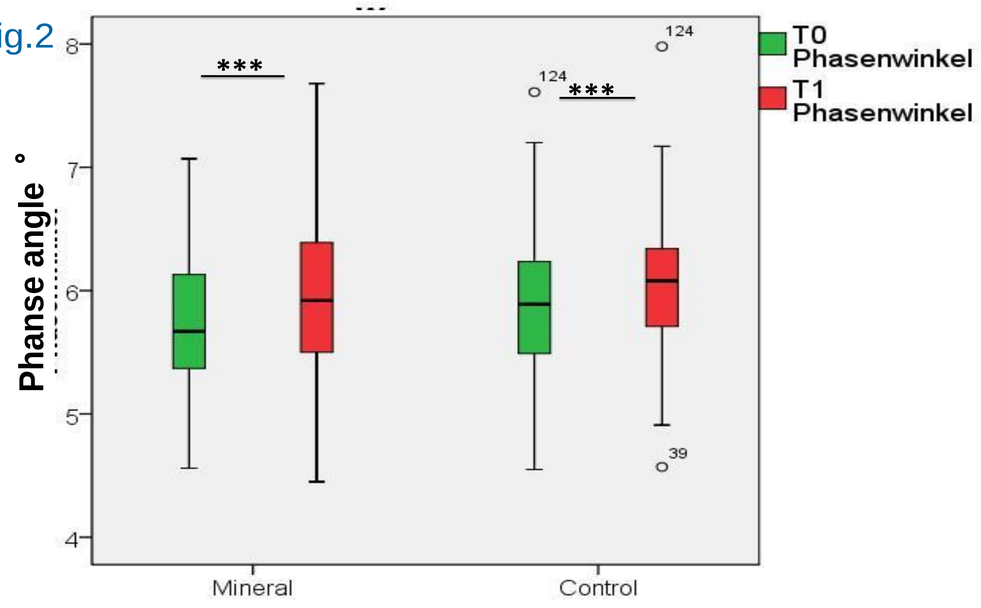
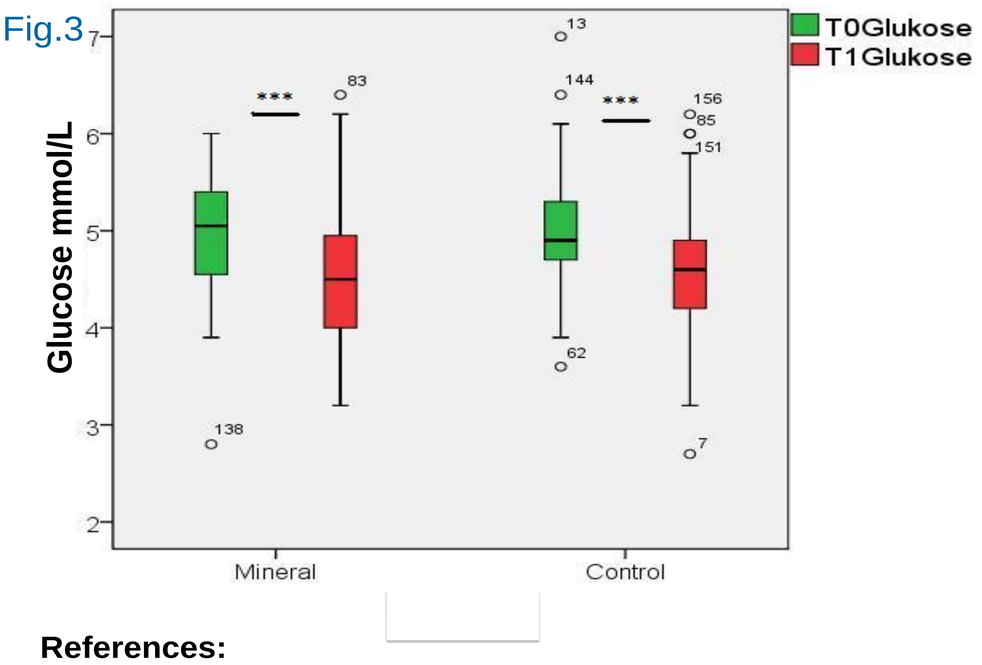


Fig.3



Conclusions

Pediatric staff participating in this RCT may be a particularly healthy role model population, e.g. physical activity was above national recommendation; all mean changes occurred within the normal range. The variations in cholesterol levels were unexpected.

The significant decrease of waist circumference as well as of glucose levels points to favourable effects of drinking water. This is supported by epidemiological findings of higher type 2 diabetes prevalence in restricted fluid intake and may be associated with higher levels or Copeptin / Antidiuretic Hormone.

Notes : The authors declare no conflict of interest.

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