frontiers in Neurology

ORIGINAL RESEARCH
published: 30 November 2021
doi: 10.3389/fneur.2021.691917

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Balance Training With Vibrotactile Neurofeedback and *Ginkgo Biloba* Extract in Age-Related Vertigo

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Background

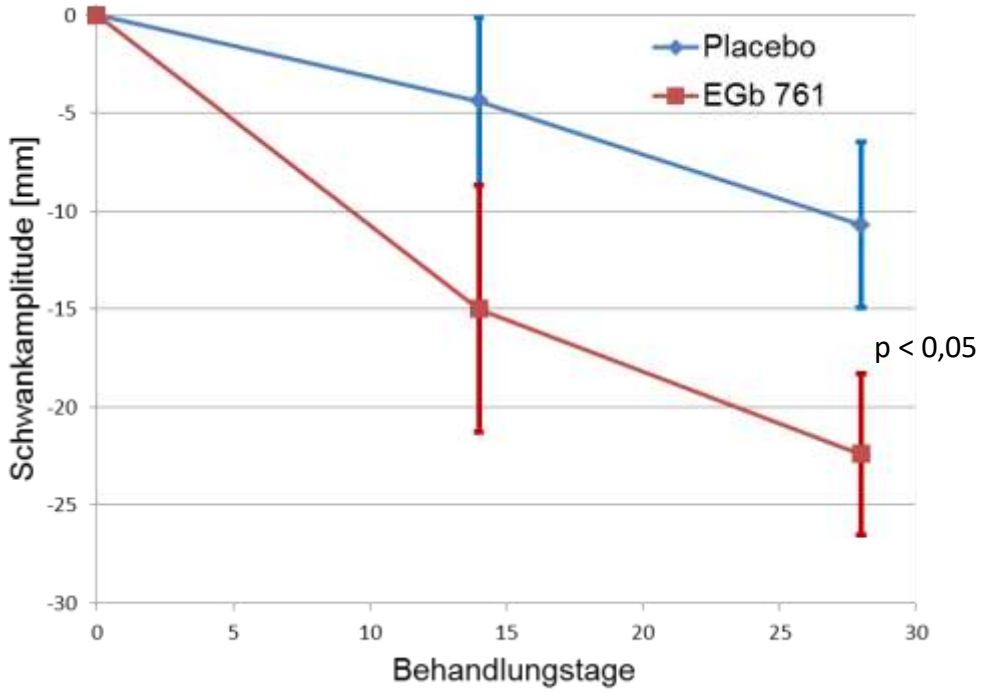
- Balance training is the standard therapy for age-associated vertigo, but only moderate therapy effects[1]
- EGb 761® ameliorates age-associated vertigo[2]
- EGb 761® enhances effect of balance training in chronic vertigo[3]
- Vibrotactile neurofeedback improves effect of balance training in presbyvertigo[4,5]

➢ Synergistic effects of EGb 761® and balance training with vibrotactile neurofeedback?

1 DEGAM (2016) S3 Guideline Dizziness in Family Practice. 2 Hamann KF (2007) The Internet Journal of Otorhinolaryngology 6, 2. 3 Heide W et al (1998) Current Neurology 25S3 [71], 94.
4 Basta D et al (2011) Otol Neurotol 32, 1492-9. 5 Basta D et al (2017) Int J Rehabil Res, 40:333-338.

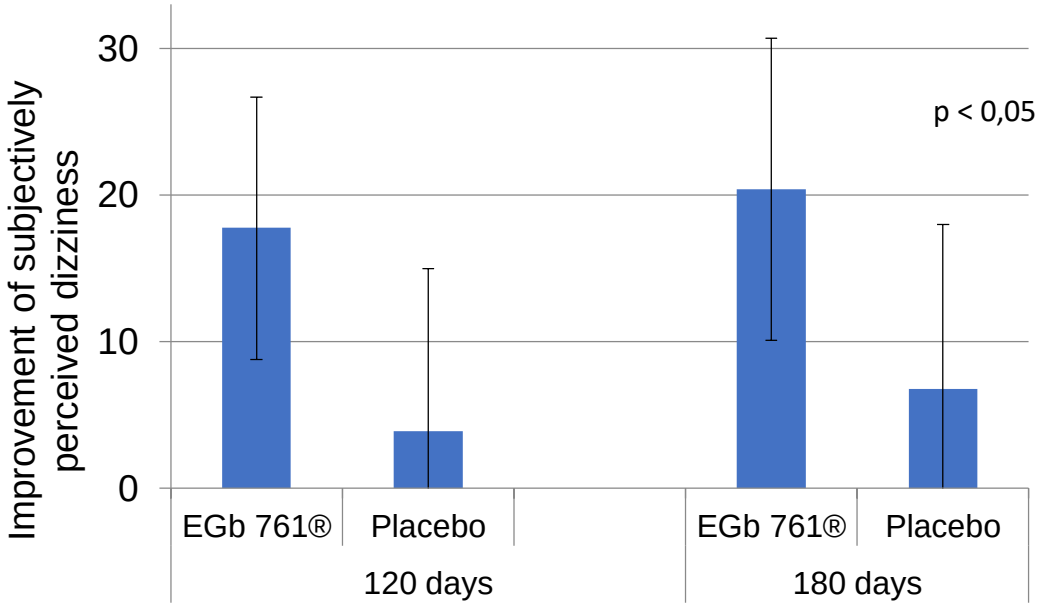
EGb 761® enhances effect of balance training

- n=35
- vestibular vertigo for 3-4 years
- previously unsuccessfully treated
- Balance training + EGb 761®/Placebo



Hamann 1985, Therapy Week; 35: 4586-4590.

- n=40
- > 3 months persistent dizziness after TIA/infarction
- Vestibular training + EGb 761®/Placebo

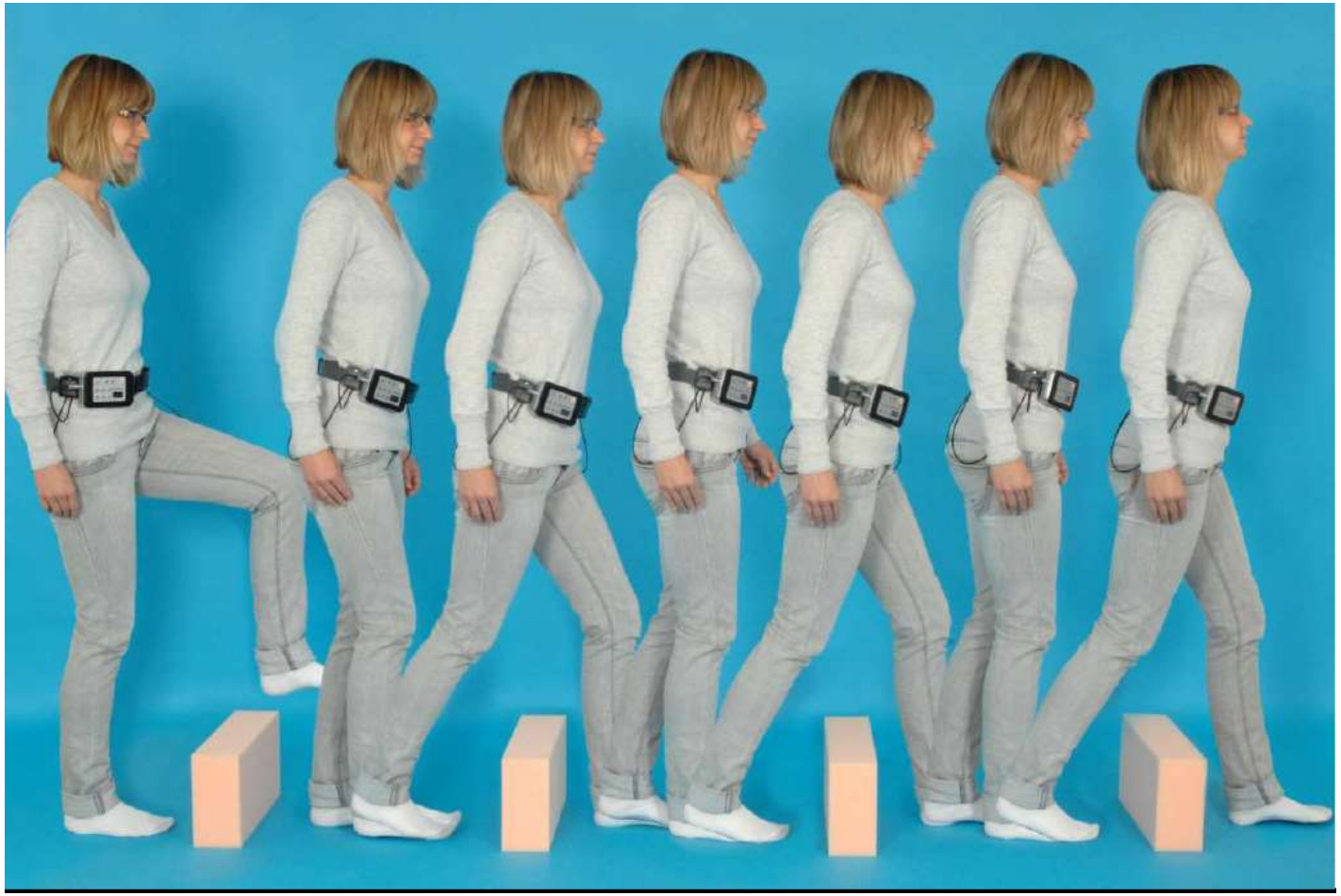


Heide et al. 1998, Akt Neurol 25: S94.

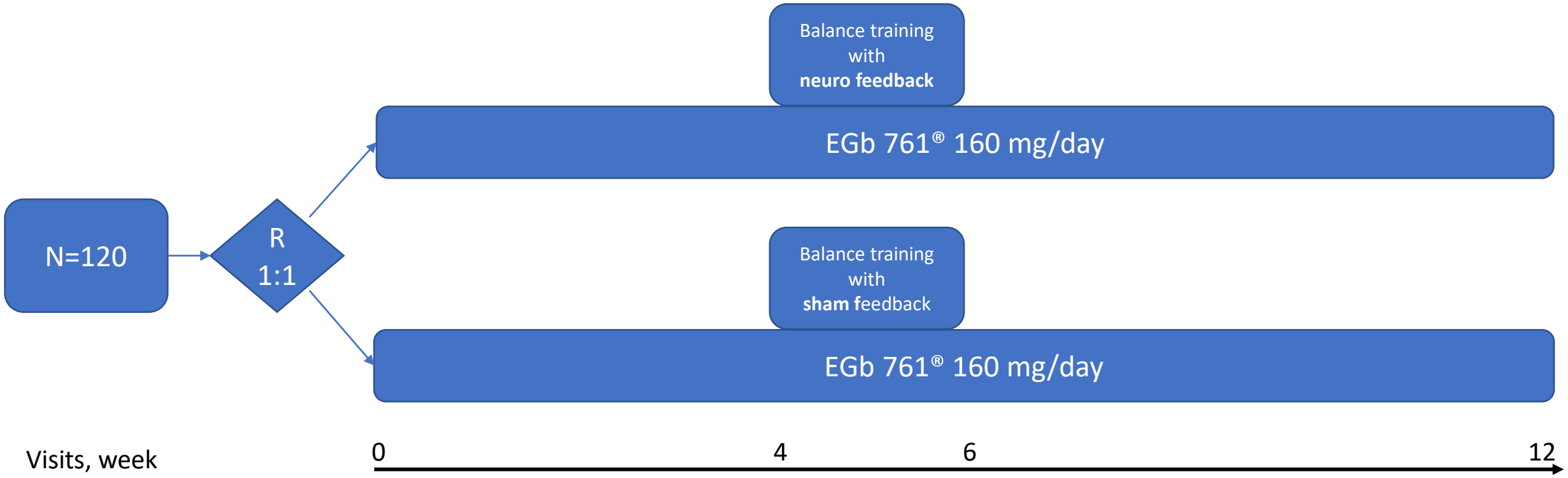
Balance Training with Vibrotactile Neurofeedback







Study design



Decker et al., Frontier Neurol. 2021

Patients	
Inclusion	**Exclusion**
≥ 60 years	Acute or chronic otologic, neurologic, or psychiatric illness within the past 12 months, e.g., depression, stroke, TIA, Parkinson's disease, Alzheimer's disease, seizure disorder, traumatic brain injury, cerebral hemorrhage, multiple sclerosis, hearing loss, Meniere's disease, benign positional vertigo, stroke.
Vertigo for > 3 months	
Dizziness Handicap Inventory > 25 points	
gSBDT Fall risk > 40%	
	…

Endpoints		
	Primary	**Secondary**
Objective	Geriatric Standard Balance Deficit Test (gSBDT) = **risk of falling in balance situations.** Improvement week 6	gSBDT, week 4, week 12, patients < 50%, etc.
		Hearing thresholds
		Trail Making Test (A, B, B-A) = Cognition
		Safety laboratory, ECG
Subjective		Dizziness Handicap Inventory = **Impairment due to dizziness in everyday life**
		Adverse events

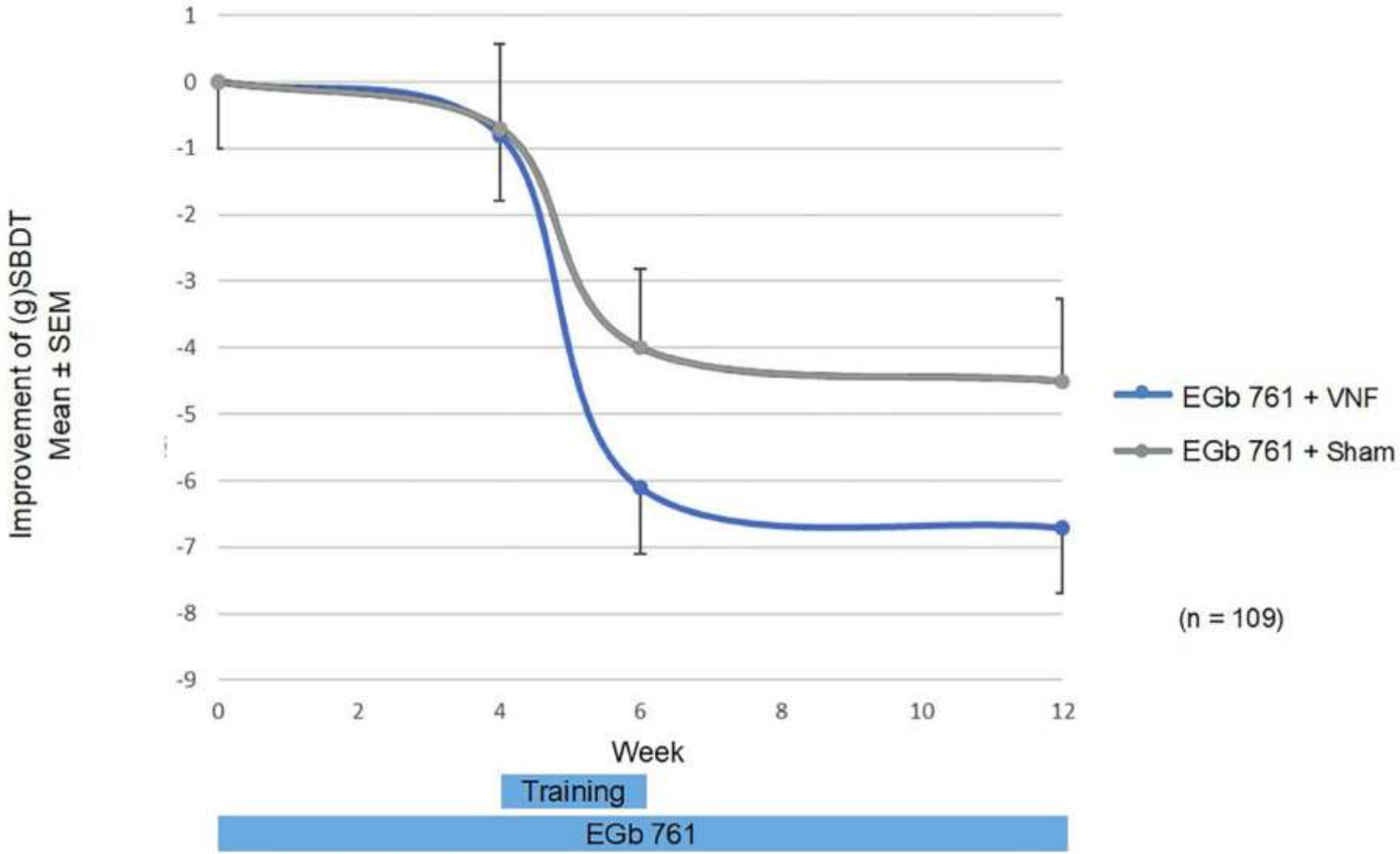
Decker et al., Frontier Neurol. 2021

Patients: Baseline scores

	EGb 761 + active training (*N* = 53)	EGb 761 + sham training (*N* = 56)
Age (years); [Min, Median, Max]	74.0 ± 5.6 [63, 75, 86]	74.0 ± 6.6 [61, 76, 89]
Gender (% female)	73.6	60.7
Duration of dizziness (years)	4.1 ± 3.4	5.5 ± 5.9
gSBDT-CS	55.8 ± 10.3	56.3 ± 11.9
DHI sum score	46.5 ± 14.4	41.9 ± 12.7
Functional impact	17.0 ± 6.3	15.7 ± 6.3
Physical impact	16.6 ± 4.6	15.3 ± 5.4
Emotional impact	12.9 ± 6.6	10.9 ± 5.9
Previous non-drug treatments for dizziness (%)		
Any	18.9	23.2
Physiotherapy	3.8	12.5
Physical Exercise	7.5	3.6
TMT A (s)	51.0 ± 15.2	54.2 ± 18.9
TMT B (s)	126.7 ±57.1	119.6 ± 56.1
Mean hearing threshold (dB HL)	33.3 ± 14.7	34.0 ± 14.1
Concomitant medication (%)		
Any	88.7	85.7
agents acting on the RAAS	54.7	44.6
beta blocking agents	28.3	35.7
antithrombotic agents	39.6	21.4
Concomitant diseases (%)		
Any	88.7	85.7
Vascular disorders	64.2	60.7
Metabolism disorders	47.2	39.3
Musculoskeletal disorders	41.5	41.1

Decker et al., Frontier Neurol. 2021

Fall risk declines with EGb 761® plus balance training plus vibrotactile neurofeedback (VNF)



Decker et al., Frontier Neurol. 2021

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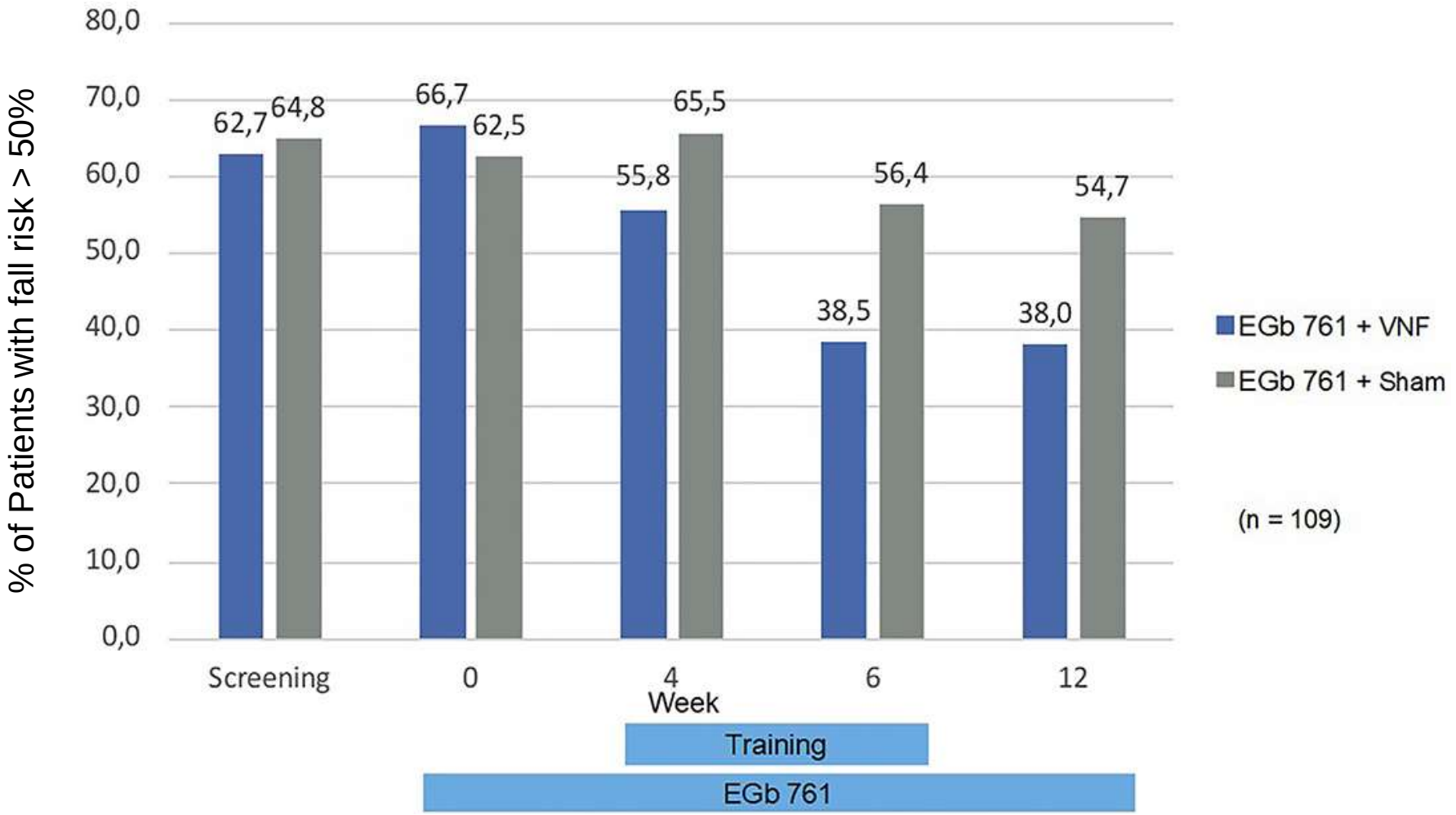
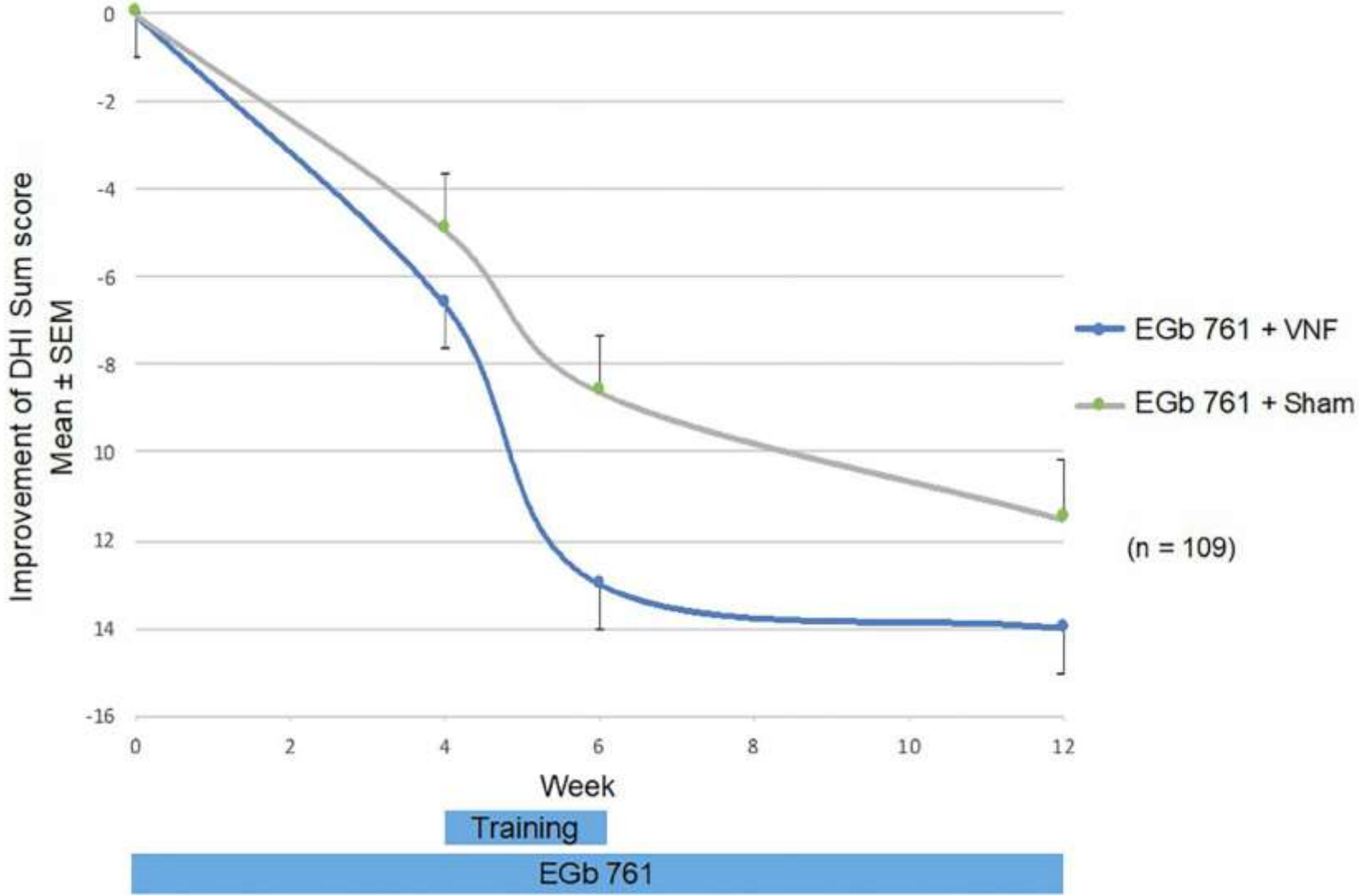


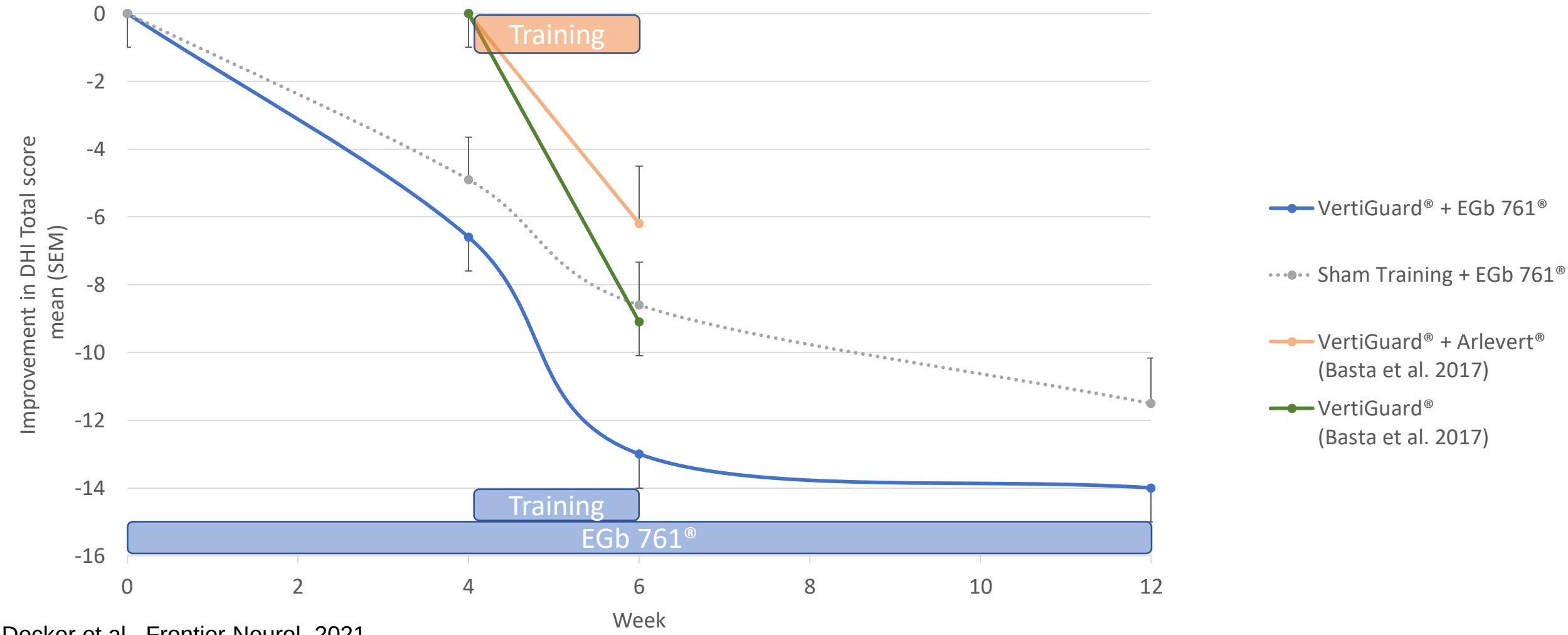
Decker et al., Frontier Neurol. 2021

Impairment due to dizziness improves with EGb 761® plus balance training plus vibrotactile neurofeedback (VNF)



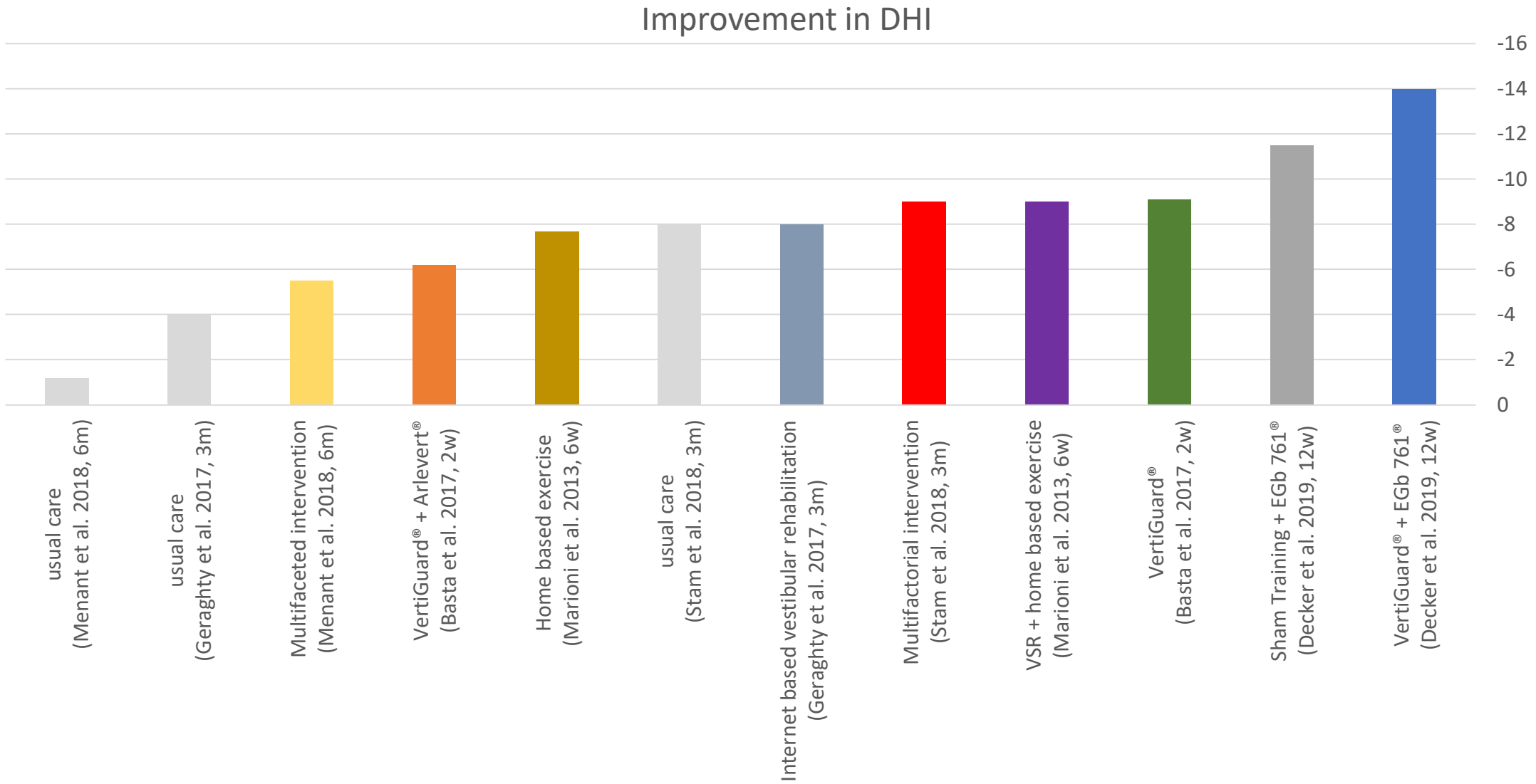
Decker et al., Frontier Neurol. 2021

Apparent synergy of EGb 761® and VNF reducing impairment due to dizziness in everyday life

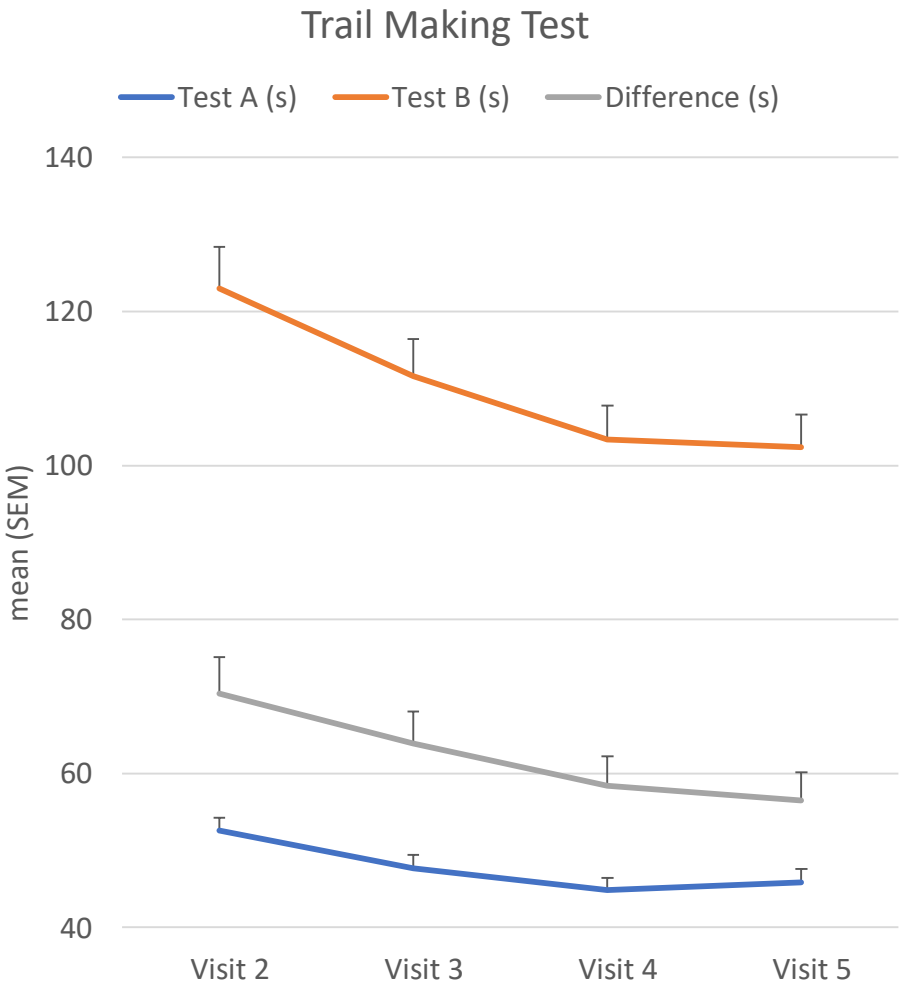


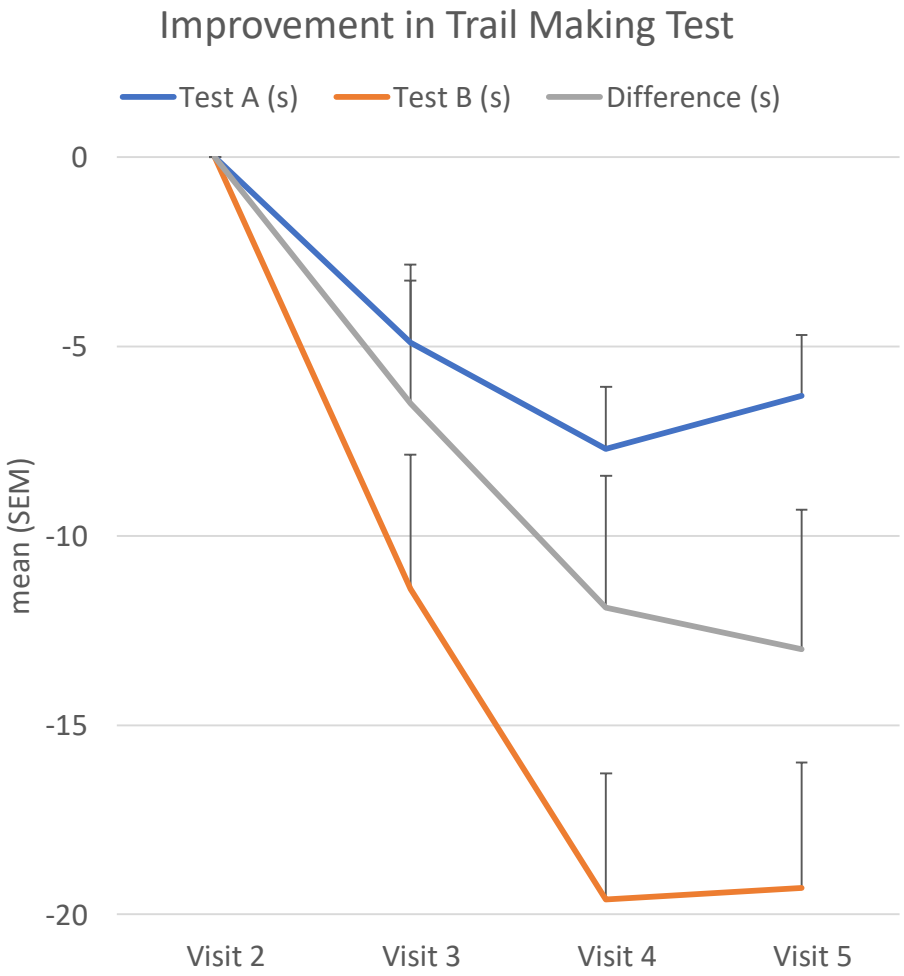
Decker et al., Frontier Neurol. 2021

Remarkable improvement of impairment due to dizziness in everyday life



Cognition improves in patient treated with EGb 761® for age-related vertigo and dizziness





n = 109
ø age 74 y

Decker et al., Frontier Neurol. 2021

Good tolerability of
EGb 761® plus balance training plus vibrotactile neurofeedback

- No fatalities
- 5 serious adverse events, all typical for the included age group:
  - Collapse, hypertensive crisis, ovarian cystenofibroma, stroke, fall.
  - All with no or unlikely association with investigational treatments
- No adverse events related to VertiGuard® or procedure
- Observed incidence for falls only 3% in 12 weeks

Decker et al., Frontier Neurol. 2021

Conclusion

- Combination of balance training with vibrotactile neurofeedback and EGb 761® reached clinically relevant improvements
  - Largest improvement in everyday life impairment in age-related vertigo reported to date in any trial
  - Reduction of the risk of falls as already described for balance training with vibrotactile neurofeedback alone
  - proportion of patients with fall risk > 50% declined from 67% to 38%
  - Observed 12-week incidence of falls only 3%
- Good tolerability of the combination

Decker et al., Frontier Neurol. 2021