

# POSTURAL CORRECTION IN PRIMARY SCHOOL CHILDREN AND THE EFFECTS OF SCHOOL BACKPACK ON POSTURE

Katona V<sup>1</sup>, Kovacs L<sup>1</sup>, Elmer D<sup>2</sup>, Pakai A<sup>3</sup>, Horvath B<sup>1</sup>

- 1. Institute of Physiotherapy and Sports Science, Faculty of Health Sciences, University of Pécs, Pécs, Hungary
- 2. Institute for Health Insurance, Faculty of Health Sciences, University of Pécs, Pécs, Hungary
- 3. Institute of Emergency Care, Pedagogy of Health and Nursing Sciences, Faculty of Health Sciences, University of Pécs, Pécs, Hungary

### OBJECTIVES

Students spend a substantial amount of time sitting at school desks and carry heavy loads on their backs, which requires proper musculoskeletal function as well as adequate opportunities for physical activity. The aim of our study was to examine the relationship between posture and school backpack use among primary school students, with particular emphasis on the effects of a posture correction exercise program.

### METHODS

The longitudinal, quantitative study was conducted at the Derkovits Városrészi Szent Márton Catholic Primary School between January and March 2024. Sixth- and eighth-grade students without musculoskeletal disorders were purposively selected for inclusion. Students who missed more than 30% of the exercise program were excluded (N=3). The assessment employed the 12 tests of the Hungarian Spine Society, as well as the Matthias test, Schober test, Domján lateral flexion test, and the Plank test (p<0.05).

### RESULTS

Participants carried school backpacks weighing an average of 10.60±4 kg, corresponding to 12.48±7% of their body weight. Following the 12-week posture correction exercise program, significant improvements were observed in the 12 tests of the Hungarian Spine Society (p<0.05), as well as in the results of the Matthias, Schober, lateral flexion, and Plank tests (p<0.05). A significant reduction was also found in the distance between the inferior angles of the scapulae (p<0.05). Among sixth-grade students in the control group, improvement in protracted head posture was more pronounced than in eighth-grade students, further supporting the age-specific adaptability and effectiveness of the program.

### CONCLUSIONS

Based on our results, it can be concluded overall that the complex exercise program is suitable for both preventive and corrective purposes, and thus may play a significant role in the prevention and management of postural disorders in childhood. Proper adjustment of school backpacks supports the effectiveness of the exercise program.

N=37	AGE	WEIGHT (KG)	SCHOOLB AG'S WEIGHT (kg)	SCHOOLB AG-WIEIGHT %
AVERAGE	13,05±1,12	59,75±16,11	5,9±1,39	10,60±3,96
AVERAGE OF GRADE 6	11,85±0,66	56,16±15,8	6,57±1,28	12,48±4
AVERAGE OF GRADE 8	13,78±0,59	61,93±16,24	5,48±1,31	9,46±3,55

Table 1. Sociodemographic Characteristics of the Participants (2024)

PHASE	WEEK	INTENSITY	MAIN FOCUS	Key features
ADAPTION	1-2	LOW	BREATHING, POSTURE AWARENESS	BASIC EXERCISES
DEVELOPMENT	3-6	LOW-MODERATE	SPINAL MOBILITY, STRENGTHENING	SHORT LEVER ARM EXC.
PROGRESSION	7-10	MODERATE	CORE STABILITY	UNSTABLE SURFACE
ADVANCED	-11-12	MODERATE-HIGH	POSTURAL CONTROL	RESISTENCE BANDS, TIMING

Table 2. Exercise programme progression (2024)

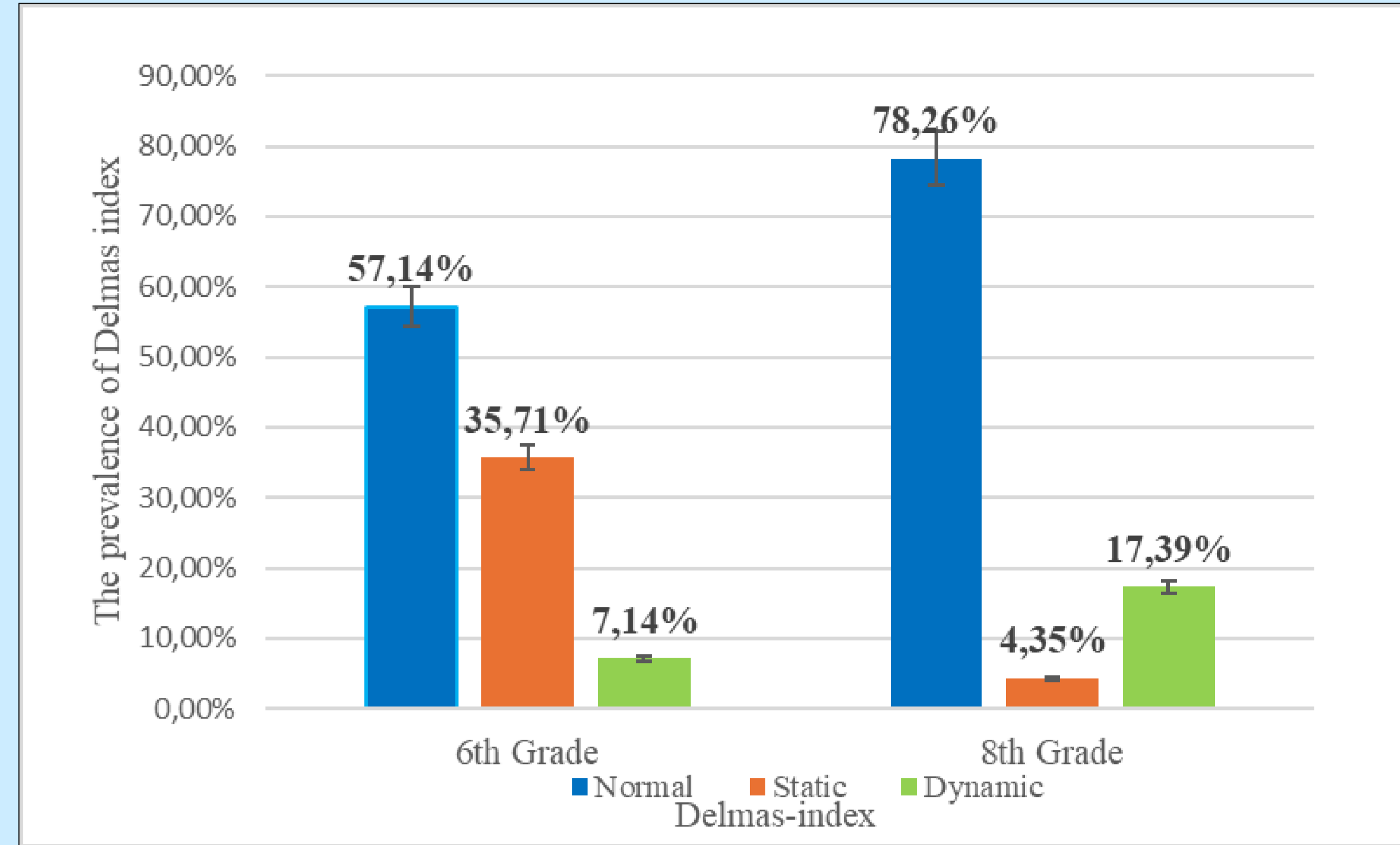


Figure 1. Distribution of Delmas-index categories by grade (2024)

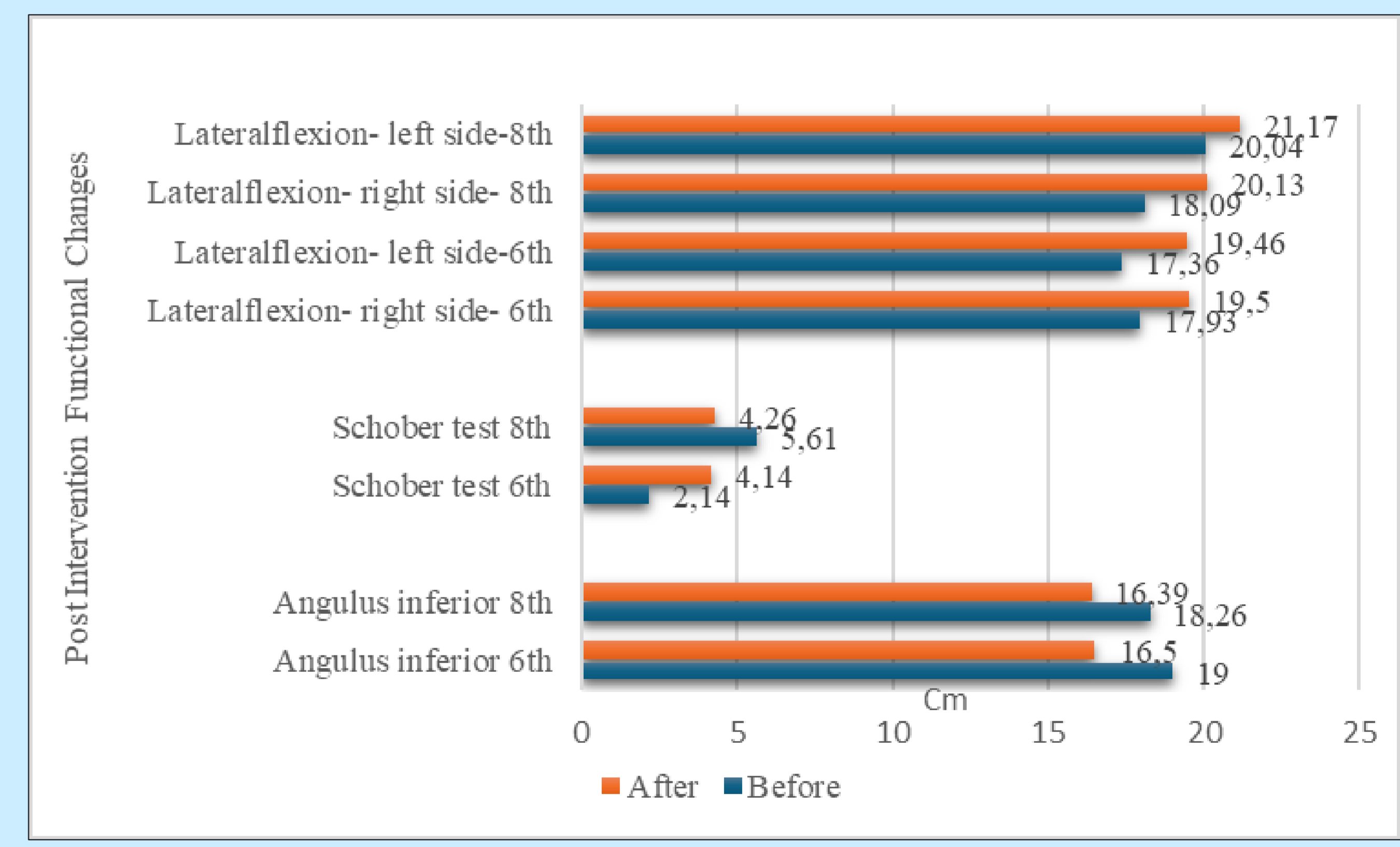


Figure 2. Functional Changes after the intervention programme (2024)



Corresponding author:  
 prof. dr. Annamária Pakai, RN, MNS, PhD, Habil  
 University of Pécs, Faculty of Health Sciences, Hungary  
 Institute for Health Insurance  
 E-mail: annamaria.pakai@etk.pte.hu

