

Evaluation of 7–9 years old children’s motor function according to Touwen neurological examination



BACKGROUND

Lately there has been an increase in the number of children who come to physiotherapist without concrete diagnosis, but still have minor deviations in motor performance. Thus, there is growing need for a specific test to evaluate neurological status of children through evaluation of motor functions. Neurological examination according to Touwen (TowenNE) is detailed, standardized, age-specific examination, which takes into account the developmental aspects of rapidly changing nervous system. Most of the units in examination assess motor or sensorimotor function. Neurological examination according to Touwen allows for the differentiation into three neurological subtypes: children who have normal neurological condition, children who have simple minor neurological dysfunction (MND) and children who have complex MND.

PURPOSE

The aim of the study was to assess 7-9 years old children’s neurological function according to TowenNE. The goals of the study were (1) to find out the prevalence of minor neurological dysfunction in children aged 7-9-years, (2) to find out the most affected units in Touwen neurological examination in children aged 7-9-years, (3) to evaluate the correlations between prevalence of MND and gender, age, physical activity, emergence of walking, Apgar score, academic achievement and independence in activities of daily living.

METHODS

63 healthy 7-10-years-old children (32 males, 31 females; mean age 8,4 years \pm 0,91) were studied. The most important exclusion criterion was diagnosed neuromuscular disease (CP, dystrophy). Firstly, parents answered a questionnaire about their child. Children’s weight and height was measured. Every child underwent TowenNE. Results were documented, coded and analysed to find correlations between gender, age, activity, birth anamnesis, functional skills and outcomes of TowenNE. The Statistica 12 was used. For correlational analysis the Spearman Rank Order Correlation was used. $P < 0.05$ was considered statistically significant.

RESULTS

The prevalence of simple MND was 27% (n=17), complex MND 5% (n=3) (Figure 1). The prevalence of MND was evenly divided between boys (n=10) and girls (n=10). Simple MND appeared more in girls (n=10) than boys (n=7), complex MND appeared only in boys (n=3) (Figure 2). The most commonly affected unit in TowenNE was coordination (Figure 3). Prevalence of MND was correlated with age (lower prevalence, older age, $r = -0.296$, $p < 0.05$) and help needed with dressing (higher prevalence, more help, $r = 0.317$, $p < 0.05$). Prevalence of MND did not correlate statistically significantly with gender, Apgar score, emergence of walking, activity and academic achievement. Dysfunction in coordination according to TowenNE was correlated with the help needed with dressing ($r = 0.289$, $p < 0.05$) and dysfunction in fine motor was correlated with the help needed with shoelaces ($r = 0.256$, $p < 0.05$).

CONCLUSION

The prevalence of simple MND in healthy 7-9-year-old children is 27% and of complex MND 5%. The prevalence of MND is correlated with age: simple MND appears less in older children. The most common dysfunctional units of TowenNE are coordination and fine motor. Higher need for help while dressing is statistically significantly correlated with the prevalence of MND and coordination problems.

IMPLICATIONS

TowenNE is a simple test that should be more widely introduced to physiotherapists. This 30-minute examination requires no special equipment and helps to select children, who need special assessment and attention.

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Ethics approval

Tallinn Medical Research Ethics Committee. Permission No 107

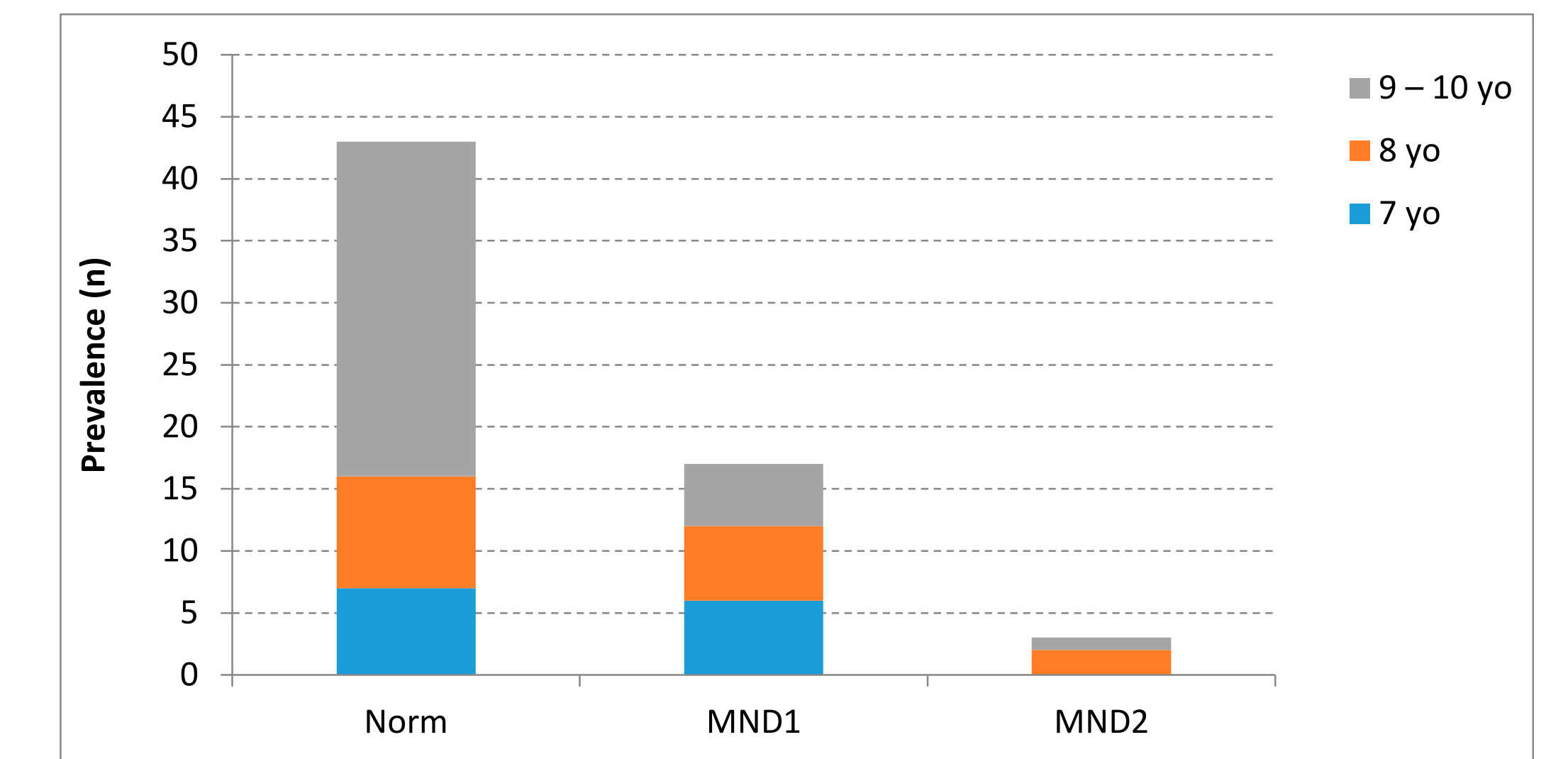


Figure 1. Prevalence of minor neurological disorder in children of different ages.

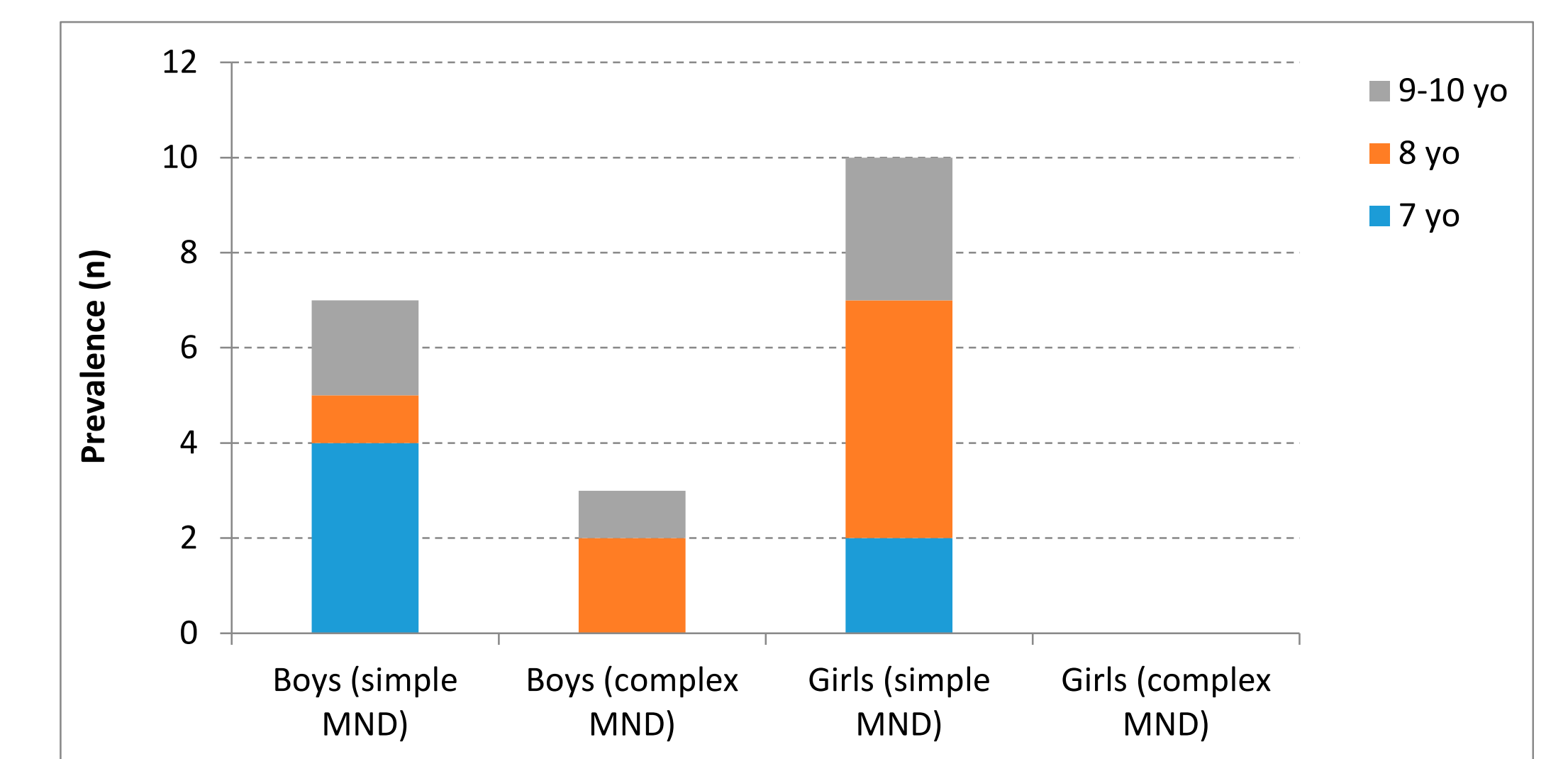


Figure 2. The prevalence of minor neurological disorder in children of different age and sex.

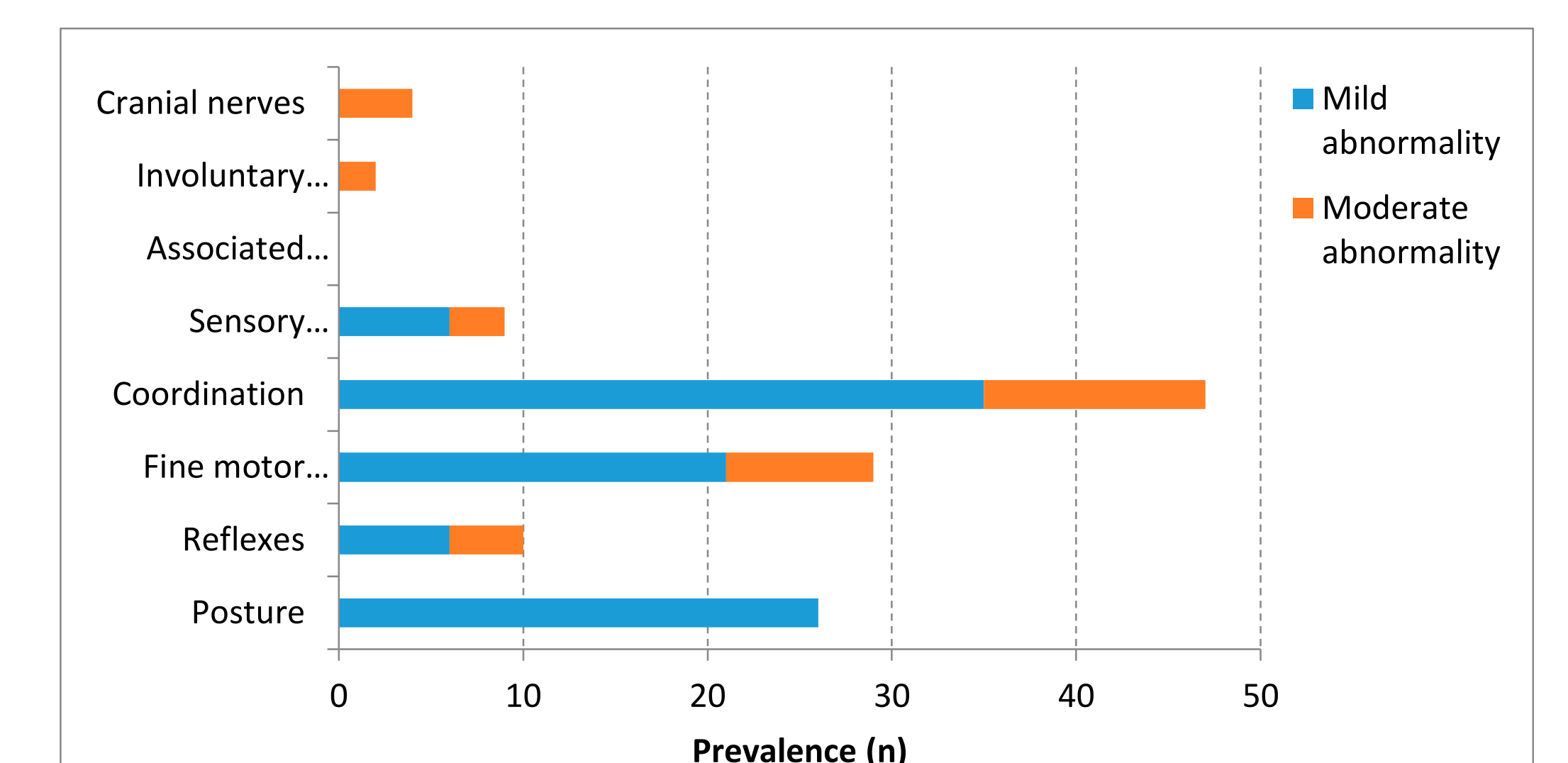


Figure 3. The abnormalities in different categories of Touwen neurological examination.

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