The relationship between respiratory muscle strength and exercise in primary school children in Leicestershire

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Rationale:
Few studies relate respiratory muscle strength to physical activity. One study of 100 adults has shown a significant relationship between exercise and respiratory muscle strength, measured as maximum inspiratory or expiratory pressure (MIP and MEP, respectively). 1 A separate study reported that boys aged 7-8y who swim have larger maximum respiratory pressures than those who are sedentary. Data in healthy children, over a wider age range are lacking. 2

Objectives:
I sought to determine the relationship between respiratory muscle strength and exercise in healthy children.

Methods:
➢ The children’s families were contacted through the schools. Children took home a letter, consent form and a questionnaire. Children aged 5-11 were eligible if they were healthy and if parental consent was given. Each child gave assent at the time of my visit to the schools.
➢ I measured height, weight, and respiratory muscle strength (Vynitus pneumo, Carefusion). (Figure 1)
➢ Respiratory muscle strength was assessed by measurement of maximum expiratory and inspiratory pressures (MEP and MIP, respectively). For both measurements, the child breathed through a flow meter attached to a shutter. To measure MEP, after several quiet breaths, the child was asked to breathe in until the lungs were full, and the shutter was activated during this big breath. S/he was then encouraged to try and breathe out hard against the obstruction. The peak pressure was recorded and the manoeuvre was repeated several times. (Figure 2)
➢ Measurement of MIP was similar, except that the child breathed out as far as possible and then made a forceful inspiratory effort. (Figure 2)

Results:
➢ One hundred seventy-five children were studied. I have obtained MIP on 124 children (44 reported no exercise) and MEP on 138 (46 no exercise).
➢ MEP were higher in boys than in girls (p=0.002, t=0.0003) respectively (Figures 3 & 4)
➢ No significant differences were detected in MIP & MEP between boys who do exercise and boys who do not (p=0.20, p=0.09) respectively.
➢ Girls who exercise have greater inspiratory muscle strength (MIP) compared to those who do not (p=0.0004) (Figure 5)
➢ No significant difference was detected in MEP between girls who do exercise and girls who do not (p=0.09).

Conclusion:
Girls who exercise have greater maximal inspiratory pressure (MIP) but not MEP compared to those who do not. This does not appear to be the case in boys, and I will explore reasons for this as the study progresses.

References:

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