Integrating health physical activities into primary education: A study of South Bohemian elementary schools

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ABSTRACT

Objectives: The aim of the study was to analyse the frequency and methods of integrating elements of Health Physical Education into the curriculum in South Bohemian primary schools. This study builds on contemporary research findings indicating that the Czech School Inspectorate (CSI) strongly recommends increasing physical activity in elementary school curricula alongside conventional Physical Education (PE) through Health Physical Education (HPE) programs. The allocation of HPE funds is recommended for the mitigation of functional disorders of the locomotor system, in addition to the promotion of associated benefits derived from physical activity.

Methodology: As part of the quantitative investigation, a self-constructed questionnaire with 22 questions was distributed to the management of 250 elementary schools in the South Bohemian Region with a request to forward it to 1st grade teachers. The questionnaire included closed-ended, semi-closed, and open-ended questions focusing on the use of HPE elements in PE lessons and in other subjects. A total of 92 teachers completed the questionnaire.

Results: The results of the questionnaire survey revealed that 32.6% of teaching professionals in the South Bohemian Region engage in corrective exercise on a regular basis, including stretching and strengthening activities, on a daily basis. The survey further revealed that only 29.3% of teaching professionals incorporate physical education moments into their lessons on a daily basis. Additionally, it was observed that three-quarters of teaching professionals utilize movement to facilitate learning during mathematics or Czech language lessons.

KEYWORDS

corrective exercise; younger school age; physical education; movement moments; learning in movement

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INTRODUCTION

The transition to elementary school represents a substantial life change for both children and their parents, along with new opportunities for cognitive and psychosocial development. Nevertheless, this transition can simultaneously create negative consequences, most notably the curtailment of daily physical activity. Preschool children typically engange in significant amounts of physical activity on a daily basis; however, this is significantly reduced when they enter into school. The national report on the physical activity of Czech children and youth (Gába et al., 2022) highlights that almost half of school children are not sufficiently active, and that the reduced exercise load cannot easily be compensated even by afternoon activities, such as spontaneous play outside or organized exercise after school activity. The influence of digital technologies, which according to Sigmundová et al. (2010) should not exceed 90 minutes per day for children aged 6–11, is another factor that limits children's movement. Hamřík et al. (2012) found that more than half of children spent two or more hours a day in front of screens. The 2022 National Report further illuminates this trend, revealing that a staggering 71% of children already engage in two or more hours of "screen time" daily (Gába et al., 2022). Similar concerns have been raised internationally, with evidence showing that increased sedentary behavior, including screen time, is negatively associated with physical and mental health among school-aged children (Tremblay et al., 2011).

Movement represents a natural need for children of younger school age (6–11 years), which is affected by growth changes and other factors (Dvořáková & Engelthalerová, 2020). In addition to the positive impact on physical and mental health, movement plays a key role in concentration and attention, which has a direct effect on the quality of education (Dvořáková & Engelthalerová, 2020). While sufficient exercise contributes to the positive development of children, hypoactivity has serious risks. A prevailing concern within the contemporary school population pertains to the prevalence of functional disorders within the locomotor system, characterised by posture-related imbalances and muscle dysfunction. Research findings indicate that the prevalence of posture-related disorders in children ranges from 38% to 51% (NIPH, 2016; Šeráková, 2009; Vrbas, 2010). Furthermore, the prevalence of these conditions is known to increase with age, and they have been identified as a contributing factor to the development of locomotor system problems in adulthood (Kratěnová, 2006; Kolisko, 2003). However, it is also important to note the significant increase in both mental and metabolic diseases, and the decrease in physical fitness, which are already being observed in childhood (Sigmundová et al., 2010).

The World Health Organization (WHO) has long recommended that children and young people engage in physical activity for a minimum of 60 minutes per day at a medium to high intensity (WHO, 2010, 2020). The majority of this activity should be of an aerobic nature, while at least three times per week should include exercises to strengthen muscles and bones (NHIP, 2023). For children, these exercises should be natural, for example running, jumping or climbing over obstacles (WHO, 2010, 2020; NHIP, 2023; Sigmundová et al., 2010). These global recommendations highlight the urgent need for systematic physical activity programs in schools. International research confirms that school-based interventions can significantly increase children's

physical activity levels and improve their fitness and health outcomes (Dobbins et al., 2013).

Primary school education plays a pivotal role not only in a child's cognitive development, but also influences other domains, including biological and psychosocial development. In its material Active School, the Czech School Inspectorate (2023a) draws attention to the significant responsibility of schools for the physical development of children, a commitment that is in accordance with the Education Act, which emphasises the support of children's development to the maximum extent possible based on modern knowledge (561/2004, Education Act). This position is further elaborated in the publication by the Centers for Disease Control and Prevention (CDC, 2013), which released the Comprehensive School Physical Activity Program: A Guide for Schools. Furthermore, physical education lessons serve as a critical platform to establish healthy lifestyle habits during early life stages, which are associated with numerous physical and mental health benefits (Pate, O'Neill, & McIver, 2011).

As CSI (2023a) notes, there are a variety of ways in which physical activity can be integrated into the school day. These include physical education, which typically comprises 2–3 hours per week. However, this is often insufficient in light of contemporary lifestyles. It is therefore recommended that physical activities be incorporated into the entire teaching day (Hošková & Nováková, 2008).

Movement breaks are defined as short 2–3 minute blocks aimed at activating attention, compensating for prolonged sitting and correcting posture (Dvořáková & Engelthalerová, 2020). Learning in movement, a kinesthetic approach to teaching where movement facilitates understanding of subject matter, is employed, for example, in the Hejný method of mathematics (Hejný, 2005).

Movement breaks represent a natural form of physical activity occurring during the school day, supporting both physical fitness and a positive social climate in the classroom (Mužík & Vlček, 2010). Another concerning phenomenon limiting schools' ability to foster children's physical literacy is the growing number of students exempted from physical education (Ješina et al., 2024; Vařeková et al., 2022). This trend negatively affects their inclusion in other physical activities within the school environment. This has a detrimental effect on the inclusion of children in other physical activities within the school environment. Conversely, the judicious implementation of health and adapted physical education, as delineated by the Framework Educational Program for Basic Education (NPI, 2024), holds the potential to enhance the efficacy of this endeavour. The prescription of suitable corrective exercise regimens is furthermore contingent upon the capacity of physical education teachers to perform an orientational diagnosis of movement disorders in a practical context (Ješina et al., 2020, Vařeková, 2020).

The aim of this work is to analyse the frequency of use of means for the prevention of poor posture and muscle imbalances in elementary schools in the South Bohemian Region.

METHOD

As part of the quantitative study, a custom-designed questionnaire focused on the use of health physical education procedures was disseminated to the management of 250 elementary schools in the South Bohemian Region with a request to forward it to

1st grade teachers. The questionnaire, created in the Survio environment, contained 22 closed, semi-closed and open questions, which were divided into several sections. The initial six questions addressed the provision of physical education in schools, enquiring about its status as a compulsory or optional subject and the number of pupils exempted from physical education. Questions seven to ten pertained to the recommended elements of physical education included in regular classes, such as diagnostics, stretching, and strengthening. Questions 11 to 13 addressed the incorporation of movement elements into other lessons beyond physical education – for example, movement games in Czech language and mathematics, as well as movement-based activities in other subjects (movement breaks). The subsequent questions focused on the conditions in schools and teachers' subjective opinions regarding the use of movement elements in education.

RESULTS

A total of 92 teachers of first grade from primary schools in the South Bohemian Region completed the questionnaire. Only 2 schools confirmed the teaching of Health Physical Education (HPE) as a separate subject, which corresponds to 3.3% of respondents. In the form of a group exercise person, HPE is only offered at one school, specifically in the form of a yoga group for eight children once a week (Fig. 1).

The majority of respondents reported that their schools had no students exempted from PE, with eight educators reporting one exempted student in their class and only one educator reporting two exempted students.

59.3% of teachers reported monitoring posture and muscle imbalances, and 39.6% only noticing more severe cases. The aggregate response of 89.9% of educators indicates a collective awareness of these issues, albeit with varying degrees of attention.

The incorporation of corrective exercise in PE classes varies significantly. A substantial proportion of teachers (51.7%) consistently integrate stretching exercises targeting muscles with a tendency to shorten into their lessons. In contrast, 47.2% of teachers incorporate these exercises on an occasional basis, while a notable 1% does not include them at all. Furthermore, a significant proportion, amounting to 32.6%, incorporates strengthening exercises targeting weak muscles in every lesson. However, this practice is less common, with only 64% of teachers choosing to do so occasionally. Notably, one teacher does not incorporate strengthening exercises at all. Exercises targeting the deep stabilization system are included in every lesson by 12.4% of teachers, while 61.8% include them on an occasional basis and 20% of teachers are uncertain about the suitability of exercises for this purpose. Furthermore, 29.3% of teachers regularly include physical education moments in their lessons on a daily basis, while 65.2% do so only occasionally. It is noteworthy that only 5.4% of teachers do not incorporate these moments in their lessons. The majority of respondents, specifically 93.5%, expressed the importance of the inclusion of corrective exercise. However, it is also important to note that half of the teachers expressed uncertainty regarding their ability to compile appropriate exercises based on their knowledge.

In 53.8% of schools, pupils have the opportunity to engage in physical activity during school breaks. The most frequently mentioned activities include ball games, table tennis, jumping hoops and spending time on the school playground. Furthermore,

three-quarters of teachers incorporate movement into their lessons, particularly in mathematics and the Czech language. The most prevalent activities include running dictations, movement alphabet, walking and mathematical exercises.

Regarding teaching outside the school building, 26.1% of teachers go out with their children at least once a week, while 54.3% do so at least once a month. 96.7% of teachers said that they have good conditions for walking around the school. Teachers' comments indicated that the biggest obstacle to the inclusion of physical activities in teaching is the lack of time and space. The teachers further noted that parents' insufficient support and physical education teachers' use of unnecessary excuses were significant barriers. The teachers also highlighted the school management's approach to physical activities during breaks as playing a significant role. Additionally, some teachers pointed to the overall decline in normal physical activities in families and the growing number of children with health problems.

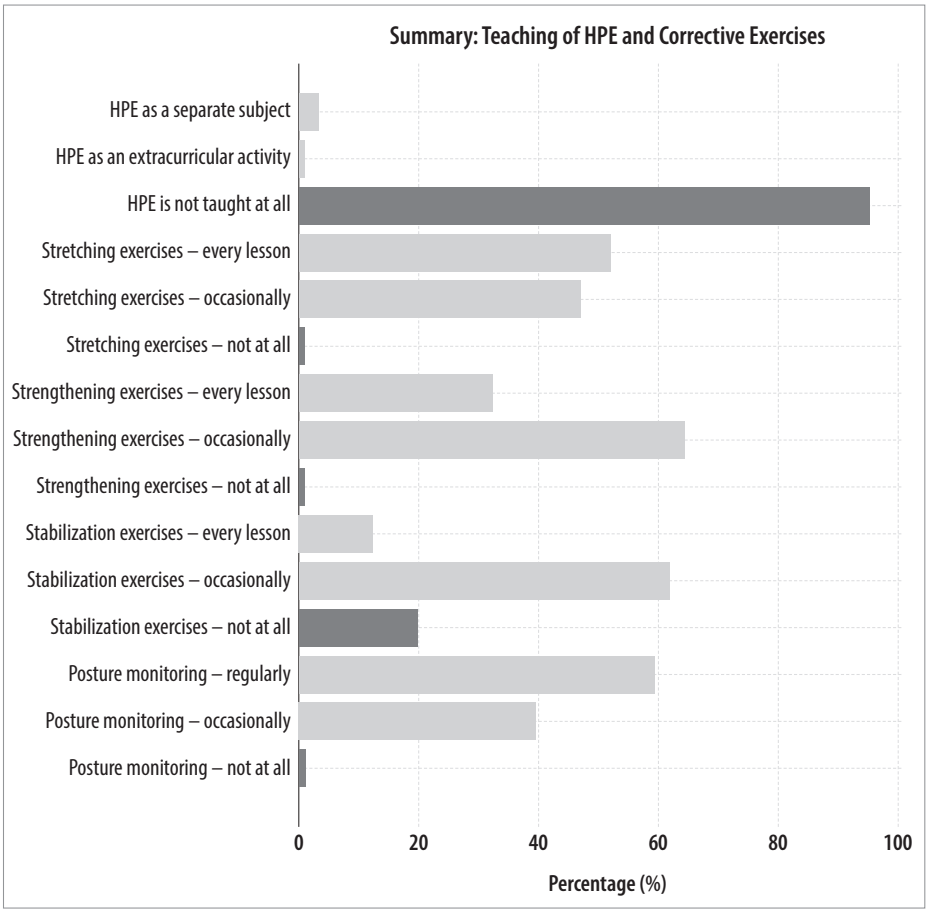

Figure 1 Frequency of selected responses on health physical education and corrective exercise.

DISCUSSION

Current lifestyles, characterised by insufficient physical activity and children spending their free time sitting at the phone or computer, causes a high percentage of children to suffer from functional disorders of the locomotor system and poor posture, which may, in the future, have a negative effect on a number of civilizational diseases and the overall quality of human life (NIPH, 2016; Kratěnová et al., 2006; Kolisko, 2003; Šeráková, 2009). In light of these concerns, the Czech School Inspectorate has initiated a series of thematic investigations and issued methodological recommendations to promote physical activity in schools (Active School, CSI 2023a). These recommendations are underpinned by the observation that pupils spend a significant portion of their day, ranging from a quarter to a third, in educational institutions, making schools a pivotal influence on their lifestyle alongside the family. The inadequate inclusion of exercise in the school curriculum thus poses a fundamental risk to the health development of pupils (Active School, CSI, 2023a).

The primary objective of this study was to determine whether adequate provisions are in place to mitigate the adverse effects of contemporary society on the physical well-being of children in the initial grade of elementary school. The central inquiry posed to educators pertained to the frequency with which they engage in corrective physical education activities.

The results of the questionnaire survey revealed that in elementary schools in the South Bohemian Region, HPE is only minimally taught as a discrete subject. This finding corroborates the national decline in HPE, as evidenced by the Czech School Inspectorate's thematic report for the 2022–2023 academic year, which followed the 2016 survey (CSI, 2016, CSI 2022). This situation indicates the need to include elements of Physical Education in regular PE lessons and also in other subjects in the form of movement breaks. It is also a shame that HPE in the form of an extracurricular HPE group was mentioned by only one respondent. The reasons may include the limited capacity of school facilities for clubs, a lack of interest on the part of children or their parents, and also teachers' unwillingness to participate in these activities.

The data found correspond to the CSI Thematic Report from 2016, which stated that only 3.4% of elementary schools organised the teaching of the separate subject of HPE. At these schools, an average of 10.2 pupils attended the subject in the 1st grade and 9.4 pupils in the 2nd grade (Ibid.). An extensive survey from 2023 then confirmed a very low proportion of schools providing HPE classes. Conversely, a favourable trend was observed in certain schools, characterised by the augmentation of PE hours utilising available time (less than a third of schools) or the introduction of elective subjects related to PE (less than half of schools) (CSI, 2022).

The findings pertaining to the provision of exemption from physical education were found to be remarkably favourable. The majority of the schools surveyed reported no instances of disengaged pupils in the first grade, with only a minimal number of cases being reported among those who did express such concerns. The number of students granted exemption from television classes is a parameter that is subject to close monitoring. Section 50 of the Education Act (561/2004) stipulates the criteria for exemption, which include parental request and a physician's confirmation. Concurrently, the exemption from PE has been the subject of criticism, with commentators asserting

that it constitutes a violation of children's rights to equal access to education (Ješina et al., 2024). This is due to the fact that support measures are not applied in an appropriate manner depending on the needs of the individual, as is customary in other subjects. The ombudsman of the Czech Republic has previously addressed this issue (Višňa, 2024).

The number of exempted pupils was also discussed in the 2016 CSI thematic report. In that year, an average of 1.2 exempted pupils per school was recorded at the first level (0.8 partially and 0.4 fully exempted) and an average of 2.4 at the second level (1.4 partially and 1 fully exempted). Consequently, it can be concluded that the findings of our investigation are in alignment with the conclusions of the aforementioned report. The investigation was conducted at the first level, a time when the number of exempted pupils remains relatively low. A more significant increase is observed in secondary schools (95% of secondary schools had exempted pupils in 2016, with an average of 8.7 partially exempted and 17.8 fully exempted per school), although these institutions were not the primary focus of our research.

As stated in the methodological recommendations of the CSI (Active School material and related document for self-evaluation), the importance of quality formative assessment of pupils in PE is recognised. The document for self-evaluation of schools commends the practice of "Recording and monitoring of data on the motor development of pupils is ensured on the basis of regular assessment of pupils, which is a regular part of Physical Education. This is then used to differentiate teaching methods ... The school provides parents with recommendations for student development if they express interest" (CSI 2023a, p. 32). It is recommended that such an assessment should not only include fitness testing, but also the most common functional disorders of the locomotor system. In the present survey, 59.3% of teachers reported that they monitor posture and muscle imbalances, while 39.6% only notice more severe cases. The findings of this study indicate that a substantial proportion of educators (89.9%) are committed to addressing these concerns, though to varying degrees. This observation underscores the necessity for a more comprehensive approach to address the underlying reasons for the observed disparities in attention.

The subsequent section of the questionnaire focused on the frequency with which teachers incorporate elements of corrective exercise into their practice. The results indicated that 32.6% of teachers regularly engage in corrective exercise, encompassing stretching and strengthening exercises, during each PE lesson. However, most teachers incorporate at least stretching exercises aimed at muscles with a tendency to shorten each PE lesson, with a third of them also including daily movement breaks in their lessons. It is acknowledged that the positive results may be influenced to some extent by the respondents' efforts to present themselves positively. 47.2% of teachers do stretching exercises with their students only occasionally. However, this is insufficient given the number of hours of PE, even if it were once a week. Strengthening exercises are included in PE lessons even less than stretching exercises. 64% of teachers in the South Bohemian Region include strengthening exercises in PE lessons only occasionally. A mere 32.6% incorporate strengthening exercises of muscles with a tendency to weaken every hour of PE. A mere 12.4% of teachers incorporate exercises to strengthen the deep stabilization system with pupils during each PE class, a figure that is particularly low given that research has shown that almost half of children

already exhibit posture problems by the time they enter the first grade (NIPH, 2016; Kratěnová et al., 2006; Kolisko, 2003; Šeráková, 2009). Furthermore, a fifth of the subjects interviewed reported a lack of awareness regarding the specific exercises recommended for enhancing the deep stabilization system function.

The majority of respondents (93.5%) acknowledged the importance of including corrective exercise, however, half of the teachers expressed uncertainty about their ability to compile appropriate exercises based on their knowledge, which may contribute to insufficient compensation.

A further investigation focused on graduates of the PE-oriented universities (Vařeková et al., 2021) revealed insufficient self-efficacy, i.e. subjectively low-rated competence to implement health-oriented exercise. The solution to this issue lies in the attention focused on undergraduate training, including internships, and the availability of quality regular in-service training for teachers. The CSI Thematic Report (2022) indicates that only 20% of PE teachers at the 1st level use further education of pedagogical staff (FEPS) focusing on physical education, with approximately 10% participating in seminars and conferences. A third of PE teachers at the 1st level stated that the offer of FEPS in the area of PE is insufficient.

In addition to structured physical education, the integration of brief movement activities into regular lessons plays an important role in the prevention of functional disorders of the musculoskeletal system. Carter et al. (2024) emphasise that implementing short movement breaks throughout the school day is not only feasible and cost-effective, but also beneficial in increasing pupils' physical activity, enhancing their attention and engagement, and supporting long-term health outcomes such as the prevention of childhood obesity. Despite these positive prospects, the findings of this study indicate that such breaks are often implemented in a limited and rather uniform way – typically involving simple stretching, hand relaxation exercises before writing, or recitation of poems with movement. While these strategies may help to interrupt prolonged sitting, they do not always offer a sufficient or targeted compensatory effect, particularly regarding posture correction. In the early stages of education, the inclusion of didactic games appears to be especially valuable – not only because they promote movement and position changes, but also due to their potential to increase motivation and deepen understanding of the learning content. It is therefore encouraging that a considerable number of teachers are already incorporating these forms of movement into their teaching practice.

The analysis of individual responses showed that the categorization of movement breaks was not affected by the number of seats in the classroom. In the questionnaire survey, some teachers identified insufficient time as the main reason for not implementing this activity. According to CSI (2023a), however, schools have a crucial responsibility to establish an organizational framework that supports the integration of movement into pupils' daily routines. Movement breaks serve as a necessary counterbalance to the one-sided mental and physical burden of children, and it is important for the teacher to be able to find the right moment to change the activity and thus influence the decreasing attention of the pupils and the deteriorated body posture (Nováček et al., 2001). An interesting result of the questionnaire survey was that three quarters of teachers use movement for learning during mathematics or Czech language lessons. These movement forms of teaching have been shown to enhance sub-

ject comprehension and student motivation, while also compensating for prolonged periods of sitting during lessons (Nováček et al., 2001).

In the context of the Active school programme, the CSI underscores the significance of the total volume, frequency, and intensity of physical activities in shaping the physical activity regime within educational institutions. The overarching objective is to foster an active student "who seeks out physical activities during the school day, including during breaks and in the afternoon. These activities should involve movement, such as stretching and walking, rather than sedentary behaviour" (CSI 2023a, Active School, p. 17). They further emphasize the importance of adhering to a movement regime during these breaks (Mužík & Vlček, 2010).

According to the respondents in our sample, pupils had the opportunity to be active during breaks in only 53.8% of schools, with the most frequently mentioned activities being ball games, table tennis, jumping shots or spending time on the school playground.

Regarding the use of outdoor educational opportunities, the data show that only 26.1% of teachers conduct outdoor activities with their pupils weekly, whereas 54.3% do so at least once a month.

Concurrently, a resounding majority of 96.7% of teachers reported that their institution provides favourable conditions for walking around the school, suggesting that the potential for outdoor education is not being fully exploited. This phenomenon may be attributed, at least in part, to the pedagogues' own attitudes and behaviours regarding physical activity and movement. Half of the teachers (50%) engage in active sports at least three times a week, while 16.3% participate in sports on an occasional basis and 8.7% engage in daily walks.

A recent analysis of teacher comments revealed that the most significant barriers to integrating physical activities into the curriculum are the lack of time and insufficient facilities (CSI, 2022). The prevalence of competing demands, such as fulfilling curriculum requirements and adapting to pupils' learning pace, was also identified as a major challenge. Furthermore, insufficient parental support and physical education teachers' reliance on unconvincing justifications were frequently cited as additional contributing factors. The school management's approach to physical activities during school breaks was also found to be a salient factor. Furthermore, some teachers highlighted the broader societal trend of a decline in physical activities within households, as well as the rising prevalence of children experiencing physical health challenges. This observation is corroborated by the findings of the CSI thematic report from 2022, which revealed that up to 22% of first-grade teachers perceive the school's facilities to be inadequate for teaching physical education, despite the presence of adequate equipment, such as balls and jump ropes.

CONCLUSION

The objective of the present study was to examine the extent to which and the manner in which teachers at the first level of elementary school in the South Bohemian region dedicate themselves to the prevention of posture disorders and muscle imbalances in their pupils. The results indicate that, although most teachers are aware of the importance of movement for the healthy development of children, the inclusion of corrective

exercise and movement activities during lessons is often insufficient. The prevailing constraints pertain to a paucity of time, space and opportunities within educational institutions, compounded by the competencies of teaching staff. The study further reveals that while many pedagogues employ learning through movement, approximately a third incorporate movement moments. However, it is imperative to enhance the pedagogues' expertise in the domain of corrective exercise to avert posture disorders and muscle imbalances, not solely in PE classes, but predominantly by integrating physical education moments into daily lessons. Given the rising prevalence of children experiencing mobility challenges, it is recommended that greater emphasis be placed on incorporating physical activities into both regular lessons and class periods.

REFERENCES

Carter, J., Greene, J., Neeraja, S., Bovenzi, M., Sabir, M., Carter, S., Bolton, A. A., Barrett, J. L., Reiner, J. R., Cradock, A. L., & Gortmaker, S. L. (2024, February). *Movement breaks in the classroom* [Issue brief]. Boston Public Schools; Boston Public Health Commission; CHOICES Learning Collaborative Partnership at the Harvard T. H. Chan School of Public Health. https://choicesproject.org/wp-content/uploads/2024/02/CHOICES_BPHC_MvmntBreaks_2024.pdf.

Centers for Disease Control and Prevention (2013). *Comprehensive school physical activity programs: A guide for schools.* Retrieved February 16, 2022, from: https://www.cdc.gov/healthyschools/physicalactivity/pdf/13_242620-A_CSPAP_SchoolPhysActivityPrograms_Final_508_12192013.pdf.

Czech School Inspectorate (CSI, Česká školní inspekce) (2023a). *Aktivní škola: Inspirace pro podporu pohybových aktivit žáků.* Retrieved February 3, 2025, from: https://www.csicr.cz/CSICR/media/Elektronicke-publikace/2023/MD_Aktivni_skola_pohybove_aktivity_a/html5/index.html?pn=3.

Czech School Inspectorate (CSI, Česká školní inspekce) (2023b). *Aktivní škola – autoevaluace: Vlastní hodnocení školy v oblasti podpory pohybových aktivit žáků.* Retrieved February 3, 2025, from: https://www.csicr.cz/CSICR/media/Elektronicke-publikace/2024/MD_Aktivni_skola_autoevaluace/html5/index.html?pn=1.

Czech School Inspectorate (CSI, Česká školní inspekce) (2016). *Tematická zpráva: Vzdělávání v tělesné výchově, podpora rozvoje tělesné zdatnosti a pohybových dovedností.* Retrieved February 3, 2022, from: https://www.csicr.cz/Csicr/media/Prilohy/PDF_el._publikace/Tematick%C3%A9%20zpr%C3%A1vy/2016_TZ_vzdelavani_v_telesne_vychove.pdf.

Czech School Inspectorate (CSI, Česká školní inspekce) (2022). *Tematická zpráva: Tělesná zdatnost žáků na základních a středních školách.* Retrieved February 3, 2025, from: https://www.csicr.cz/cz/Dokumenty/Tematicke-zpravy/Tematicka-zprava-%E2%80%93-Telesna-zdatnost-zaku-na-zaklad.

Dobbins, M., Husson, H., DeCorby, K., & LaRocca, R. (2013). School-based physical activity programs for promoting physical activity and fitness in children and adolescents aged 6 to 18. *Cochrane Database of Systematic Reviews*, *2013*(2), Article CD007651. https://doi.org/10.1002/14651858.CD007651.pub2.

Dvořáková, H., & Engelthalerová, Z. (2020). *Tělesná výchova na 1. stupni základní školy.* Prague: Karolinum. ISBN 978-80-246-3308-4.

Gába, A., et al. (2022). *Národní zpráva o pohybové aktivitě českých dětí a mládeže 2022.* Active Healthy Kids Czech Republic. Retrieved from: https://www.activehealthykids.org/wp-content/uploads/2022/04/Czech-report-card-long-form-2022-cz.pdf.

Hamřík, Z., Kalman, M., Bobáková, D., & Sigmund, E. (2012). Sedavý životní styl a pasivní trávení volného času českých školáků. *Tělesná kultura*, *35*(1), 28–39. Retrieved January 5, 2022, from: https://telesnakultura.upol.cz/pdfs/tek/2012/01/02.pdf.

Hejný, M. (2005). Matematika. In: *Proměny primárního vzdělávání v ČR* (pp. 175–191). Prague: Portál. ISBN 80-7178-942-9.

Hošková, B., & Nováková, P. (2010). Význam kompenzačních cvičení pro správné držení těla. *Studia Kinanthropologica*, *9*(1), 89–91. Retrieved March 6, 2022, from: http://www.pf.jcu.cz/stru/katedry/tv/SK_vol_9_2008_1.pdf.

Ješina, O. (2020). *Otázky a odpovědi aplikované tělesné výchovy II.* Olomouc: Univerzita Palackého.

Ješina, O., Tomoszek, M., Vařeková, J., & Kotlík, K. (2024). Uvolňování žáků z tělesné výchovy z pohledu práva a inkluzivního vzdělávání. *Pediatrie pro praxi*, *25*(6), 301–306.

Kolisko, P. (2003). *Integrační přístupy v prevenci vadného držení těla a poruch páteře u dětí školního věku.* Olomouc: Univerzita Palackého. ISBN 80-244-0750-7.

Kratěnová, J., et al. (2008). Výskyt vadného držení těla u dětí školního věku v ČR. *Demografie*, *50*(2), 144–148. Retrieved December 5, 2021, from: https://sancedetem.cz/publikace/vyskyt-vadneho-drzeni-tela-u-deti-skolniho-veku-v-cr.

Kopřivová, J. (2000). Jak naučit děti mladšího školního věku návyku správného držení těla. *Těl. Vých. Sport Mlád.*, *66*(2), 19–21.

Mužík, V., & Vlček, P. (2010). *Škola, pohyb a zdraví: výzkumné výsledky a projekty.* Brno: Masarykova univerzita. ISBN 978-80-210-5371-7.

National Institute of Public Health (NIPH, Státní zdravotní ústav) (2016). *Studie zdraví dětí 2016.* from: https://szu.gov.cz/temata-zdravi-a-bezpecnosti/studie-zdravotniho-stavu-obyvatelstva/deti/studie-2016/.

National pedagogical Institute of the Czech Republic. Národní pedagogický institut. NPI (2024). *Rámcový vzdělávací program pro základní vzdělávání.* Retrieved from: https://prohlednout.rvp.cz/zakladni-vzdelavani.

National Health Information Portal (Národní zdravotnický informační portál, NHIP) (2023). *Doporučení pro pohybovou aktivitu dětí a dospívajících.* Retrieved February 2, 2025, from: https://www.nzip.cz/clanek/1573-doporuceni-pro-pohybovou-aktivitu-deti-a-dospivajicich.

Pate, R. R., O'Neill, J. R., & McIver, K. L. (2011). Physical activity and health: Does physical education matter? *Quest*, *63*(1), 19–35. https://doi.org/10.1080/00336297.2011.10483660.

Sigmundová, D., Sigmund, E., & Šnoblová, R. (2010). Návrh k doporučení provádění pohybové aktivity pro podporu pohybově aktivního a zdravého životního stylu českých dětí. *Tělesná kultura*, *35*(1), 9–7. Retrieved February 5, 2022, from: https://www.researchgate.net/publication/285037466_Proposal_of_physical_activity_recommendations_to_support_of_active_life_style_of_Czech_children.

Šeráková, H. (2009). *Cvičím pro zdraví a baví mě to.* Brno: Masarykova univerzita. ISBN 978-80-210-4833-1.

Tremblay, M. S., LeBlanc, A. G., Kho, M. E., Saunders, T. J., Larouche, R., Colley, R. C., Goldfield, G., & Gorber, S. C. (2011). Systematic review of sedentary behaviour and health indicators in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity, 8*, 98. https://doi.org/10.1186/1479-5868-8-98.

Vařeková, J. (2020). Diagnostika ve zdravotní tělesné výchově. *Těl. Vých. Sport Mlád.*, *86*(6), 12–20.

Vařeková, J., Křivánková, M., Šubertová, A., & Krejčík, P. (2021). Self-efficacy budoucích učitelů ve vztahu k výuce zdravotní tělesné výchovy. *Gramotnost, pregramotnost a vzdělávání*, *5*(3), 5–22. Retrieved from: https://pages.pedf.cuni.cz/gramotnost/files/2021/12/01_Varekova.pdf.

Vařeková, J., Daďová, K., Nováková, P., et al. (2022). *Žák se speciálními vzdělávacími potřebami v tělesné výchově.* Prague: Karolinum.

Višňa, M. (2024). Kulatý stůl u ombudsmana se zaměřil na uvolňování žáků z tělocviku. *Žurnál UP.* from: https://www.zurnal.upol.cz/nc/ru/zprava/clanek/kulaty-stul-u-ombudsmana-se-zameril-na-uvolnovani-zaku-z-telocviku/.

Vrbas, J. (2010). *Zdravotně orientovaná zdatnost dětí mladšího školního věku: Analýza vybraných ukazatelů.* Brno: Masarykova univerzita ve spolupráci s MSD.

World Health Organization (2010). *Global recommendations on physical activity for health.* Retrieved December 7, 2021, from: https://www.who.int/publications/i/item/9789241599979.

World Health Organization (2020). *WHO guidelines on physical activity and sedentary behaviour.* Retrieved February 1, 2025, from: https://www.who.int/publications/i/item/9789240015128.