

Incorporating Musculoskeletal Examination in School Health Program of Japan: From the standpoint of a school physician

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Introduction

When the national education system was promulgated in 1872 as Japan's first plan to provide nationwide schooling, the government prioritized school hygiene to redress the overemphasis on intellectual education that had led to a lack of attention to the health of schoolchildren and students. Under this new order, the prevention of infectious diseases, environmental sanitation, and the enhancement of physical strength were encouraged. Over the next 135 years, Japan experienced a wide range of health-related problems,¹ as shown in **Fig. 1**. The national government promoted a variety of measures to resolve these problems, and specialists at local hospitals worked with school physicians to meet the government's expectations by ensuring the health of children who would represent the next generation.²

Since 1989, sports activity became more popular as a result of the government's sports promotion measures, and with this came a marked rise in sports injuries among middle and high school students who participate in extracurricular school sports.

In 1995, to accommodate the partial revisions to the enforcement regulations of School Health Law, the notification of the "Reminder to check for abnormalities in the musculoskeletal system and condition of the limbs when examining the spine and thorax" was issued.³ However, no such examination had been actually conducted because of the lack of any specific diagnostic guidelines such as scoliosis examinations.

Current Status of Health Problems Related to Sports Activity for Schoolchildren and Students in Japan⁴

(1) Stagnation of physical development and decline in physical strength

As described in reports from the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT), physical fitness and athletic ability have not returned to the levels observed in Fiscal Year (FY) 1985.

(2) Disordered lifestyles

Hours of sleep have become shorter due to later bedtime. The habit of missing breakfast has spread, leading to a rise in lassitude and languid children.

(3) Increase in the number of thin and near-thin children as a result of unnecessary dieting, rather than overweight children

A survey conducted in Kyoto City in 1998 revealed that, out of 2,000 students attending its municipal middle schools, 8.5% of the boys and 37.5% of the girls had been on unnecessary diet.

(4) Polarization between children who do exercise and those who do not

There is an urgent need for measures to address injuries due to over-exercise as well as deficiency of musculoskeletal function resulting from insufficient exercise.

(5) Increase in injury and diseases among children

Despite the decreasing trend in the number of children in Japan due to declining birthrate, the incidence of injuries and the number of disorders

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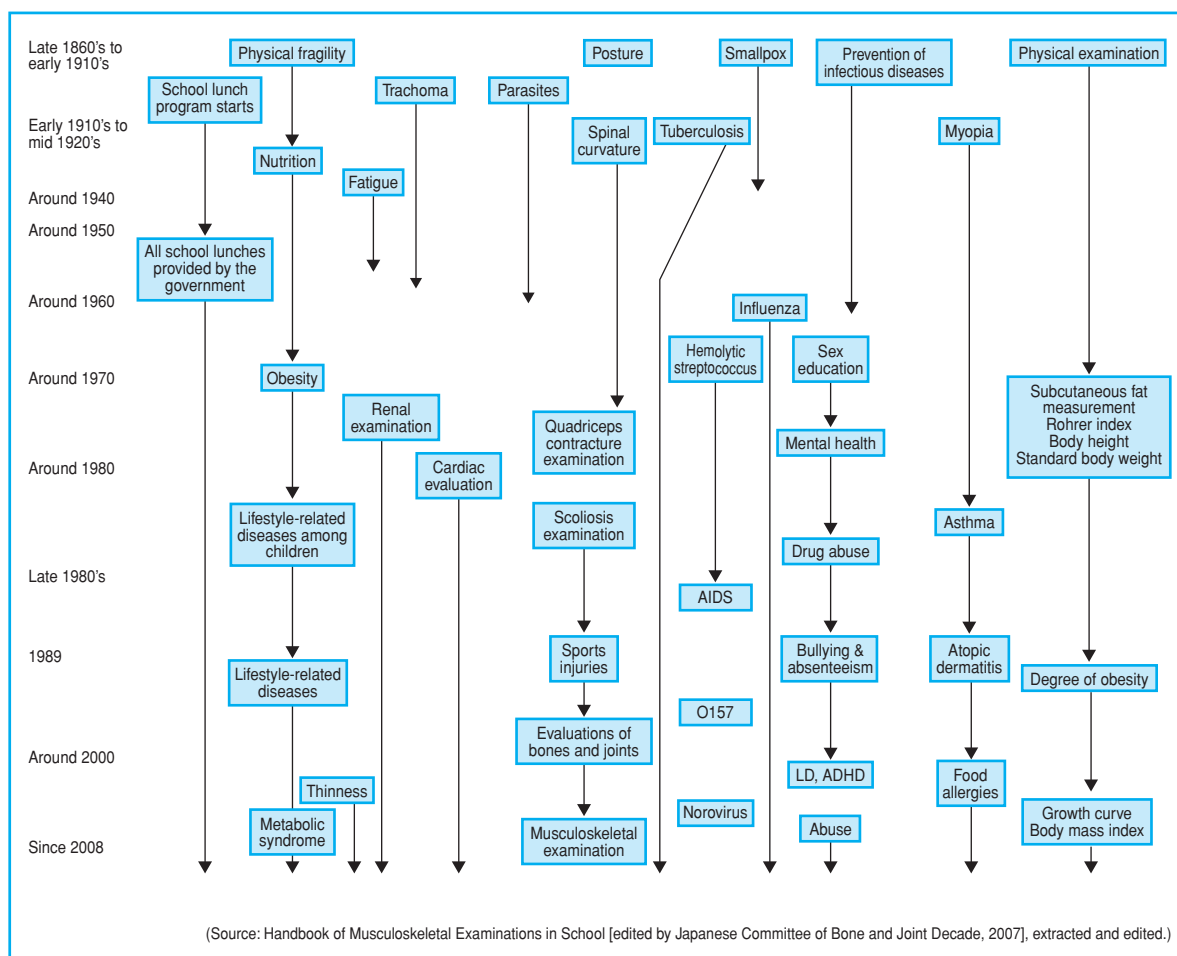


Fig. 1 Trends in health problems in school

among children are on the rise. The number of students attending elementary, middle, and high schools in FY 2006 was down by approximately 1 million compared to FY 2001, but the number of cases of injuries/disorders had increased by about 490,000 cases. Some of these cases were due to accidents other than extracurricular school sports activity, suggesting the need for safety guidelines. (Data source: Status of accident benefit payments, prepared by National Agency for the Advancement of Sports and Health.)

(6) Impact of accident rate for school-aged children to the physical education program in school

A report by the Sports Safety Association showed that the accident rate for children aged 11–19 is 39.5% overall, which raises concern over the impact on physical education programs of school.

(7) Rise of sports injury and sports disorder in middle and high schools

According to the “Research on extracurricular school sports activity” conducted in FY 1995, 20% of middle school students and 33% of high school students suffered external sports injuries, and 12.6% of middle school students and 24% of high school students experienced sports disorders. This illustrates the importance of health evaluation.

(8) Drop in the extracurricular sports participation among older school-aged children

According to White Paper on Education, Culture, Sports, Science and Technology (by MEXT), in FY 2007, 75.5% of boys and 53.9% of girls in middle schools participated in extracurricular sports, while in high schools these figures drop to 54.1% for boys and 26.6% for girls. The withdrawal

among girls from the school sports is particularly pronounced. Considering that participation in physical exercise during the growth period affect juvenile development, the need for education in sports and health should be more strongly emphasized, particularly for young females since maintaining and improving the general health as adult is important for motherhood.

Trends in Musculoskeletal Examinations in Japanese School Health Program

Japan Medical Association (JMA) recognized the importance of the global campaign by World Health Organization (WHO) called the “Bone and Joint Decade” early on. In the October 2004 issue of the JMA’s official journal, *Journal of Japan Medical Association* (in Japanese), it included a special segment on this topic. Also in December of 2004, JMA sponsored a special lecture entitled “Musculoskeletal System and School Physicians: Appropriate Approach to Physical Exercise and Sports to Prevent Sports Injuries and Lifestyle-related Diseases” (presented by Dr. Yoshiteru Mutoh, Professor, Graduate School of Education, the University of Tokyo) to appeal the importance of the musculoskeletal system in school health education programs.

JMA also launched a model project to put school health programs into practice through participation of medical specialists from all fields of medicine, which subsequently was tied up with the school-community health collaboration project of MEXT. Now, examinations and health education programs on musculoskeletal disorders continue to be conducted by local orthopedic specialists.

At the same time, as part of the Bone and Joint Decade project, Japanese Orthopaedic Association launched “the model project for the preparation and enhancement of the musculoskeletal examination system in school (organized by Dr. Yoshiteru Mutoh)” from FY 2005 (with eight regions nationwide in FY 2008), and a series of discussions based on the examination results from each region have been held with MEXT.

The January 2008 Report of Central Education Council recognized that “musculoskeletal disorders and injuries caused by excessive exercise and sports activity are seen in children as well.” Here, “musculoskeletal system” was defined as the organs that support and move the body,

such as bones, joints, muscles, ligaments, tendons, and nerves. It is hoped that, in the future, the term “musculoskeletal system” will be commonly used in educational circles and the mass media.

Since 1872, the government has been conducting national fitness test, physical examination, and health evaluation to examine various items such as posture, body figure, gait abnormality, physical fragility, vertical and lateral spinal curves, and body measurements—all of which are actually related to the musculoskeletal system. It is hoped the administration will start taking measures from such new point of view.

In December of 2008, “the exploratory committee for promotion of measures against musculoskeletal disorders and injuries (chaired by Dr. Yoshiteru Mutoh)” was established within Japanese Association of School Health to realize the aforementioned intent of the Central Education Council. The exploratory committee compiled the “Handbook of addressing musculoskeletal disorders and injuries in schools,” which was distributed to schools nationwide in FY 2009. This handbook is expected to promote the understanding among school officials on the musculoskeletal system and facilitate the examination process.

To Promote Musculoskeletal Examinations in School

Childhood represents the stage for growth and development leading to maturity. Children are still socially dependent and susceptible to social influences including family. Accordingly, infants receive health evaluations under the auspices of the Japanese Ministry of Health, Labour and Welfare, while MEXT provides health evaluation to children right before they enter elementary school and thereafter. National School Health Survey (conducted by MEXT for elementary, middle, and high school students annually) now include musculoskeletal examination in order to improve aforesaid health problems observed in schoolchildren and students.

School physicians practicing pediatrics and internal medicine primarily may hesitate to carry out musculoskeletal examination they are inexperienced. However, when lateral spinal curve examinations began almost 30 years ago in 1977, school physicians received training from orthopedists and conducted examinations, trying to achieve better accuracy every year. This time, too,

Table 1 Points to note when conducting health evaluation

December 1994 Notice from the MEXT Bureau Chief

1. Protection of privacy
2. Follow-up measures
3. Health survey, etc.
 In order to accurately and smoothly provide health evaluation in school, a survey of a student's growth and health (health survey) is to be conducted when deemed necessary (Article 8, Clause 2 of School Health Law Enforcement Regulations), but health evaluation should be held every year without fail to ensure that the evaluations are meaningful. Schools should use health surveys to ascertain the condition of students' lives at home and in the community with due consideration for individual privacy, as well as to monitor student health on a daily basis, in order to properly manage the health of schoolchildren and students and provide health guidance by making use of the results comprehensively along with the results of physical fitness and athletic ability tests.
4. Items to be examined

(Quoted from Fifth Revised Supplement to School Health and School Safety Law, [edited by Study Group for School Health Education Law, 2004].)

(Translated by JMAJ.)

Table 2 Relationship between body figure and areas of superior performance

	Physical fitness		Athletic ability	
Moderately overweight	Back strength	(boys)		
	Grasping power	(boys) (girls)		
	Backward bending of upper body	(girls)		
Slightly overweight	Back strength	(girls)		
	Standing forward bend	(boys) (girls)		
	Vertical jump	(boys)		
	Stepping up and down on a step	(girls)		
Average	Repetitive sideways jump	(boys) (girls)	50-m run	(boys)
			Handball throw	(boys) (girls)
Thin	Vertical jump	(girls)	50-m run	(girls)
	Stepping up and down on a step	(boys)	Chinning exercises	(boys) (girls)
			Long jump	(boys) (girls)
			Endurance run	(boys) (girls)

Based on 408 third-year middle school students (217 boys, 191 girls).

(Extracted from FY 1987 Report of Kyoto Municipal School Health Council Research Committee.)

Table 3 Relationship between body figure and areas of poor performance

	Physical fitness		Athletic ability	
Moderately overweight	Backward bending of upper body	(boys)	50-m run	(boys) (girls)
	Vertical jump	(boys) (girls)	Long jump	(boys)
	Repetitive sideways jump	(boys) (girls)	Chinning exercises	(boys) (girls)
	Stepping up and down on a step	(boys) (girls)	Endurance run	(boys) (girls)
Slightly overweight			Long jump	(girls)
Thin	Grasping power	(boys) (girls)	Handball throw	(boys) (girls)
	Back strength	(boys) (girls)		
	Backward bending of upper body	(girls)		
	Standing forward bend	(boys) (girls)		

Based on 408 third-year middle school students (217 boys, 191 girls).

(Extracted from FY 1987 Report of Kyoto Municipal School Health Council Research Committee.)

school physicians should seek training and guidance from specialists as well. For those school physicians who have experienced health evaluation for infants and toddlers, musculoskeletal examination should be seen simply as an extension of such. Below I have listed some points required to promote musculoskeletal examinations in school.

- (1) Laws should be revised so that examinations are easier to conduct (, which will be the role of MEXT and JMA).
- (2) Establish a liaison council with local medical associations, associations of school physician, orthopedic associations, and Board of Education, and confirm specific components of the examination.
- (3) In many cases, causality for many diseases and abnormalities resulting from sports injury is clear, and the diagnosis and follow-up measures proceed smoothly. However, musculoskeletal function deficiencies may require more information, awaiting for future investigations. In this regard, the Notice from the MEXT Bureau Chief released in December of 1994³ lays out some points to note when conducting health evaluation (**Table 1**). This Notice reflects MEXT's intention to assess an individual's health in a comprehensive manner by looking at both the results of regular health evaluation and the results of physical fitness and athletic ability tests. I myself once examined the correlation between body figure and the results from physical fitness and athletic ability tests in early 1985⁵ as shown in **Tables 2 and 3**, and I hope to reinvestigate such correlation along with muscu-

loskeletal function deficiency in the future.

- (4) Guidelines for effective implementation of musculoskeletal examination are currently under review. For the children just entering elementary school and those in lower school years, the focus should be on musculoskeletal function deficiency rather than musculoskeletal injuries, keeping in mind that sometimes a deficiency may be due to a decline in balance function. The school officials must also verify whether children in the senior school years of elementary school suffer injuries during Sports Boys Scouts activity outside of the school-related programs and whether middle and high school students participate in extracurricular sports activities. It will be particularly important to provide instructions on characteristics of specific sports, common sports injury, and the means to check for possible injury.
- (5) In considering the maintenance and enhancement of the general health of schoolchildren and students with life-long prospect in mind, the issue of thin female high school students deserves more attention. Japan Society of Obstetrics and Gynecology reports a rise in undernourished pregnant women for being so thin and a corresponding rise in low-birth-weight babies. Okada⁶ explained in a lecture entitled "Prevention of lifestyle-related diseases in children" in the FY 2007 Workshop for School Physicians that low-birth-weight babies tend to develop lifestyle-related diseases in their adulthood (embryonic programming, called Barker Hypothesis) and emphasized the importance of health education by school physicians to prevent it.

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