

# Incorporating Musculoskeletal Examination in School Health Program of Japan: From the standpoint of a sports organization

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## Status of High School Baseball's Reality

In Japanese National High School Baseball Championship, joint function examination for pitchers has been implemented since the 1993 Summer Tournament. An item stating that “Players with injuries that hinder his play shall be prohibited from participation” was added to the tournament regulations, and pre-tournament examinations were to be performed by sports orthopedic specialists.

Additionally, the tournament regulations stipulated that “A player will be prohibited from participating as a pitcher immediately following a rotator cuff tear of the shoulder or ligament rupture with an avulsion fracture of the elbow.” Players who pitched in games during preliminary rounds who are also registered to play in the national tournament are to undergo medical examinations during an official pre-tournament practice session. On the spring of 1994, x-ray equipment was set up in a room at the official stadium of the National High School Baseball Championship (called Hanshin Koshien Stadium, Hyogo, Japan). Since, each pitcher undergoes x-ray examination of the shoulder and elbow on his pitching arm, medical examination by a specialist, and examination of articular motion range by a physical therapist (**Fig. 1**).

Because National High School Baseball Championship takes the form of a tournament, the risk of injury for a pitcher becomes greater towards the closing stages of the tournament due to forced overuse of the elbow from repeated pitch-

ing. These pre-tournament measures had been established to reduce sports injury among pitchers after many requests for improvement over the years.

When this joint function examination was first introduced in 1993, Japan High School Baseball Federation (JHSBF) developed a network of sports orthopedists for each of the nine regions of Japan, organized a medical support system by physical therapists, and held seminars in various locations on preventing sports injury during the growth period of students. Furthermore, JHSBF produced the promotional video on sports injury prevention called “Pitch Smart II” and distributed 5,000 copies to its members and boys baseball federations.

It has been over 16 years since the examination was introduced. The idea of “medical examination for pitchers at the official stadium for National High School Baseball Championship” has settled firmly now. However, results of examination have not shown much improvement, and the number of pitchers with injury is exceeding the expectation. Careful investigation found evidences of past injuries sustained in elementary or middle school days among many pitchers (**Table 1**).

In other words, focusing solely on high school students had little effect because the elementary and middle schools have not implemented sufficient measures to prevent sports injury. Understanding towards prevention of sports injury is still quite insufficient at the elementary and

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Fig. 1 Medical examination by a physician

Table 1 Joint function examination results of pitchers from 2003 to 2008 (85th through 90th National Championship Tournaments)

	2008 (90th)			2007 (89th)			2006 (88th)			2005 (87th)			2004 (86th)			2003 (85th)		
Total number of pitchers examined	155			159			162			142			155			154		
Average team size (persons)	2.82			3.24			3.31			2.89			3.16			3.14		
Number of teams examined, by the number of pitchers in a team																		
6 pitchers							1 team						2 teams					
5 pitchers	2 teams			3 teams			5 teams			1 team			2 teams			3 teams		
4 pitchers	12 teams			17 teams			16 teams			12 teams			14 teams			19 teams		
3 pitchers	19 teams			20 teams			14 teams			20 teams			17 teams			15 teams		
2 pitchers	18 teams			7 teams			12 teams			13 teams			12 teams			6 teams		
1 pitchers	4 teams			2 teams			1 team			3 teams			2 teams			6 teams		
Regulations was enforced <sup>a)</sup>	None			None			None			None			None			None		
Status of diagnosis	S	E	n	S	E	n	S	E	n	S	E	n	S	E	n	S	E	n
Preexisting condition(s), obtained from the written interview sheet (by school type)																		
Elementary	8	14		3	18		6	17		4	19		2	8		8	9	
Middle	7	27		14	19		10	15		11	22		5	13		9	21	
High	31	38		33	35		43	38		24	20		32	27		26	30	
Total	46	79	98	50	72	92	59	70	107	39	61	80	39	48	74	43	60	54
X-ray findings																		
Avulsion fracture	(Not applicable)*			23			24			18			26			24		
Intraarticular free body	(Not applicable)*			2						4			3			3		
Current diagnosis by physicians (inflammation level)	S	E	n	S	E	n	S	E	n	S	E	n	S	E	n	S	E	n
Mild	26	24	40	9	21	26	16	23	32	10	29	32	12	38	44	11	17	21
Moderate	1	1	2	2	1	3	2	2	4	1	1		1	1	2	4	1	4
Severe				1			1						1			1		
Impaired																		
Total number of pitchers with symptoms	27	25	42	11	23	30	18	25	36	11	29	33	14	40	48	15	18	25

List of abbreviations: S (shoulder), number of pitchers with some conditions with the shoulder; E (elbow), number of pitchers with some conditions with the elbow; n, the total number of pitchers with some conditions in the shoulder and/or elbow.

a) Number of players to whom tournament regulations was applied (prohibited from pitching).

\* Radiography evaluation was not performed for the 90th Tournament (Year 2008) due to the scheduling problem with the Beijing Olympics.

**Table 2 From “American College Sports,” Chapter 7 *The Hygiene of Athletic Training* (partially extracted)****4. Current School Sports Practices at a Few Representative Private Schools**

Conclusion Summary: Athletes incur great physical damage from excessive athletic competition. Under the present system of conducting sports activity, too few students receive benefit while too many incur harm.

To summarize, firstly, the notion appears to be very widespread that exercise constitute a sort of panacea for all forms of illness. In actual fact, exercise should be regarded as sort of medicament to be prescribed on an individual basis.

Secondly, there exist serious defect in the relations between the medical profession and college sports. Pressure from athletes often prevents physicians from acting properly, and they allow injured athletes to participate in competition.

Thirdly, certain common practices among school sports teams are extremely unhygienic, such as dirty clothing or sharing drinking cups and water bottles.

Finally, practice schedule in college sports are excessive in general.

**<Suggestions (partially extracted)>**

A. The team physician should be considered the key person in the supervision of the hygiene during athletic training and in competitions and be given full authority to manage all physical conditions of athletes.

B. The team physician should be given proper and complete equipment and assistance. The team physician must be fully skilled with necessary qualifications.

C. Every school must conduct full medical examination for the students at least once a year and prepare their health history records.

Source: “American College Sports” (Carnegie Foundation for the Advancement of Teaching Bulletin No. 26, 1931), translated and edited by the Physical Education Division, Secretariat of the Japanese Minister for Education (March 1932).

middle school levels, leading to the stagnation of the sports injury education at the high school level.

## Historical Background

According to the material I received at FY 2008 Workshop for School Physicians, the first form of national School Health Survey (general health examination currently conducted annually by Ministry of Education, Culture, Sports, Science and Technology), which measures physical posture and fitness, was part of the school health program to enhance the physical fitness of schoolchildren and students under School Education System promulgated in 1872.

Coincidentally, baseball was first introduced to Japan in 1872, too. It is said that Horace Wilson, a visiting teacher employed by Meiji Government who came to Japan in 1871, first taught baseball to college students (of the Tokyo University today).

Subsequently, British teacher Frederick Strange, who came to Japan in 1875, advocated the spirit of fair play to students, saying “What is most revered in competition is to do one’s best without regret. Winning or losing is secondary.” Strange is

also remembered that he preached the necessity of school sports and organized the first full-scale athletic tournament in central Tokyo, which is said to be the origin of sports tournaments in Japan.

Even in those early days, Strange warned us of the dangers of overuse by students from school sports activity. “Practice during breaks from study. When you do practice, do so promptly, and leave at once when you finish. Staying longer will merely slacken your spirit. Truly, the best awards that Heaven can bestow upon an athlete for one’s spiritual attributes are; discipline, moderation, abstinence, endurance, courage, composure, keen and sharp-witted intellect, and bright and magnanimous disposition.”\*

Thus, the risk of sports injury due to excessive activity had been warned in the early years of Japanese sport history. Yet, there were a few periods that enthusiasm for sports got heated, namely the “*baseball poison theory* period” in the 1910s and the “*baseball madness* period” from the late 1920s to early 1930s. Concerned that enthusiasm for school baseball has gone too far, Japanese Ministry of Education issued “Baseball Control Ordinance” in 1932 (Ministry of Education Directive No. 4; March 28, 1932).

This control ordinance states that “The school principal shall select only those who have both the permission of their parents to participate and a health certification issued by a school physician,” making medical examinations for baseball players mandatory.

The Ministry of Education based the draft of this control ordinance on the situation of National Collegiate Athletic Association (NCAA) in the United States. In the USA, too, there were warnings about the dangers of excessive school sports in those days. A research group commissioned by Carnegie Foundation compiled a proposal, which emphasized the need for appropriate limitations on sports activities and medical examinations of athletes (“American College Sport,” prepared by Carnegie Foundation for the Advancement of Teaching (Bulletin No. 26, 1931), and translated and edited by Physical Education Division of the Japanese Ministry of Education (March 1932); **Table 2**).

### **The Future of School Sports Activities**

For students, balancing schoolwork and extracurricular activities is a never-ending subject. Good balance between the two enables students to experience a “rich school life.” Enhancing school sports is important in encouraging the development of healthy youth.

Another important aspect of health education in school is that data from School Health Survey enable students to know their own physical conditions. However, I understand that most School Health Survey today focus on internal medicine and pay little attention to the musculoskeletal development.

Data from School Health Survey would be beneficial not only to students themselves but also to instructors of school sports teams, I believe. But the content of musculoskeletal examinations at present appears to be of little interest to those involved in school sports, for both the students and their instructors. Particularly dedicated instructors, who actually visit the school nurse teachers in charge of the School Health Survey data to inspect the results of his baseball team members, usually finds the examination content to be inadequate.

On the other hand, there are limitations on what baseball instructors can do to improve the situation. One possibility is to entrust students

themselves (or their guardians) to undergo the necessary examinations. Or, an instructor could set up an independent system of medical examination for his students. Either way, it becomes difficult for an instructor to investigate the health status of his students in an integrated manner. This problem likely stands as a great obstacle to prevent injury to young people during their growth period.

When I visited the relevant section of Ministry of Education some time ago, I was told that, “[School Health] Survey target the level required for a general student population to spend normal everyday student life. Students belonging to extracurricular sports activities should devise to receive necessary medical examinations in accordance with the characteristics of their particular sports.” However, a variety of sports are played in school through physical education classes, and school health officials and physical education teachers are also pointing out a need for musculoskeletal examinations specifically targeting the orthopedic items. I would very much hope this workshop would be an opportunity for raising the debate on the improvement of School Health Survey program in Japan.

### **Issues for Sports Organizations**

Next, I would like to raise the issue that pose a problem for a sports organization in relation to the health of participating athletes; the content of health check items required for participation in tournaments. The joint function examinations for pitchers I mentioned at the beginning can only be implemented at national tournaments because local tournaments have limitations on budget and manpower of specialists. Even at national baseball tournaments, it is difficult to implement medical examinations for all players due to time restraints. Under the “Standards for Participation in Competitive Sports by Schoolchildren and Students” (the so-called “Notice 54”), organizers are required to pay attention to the health of participants in sports competitions. For high school baseball, schools participating in tournaments have been required to present health certification by a school physician since 1922.

Since World War II, the wording on the health certificate has changed, as follows.

1946: I hereby certify that each and every individual player is in good health and capable

of enduring several consecutive days of baseball games.

- 1966: I hereby certify that each and every individual player is in good health and capable of enduring baseball games during the tournament.
- 1975: I hereby certify that results of regular medical examinations have shown them to be healthy.
- 1978: I hereby certify that each and every individual player had no abnormalities at the time of their medical examinations.
- 2000: I hereby certify that all players had no abnormalities at the time of their medical examinations.

School physicians have raised concerns regarding the procedures mentioned above. It would be best if the required examination items were to be represented numerically by looking up the most recent data. However, there are also other problems that need to be addressed before improving the procedures, such as securing even opportunities to undergo medical examinations and sharing of the necessary expenses.

## Conclusion

The extracurricular activity is a central pillar of a rich high school life, and it goes without saying that the schools with the higher participation rates of extracurricular activities are also the more active. Generally speaking, competitive sports are introduced in the latter half of elementary school and time spent on sports activities increases through middle and high school years. Since intensity also increases, the harm of sports injuries caused by overuse are of concern.

Neglecting sports injuries incurred during the growth period poses the risk of lifetime impairment of musculoskeletal function. If the content of School Health Survey is adjusted to suit those students participating in extracurricular sports activities as well, it is likely to play a large role in the early detection and treatment of injuries.

Students who experience pain or a sense of discomfort face various obstacles when seeking a consultation with a specialist. Issues such as time constraints, rivalries, and pressure from people

around them may rob them of the opportunity to seek medical consultation promptly. Moreover, instructors of extracurricular sports teams need to know the team members' health and injury status. If individual students and their guardians are entirely responsible to seek medical examinations, instructors' ability to gather information on students' health status in an integrated manner becomes limited, making it difficult to implement preventative measures.

From the standpoint of a sports organization, eliminating health evaluations of participating athletes prior to tournaments is not an option. Yet the burden of sharing the necessary costs could pose a difficulty for a sports organization. In high school baseball, while the national tournament venue is already equipped to handle first-aid treatment and have ensured hospitals for follow-up and support, there are still many issues to be resolved concerning health management of tournament players including physical overuse.

At the beginning I reported the status of medical examinations at National High School Baseball Championship tournaments. Undoubtedly, other sports also have injuries typical of their own characteristic, too. It is likely that students involved in specific sports are sustaining similar injuries during school life, as early as in elementary school days.

Implementation of highly accurate musculoskeletal evaluation in the current School Health Survey program is desirable but difficult, considering the situation of physicians and the fixed schedule for examination. However, I believe the urgent issue here is to gain better understanding of school officials to prevent impairing the students' abilities in their growth period. It is my fervent hope that screening that could lead to the early detection of sports injuries can be realized as part of the primary stage of School Health Survey.

Furthermore, sports organizations also need to make serious efforts to work in collaboration with extracurricular sports instructors and to gain cooperation from both school and school physicians in order to improve the environment for student who participate in school sports.

\* Quotes from the report written by K. Ohtomo, Yotsukura High School Baseball Team Coach, Fukushima Prefecture, Japan (March 2009) (available online at <http://www.ne.jp/asahi/fukushima/kouyaren/H21-2009/Renraku/1Kai-Koushien-Report.pdf>, as of April 2010), translated.