

〈Material〉

**Study on Cumulative measurement of physical fitness at Juntendo University, 2020
(COVID-19-related report)**

Committee for Cumulative Record of Physical Fitness

Committee Chairperson: Koya Suzuki

Committee members: Kazuhiro Aoki, Yujiro Kawata, Eri Miyamoto-Mikami,
Tomonori Kito, Sawako Wakui

Secretariat: Yoshimitsu Kohmura, Noriyuki Fuku

Support for measurement: Institute of Health and Sports Science & Medicine

Support for data analysis: Shaoshuai Shen

1. INTRODUCTION

In 2020, four years had passed since the admission of 410 undergraduates per year to Faculty of Health and Sports Science had been started, and the first cumulative measurement of physical fitness at the Juntendo University was performed, with all students from all four years pooled, making a maximum of 1,640. In addition, changes to the Faculty of Health and Sports Science in 2021 have been approved, these being a reorganization to make one department instead of three and increase the number of undergraduates admitted to 600. So, a fundamental reassessment of the approach taken with all undergraduates is therefore required as of 2021. Therefore, since the completion of the 2019 cumulative measurement, the appropriate approach to new cumulative measurement was looked into. However, before that was done, COVID-19 had spread worldwide, and, on March 11, 2020, the World Health Organization declared COVID-19 a pandemic. On April 7, 2020, the Japanese government declared a state of emergency in seven prefectures (Tokyo, Kanagawa, Saitama, Chiba, Osaka, Hyogo, and Fukuoka) and, on April 16, extended this to the whole prefectures.

Entry to the Sakura Campus of Juntendo University was prohibited for all students from April 4. The start of the first semester was postponed until May 11, and even after it was started, internet-based remote teaching was used. The national government lifted the state of emergency on May 25, but the Chiba prefectural government had already, on May 22, partially rescinded the requirement to desist from the use of facilities due to the thoroughgoing measures being taken to prevent the spread of the infection. Exercise/sport activities were, therefore, restarted at the Sakura Campus using very limited facilities with which measures to prevent infection are feasible and with a very limited number of participants. The restrictions on the use of facilities were relaxed somewhat on June 1, and with some exceptions, use of the exercise facilities was expanded on June 22, followed on July 20 by an expansion to include all exercise/sport facilities, with certain specified conditions, of the restrictions on holding and participating in competitions. Therefore, training at the Sakura Campus, as units of athletics clubs (except for first-year students) and under the control of on-campus instructors, was actually restarted later than June 1. However, the number of students who were able to restart training was limited, and most athletics clubs and associations did not restart until July 20 or later. Furthermore, the postponement of matches and restrictions on the criteria and rules for the use of facilities have meant that some organizations still do not have regular activities. In addition, even after activities of the university's athletics clubs and associations were restarted, some students did not participate due to individual circumstances relating to concerns about the infection, such as their hometowns being in different prefectures or in

areas with widespread infection. The summer holiday was then from August 22, entry to the Dormitory for first-year students (Keishinryo) was from August 31, with the capacity restricted to 50% of a typical year, and the second semester started on September 28, with combined-mode teaching, that is, with some students having lectures in person and others having internet-based remote learning; however, as of the end of 2020, the basic principles for activities of athletics clubs and use of exercise/sport facilities have not been changed since July 20. Therefore, first-year students were able to participate in athletics club activities from, at the earliest, June 22; however, in many cases, it was from August 31. Therefore, the activities of athletics clubs, associations, etc., have been delayed by approximately six months in comparison with a typical year. In addition, in the case of students who do not belong to athletics clubs or associations (not only first-year students), the situation of the individual use of facilities being impossible has continued to the present day. For other COVID-19-related measures by university departments, reference should be made to “Measures relating to COVID-19 infection” on Juntendo University’s homepage.

Taking into consideration the characteristics of the above situation, a cumulative measurement of physical fitness in 2020 was performed, together with an Internet-based survey of the status of engaging in exercise, sport, etc. The present document is the first report of the findings, a preliminary report of the relevant data, intended to serve as a basic resource for assessing the effects of COVID-19 on engagement in exercise, sport, etc., and physical fitness. The remaining data are to be published at the end of 2020, just like in a typical year.

2. MEASUREMENT AND SURVEY DATES AND SUBJECTS

The measurements and survey in 2020 were performed on Wednesday, October 21, in accordance with the academic calendar. In order to prevent COVID-19 infection, the measurement of physical fitness was performed only with the first-year students, with established measures to prevent infection. The total number of participants on that date was 380 (233 males and 147 females), and 90.7% of enrolled students participated. Also, a total of 1,213 people responded to the internet-based survey about exercise, sport, etc., with a response rate of 74.2%. These consisted of 399 first-year students, 333 second-year students, 284 third-year students, and 197 fourth-year students, consisting of 724 males and 489 females. Details of the survey method are to be presented in a separate report.

3. RESULTS AND CHARACTERISTICS OF PHYSICAL FITNESS

Due to the spread of COVID-19 infection in 2020, measurement of physical fitness was performed while avoiding “the three Cs”: closed spaces with poor ventilation, crowded places with many people nearby, and close-contact settings. Given that the measurement parameters had to be those with which contact between subjects and measurement personnel could be minimized, and the numbers of subjects entering the gymnasium used as the measurement site, and the time for which they entered, were restricted, and only the following four parameters were measured: body weight, grip strength, standing long-jump (strength and power), and side-step test (agility). Height was assessed on a self-reported basis by subjects remembering the results of the health and medical examinations performed in August.

Table 1 shows the results of measurement of physical fitness in 2020 and the results with first-year students over the last three years (Table 1-1: males; Table 1-2: females). Comparison of the mean values for three years (from 2017 to 2019) with those for 2020 showed differences between 0.2 and 6.1%. The parameter with the smallest difference, for both sexes, was height, at 0.2% (+0.3 cm) in males and 0.6% (+0.6 cm) in females, and that with the greatest difference, for both sexes, was side-step test, at 4.9% (+2.9 points) in males and 6.1% (+3.2 points) in females. Overall, the difference from previous years was not great. The parameters that showed different inter-year tendencies in males and females were body weight and grip strength, for which the values in males were higher than those of the

Table 1-1 Descriptive statistics of Physical fitness (first-year students: male)

Measurement items	2020			2019*			2018*			2017*			
	N	M	SD	N	M	SD	N	M	SD	N	M	SD	
Physique													
Height (self-reported)	(cm)	233	173.3	5.9	220	173.1	6.5	233	172.8	5.8	221	173.0	6.5
Body weight	(kg)	233	68.3	11.4	217	66.6	10.0	233	66.2	9.9	221	66.8	9.1
Physical Fitness													
Side-step test	(point)	224	62.4	5.0	208	60.5	6.2	212	59.8	6.2	202	58.1	6.8
Grip strength	(kg)	233	44.6	6.8	219	43.9	6.8	232	42.2	7.3	221	44.2	6.6
Standing long Jump	(cm)	227	238.3	23.2	211	237.1	19.8	220	234.9	21.9	203	235.8	22.1

Note. * Citation from Annual reports by Committee for Cumulative Record on Physical Fitness (2018, 2019, 2020)

Table 1-2 Descriptive statistics of Physical fitness (first-year students: female)

Measurement items	2020			2019*			2018*			2017*			
	N	M	SD	N	M	SD	N	M	SD	N	M	SD	
Physique													
Height (self-reported)	(cm)	147	160.4	6.7	146	160.6	5.6	152	159.0	5.6	158	159.9	5.4
Body weight	(kg)	147	54.1	6.4	146	55.9	6.5	152	55.1	6.1	158	55.4	6.1
Physical Fitness													
Side-step test	(point)	133	56.1	4.7	141	53.0	5.5	131	53.4	4.3	147	52.2	5.3
Grip strength	(kg)	147	28.1	4.9	152	29.1	4.7	152	27.8	4.6	158	29.3	4.7
Standing long Jump	(cm)	141	191.1	17.0	146	191.5	15.2	130	188.2	17.0	147	188.2	16.7

Note. * Citation from Annual reports by Committee for Cumulative Record on Physical Fitness (2018, 2019, 2020)

previous years (body weight: +1.8 kg; grip strength: +1.1 kg), and those in females were lower than those of the previous years (body weight: -1.4 kg; grip strength: -0.6 kg).

It is not easy to identify the factors responsible for the differences between the results in the previous years and 2020; however, in previous years, all first-year students were living in dormitories from the end of March and started participating in organized activities in university athletics clubs, associations, etc., from about that time. However, in 2020, due to COVID-19, the students entered the Keishinryo Dormitory on August 31. So, with the exception of some students, most of their activities to that date were independent, at their own homes, which presented difficulties for exercise/sport activities. However, during the subsequent time when physical fitness were measured, lasting until October 21, exercise/sport activities were engaged in on the basis of organized participation in athletics clubs, associations, etc., and with physical activity performed together by dormitory residents, so it might have been possible to maintain a certain level of physical activity. Nevertheless, it is possible that changes in lifestyle associated with the COVID-19 pandemic have impacted the balance between energy intake and expenditure. For example, the increases in male grip strength and body weight may have been because they engaged in indoor exercise such as muscle strength training, so energy intake was greater than expenditure. Females, on the other hand, showed decreases in both grip strength and body weight, which may be because their level of exercise, such as muscle strength training, decreased, and to make up for that, they deliberately reduced their energy intake. If grip strength is taken to be an estimate of whole-body muscle strength, as muscle strength increased or decreased, body weight likewise increased or decreased, and it can be understood that, as the participants wanted muscle strength and power in their

Table 2 Details of Internet-based survey, 2020

Question details	Score	Options
Basic attributes		
(1) Sex	1	Male
	2	Female
Date of birth		
Age		
Height (self-reported)		
Body weight (self-reported)		
Females only: Is your menstruation regular?	1	Yes
	2	No
(2) Club: Affiliated or not?	1	Affiliated
	2	Not affiliated
Club: Name		
Club: Specialty event/position		
Club: Type	1	Formal club
	2	Circle, association
	3	Extramural
(3) Engagement in non-club activities/sports or not?	1	Yes
	2	No
Engagement in non-club activities/sports?: Details		
Engagement in non-club activities/sports?: Frequency		
Engagement in non-club activities/sports?: Activity duration		
Intensity	1	Very light
	2	Fairly light
	3	Somewhat hard
	4	Hard
	5	Very hard
Lifestyle		
(1) How often do you drink alcohol?	1	Almost every day
	2	Sometimes
	3	I do not drink
	4	I cannot drink
(2) Do you smoke?	1	I smoke
	2	I have stopped smoking
	3	I have never smoked
(3) Sleeping duration	1	<5 hours
	2	5 to 6 hours
	3	6 to 7 hours
	4	7 to 8 hours
	5	8 hours or more
(4) Time of going to bed		
(5) Do you have meals at regular times?	1	No
	2	Yes
(6) Do you think about the nutritional balance in your diet?	1	I do not think about it.
	2	I think about it a little.
	3	I eat only after thinking about it.

Question details	Score	Options
(7) Do you eat breakfast? (8) How often do you eat snacks per day? (9) Daily screen time with television, smartphones, computers, games, etc. Outside class In class	1 2 3 4 1 2 3	I do not eat it. I sometimes eat it. I usually eat it. I eat it every day. Twice or more Once Less than once
Experience of exercise and sport		
(1) Do you have experience of exercise and sport? Athletic and special events Years of experience (age at start) Years of experience (age at completion) Frequency (days/week) Activity duration (days/week) Highest-level tournament Age at taking part in highest-level tournament	1 2 1 2 3 4	Yes (number of special events:) No Never taken part in tournament Prefectural or regional tournament National tournament International tournament
Injuries		
(1) Injuries: present or absent? (2) Muscle injuries Muscle injuries over the last year Number of muscle injuries over the last year Injury types Physician's diagnosis Cause of injury Timing of injury (month) Time needed for recovery (3) Ligament injuries Ligament injuries over the last year (including sprains and dislocation)	1 2 1 2 1 2 1 2 3 1 2 3 4 1 2	Present Absent Present Absent Pulled muscle Other muscle injury (details:) Present Absent Physical contact Non-contact Other (details:) 1 to 3 days 4 to 7 days 8 to 28 days More than 28 days Present Absent

Question details	Score	Options
Number of ligament injuries over the last year Injury types Physician's diagnosis Cause of injury Timing of injury (month) Time needed for recovery	1 2 3 4 5 6 7 1 2 1 2 3 1 2 3 4	Anterior cruciate ligament injury/ rupture Posterior cruciate ligament injury/ rupture Lateral collateral ligament injury/ rupture Medial collateral ligament injury/ rupture Dislocation Sprain Other (details:) Present Absent Physical contact Non-contact Other (details:) 1 to 3 days 4 to 7 days 8 to 28 days More than 28 days
(4) Fatigue fracture Fatigue fractures over the last year (excluding shin splints) Number over the last year Injury types Physician's diagnosis Timing of injury (month) Time needed for recovery	1 2 1 2 1 2 3 4	Present Absent Metatarsal fatigue fracture Tibial fatigue fracture Femoral fatigue fracture Lumbar vertebral fatigue fracture Other (details:) Present Absent 1 to 3 days 4 to 7 days 8 to 28 days More than 28 days
Leg shape		
(1) Leg shape	1 2 3	O-leg X-leg Neither

Question details	Score	Options
Mental toughness index		
<p>(1) I believe in my ability to achieve my goals</p> <p>(2) I am able to regulate my focus when performing tasks</p> <p>(3) I am able to use my emotions to perform the way I want to</p> <p>(4) I strive for continued success</p> <p>(5) I execute my knowledge of what is required to achieve my goals</p> <p>(6) I consistently overcome adversity</p> <p>(7) I am able execute appropriate skills or knowledge when challenged</p> <p>(8) I can find a positive in most situations</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p>	<p>False, 100% of the time</p> <p>True, 100% of the time</p> <p>Same grading to the above for each of the following.</p>
Effects of declaration of a state of emergency		
<p>(1) Changes relating to exercise/sport activities between before and during the state of emergency</p> <p style="padding-left: 20px;">Amount of exercise/training</p> <p style="padding-left: 20px;">Intensity of exercise/training</p> <p style="padding-left: 20px;">Quality of exercise/training</p> <p style="padding-left: 20px;">Exercise/training environment</p> <p>(2) Changes in physical fitness between before and during the state of emergency</p> <p style="padding-left: 20px;">Muscle strength (ability to perform actions)</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p>	<p>Markedly decreased</p> <p>Somewhat decreased</p> <p>Almost no change</p> <p>Somewhat increased</p> <p>Markedly increased</p> <p>Markedly decreased</p> <p>Somewhat decreased</p> <p>Almost no change</p> <p>Somewhat increased</p> <p>Markedly increased</p> <p>Markedly deteriorated</p> <p>Somewhat deteriorated</p> <p>Almost no change</p> <p>Somewhat improved</p> <p>Markedly improved</p> <p>Markedly deteriorated</p> <p>Somewhat deteriorated</p> <p>Almost no change</p> <p>Somewhat improved</p> <p>Markedly improved</p> <p>Markedly decreased</p> <p>Somewhat decreased</p> <p>Almost no change</p> <p>Somewhat improved</p> <p>Markedly improved</p>

Question details	Score	Options
Endurance (ability to continue to perform actions)	1 2 3 4 5	Markedly decreased Somewhat decreased Almost no change Somewhat improved Markedly improved
Coordination (ability to control actions)	1 2 3 4 5	Markedly decreased Somewhat decreased Almost no change Somewhat improved Markedly improved
Flexibility	1 2 3 4 5	Markedly decreased Somewhat decreased Almost no change Somewhat improved Markedly improved
(3) Changes in dietary habits between before and during the state of emergency		
Food consumption	1 2 3 4 5	Markedly decreased Somewhat decreased Almost no change Somewhat increased Markedly increased
Nutritional balance	1 2 3 4 5	Markedly deteriorated Somewhat deteriorated Almost no change Somewhat improved Markedly improved
(4) Daily screen time (television, smartphones, computers, games, etc.) during state of emergency Before the course started (April 1 to May 11): hours/day After the course started (May 12 to May 31): Outside class, hours/day In class, hours/day		
(5) Status of engaging in exercise and sport during the state of emergency (April and May) Mean frequency and duration of exercise/sport per week Frequency as activities of athletics clubs and associations (days/week) Duration as activities of athletics clubs and associations (hours/day) Frequency as independent, individual activities (day/week) Duration as independent, individual activities (hours/day) Details of exercise/training Details as activities of athletics clubs and associations (free answer) Details as independent, individual activities (free answer)		
Informed consent		
(1) Informed consent obtained or not	1 2	Obtained Not obtained

Table 3-1 Changes relating to exercise/sport activities between before and during the state of emergency
Amount of exercise/training

(%)

	N	Markedly decreased	Somewhat decreased	Almost no change	Somewhat increased	Markedly increased
Total	1213	40.9	34.0	14.3	8.7	2.1
Sex						
Male	724	38.7	36.3	13.5	8.7	2.8
Female	489	44.2	30.7	15.3	8.8	1.0
Grade						
First-year	399	40.1	33.1	13.0	10.3	3.5
Second-year	333	44.7	34.8	13.2	6.0	1.2
Third-year	284	39.1	35.6	15.5	9.5	0.4
Forth-year	197	38.6	32.5	16.8	9.1	3.0
Sex * Grade						
Male						
First-year	242	37.2	34.3	12.4	11.2	5.0
Second-year	202	41.1	39.6	12.9	5.4	1.0
Third-year	172	40.1	34.9	14.0	10.5	0.6
Forth-year	108	35.2	37.0	16.7	6.5	4.6
Female						
First-year	157	44.6	31.2	14.0	8.9	1.3
Second-year	131	50.4	27.5	13.7	6.9	1.5
Third-year	112	37.5	36.6	17.9	8.0	0.0
Forth-year	89	42.7	27.0	16.9	12.4	1.1
Department						
Sports science	767	39.6	35.9	14.3	8.2	2.0
Sports Management	218	40.8	31.7	16.1	10.6	0.9
Health	228	45.2	30.3	12.3	8.8	3.5

legs, there were almost no body-weight-related changes in their standing long-jump distance records.

Irrespective of whether or not the above explanations are correct, Table 1 shows the results of measurement of the physical fitness of first-year students at Juntendo University's Faculty of Health and Sports Science during the COVID-19 pandemic. However, to identify the factors responsible for the differences in results between 2020 and the previous years, it is necessary to investigate matters such as the relationships with the internet-based survey results.

4. RESULTS AND CHARACTERISTICS OF INTERNET-BASED SURVEY

Table 2 shows the internet-based survey performed with all students at the Faculty of Health and Sports Science. The present document, being this report, covers only the seventeen parameters for which the effects of the state of emergency were assessed. The basic attributes are presented in Table 3.

4.1 Changes relating to exercise/sport activities

With respect to changes in exercise/sport activities between before and after the declaration of the state of emergency, at least 60% of the answers about exercise, training level, intensity, contents, and environment were negative; that is, these had decreased or deteriorated (Tables 3-1 to 3-4). With

Table 3-2 Changes relating to exercise/sport activities between before and during the state of emergency
Intensity of exercise/training

	N	Markedly decreased	Somewhat decreased	Almost no change	Somewhat increased	Markedly increased (%)
Total	1213	37.3	34.9	18.1	7.7	2.1
Sex						
Male	724	36.3	35.6	17.3	8.1	2.6
Female	489	38.7	33.7	19.2	7.2	1.2
Grade						
First-year	399	35.1	35.6	17.5	8.5	3.3
Second-year	333	41.4	34.2	16.5	6.3	1.5
Third-year	284	36.6	35.6	19.7	7.4	0.7
Forth-year	197	35.5	33.5	19.3	9.1	2.5
Sex * Grade						
Male						
First-year	242	33.1	34.3	18.6	9.9	4.1
Second-year	202	38.6	37.1	16.3	6.9	1.0
Third-year	172	39.0	34.9	17.4	7.6	1.2
Forth-year	108	35.2	37.0	15.7	7.4	4.6
Female						
First-year	157	38.2	37.6	15.9	6.4	1.9
Second-year	131	45.8	29.8	16.8	5.3	2.3
Third-year	112	33.0	36.6	23.2	7.1	0.0
Forth-year	89	36.0	29.2	23.6	11.2	0.0
Department						
Sports science	767	36.2	36.8	17.5	7.7	1.8
Sports Management	218	38.5	28.9	24.8	7.3	0.5
Health	228	39.5	34.2	13.6	8.3	4.4

respect to changes in physical fitness between before and after declaring the state of emergency (Tables 3-5 to 3-8), at least 60% of students reported the perception that their muscle strength (i.e., ability to perform) and endurance (i.e., ability to continue to perform) had decreased, whereas less than 50% reported the perception that their coordination (i.e., ability to control performance) and flexibility had decreased. These findings suggest that the declaration of the state of emergency had more effect on the decrease in muscle strength and endurance in exercise/sport activities than on coordination and flexibility.

4.2 Changes in dietary habit

Food consumption and nutritional balance were assessed in order to determine changes in dietary habits between before and after the declaration of the state of emergency (Table 3-9 and 3-10). The proportion of participants who reported a decrease in their food consumption (markedly decreased, or somewhat decreased), 35.0%, was greater than the proportion that reported an increase (18.6%). For males and females separately, the proportion reporting food consumption decrease was greater in females than males, at 44.0% and 29.0%, respectively. In addition, the proportion of participants reporting an improvement in nutritional balance (27.3%) was greater than the proportion reporting a

Table 3-3 Changes relating to exercise/sport activities between before and during the state of emergency
Quality of exercise/training

	N	Markedly deteriorated	Somewhat deteriorated	Almost no change	Somewhat improved	Markedly improved (%)
Total	1213	21.8	38.0	26.1	11.0	3.1
Sex						
Male	724	22.8	37.6	24.3	11.3	4.0
Female	489	20.4	38.7	28.6	10.4	1.8
Grade						
First-year	399	20.8	38.1	25.3	11.8	4.0
Second-year	333	24.3	38.4	24.9	9.6	2.7
Third-year	284	22.2	37.0	27.8	10.9	2.1
Forth-year	197	19.3	38.6	26.9	11.7	3.6
Sex * Grade						
Male						
First-year	242	21.1	34.3	26.0	12.8	5.8
Second-year	202	25.2	38.1	23.3	10.4	3.0
Third-year	172	25.0	37.8	24.4	11.0	1.7
Forth-year	108	18.5	43.5	22.2	10.2	5.6
Female						
First-year	157	20.4	43.9	24.2	10.2	1.3
Second-year	131	22.9	38.9	27.5	8.4	2.3
Third-year	112	17.9	35.7	33.0	10.7	2.7
Forth-year	89	20.2	32.6	32.6	13.5	1.1
Department						
Sports science	767	22.2	37.8	26.1	11.1	2.9
Sports Management	218	20.6	37.6	29.4	11.0	1.4
Health	228	21.9	39.0	22.8	10.5	5.7

deterioration (18.4%); however, approximately 50% reported almost no change. Taking into consideration the decrease in energy expenditure due to restrictions on exercise/sport activities, it is probable that a considerable number of students were strongly aware of their food consumption and nutritional balance.

4.3 Changes in screen time, including television, smartphones, computers, and games

Screen time, that is, the time per day spent watching television, or using smartphones, computers, games, etc., was assessed before the start of the first semester, from April to May 11, and after the start of the first semester, from May 12 to 31 (Tables 3-11 to 3-13). Before the start of the first semester, the mean screen time was 5.4 ± 2.7 hours/day, whereas after the start of the first semester, the mean non-class screen time was 4.1 ± 2.1 hours/day, and the mean in-class screen time was 3.6 ± 2.2 hours/day. Thus, the non-class screen time decreased after the start of the first semester; however, if the in-class screen time is included, the mean screen time increased by more than 2 hours/day. In the cumulative measurements and Internet-based survey in 2019, the daily screen time, including television, smartphones, etc., was placed in one of the following five-point scales: 6 hours or more; 4 to 6 hours; 2 to 4 hours; up to 1 hour; and almost none. According to the 2019 report, the proportions of participants in

Table 3-4 Changes relating to exercise/sport activities between before and during the state of emergency
Exercise/training environment

	N	Markedly deteriorated	Somewhat deteriorated	Almost no change	Somewhat improved	Markedly improved (%)
Total	1213	37.9	36.4	18.5	4.9	2.4
Sex						
Male	724	40.1	35.9	15.3	5.7	3.0
Female	489	34.8	37.0	23.1	3.7	1.4
Grade						
First-year	399	31.6	38.3	20.8	6.3	3.0
Second-year	333	40.8	39.0	14.4	3.3	2.4
Third-year	284	44.0	30.6	19.0	4.9	1.4
Forth-year	197	37.1	36.0	19.8	4.6	2.5
Sex * Grade						
Male						
First-year	242	31.4	36.8	20.7	7.9	3.3
Second-year	202	42.1	39.6	10.9	4.5	3.0
Third-year	172	49.4	31.4	13.4	4.1	1.7
Forth-year	108	40.7	34.3	14.8	5.6	4.6
Female						
First-year	157	31.8	40.8	21.0	3.8	2.5
Second-year	131	38.9	38.2	19.8	1.5	1.5
Third-year	112	35.7	29.5	27.7	6.3	0.9
Forth-year	89	32.6	38.2	25.8	3.4	0.0
Department						
Sports science	767	37.7	38.1	17.6	4.6	2.1
Sports Management	218	35.3	33.5	24.3	6.0	0.9
Health	228	41.2	33.3	15.8	4.8	4.8

each of these categories were 9.5%, 39.5%, 42.9%, 6.6%, and 1.4%, respectively, and a comparison of these with Table 3-11, showing the proportions in 2020 before the start of the first semester, shows a marked increase in 2020. For example, in 2020, before the start of the first semester, the proportion of participants reporting 6 hours or more screen time per day was 40.3%, which was approximately four times that reported in 2019. This is considered to be due to the increase in the time spent by these people in their own homes, due to the policy of sheltering put in place during the state of emergency. In 2019, the proportion reporting 4 hours per day or more of screen time was 49.0%, and in 2020, the proportion reporting this level of non-class screen time after the start of the first semester was 53.4% (Table 3-12), which was not a significant increase, suggesting that there had been few changes in the way that free time was spent outside classes after the start of the first semester as compared to 2019. However, it must be noted that the classes themselves involved Internet-based remote learning, so the total screen time per day, including in-class screen time, was increased by the time spent in lectures, etc.

4.4 Changes in status of engaging in exercise, sport, etc.

With respect to the status of engaging in exercise, sport, etc. during the state of emergency (April and May), the frequency and duration of physical activity were assessed, with classification by activities in

Table 3–5 Changes in physical fitness between before and during the state of emergency
Muscle strength (ability to perform actions)

(%)

	N	Markedly decreased	Somewhat decreased	Almost no change	Somewhat improved	Markedly improved
Total	1213	20.8	44.6	21.1	10.6	2.9
Sex						
Male	724	19.5	41.6	22.0	13.1	3.9
Female	489	22.7	49.1	19.8	7.0	1.4
Grade						
First-year	399	25.8	39.1	17.3	14.0	3.8
Second-year	333	16.8	49.2	22.8	8.4	2.7
Third-year	284	19.4	48.6	23.6	7.0	1.4
Forth-year	197	19.3	42.1	22.3	12.7	3.6
Sex * Grade						
Male						
First-year	242	23.1	37.6	17.4	16.9	5.0
Second-year	202	16.8	45.5	24.8	9.4	3.5
Third-year	172	20.9	41.3	24.4	11.6	1.7
Forth-year	108	13.9	43.5	23.1	13.9	5.6
Female						
First-year	157	29.9	41.4	17.2	9.6	1.9
Second-year	131	16.8	55.0	19.8	6.9	1.5
Third-year	112	17.0	59.8	22.3	0.0	0.9
Forth-year	89	25.8	40.4	21.3	11.2	1.1
Department						
Sports science	767	20.6	44.3	21.1	11.1	2.9
Sports Management	218	21.1	43.1	24.3	10.1	1.4
Health	228	21.1	46.9	18.0	9.6	4.4

athletics clubs and associations, and independent activities (Tables 3–14 to 3–17). For students' exercise/sport activities, use of facilities at the university and elsewhere was completely prohibited from April 4 to May 21, on the basis of the policies in "Measures relating to COVID–19 infection," the "road map" for the use of the exercise/sport facilities at the Sakura Campus, and the rules and specifications for the use of exercise facilities. Therefore, it is taken that in the case of participants who gave responses other than "never" and "0 hours" for the duration and frequency of activities in connection with athletics clubs and associations, these activities were in, or at least near their homes. It can be seen from Tables 3–14 and 3–15 that at least 70% of students engaged in no exercise/sport activities as part of athletics clubs or circles. On the other hand, almost 30% of students did engage in exercise/sport activities as organized by athletics clubs and associations by one means or another. According to the interviews with the students, they managed to connect with other students in their own homes over the internet, using applications such as LINE and ZOOM and thus engaged in activities such as muscle strength training. On the other hand, more than 80% of students engaged in individual and independent exercise/sport activities, at a median frequency of 3.0 days per week and a median duration of 1 hour per day. However, at least 70% of students reported that the amount and intensity of their exercise and training had decreased (Tables 3–1 and 3–2), suggesting that the frequency and time of such activities were low-

Table 3–6 Changes in physical fitness between before and during the state of emergency
Endurance (ability to continue to perform actions)

	N	Markedly decreased	Somewhat decreased	Almost no change	Somewhat improved	Markedly improved (%)
Total	1213	27.5	39.5	21.8	8.7	2.5
Sex						
Male	724	26.9	38.4	20.9	10.2	3.6
Female	489	28.2	41.1	23.3	6.5	0.8
Grade						
First-year	399	33.8	35.3	16.5	10.5	3.8
Second-year	333	22.8	47.7	21.9	6.3	1.2
Third-year	284	25.7	40.1	26.1	6.7	1.4
Forth-year	197	24.9	33.0	26.4	12.2	3.6
Sex * Grade						
Male						
First-year	242	32.2	34.3	15.7	12.0	5.8
Second-year	202	23.3	46.5	22.3	6.9	1.0
Third-year	172	26.7	37.8	24.4	9.3	1.7
Forth-year	108	22.2	33.3	24.1	13.9	6.5
Female						
First-year	157	36.3	36.9	17.8	8.3	0.6
Second-year	131	22.1	49.6	21.4	5.3	1.5
Third-year	112	24.1	43.8	28.6	2.7	0.9
Forth-year	89	28.1	32.6	29.2	10.1	0.0
Department						
Sports science	767	26.5	39.6	22.2	9.4	2.3
Sports Management	218	31.2	36.7	21.6	8.7	1.8
Health	228	27.2	41.7	21.1	6.6	3.5

er during the state of emergency than at other times.

5. CONCLUSIONS

The measurements of physical fitness in 2020 were collected from only for first-year students, and the number of parameters included was limited. However, historical values that have been measured continuously and cumulatively since 1969, documentary values that have been collated as records of the physical fitness of students during the COVID–19 pandemic, social values indicating the feasibility of measuring physical fitness even during the COVID–19 pandemic, etc., are highly valuable for suggesting the appropriate mode for measuring physical fitness under conditions of natural disaster or crisis. The present report covers the basic results of cumulative measurement of physical fitness and an internet-based survey about exercise, sport, etc., between before and after the declaration of the state of emergency. Details of the collated results and methods are to be reported at the end of 2020, as in an ordinary year; however, it is assumed that after anonymization, they will be widely used secondarily in research, as part of Institute of Health and Sports Science & Medicine’s research project called the Juntendo Fitness Plus Study (J–Fit⁺ Study), and further analysis is, therefore, expected¹. Applications for permission to use these data should be addressed to the J–Fit⁺ Study Secretariat at the Institute of

Table 3-7 Changes in physical fitness between before and during the state of emergency
Coordination (ability to control actions)

(%)

	N	Markedly decreased	Somewhat decreased	Almost no change	Somewhat improved	Markedly improved
Total	1213	12.7	32.6	44.3	8.2	2.2
Sex						
Male	724	12.2	32.6	42.3	10.1	2.9
Female	489	13.5	32.5	47.2	5.5	1.2
Grade						
First-year	399	16.0	32.8	39.1	9.8	2.3
Second-year	333	9.9	37.2	45.0	6.0	1.8
Third-year	284	12.3	29.2	49.6	7.0	1.8
Forth-year	197	11.2	28.9	45.7	10.7	3.6
Sex * Grade						
Male						
First-year	242	14.0	31.8	38.8	12.4	2.9
Second-year	202	9.9	37.1	44.1	6.9	2.0
Third-year	172	13.4	28.5	47.7	8.1	2.3
Forth-year	108	10.2	32.4	38.0	13.9	5.6
Female						
First-year	157	19.1	34.4	39.5	5.7	1.3
Second-year	131	9.9	37.4	46.6	4.6	1.5
Third-year	112	10.7	30.4	52.7	5.4	0.9
Forth-year	89	12.4	24.7	55.1	6.7	1.1
Department						
Sports science	767	12.5	33.4	42.9	9.3	2.0
Sports Management	218	12.8	30.3	48.6	6.9	1.4
Health	228	13.2	32.0	44.7	6.1	3.9

Health and Sports Science & Medicine or by email to jfitplus@juntendo.ac.jp.

Acknowledgement

The authors would like to thank all faculty members for understanding the significance of continuing the measurement and the school event in severe condition relating COVID-19 infection. We also thank all professors in managerial posts for useful and positive comments. Finally, we are grateful to post-doctoral researchers and research assistants for technical support as testers.

(Koya Suzuki, Ph.D.)

¹ Research performed at Japanese universities has been introduced in the following report, and liaison between universities is ongoing: "Current status and future of follow-up research with university graduates: Release of evidence on which to base the future of physical fitness and sports medicine" [*Japanese Journal of Physical Fitness and Sports Medicine*, 69: 1, 81-85 (2020)].

Table 3-8 Changes in physical fitness between before and during the state of emergency Flexibility (%)

	N	Markedly decreased	Somewhat decreased	Almost no change	Somewhat improved	Markedly improved
Total	1213	7.4	19.6	54.7	14.5	3.8
Sex						
Male	724	9.3	20.6	51.5	15.2	3.5
Female	489	4.7	18.2	59.3	13.5	4.3
Grade						
First-year	399	8.0	22.1	48.6	17.5	3.8
Second-year	333	8.1	18.9	54.7	14.7	3.6
Third-year	284	7.4	18.7	59.2	11.3	3.5
Forth-year	197	5.1	17.3	60.4	12.7	4.6
Sex*Grade						
Male						
First-year	242	9.9	21.9	45.9	18.2	4.1
Second-year	202	8.9	21.8	54.5	12.4	2.5
Third-year	172	9.9	19.8	53.5	14.5	2.3
Forth-year	108	7.4	16.7	55.6	14.8	5.6
Female						
First-year	157	5.1	22.3	52.9	16.6	3.2
Second-year	131	6.9	14.5	55.0	18.3	5.3
Third-year	112	3.6	17.0	67.9	6.3	5.4
Forth-year	89	2.2	18.0	66.3	10.1	3.4
Department						
Sports science	767	7.0	17.5	56.2	15.4	3.9
Sports Management	218	7.8	23.9	54.6	11.5	2.3
Health	228	8.3	22.8	49.6	14.5	4.8

Table 3-9 Changes in dietary habits between before and during the state of emergency Food consumption (%)

	N	Markedly decreased	Somewhat decreased	Almost no change	Somewhat increased	Markedly increased
Total	1213	6.9	28.1	46.3	16.4	2.2
Sex						
Male	724	6.5	22.5	51.0	17.7	2.3
Female	489	7.6	36.4	39.5	14.5	2.0
Grade						
First-year	399	5.0	24.6	46.6	19.8	4.0
Second-year	333	6.9	28.5	44.7	18.3	1.5
Third-year	284	9.2	27.8	48.6	13.4	1.1
Forth-year	197	7.6	35.0	45.2	10.7	1.5
Sex*Grade						
Male						
First-year	242	3.7	20.7	50.4	21.5	3.7
Second-year	202	5.9	23.8	49.0	19.8	1.5
Third-year	172	9.9	21.5	52.3	15.1	1.2
Forth-year	108	8.3	25.9	53.7	9.3	2.8
Female						
First-year	157	7.0	30.6	40.8	17.2	4.5
Second-year	131	8.4	35.9	38.2	16.0	1.5
Third-year	112	8.0	37.5	42.9	10.7	0.9
Forth-year	89	6.7	46.1	34.8	12.4	0.0
Department						
Sports science	767	7.0	26.6	47.8	16.4	2.1
Sports Management	218	7.8	28.0	47.7	15.6	0.9
Health	228	5.7	33.3	39.9	17.1	3.9

Table 3-10 Changes in dietary habits between before and during the state of emergency Nutritional balance (%)

	N	Markedly deteriorated	Somewhat deteriorated	Almost no change	Somewhat improved	Markedly improved
Total	1213	3.3	15.1	54.3	19.5	7.8
Sex						
Male	724	2.9	13.7	56.1	19.8	7.6
Female	489	3.9	17.2	51.7	19.0	8.2
Grade						
First-year	399	4.0	13.3	63.2	13.8	5.8
Second-year	333	3.9	16.8	46.5	25.5	7.2
Third-year	284	2.5	14.4	50.7	20.8	11.6
Forth-year	197	2.0	16.8	54.8	18.8	7.6
Sex*Grade						
Male						
First-year	242	3.3	12.0	62.4	16.5	5.8
Second-year	202	4.0	16.8	48.0	24.3	6.9
Third-year	172	2.3	12.8	54.1	19.8	11.0
Forth-year	108	0.9	13.0	60.2	18.5	7.4
Female						
First-year	157	5.1	15.3	64.3	9.6	5.7
Second-year	131	3.8	16.8	44.3	27.5	7.6
Third-year	112	2.7	17.0	45.5	22.3	12.5
Forth-year	89	3.4	21.3	48.3	19.1	7.9
Department						
Sports science	767	3.1	14.1	55.3	18.9	8.6
Sports Management	218	2.8	18.3	55.0	18.3	5.5
Health	228	4.4	15.4	50.4	22.4	7.5

Table 3-11 Daily screen time (television, smartphones, computers, games, etc.) during state of emergency Before the course started (April 1 to May 11)

	N	Mean (hour/day)	SD	Less than 2 hr	2-4 hr	4-6 hr	6-8 hr	More than 8 hr
Total	1213	5.4	2.7	3.0	24.3	32.5	18.9	21.4
Sex								
Male	724	5.4	2.7	3.9	24.9	30.1	19.9	21.3
Female	489	5.4	2.6	1.6	23.5	36.0	17.4	21.5
Grade								
First-year	399	5.3	2.7	3.8	25.3	31.6	17.5	21.8
Second-year	333	5.7	2.7	1.2	19.5	33.3	22.5	23.4
Third-year	284	5.3	2.6	3.2	24.6	33.8	18.3	20.1
Forth-year	197	5.1	2.7	4.1	29.9	31.0	16.2	18.8
Sex*Grade								
Male								
First-year	242	5.1	2.6	5.4	28.5	28.9	16.1	21.1
Second-year	202	5.8	2.9	2.0	19.8	30.2	22.3	25.7
Third-year	172	5.3	2.7	3.5	26.2	31.4	20.9	18.0
Forth-year	108	5.3	2.5	4.6	24.1	30.6	22.2	18.5
Female								
First-year	157	5.6	2.7	1.3	20.4	35.7	19.7	22.9
Second-year	131	5.5	2.4	0.0	19.1	38.2	22.9	19.8
Third-year	112	5.4	2.5	2.7	22.3	37.5	14.3	23.2
Forth-year	89	4.9	2.9	3.4	37.1	31.5	9.0	19.1
Department								
Sports science	767	5.2	2.7	3.3	27.9	32.2	17.2	19.4
Sports Management	218	5.8	2.7	1.8	20.2	30.3	18.8	28.9
Health	228	5.6	2.4	3.1	16.2	35.5	24.6	20.6

Table 3-12 Daily screen time (television, smartphones, computers, games, etc.) during state of emergency
After the course started (May 12 to May 31): Outside class

(%)

	N	Mean (hour/day)	SD	Less than 2 hr	2-4 hr	4-6 hr	6-8 hr	More than 8 hr
Total	1213	4.1	2.1	5.8	40.8	33.5	12.2	7.7
Sex								
Male	724	4.1	2.1	6.1	38.8	34.3	12.8	8.0
Female	489	4.0	2.1	5.3	43.8	32.3	11.2	7.4
Grade								
First-year	399	4.0	2.1	7.5	41.6	32.6	11.3	7.0
Second-year	333	4.2	2.0	3.0	40.8	35.1	13.5	7.5
Third-year	284	4.0	2.0	6.0	40.1	34.5	11.3	8.1
Forth-year	197	4.2	2.4	6.6	40.1	31.0	13.2	9.1
Sex*Grade								
Male								
First-year	242	4.0	2.1	7.4	39.7	33.9	10.7	8.3
Second-year	202	4.2	2.0	4.0	37.6	35.6	14.9	7.9
Third-year	172	4.0	2.0	5.8	39.0	35.5	13.4	6.4
Forth-year	108	4.3	2.2	7.4	38.9	30.6	13.0	10.2
Female								
First-year	157	3.9	2.0	7.6	44.6	30.6	12.1	5.1
Second-year	131	4.1	2.0	1.5	45.8	34.4	11.5	6.9
Third-year	112	4.0	2.1	6.3	42.0	33.0	8.0	10.7
Forth-year	89	4.2	2.5	5.6	41.6	31.5	13.5	7.9
Department								
Sports science	767	4.0	2.1	6.0	44.1	31.2	11.0	7.8
Sports Management	218	4.3	2.1	5.5	34.4	35.3	16.5	8.3
Health	228	4.2	2.0	5.3	36.0	39.5	12.3	7.0

Table 3-13 Daily screen time (television, smartphones, computers, games, etc.) during state of emergency After the course started (May 12 to May 31): In class

	N	Mean (hour/day)	SD	Less than 2 hr	2-4 hr	4-6 hr	6-8 hr	More than 8 hr
Total	1213	3.6	2.2	23.2	22.7	37.8	12.7	3.5
Sex								
Male	724	3.5	2.1	23.8	22.7	38.1	12.6	2.9
Female	489	3.7	2.3	22.5	22.7	37.4	12.9	4.5
Grade								
First-year	399	4.0	2.2	19.5	15.8	43.4	16.0	5.3
Second-year	333	3.9	2.1	17.7	21.0	39.6	18.0	3.6
Third-year	284	3.6	1.9	20.8	23.2	44.4	8.8	2.8
Forth-year	197	2.1	1.9	43.7	38.6	14.2	2.5	1.0
Sex*Grade								
Male								
First-year	242	3.9	2.1	20.2	17.4	43.4	15.7	3.3
Second-year	202	3.7	2.1	19.8	20.8	39.6	17.3	2.5
Third-year	172	3.7	2.0	19.8	23.8	43.0	9.3	4.1
Forth-year	108	2.1	1.7	45.4	36.1	15.7	1.9	0.9
Female								
First-year	157	4.2	2.3	18.5	13.4	43.3	16.6	8.3
Second-year	131	4.2	2.2	14.5	21.4	39.7	19.1	5.3
Third-year	112	3.5	1.9	22.3	22.3	46.4	8.0	0.9
Forth-year	89	2.2	2.0	41.6	41.6	12.4	3.4	1.1
Department								
Sports science	767	3.6	2.2	23.9	22.4	37.5	12.3	3.9
Sports Management	218	3.3	2.1	26.6	26.1	33.9	11.0	2.3
Health	228	3.9	2.2	18.0	20.2	42.5	15.8	3.5

Table 3-14 Status of engaging in exercise and sport during the state of emergency (April and May)
 Mean frequency and duration of exercise/sport per week: Frequency as activities of athletics clubs and associations
 (days/week)

(%)

	N	Median (days/week)	Interquartile range	0 day	1-2 days	3-4 days	5-6 days	7 days
Total	1213	0.0	(0.0, 1.0)	72.6	7.1	7.6	12.4	0.3
Sex								
Male	724	0.0	(0.0, 0.0)	75.1	5.5	7.3	11.6	0.4
Female	489	0.0	(0.0, 2.0)	68.9	9.4	8.0	13.5	0.2
Grade								
First-year	399	0.0	(0.0, 2.0)	71.2	6.5	8.0	13.5	0.8
Second-year	333	0.0	(0.0, 1.0)	72.7	8.4	7.2	11.7	0.0
Third-year	284	0.0	(0.0, 1.0)	73.9	8.1	7.4	10.6	0.0
Forth-year	197	0.0	(0.0, 1.0)	73.6	4.6	7.6	13.7	0.5
Sex * Grade								
Male								
First-year	242	0.0	(0.0, 1.3)	72.7	5.4	7.0	14.0	0.8
Second-year	202	0.0	(0.0, 0.3)	75.2	6.9	6.4	11.4	0.0
Third-year	172	0.0	(0.0, 0.0)	78.5	5.8	7.0	8.7	0.0
Forth-year	108	0.0	(0.0, 0.8)	75.0	2.8	10.2	11.1	0.9
Female								
First-year	157	0.0	(0.0, 2.0)	68.8	8.3	9.6	12.7	0.6
Second-year	131	0.0	(0.0, 2.0)	68.7	10.7	8.4	12.2	0.0
Third-year	112	0.0	(0.0, 2.0)	67.0	11.6	8.0	13.4	0.0
Forth-year	89	0.0	(0.0, 1.5)	71.9	6.7	4.5	16.9	0.0
Department								
Sports science	767	0.0	(0.0, 1.0)	73.9	6.4	6.0	13.3	0.4
Sports Management	218	0.0	(0.0, 2.0)	70.2	6.9	11.5	11.5	0.0
Health	228	0.0	(0.0, 1.0)	70.6	9.6	9.2	10.1	0.4

Table 3-15 Status of engaging in exercise and sport during the state of emergency (April and May)

Mean frequency and duration of exercise/sport per week: Duration as activities of athletics clubs and associations (hours/day)

(%)

	N	Median (hours/day)	Interquartile range	None at all	0-1 hr	1-2 hr	2-3 hr	3-4 hr	More than 4 hr
Total	1213	0.0	(0.0, 1.0)	72.5	1.0	7.3	10.4	5.9	2.8
Sex									
Male	724	0.0	(0.0, 0.2)	75.0	0.6	4.7	10.9	5.9	2.9
Female	489	0.0	(0.0, 1.0)	68.9	1.6	11.2	9.6	5.9	2.7
Grade									
First-year	399	0.0	(0.0, 1.5)	71.2	0.5	3.8	12.0	8.0	4.5
Second-year	333	0.0	(0.0, 1.0)	72.7	1.5	8.1	9.9	4.8	3.0
Third-year	284	0.0	(0.0, 1.0)	73.6	1.1	10.6	8.1	4.9	1.8
Forth-year	197	0.0	(0.0, 1.0)	73.6	1.0	8.6	11.2	5.1	0.5
Sex*Grade									
Male									
First-year	242	0.0	(0.0, 1.5)	72.7	0.0	2.9	12.8	7.0	4.5
Second-year	202	0.0	(0.0, 0.1)	75.2	1.5	5.4	10.4	5.0	2.5
Third-year	172	0.0	(0.0, 0.0)	77.9	0.6	5.8	7.6	5.8	2.3
Forth-year	108	0.0	(0.0, 0.8)	75.0	0.0	5.6	13.0	5.6	0.9
Female									
First-year	157	0.0	(0.0, 1.8)	68.8	1.3	5.1	10.8	9.6	4.5
Second-year	131	0.0	(0.0, 1.0)	68.7	1.5	12.2	9.2	4.6	3.8
Third-year	112	0.0	(0.0, 1.0)	67.0	1.8	17.9	8.9	3.6	0.9
Forth-year	89	0.0	(0.0, 1.0)	71.9	2.2	12.4	9.0	4.5	0.0
Department									
Sports science	767	0.0	(0.0, 1.0)	73.8	0.5	6.0	11.2	5.9	2.6
Sports Management	218	0.0	(0.0, 1.0)	70.2	1.4	11.0	10.1	4.1	3.2
Health	228	0.0	(0.0, 1.0)	70.6	2.2	8.3	7.9	7.9	3.1

Table 3-16 Status of engaging in exercise and sport during the state of emergency (April and May)
 Mean frequency and duration of exercise/sport per week: Frequency as independent, individual activities (day/week) (%)

	N	Median (days/week)	Interquartile range	0 day	1-2 days	3-4 days	5-6 days	7 days
Total	1213	3.0	(2.0, 5.0)	15.7	19.3	27.0	29.3	8.7
Sex								
Male	724	4.0	(2.0, 6.0)	14.8	16.2	26.4	34.1	8.6
Female	489	3.0	(1.0, 5.0)	17.0	23.9	28.0	22.3	8.8
Grade								
First-year	399	3.0	(2.0, 5.0)	14.3	20.1	27.6	27.3	10.8
Second-year	333	3.0	(2.0, 5.0)	15.3	19.8	27.6	30.3	6.9
Third-year	284	3.0	(2.0, 5.0)	16.2	20.1	27.1	29.9	6.7
Forth-year	197	4.0	(2.0, 5.5)	18.3	15.7	24.9	31.0	10.2
Sex * Grade								
Male								
First-year	242	4.0	(2.0, 6.0)	12.8	15.3	27.3	32.2	12.4
Second-year	202	3.0	(2.0, 5.0)	15.8	19.3	28.7	32.2	4.0
Third-year	172	4.0	(2.0, 6.0)	15.1	16.3	27.3	33.1	8.1
Forth-year	108	5.0	(2.0, 6.0)	16.7	12.0	18.5	43.5	9.3
Female								
First-year	157	3.0	(1.0, 5.0)	16.6	27.4	28.0	19.7	8.3
Second-year	131	3.0	(2.0, 5.0)	14.5	20.6	26.0	27.5	11.5
Third-year	112	3.0	(1.0, 5.0)	17.9	25.9	26.8	25.0	4.5
Forth-year	89	3.0	(1.0, 5.0)	20.2	20.2	32.6	15.7	11.2
Department								
Sports science	767	4.0	(2.0, 6.0)	14.3	17.5	26.7	32.5	9.0
Sports Management	218	3.0	(1.0, 5.0)	21.1	19.3	29.8	24.3	5.5
Health	228	3.0	(1.0, 5.0)	14.9	25.4	25.4	23.7	10.5

Table 3-17 Status of engaging in exercise and sport during the state of emergency (April and May)
 Mean frequency and duration of exercise/sport per week: Duration as independent, individual activities (hours/day)

	N	Median (hours/day)	Interquartile range	None at all	0-1 hr	1-2 hr	2-3 hr	3-4 hr	More than 4 hr
Total	1213	1.0	(1.0, 2.0)	15.5	6.3	40.6	28.4	7.3	2.0
Sex									
Male	724	1.5	(1.0, 2.0)	14.6	3.3	37.3	33.4	9.3	2.1
Female	489	1.0	(0.5, 2.0)	16.8	10.6	45.4	20.9	4.5	1.8
Grade									
First-year	399	1.5	(1.0, 2.0)	14.0	6.5	38.3	29.6	8.5	3.0
Second-year	333	1.0	(1.0, 2.0)	15.0	6.3	45.0	26.1	6.0	1.5
Third-year	284	1.0	(1.0, 2.0)	16.2	4.9	40.8	28.5	8.5	1.1
Forth-year	197	1.0	(0.5, 2.0)	18.3	7.6	37.1	29.4	5.6	2.0
Sex*Grade									
Male									
First-year	242	1.6	(1.0, 2.0)	12.4	3.3	35.1	34.7	10.7	3.7
Second-year	202	1.0	(1.0, 2.0)	15.8	4.0	41.6	30.2	6.4	2.0
Third-year	172	1.5	(1.0, 2.0)	15.1	2.9	36.6	34.3	11.0	0.0
Forth-year	108	1.5	(1.0, 2.0)	16.7	2.8	35.2	35.2	8.3	1.9
Female									
First-year	157	1.0	(0.5, 2.0)	16.6	11.5	43.3	21.7	5.1	1.9
Second-year	131	1.0	(1.0, 2.0)	13.7	9.9	50.4	19.8	5.3	0.8
Third-year	112	1.0	(0.5, 2.0)	17.9	8.0	47.3	19.6	4.5	2.7
Forth-year	89	1.0	(0.5, 2.0)	20.2	13.5	39.3	22.5	2.2	2.2
Department									
Sports science	767	1.0	(1.0, 2.0)	14.2	5.2	39.4	30.1	9.3	1.8
Sports Management	218	1.0	(0.5, 2.0)	20.6	8.7	39.4	23.4	5.0	2.8
Health	228	1.0	(1.0, 2.0)	14.9	7.5	45.6	27.2	3.1	1.8

【日本語訳】

2020年度 順天堂大学体格体力累加測定
(COVID-19関連報告)

体格体力累加測定委員会

委員長 鈴木 宏哉

委員 青木 和浩 川田裕次郎 宮本 (三上) 恵里

木藤 友規 涌井佐和子

幹事 河村 剛光 福 典之

測定実施協力 スポーツ健康医科学研究所

分析協力 慎 少帥

1. はじめに

2020年度の順天堂大学体格体力累加測定は、スポーツ健康科学部の入学定員が410名となってから4年が経過し、4学年あわせて過去最大の1640名定員となった初めての年であった。加えて、2021年度からはスポーツ健康科学部が3学科から1学科に改組され、かつ入学定員が600名となることが認可されたため、2021年度からは学部生全員を対象とするこれまでのやり方を抜本的に見直すことが必要であった。そのため、2019年度の累加測定が終わってから、新たな累加測定の在り方を検討していた。その矢先に、新型コロナウイルス感染症(COVID-19)が世界的に蔓延し、World Health Organizationは2020年3月11日にパンデミック宣言をした。日本では政府が2020年4月7日に東京、神奈川、埼玉、千葉、大阪、兵庫、福岡の7都府県に緊急事態宣言を行い、4月16日に対象地域を全国に拡大した。

さくらキャンパスでは4月4日から全学生の立ち入りを禁止した。前期授業開始も5月11日に延期され、再開後もインターネットを活用した遠隔授業となった。5月25日に緊急事態解除宣言が政府によって発出されたが、その前の5月22日に千葉県が感染拡大防止対策を徹底したうえで施設の使用停

止要請を一部解除したため、さくらキャンパスにおいても感染対策が可能な極めて限定的な運動施設かつ極めて限定的な活動人数に制限したうえで、キャンパス内での運動・スポーツ活動を再開した。6月1日からは施設利用制限の一部緩和、6月22日から一部を除く運動施設利用の拡大、7月20日から全運動施設利用へ拡大し、一定の条件にもとづく大会参加・競技会開催の制限緩和となった。したがって、実態としては学内指導者の管理下のもと、運動部単位で学生(1年生を除く)がさくらキャンパス内で練習を再開できたのは6月1日よりも後からであった。ただし、再開できた学生は限定的であり、多くの運動部や同好会は、概ね7月20日以降に再開された。ただし、競技会の延期、施設使用基準および規則の制約によって定期的な活動がままならない組織も散見された。また、所属する運動部や同好会の活動が再開された後も、帰省先が県外であったり感染拡大地域であったり、感染への不安などといった個人的な事情で活動に参加しない学生もいた。その後、8月22日からの夏季休業、8月31日から啓心寮入寮(入寮できる学生を例年の50%に制限)、9月28日から後期授業開始となり、一部の授業、一部の学年で対面型授業と遠隔授業を組み合わせた形態で実施することとなったが、現在(2020年末)に至るまで運動部活動ならびに運動施設利用の基本

的な方針は7月20日以降のままとなっている。そのため、1年生においては、早いケースで6月22日以降に運動部活動に参加することができたが、多くは8月31日以降になった。したがって、1年生は例年よりも約6ヶ月遅れて運動部や同好会等での活動を行うこととなった。また、運動部や同好会に所属していない学生においては、1年生に限らず、個人的な施設利用はできない状況が現在もなお続いている。この他、COVID-19に関連した学部の対応については、学校法人順天堂のホームページ「新型コロナウイルス感染症に関連する対応について」を参照されたい。

こういった事態の特殊性を鑑み、COVID-19に起因する運動・スポーツ実施状況や体格・体力への影響を検討する基礎資料とするため、今年度の体格体力累加測定および運動・スポーツ実施状況等に関するWeb調査の結果については、第1報として、関連するデータのみ先行して報告することとした。なお、その他のデータについては、例年通り年度末に報告する予定である。

2. 測定・調査日と対象者

本年度は当初の学事暦通りの10月21日（水）に実施した。COVID-19感染予防のため、体格・体力測定の対象者は1年生のみを対象に、感染予防対策を講じたうえで実施した。当日の参加者は男性が233名、女性が147名、計380名であり、在籍者の90.7%が参加した。また、運動・スポーツ実施状況等に関するWeb調査の回答者は、1年生399名、2年生333名、3年生284名、4年生197名、男性計724名、女性計489名、総計1213名であり、回答率は74.2%であった。なお、実施方法の詳細については別途報告する。

3. 体格・体力測定結果および特徴

本年度の体格・体力測定はCOVID-19感染拡大のため、3密（密集，密接，密閉）を避けながら実施せざるを得なかった。対象者が測定員と対象者との接触を最小限に抑えられる測定項目で、かつ測定

場所の体育館に入館する人数と時間を制限したため、体重，握力，立ち幅とび，反復横とびの4項目のみを測定することとなった。なお，身長については，8月末に実施した健康診断の結果を思い出してもらい自己申告により調査した。

Table 1は，本年度の体格・体力測定結果と過去3年間の1年生の結果を示している（Table 1-1：男子，Table 1-2：女子）。2017年度から2019年度の3年度分の平均値と本年度の平均値を比較すると，その差は0.2～6.1%の範囲にあった。最も小さな差は男女とも身長（男性0.2%；[+0.3 cm]，女性0.6% [+0.6 cm]）であり，最も大きな差は男女とも反復横とび（男性4.9% [+2.9点]，女性6.1% [+3.2点]）であり，過年度との差は総じて大きくなかった。また，男女でその傾向が異なったのは，体重と握力であり，男性では過年度よりも高い値（体重+1.8 kg，握力+1.1 kg）を示した一方で，女性は過年度よりも低い値（体重-1.4 kg，握力-0.6 kg）を示した。

過年度と本年度の1年生の結果の違いに及ぼす要因を特定することは単純ではないが，これまで1年生は3月末に全員が寮生活を始め，その前後から大学の運動部や同好会等の組織的活動に参加していた。しかし本年度はCOVID-19の影響によって，8月31日に啓心寮へ入寮したため，それ以前の活動は一部の学生を除けば，実家での自主的な活動となり，運動・スポーツ活動に支障があったといえる。しかしその後，体格・体力測定が行われた10月21日までの間に，運動部や同好会等での組織的活動に参加することを通して運動・スポーツ活動を行ったり，寮内の仲間同士で体を動かしたりすることによって一定の身体活動量が確保できていたのかもしれない。ただし，コロナ禍における生活様式の変化はエネルギー摂取量と消費量のバランスに影響を及ぼしていたことも考えられる。例えば，男性の握力の増加と体重の増加を考えると，筋力トレーニングのような室内での運動によるエネルギー消費量以上に摂取量が増えていた可能性がある。女性はその反対に握力と体重が減少しており，筋力トレーニングの

ような活動が減った代わりにエネルギー摂取量を意図的に減らしていたのかもしれない。握力が全身の筋力を推定しているとすれば、筋力が増減し体重も同じように増減したことで、下肢の筋力・筋パワーが要求され、体重移動を伴う立ち幅とびの記録がほとんど変化しなかったことも納得できる。

いずれにしても、Table 1 はコロナ禍における順天堂大学スポーツ健康科学部1年生の体格・体力測定結果の事実であるが、本年度と過年度の結果の違いに及ぼす要因を同定するためには、Web 調査結果との関連等を検討する必要がある。

4. Web 調査結果および特徴

Table 2 はスポーツ健康科学部全学生を対象に実施した Web 調査内容を示している。第1報では、緊急事態宣言による影響を調査した17項目についてのみ、基本属性ごとに集計した (Table 3)。

4.1 運動・スポーツ活動に関連した変化

緊急事態宣言期間前と期間中における運動・スポーツ活動に関連した変化 (Table 3-1~Table 3-4) については、運動・トレーニングの量・強度・内容・環境、いずれについても否定的な回答 (減った、下がった、悪化した) が60%以上であった。緊急事態宣言期間前後の体力の変化 (Table 3-5~Table 3-8) については、行動を起こす能力 (筋力) と行動を持続する能力 (持久力) について、その低下を実感している学生が60%以上であるのに対して、行動を制御する能力 (調整力) と体の柔らかさ (柔軟性) については、その低下を実感している学生は過半数を下回った。以上のことから、緊急事態宣言期間中の運動・スポーツ活動の制限が調整力や柔軟性よりも筋力や持久力の低下に影響していたことがうかがえた。

4.2 食習慣の変化

緊急事態宣言期間前と期間中における食習慣の変化 (Table 3-9, Table 3-10) については、食事量と栄養バランスについて調査した。食事量が増えたという回答した割合 (18.6%) よりも減った (とても減った・やや減った) と回答した割合 (35.0%) の方

が多かった。男女別にみると、男性が29.0%であるのに対して、女性が44.0%と多かった。そして栄養のバランスが悪化したと回答した割合 (18.4%) よりも改善したと回答した割合 (27.3%) の方が多かった。一方、約半数はほぼ同じと回答していた。運動・スポーツ活動の制限によるエネルギー消費量の減少を考慮して、食事量や栄養のバランスを意識していた学生が一定数いたことがうかがえた。

4.3 TV・スマホ・PC・ゲーム等のディスプレイ視聴時間の変化

1日のTV・スマホ・PC・ゲーム等のディスプレイ視聴時間については、授業開始前の時期 (4月から5月11日) と授業開始後の時期 (5月12日から5月末) の状況について調査した (Table 3-11~Table 3-13)。授業開始前の時期は 5.4 ± 2.7 時間/日であり、授業開始後の時期は授業外で 4.1 ± 2.1 時間/日、授業内で 3.6 ± 2.2 時間/日であった。授業開始後に授業外でのディスプレイ視聴時間は減少したが、授業内での視聴時間を含めると、授業開始後の時期に平均して1日2時間以上視聴時間が増加していたことが分かった。2019年度の累加測定 Web 調査では、「1日のTV・スマホ等ディスプレイ視聴時間」として、5件法 (6時間以上, 4時間以上, 2時間以上, 1時間以内, ほぼ見ない) で調査を行った。2019年度の報告書によれば、6時間以上が9.5%, 4時間以上が39.5%, 2時間以上が42.9%, 1時間未満が6.6%, ほぼ見ないが1.4%であり、授業開始前の時期を示したTable 3-11と比べると、本年度のディスプレイ視聴時間が著しく増加していることが分かる。例えば、6時間以上の割合で見ると、授業開始前の時期が40.3%であり昨年度と比べて約4倍に増加した。これは緊急事態宣言下における外出自粛等により自宅で過ごす時間が増加したことが一因といえる。また、4時間以上も含めた割合では昨年度が49.0%であるのに対して、本年度の授業開始後 (授業外) が53.4% (Table 3-12) とさほど変わらないことから考えると、授業が再開された後では授業外での余暇時間の過ごし方は昨年までとあまり変化がないのかもしれない。ただし、授業

自体がインターネットを活用した遠隔授業となったため、授業内のディスプレイ視聴時間を含めた1日の総ディスプレイ視聴時間は授業受講時間分だけ増加していることに注意すべきである。

4.4 運動・スポーツ実施状況の変化

緊急事態宣言期間中(4月から5月頃)の運動・スポーツ実施状況について、運動部や同好会の活動として行った頻度・時間と個人の自主的な活動として行った頻度・時間に分けて調査した(Table 3-14~Table 3-17)。学生の運動・スポーツ活動は大学としての「新型コロナウイルス感染症に関連する対応」の方針とさくらキャンパス運動施設使用のロードマップと運動施設使用基準および規則に従って、4月4日から5月21日まで、学内外の施設を利用した活動が完全に禁止されていた。そのため、運動部や同好会の活動として行った頻度や時間が「0日」以外あるいは「全くしない」以外に回答した者は、自宅やその周辺で行った活動として回答したといえる。Table 3-14とTable 3-15を見ると、70%以上の学生が運動部やサークルとしての運動・スポーツ活動を実施していなかったことが分かる。一方で、30%弱の学生は何かしらの方法を用いて運動部や同好会の組織としての運動・スポーツ活動を実施していた。学生からのヒアリングによれば、インターネットを用いた通話アプリ(LINEやZOOMなど)を利用して、学生同士の自宅をつないで、筋力トレーニングのような活動を実施していたようである。一方で、個人の自主的な活動として運動・スポーツ活動を行っていた学生は80%を超え、週に3.0日、1日あたり1時間(いずれも中央値)の運動・スポーツ活動を行っていた。ただし、70%以上の学生が運動・トレーニングの量や強度が低下したと回答している(Table 3-1, Table 3-2)ことから、緊急事態宣言期間中は通常よりも頻度と

時間が減っていたことが示唆された。

5. さいごに

本年度の体格・体力測定記録は、1年生のみで、なおかつ限られた測定項目のみとなっていたが、1969年から続く累加測定を中止することなく実施した歴史的価値、コロナ禍における学生の体格・体力を記録としてまとめた資料的価値、コロナ禍においても体格・体力測定が実施できることを示した社会的価値など、ある種の災害下における体格・体力測定の在り方を示した価値は大きい。本稿では体格体力累加測定と緊急事態宣言期間前後の運動・スポーツ実施状況等に関するWeb調査の基礎的結果のみを報告した。その他の集計結果や実施方法の詳細については、例年通り年度末に報告する予定であるが、それとは別に、本データは順天堂大学スポーツ健康医科学研究所の研究プロジェクト(Juntendo Fitness Plus Study, 略称J-Fit+ Study)の一環として、匿名化したうえで広く研究等に二次利用することを想定しており、更なる分析が期待される²。データ利用の申請方法については研究所内J-Fit+ Study事務局またはjfitplus@juntendo.ac.jp宛にお問い合わせください。

謝辞

今回の累加測定を実施するにあたり、コロナ禍でも体力を測定する意義、学校行事として累加測定を継続する意義について理解し、開催にご協力いただいた役職者の先生方をはじめ学部構成員すべての皆様、さらに運営スタッフ、測定員として重要な役割を担っていただいたスポーツ健康医科学研究所博士研究員とリサーチアシスタントの皆さんに御礼申し上げます。

(鈴木宏哉)

²「大学卒業生追跡研究の現状と未来 ~体力科学の未来を築くエビデンスの発信~」(体力科学第69巻第1号, 81-85, 2020年)に国内の大学で行われている研究が紹介されており、大学間の連携が進められているところである。