

The Effect of Sport for Maintaining Health of the Person with Spinal Cord Injuries

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脊髄損傷者の健康維持に及ぼすスポーツの影響

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脊髄損傷者のうちの90%近くがよく注意を払っているにもかかわらず、70%近くに認められると言われている褥創と40%近くに認められる尿路感染について、日頃スポーツ（車椅子バスケットボール）に親しんでいる群について、運動の効果を期待し、質問紙により、褥創や尿路感染の有無等を調査した。

その結果、以下のことが明らかになった。

① 健康意識は、80%の者が「健康」であるとし、一般に言われている脊髄損傷者の意識とは逆であったが、褥創については関心が薄く、尿路感染については関心の高い傾向がみられ、褥創はあって当然というような悪い傾向がみうけられた。

② 褥創形成については、車椅子バスケットボールを始めるようになってから経験した者が37.2%にすぎず、それ以前に経験のある者66.7%に比して大きく減少し、有意差が認められ、その非褥創成率は50%に達した。しかし、褥創形成の経験が、車椅子バスケットボールを始める前と後ともにある者が90%もあることから、車椅子バスケットボール（スポーツ）の褥創形成の機会を減ずるという効果にもかかわらず、褥創形成に関し、個人的集積性が疑われた。

③ 尿路感染については、車椅子バスケットボールを始めるようになってから経験した者が25.6%にすぎず、それを始める以前に経験のある者32%に比し減少をみたが、有意差は認められず、その非尿路感染率は56%であった。

④ 車椅子バスケットボールの経験年数の平均は4.6年であり、経験年数と褥創や尿路感染のようなリスク発生との関係は認められなかった。

⑤ 車椅子バスケットボールの練習量は、その多く（69%）が週2回以下であり、練習量とリスク発生との関係は認められなかった。

Key words: spinal cord injuries, wheelchair basketball, decubitus, urinary tract infection

1. Introduction

1) The consciousness of health and sport:

About ten years ago, according to the report of investigation about national health, one ninth of the population was in sick conditions in Japan.

According to the research for the person with spinal cord injuries, the percentage of ill contraction was over 95%.

On this status, according to the basic report of investigation about national health and hygiene, the consciousness of health of the Japanese was as follows; about 90% of them usually considered about their conditions of health, and about 47% of them pointed out that

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the maintaining and promoting health is the most important matter of concern. And only 10% of them answered excellent physical fitness. However, the majority of them did not take positive approaches to keep maintaining and promoting health, and only about 17% of them were close to sports and physical activities.

According to the research for the person with spinal cord injuries, 95% of them had positive attitude for maintaining and promoting their health. And about 78% of them wanted to get a chance of doing sports and physical activities, but actually, about 38% of them were close to sports and physical activities. On their health, about 34% of them answered poor, and only about 4% of them reported good.

As above, the condition of health and the steps to sports and physical activities are almost same situation as able-bodied and the person with spinal cord injuries.

But, it is from necessity for maintaining and promoting health, the habit of close to sports and physical activities of the person with spinal cord injuries is greater than able-bodied.

2) The necessity of sport:

Generally speaking, the main reason of modern illness is lack of physical activities. No one doubts that it is not enough to take medicine for maintaining and promoting the health.

According to Dr. L. Lamb, the clinical and preventive medicine are greenhorns, but sport is the Saviour for maintaining and promoting our health.

In a few words, physical activities and sports should be prepared for the way of satisfying our desire of keeping away from death and getting acquaintance with happiness.

We desire to keep health per unhealthness, and to be got of illhealth from the view point of the stage of health.

Therefore, when we are weak from illness, we should use sports and physical activities as remedial exercise to restore health. And, when we are in poor health, we should use sports and

physical activities for the purpose of maintaining the health. Also, when we are healthy, we should use sports and physical activities to promote health further.

Sports and physical activities are indispensable for maintaining and promoting general health.

This study investigates the effects of sport for maintaining health in particular, relating to the person with spinal cord injuries, by focusing how sports and physical activities may reduce the risks of the person with such injuries.

2. The relationships between the risk factors of the person with spinal cord injuries and their habit of sport.

Generally speaking, we can find the decubitus about 70% of the person with spinal cord injuries and the urinary tract infection (UTI) over 40% of them for all their efforts of prevention.

In this study, the author investigated into the effects of wheelchair basketball (w/cBB) to the percentage of decubitus and of UTI using questionnaire.

1) The method of investigation and analysis of the datum:

The questionnaire was sent to 168 players selected at random from 14 w/cBB teams in Japan.

Of the 78 male players, 46.4% returned the questionnaire, which provides the basis of this empirical analysis.

① 78 players were classified into 4 groups, they had not decubitus and UTI (Group A), they had not decubitus but UTI (Group B), they had not UTI but decubitus (Group C), and they had decubitus and UTI (Group D) after the experiences of w/cBB.

② The percentage of decubitus contraction was analysed by two groups, they had contract decubitus before the experiences of w/cBB (Decubitus group) and not contract it before the experiences of w/cBB (Non-decubitus group).

The percentage of decubitus uncontraction after the experience of w/cBB (PDUC after w/cBB) gains from the following method of computation;

$$\text{PDUC after w/cBB} = 100 \times$$

$\frac{\text{The numbers of Group A and B}}{\text{The numbers of Decubitus group after w/cBB}}$

The percentage of decubitus contraction after the experience of w/cBB (PDC after w/cBB) gains from the following method of computation;

$$\text{PDC after w/cBB} = 100 \times$$

$\frac{\text{The numbers of Group C and D}}{\text{The numbers of Non-decubitus group before w/cBB}}$

③ The percentage of UTI contraction were analysed by two groups same as the above, they had contract UTI before the experience of w/cBB (UTI group) and not contract it before the experience of w/cBB (Non-UTI group).

The percentage of UTI uncontraction after the experience of w/cBB (PUTIUC after w/cBB) gains from the following method of computation;

$$\text{PUTIUC after w/cBB} = 100 \times$$

$\frac{\text{The numbers of Group A and C}}{\text{The numbers of UTI group before w/cBB}}$

The percentage of UTI contraction after the experience of w/cBB (PUTIC after w/cBB) gains from the following method of computation;

$$\text{PUTIC after w/cBB} = 100 \times$$

$\frac{\text{The numbers of Group B and D}}{\text{The numbers of Non-UTI group before w/cBB}}$

④ The statistical relationships between the risk factors and the consciousness of health, the career of w/cBB, and the frequency of practice w/cBB in a week were examined by χ^2 method.

2) Results of the analysis:

① The attribute of subjects (Table 1);

A) The duration from on set;

It was 1 to 35 years, the average duration from on set was 8 years,

B) Range of chronological age;

There were 1 teens, 45 twenties, 29 thirties, and 3 forties, and the range of chronological

age was from 19 to 45 years old.

The average age was 26.7 years old.

C) Level of lesion;

The level of lesion were from cervical 6th to lumber 4th. According to the classified level of lesion by the method of International Stoke Mandeville Games Federation, there were 5 classes, 1 (1.3%) for cervical level (class 1), 11 (14.1%) for from thoracic 1st to 5th level (class 2), 19 (24.3%) for from thoracic 6th to 10th level (class 3), 46 (59.0%) for thoracic 11th to lumber 3rd level (class 4), and 1 (1.3%) for below lumber 3rd level (class 5).

D) Consciousness of health;

Majority of them (80%) reported good health, 19% reported poor and only 1% reported weak.

E) Existence of decubitus before the experience of w/cBB;

There were 52 players (66.7%) in the Decubitus group and 26 (33.3%) in the Non-decubitus group.

F) Existence of UTI before the experience of w/cBB;

There were 25 players (32%) in the UTI group and 53 (68%) in the Non-UTI group.

G) The career of w/cBB;

The career of w/cBB were from 1 year to 14 years, the average career was 4.6 years.

H) The frequency of practice in a week;

24 players (31%) practiced w/cBB over 3 times per a week, and 54 players (69%) practiced it under 2 times per a week.

② The relationships between the risk factors of the person with spinal cord injuries and their habit of sport:

A) The percentage of decubitus contraction;

The PDUC after w/cBB was 26/52 (50%) and PDC after w/cBB was 3/26 (11.5%).

Besides, there were 23/49 (46.9%) who did not experience decubitus contraction and 26/29 (89.6%) of the experienced of it before and after the experience of w/cBB. (Fig. 1)

B) The percentage of UTI contraction;

PUTIUC after w/cBB was 14/25 (56%) and

Table 1 The Attribute of Subjects

Group, Number & (%) Items		A 41(52.6)	B 8(10.3)	C 17(21.8)	D 12(15.3)	Total 78
Duration from on set (years)	1~5	18	4	8	3	33(42.3)
	6~10	12	1	6	2	21(26.9)
	11~15	10	2	3	5	20(25.6)
	16~20	1	0	0	0	1(1.3)
	21~25	0	0	0	2	2(2.6)
	26~30	0	0	0	0	0(0)
	31~	0	1	0	0	1(1.3)
	\bar{x}	7.0	10.0	7.0	11.0	8.0
Age (years old)	~19	0	1	0	0	1(1.3)
	20~29	24	2	11	8	45(57.7)
	30~39	16	4	6	3	29(37.2)
	40~49	1	1	0	1	3(3.8)
	\bar{x}	24.7	30.2	27.6	29.7	26.7
Level of lesion (class)	1	1	0	0	0	1(1.3)
	2	6	1	3	1	11(14.1)
	3	10	4	3	2	19(24.4)
	4	23	3	11	9	46(59.0)
	5	1	0	0	0	1(1.3)
	\bar{x}	3.4	3.3	3.5	3.7	3.5
Health	good	38	4	14	6	62(79.5)
	poor	3	4	3	5	15(19.2)
Consciousness	weak	0	0	0	1	1(1.3)
Decubitus	before +	21	5	16	10	52(66.7)
	—	20	3	1	2	26(33.3)
	after +	0	0	17	12	29(37.2)
	—	41	8	0	0	49(62.8)
UTI	before +	9	4	5	7	25(32.1)
	—	32	4	12	5	53(67.9)
	after +	0	8	0	12	20(25.6)
	—	41	0	17	0	58(74.4)
Career of w/c BB (years)	~1	9	0	3	3	15(19.2)
	2~3	9	4	5	0	18(23.1)
	4~5	13	2	4	3	22(28.2)
	6~7	4	0	4	3	11(14.1)
	8~9	1	0	0	0	1(1.3)
	10~	5	2	1	3	11(14.1)
	\bar{x}	4.0	5.0	4.0	6.0	4.6
Frequency	over 3/w	14	3	5	2	24(30.8)
of practice	under 2/w	27	5	12	10	54(69.2)

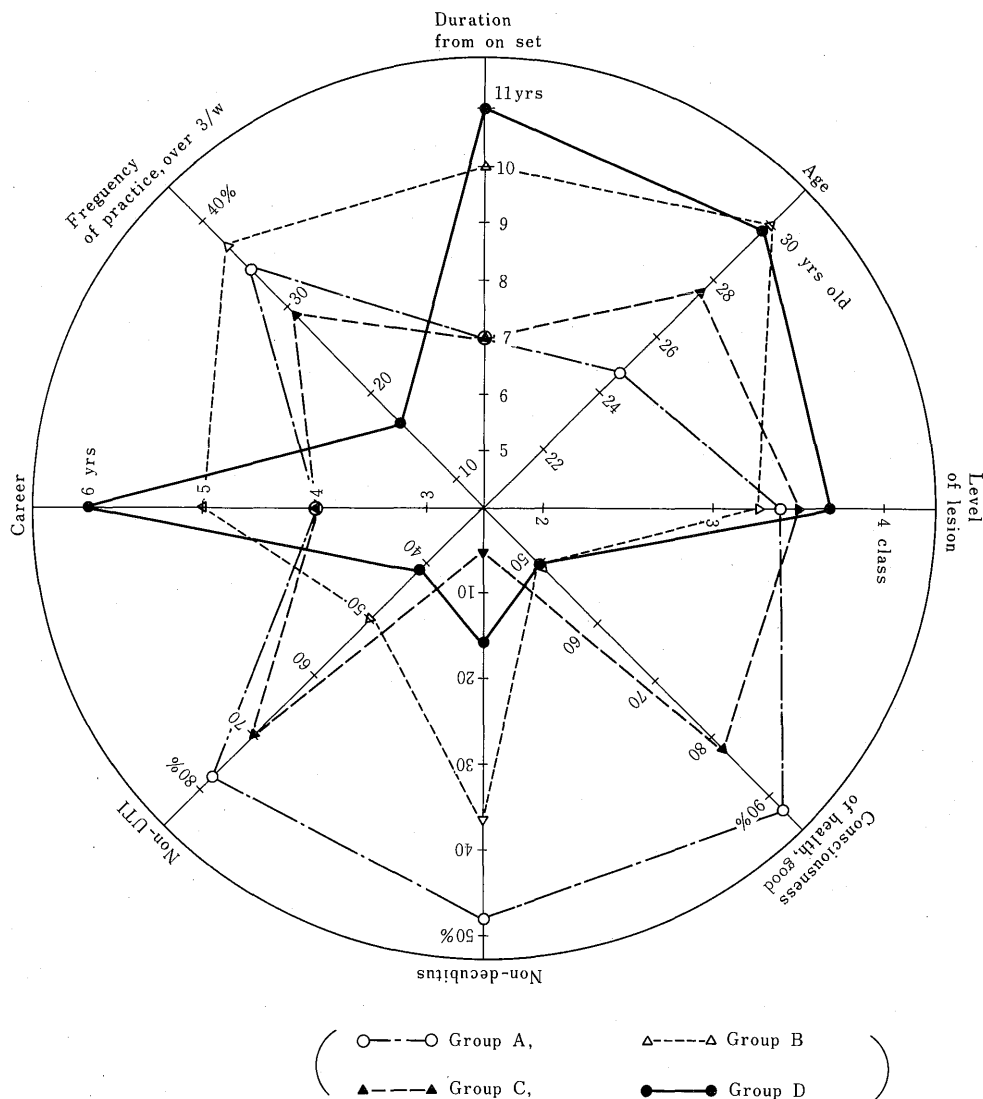


Fig. 3 The Compalition of 4 Groups

contraction but decubitus after the experience of w/cBB.

The profile of them were as follows;

- a) the average duration from on set was 7.0 years.
- b) the average age was 27.6 years old.
- c) the average level of lesion was class 3.5.
- d) about the consciousness of health, 14/17 (82.3%) reported good health, 3/17 (17.7%) reported poor, and none of them reported weak.
- e) there were 16/17 (94.1%) of decubitus

contraction and only one case (1/17, 5.9%) of uncontraction of it before the experience of w/cBB.

f) there were 5/17 (29.4%) of UTI contraction, and 12/17 (70.6%) of uncontraction it before the experience of w/cBB.

g) the average career of w/cBB was 4.0 years.

h) and the last, 5/17 (29.4%) players practiced w/cBB over 3 times per a week, and 12/17 (70.6%) practiced it under 2 times per a week.

D) Group D

There were 12 players (15.3%) of decubitus and UTI contraction after the experience of w/cBB.

The profile of them were as follows;

- a) the average duration from on set was 11.0 years.
- b) the average age was 29.7 years old.
- c) the average level of lesion was class 3.7.
- d) about the consciousness of health, 6/12 (50%) reported good health, 5/12 (41.7%) reported poor, and 1/12 (8.3%) reported weak.
- e) there were 10/12 (83.3%) of decubitus contraction, and 2/12 (16.7%) of uncontraction it before the experience of w/cBB.
- f) there were 7/12 (58.3%) of UTI contraction, and 5/12 (41.7%) of uncontraction it before the experience of w/cBB.
- g) the average career of w/cBB was 6.0 years.
- h) and the last, 2/12 (16.7%) players practiced w/cBB over 3 times per a week, and 10/12 (83.3%) practiced it under 2 times per a week.

3. Discussion

The late Sir L. Guttmann stated that he had not experienced any sports accidents in his career of w/cBB, and stressed the value of sport for maintaining and promoting good conditions of the person with spinal cord injuries.

Actually, from the result, the health consciousness of sport lovers was higher than the others. Majority of them (80%) reported good health, and 20% were poor including weak.

As supporting the fact of health consciousness, 52 players (66.7%) who had decubitus before the experience of w/cBB, as same as the general research report on the conditions of the person with spinal cord injuries, reduced by half after the experience of it. There were 29/78 (37.2%) of decubitus contraction players after the experience of w/cBB. This means the about half of general rate of decubitus contraction, and there was statistically significant difference between before and after the experience of

w/cBB. ($\chi^2=13.5842$, $p<0.01$)

And, 25 players (32.0%) who had UTI before the experience of w/cBB. This means lower than the general rate of UTI contraction (about 40%), but there was not statistically significant difference between before and after the experience of w/cBB.

The fact above mentioned means w/cBB is useful for maintaining and promoting the function of cardiovascular system, and contribute to decrease in the ratio of decubitus contraction, same as mentioned by K.A. Jockheim.

The health consciousness of Group A was the highest of other three groups as a matter of course. There was 92.7% of good health and 7.3% of poor, but the same tendency was obtained in Group C, there was 82.3% of good health, too.

But there was not statistically significant difference between Group A and C.

And, in the Group B, there were 50% of good health and 50% of poor, in the Group D, there were 50% of good health, 41.7% of poor and 8.3% of weak of health consciousness.

There was statistically significant difference between Group B and D. ($\chi^2=0$, $P<0.05$)

The fact above mentioned means, the person with spinal cord injuries light interest in decubitus and had some interest in UTI. It seemed the bad attitude of them to decubitus.

Besides, it found out that there were about 90% (26/29) of decubitus contraction players both of before and after the experience of w/cBB, so, it guessed that there were a tendency of focusing of decubitus contraction.

In addition, there were not relationships between 4 groups of the average duration from on set, the average age, the average career and frequency of practice.

4. Conclusion

In this study, the author investigated the relationships between the risk factors of the person with spinal cord injuries (decubitus and UTI) and their habit of sport.

The results were as follows;

① the health consciousness of sport lovers was higher than the others. Majority of them (80%) rated their health as good but they had light interest in decubitus and some interest in UTI.

② there were 37.2% of decubitus contraction players after the experience of w/cBB. This rate was less than before the experience of it (66.7%) and there was statistically significant difference between before and after the experience of w/cBB.

③ PDUC after the experience of w/cBB reached 50%, but there were about 90% of decubitus contraction players both of before and after the experience of w/cBB, so, it guessed that there were a tendency of focusing of decubitus contraction.

④ there were 25.6% of UTI contraction players after the experience of w/cBB. This rate was less than before the experience of it (32%), but there was not statistically significant difference between before and after the experience of w/cBB.

⑤ PUTIUC after the experience of w/cBB reached 56%.

⑥ the average career of w/cBB was 4.6 years, and there was not relationships between the career and risk factors.

⑦ majority of players (69%) practiced w/cBB under 2 times per a week, and there was not relationships between the frequency of practice in a week and risk factors.

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