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The foundation of The Japanese Society of Volleyball Research：
JSVR(http://jsvr.org.jp)and it's development

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【The Overview and Development】

The Japanese Society of Volleyball Research：JSVR aims to render services to the volleyball-related scientific research and its development, while making contribution to the practice of volleyball by encouraging research cooperation and communication among the members to foster growth of volleyball as a culture.

Furthermore, our objective is to systematize our past volleyball-related research and to establish a new volleyball coaching sciences as a place for information exchange.

We strive to study volleyball in scientific aspects to provide beneficial information to the coaches and deploy energetic activities to contribute to the national and international development and popularization of volleyball.

【The founding】

The first serious activity aimed at the founding of the JSVR was an informal meeting held at Ikebukuro in Tokyo between Shinji Tochibori (the First president of JSVR：Tsukuba University), Tadaaki Yajima (the Second president of JSVR：Waseda University) and Toshiro Endo (Current president of JSVR：Yamanashi University) in 1995, followed by a more formal meeting in the 22 charter chambers of the JSVR. The First Annual Scientific Congress for Volleyball took place at Waseda University with the participation of 121 society members in May 25th, 1996. The Japanese Society of Volleyball Research was born.

Indeed, it is certain that a decisive moment in the fascinating history of JSVR's first 10 years was the founding of the JSVR. The JSVR is 15 years old now.

【The activities】

JSVR main activities are as follows;

①Organizing Annual Scientific Congress for Volleyball (15 times)

②Organizing volleyball meetings and lectures (1 or 2 times per every year)

③Publishing the Journal of Volleyball Sciences：JVS (published 12 journals) and News Letters (published 17 issues)

④International and interdisciplinary exchange of volleyball researches

⑤Other activities to accomplish our goal

【The society members】

Numbers of JSVR society members are about 450 now. Those numbers are composed of university researchers; 56.01%, school teachers; 23.31%, company team coaches; 8.94%, medical doctors; 5.15%, public officers; 3.79% and others; 2.71%.

【The perspectives】

The one of the perspectives of JSVR is to contribute much scientific information to the Japanese Volleyball World. The second one is to make strong relationship with Asian Volleyball peoples concerned, especially Taiwan volleyball researchers. Then, JSVR will promote international exchange and international cooperation about volleyball sciences with other many foreign countries.

Game Analysis of Volleyball Using "IT VOLLEY" Software
-Introduction of "IT VOLLEY" and Comparison of the Smile Club Team with V league's Team -

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Key Words：IT Volley , Scouting, Game analysis, Software

Abstract

In recent years, the importance of scouting in volleyball is higher than before. Then Smile Club began to develop "IT VOLLEY" Software in order to spread of Volleyball not only for specialists but also beginners. Now we've got prototype "IT VOLLEY" Software which can easily analyze volleyball game.

The purpose of this study was to introduce this software and to analyze volleyball game using "IT VOLLEY".

As a result, obtained the following knowledge.

1)Introduction of "IT volleyball"

The person who has a general PC skill level and used "IT volleyball" for the first time related to volleyball, could input he data to the total this time.

Feature of ″ IT volleyball"：

a)It is possible to input data while seeing the video.

　After a game, it is possible to input data at ease while seeing the video.

b)It is possible to input data with the mouse.

　Even the junior high school student or the high school student can easily input it by using not with the keyboard but the mouse.

c)Comprehensible screen

　It is easy to input data because it is a screen along the flow of the game.

d)Handy price

　The price of about 10,000 yen is scheduled, and the amount of money obtained easily.

e)The total processing can be easily done

　Because the input data can be output by Comma Separated Value, it is possible to edit it to your original data.

2)Analysis by "IT volleyball"

The game analysis on four skills（spike, serve reception, block and serve）intended for the beginner which is women's team of Smile Club was compared with the V League women's data in Japan.

a)Spike

　Smile club has 10 points or more lower than V league in spike success.

b)Serve reception

　Similar trend was observed between serve reception and spike.

　Smile club has 40 points or more lower than V league in serve reception.

c) Block

　The biggest difference was seen for a block skill.

　Block rate of smile club was 1/3 less of the V league.

d)Service

　As for serving, the smile club was more than the V League women's at the score and the lost point also. The beginner has understood it is a tendency to a "Unstable type" that is.
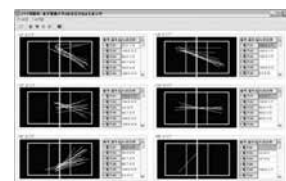
3)Sample of "IT Volley"

a) Making of team data　　　　**b)** Position setting

c) Team data　　　　**d)** Analysis of direction on spike

Characteristics of the joint torque generation in lower extremity during spike jumping

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INTRODUCTION

The ability to jump higher might be of critical important for volleyball players, especially for spiker. The purpose of the present study was to elucidate the characteristics of torque generation in lower extremity joints (ankle joint, knee joint and Hip joint) during take-off in volleyball spike.

METHODS

Two collegiate volleyball spikers participated in this study as volunteer. They performed front spike and back spike to the straight direction. During spike motion, kinematic data were obtained by using two high-speed digital video cameras at 250 frames・s^{-1}（MEMRECAMc2s, Nac, Japan）. Simultaneously, vertical and fore-aft components of the ground reaction force were measured by means of a force platform (Kistler Instrument, Switzerland). These data were stored on a personal computer system through A/D converter (MacLab/8s, ADInstruments) with a sampling frequency of 1kHz. With a motion analyzer (Frame-DIAS, DKH, Japan) the positions of five anatomical landmarks were digitized. The coordinates of the digitized landmarks were low-pass filtered at 8Hz (bidirectional Butterworth filter). After synchronization of kinematic and kinetic data, instantaneous net joint moments about the ankle, knee and hip joint were calculated using inverse dynamics.

RESULTS AND DISCUSSION

Considerably high peak extension torque was observed in both right and left hip joint during push off phase in front spike. In back spike, adduction torque of left hip joint attained to extremely high value. Abduction torque value of right hip joint in back spike was remarkably higher compare to those in front spike, which was equivalent to about double. In right knee joint, flexion torque was generated in the first half of push off phase, while extension torque was generated in the latter half of push off phase. on the other hand, left knee joint, flexion torque was developed consistently during push off phase. Flexion torque value of left knee joint in back spike was lower compare with that in front spike.Knee flexion torque might be generated by the contraction of gastrocnemius and hamstring, which could prevent forward propulsion, and control to jump vertically. It is likely that the biarticularity of the hamstring muscle will contribute to hip joint extension, and cause the power transport from the knee joint to hip joint. These results suggest that abduction torque of right hip joint and adduction torque of left hip joint should be increased to improve jumping ability
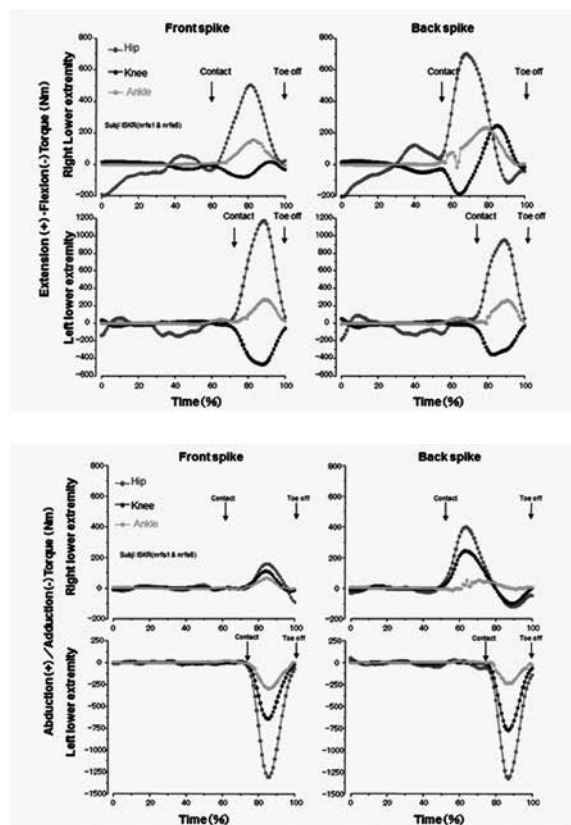
Key Words: Spike, Joint torque, jump

Figure1.Time history of joint torque of lower extremity during the push-off phase in front and back spike

Coaching Successful Service for Actual Match

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1.　Abstract

In order to create successful team, coaches should apply appropriate training method. In this report, we focus on service performance which is considered as decisive factor in modern volleyball, and make a proposal of key elements for coaching successful service for actual match. For skill execution, planting effective image of the court in players' brain and giving training under similar condition as actual match to a maximum extent would provide better performance. Acquiring variation of service skill and ability of reading situation will support improvement of service performance. For ensuring successful result on a match, telling athletes breathing maneuver, use of routine action and self-talk as well as mind set while interruption time between rallies should be considered. In conjunction of understanding focal point (Routine Visual Line) , these efforts made by players would bring forth fruit. Behavior analysis of successful players proves the above factors. **Key words : successful service, effective image, variation, routine action self-talk**

2.　Introduction

（1）Checking Your Training for Players

In order to create successful team, coaches should choose and apply appropriate training method for athletes. Before planning daily training program, coaches need to check the following aspects from view point of micro and mezzo training cycle, and even macro cycle if it is needed.

a）Understanding Your Team's Priority

Coaches have to figure out your team's strength and weakness among technical, physical and mental aspects, and then grade them based on coaches' careful testing and observation.

b）Work Allocation

Coaches have to effectively allocate training elements based on priority of athlete and team.

c）Considering Allocation and Contents of Each Element

Ex.1）Serve, Pass, Set, Attack, Dig…in ball control training

Ex.2）Evaluation, Task Solution, Decision Making, Skill Execution…in tactical/strategic training

Ex.3）Visualization, Imaging, Breathing Maneuver…in mental training…etc

（2）Focusing on One of Decisive Elements

When it comes to creating successful team, we as coaches have to cover a widespread area. It is almost impossible to perfectly cover everything due to time and special limitation. If we try to complete all equally, we will complete nothing. Therefore, we have to consider decisive factors in each element for winning and work on them in order of priority after studying and understanding characteristics of our sport. Characteristics of Volleyball game have drastically changed since introducing rally point system（RPS）. Scoring skills of attack, block and service have much more importance than those in old system. In this report, we focus on especially service performance among those scoring skills, and make a proposal of key elements for coaching successful service for actual match.

3.　Material

（1）Professional Athletes Equipped with Mental Toughness　　In our previous study, from not only volleyball but also from various kinds of sports, we had picked up a number of professional athletes who had been making successful performance and results. Then, through video analysis as well as direct observation at competition sites, we had researched their behavior and actions to figure out keys of their success from view point of behavioral science. We have used some data from this previous study to lead another dimension for successful performance especially for this article, "Coaching Successful Performance for Actual Match".

（2）Four Common Actions among Successful Athletes

Through the above mentioned analysis, we have found that there are four common actions among successful athletes as follows：

a) Aggressive Actions

Winning（Victory）Pose, Clapping and Spirited Talking

b) Actions for Relaxation

Deep Breathing, Routine Visual Line, Muscle Relaxation

c) Mental Action

Observing Opponent, Checking Environment…lights,Considering Match Situation, Tactical/Strategic Decision Making

d) Routine Action while Interruption Time

Action Original to Individuals…Touching uniform or floor, bouncing the Ball.

4.　Consideration on Characteristics of Service

(1) Service is Closed Skill

Service is closed skill enabling server perform in his/her own rhythm. If server hit ball in the same rhythm every time, it will be easy for opponent receiver to pass the ball to setter perfectly.

Therefore, server needs to take risk and change own rhythm (Location, Timing, Speed, Course) to have better result.

（2）Imaging Volleyball Court

In any kind of sports, top athletes have excellent sense of their fields/courts.

They do not depend on two-dimensional plane view, but three-dimensional solid view (Fig.1 & 2).
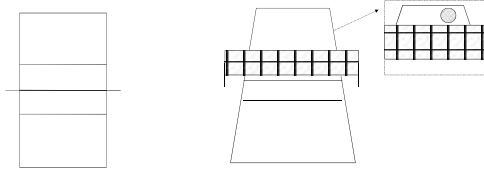
Fig.1   Two-Dimension View   Fig.2   Tree-Dimension View

It is clear that controlling ball to near target is much easier than placing ball to far target. If server develops sense of net and court, it can be more useful to control service ball. This type of server is able to control ball landing point on the court through controlling passing point above the net with consideration of velocity, momentum and spin of ball.

（3）Skill Influenced by Environment

Height of the net, size of court and ball are always the same in both training and actual match. However, an athlete has to play in various size of hall under different level of mental pressure facing many types of opponents. Those factors would frequently influence on servers even in top level. Successful servers brilliantly overcome those difficulties and contribute to victory of their team with own stable service performance.

5. Proposal

Based on findings mentioned in "3.Material" and characteristics considered in the previous section, we would like to propose the following key elements for coaching successful service for actual match.

（1）Create the Same Situation as Actual Match

a）Place receivers on the other side of court

b）Place target and make training competitive with scoring

c）Set certain scoring situation, ex）24-23 or 24-24…etc to make server image actual match

（2）Create Variety on Service Tactics

In order to develop coordination to team tactics, the items mentioned below are indispensable.

a）Let server perform on various location, ex）just behindend line, away from end line, corner of zone

b）Make server hit to various course with different velocity

c）Make server perform at various degree of fatigue

（3）Breathing Maneuver

Breathing Maneuver is basic technique for relaxation with Intentionally using abdominal breathing.

Abdominal Breathing：Takes place in relaxation

Thoracic Breathing：Takes place in tension

In this technique, controlling aspiration and expiration are important keys：

a）Aspiration：Inhale deeply until stomach is filled with air.

b）Expiration：Exhale spontaneously in double time of inhalation. As stomach is getting empty body and mind will be feeling looseness.

Awareness of tension and looseness on body and mind spontaneously take place with breathing will bring better relaxation.

（4）Utilizing Routine Action

Effect of utilizing routine action：

-Enabling server to perform as usual

-Providing server with mental readiness for service

-Eliminating obstruction for concentration

-Remove negative effect of previous results（Mental Refreshment）

-Preventing poor decision caused by haste

Example of routine action before service：

-Deep breathing, Bouncing ball certain times, Shouting positive words…etc.

（5）Enhancing Routine Action

Applying the following technique can enhance effect of routine action：

a）Positive Self-Talk

ex）"Concentrate", "Slowly", "OK"…etc.

b）Understanding Focal Point (Routine Visual Line)

Recognizing routine focal point which brings calm indaily training can provide recovery of concentration in actual match.

ex）Clock, Flag, Log on ball…etc.

c）Visualizing Great Performance

Imaging own great performance done in the past can greatly influence on current performance.

（6）Tactical/Strategic Decision Making Process

In order to bring out the best performance for actual match, the following mental work is essential.

a）Keeping in mind opponent's strength and weakness

b）Observing opponent current condition

c）Considering current situation of match（Progress of game, lead or behind in score, next possible tactic of opponent）

As previously mentioned, service is closed skill. Therefore, there is much more opportunity to utilize above mental work on service comparing other skills in volleyball. Learning and practicing this type of mental work in daily training can maximize possibility of successful service in actual match.

Constitution for evaluating the process of blocking action in volleyball game

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Key words：volleyball game，blocking，accomplishment process，the component elements，evaluating

【objective】

The purpose of this study was to clarify the performance of the block accomplishment process in the set play phase according to three attack tempos for a men's top level in Japan.

【methods and procedures】

As a result of the research of six Japanese V Premier League staffs about the constituted for of the process of blocking action with Delphi method, we could put their response together and find out six component elements following the definition of this research and of assessment of blocking action.

　①Base position　②Ready posture　③The number of blockers ④Anticipating for setting in attacking area ⑤Approach to attackers ⑥Height of blocking

①Base position…Base position means start position of blockers. The left position was 250cm, the middle was 450cm, and the right was 650cm based from the side line on the position of. ②Ready posture…After the reception and dig, it measured the position of palms of three blockers in 0.6 seconds before the set on the setter. ③The number of blockers…In case, blocker's both palms are above the net, it takes 1 point. If just a palm of blocker's is above it, it takes 0.5 point.④Anticipating for setting in attacking area…The time lag between when the spiker hit the ball and the blocker finished moving to the takeoff position.⑤Approach to attackers…The distance difference between when the spiker hit the ball and the blocker finished moving to the takeoff position. ⑥ Height of blocking…Height of the blocker's fingers position.

The consisted of eight men's team of V Premier League. The action of the teams were analyzed in 606 sequences corresponding to 14sets of the 2007/8　V Premier men's League．All videos were recorded from behind the end line and imported to a PC for further analysis with the use of the software program Frame DIAS Ⅲ．To analyze the action of the accomplishment process according to the evaluation of the blocking, it evaluated it at the following five evaluations.
・5…The block wins a point ・4…Blocker touches the ball and game continues ・3…Blocker does not touch the ball and game continues ・2…Blocker touches the ball and opposite team wins a point ・1…Blocker does not touch the ball and opposite team wins a point

The term "Contribution play" could be defined as 5 and 4 evaluations, and the term " Non-contribution play" could be defined as 1 and 2 evaluations. The 3 evaluations was excluded from the objective, because it was not an objective decisions.

【results and discussions】

・Base position…A significant relationship betweenvariables was not found .

・Ready posture… A significant relationship between first- and second –tempo variables was found（p＜0.01）. Judging from the above, for first-tempo spike, it is effective to set up a high hand position.

・The number of blockers… A significant relationship between first- and second –tempo, second-and third-tempo, and first- and third-tempo variables was found（p＜0.01）. This result suggested that use of second-tempo with an increase of double blocks and use of third-tempo with an increase of triple blocks.

・Anticipating for setting in attacking area…A significant relationship between first- and second –tempo, and first- and third-tempo variables was found（p＜0.01）. One view was that first –tempo spikes was the hitter jumped before or when the set was done，therefore, the blockers could not move to the attackers position.

・Approach to attackers… A significant relationship between first- and second –tempo, second-and third-tempo, and first- and third-tempo variables was found（p＜0.01）.

・Height of blocking

A significant relationship between first- and second –tempo, and first- and third-tempo variables was found（p＜0.01）.

This result suggested that first –tempo spikes was the hitter jumped before or when the set was done，therefore, the blockers could not jump higher to hit points of the attackers .

A Study about the Scoring in the Volleyball Rally Point System: The Case of High School Competitions in Shizuoka Prefecture

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Key words：volleyball game，scoring，probability of winning a set（PWS），rally point system，high school team

Summary

　All points in a volleyball game were divided into the points of the service side（PO）and the points of the reception side（SOP）. The main purpose of this study was to calculate the average side-out point rates（SOP%）in the games of high school competitions in Shizuoka Prefecture. It was shown that the SOP% was dominant in the games at the local level, and that the team that had the service right could not score easily. This was particularly clear in games between teams whose abilities were closely matched. Moreover, the reception side had an advantage in scoring the first point. This result should be considered when selecting the team with the right to serve using heads or tails. In games at the local level, two tendencies were observed：the tendency of difficulty to reverse the last stage of the set, and the tendency for the team that lead from the first stage to win. In many cases, whether a team will win or not is obvious by the middle of the set.

PO (point) = the point of the service side

SOP (side-out point) = the point of the reception side

PO% = the average point (PO) rates

SOP% = the average side-out point (SOP) rates

AP = all points

FP = the first point in each set

Table3. The PWS of the teams that got 10, 15, and 20 points first.

	Men			Women		
	10 points	15 points	20 points	10 points	15 points	20 points
AS	81.3%	86.9%	93.2%	82.1%	88.3%	92.7%
B8	63.3%	73.3%	85.8%	67.9%	76.1%	80.7%
CS	60.1%	66.2%	81.1%	59.1%	66.1%	75.7%

Table4. The PWS of the teams that scored first.

Table1. Number of sets.

	AS	B8	CS　(CS / AS)
Men	411 sets	97 sets	148 sets (36.0%)
Women	386 sets	103 sets	115 sets (29.8%)

AS = all sets

B8 (best 8) = the sets in the quarterfinals, the semifinals, and the finals

CS (close set) = the sets of close game within 5 points difference between 2 teams (ex. 25-20)

Table2. PO% and SOP%.
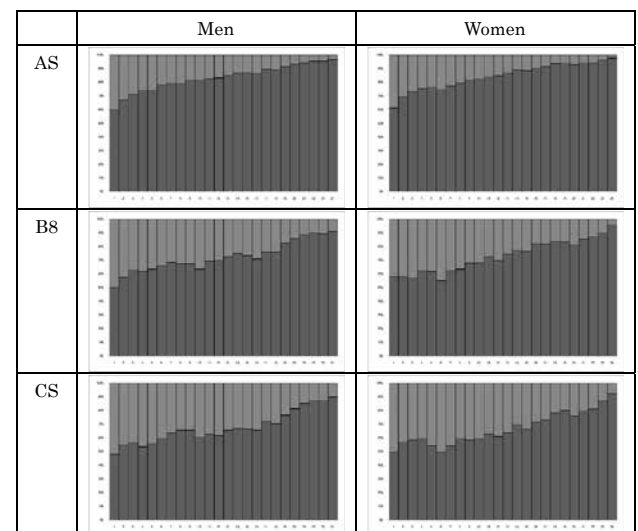
Table5. The PWS when the teams that got 10, 15, and 20 points first had more than 2 points lead.

	Men			Women		
	10 points	15 points	20 points	10 points	15 points	20 points
	86.0%	91.4%	96.3%	85.3%	91.7%	96.1%

A study on the setter's toss speed and its accuracy in volleyball.

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Key words：toss speed、accuracy、timing ability

【Purpose】

The purpose of this study was to verify the timing ability to adjust toss speed from the release of the setter to spike impact and the accuracy of the toss of the setter, and to get useful information with volleyball coaching.

【Method】

Subjects were three setters who were playing at the men's varsity volleyball team. They were carried out the timing ability test and the toss shooting test. Subjects were measured their speed expect reaction time using the tester （created by Takei Scientific Instruments Co.,Ltd.：T.K.K1108）under the two different speed conditions (*low-speed and high-speed*). Absolute error margin（AE）, Constant error margin（CE）and Variable error margin（VE）were calculated.

Procedures of experiment on setting were as follows；

Ⅰ-Set six positions as a return ball target including setter's normal position in attacking zone.

Ⅱ-Subjects were requested to shoot the parallel set to the target that set up on left side with imaging real game speed.

Ⅲ-The success rate and the accuracy of the toss speed were calculated.

Ⅳ-From the result of the measurement and the experiment, relationship between the timing ability and accuracy of toss was discussed.

【Result and Consideration】

As a result of the measurement, the reaction error margin and the direction of reaction on setter A and setter B were varied widely when switching from low speed to high speed. But those of on setter C were steady.
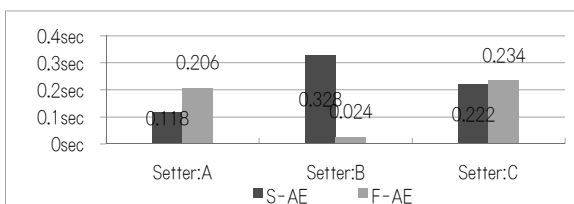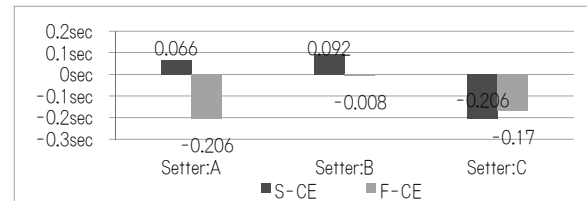

Figure-1：AE in measurement

Figure-2：CE in measurement

As a result of the toss shooting test, It was clear that the success rate resulted in setter C＞A＞B, and the standard deviation of the toss speed resulted in setter C＜A＜B.
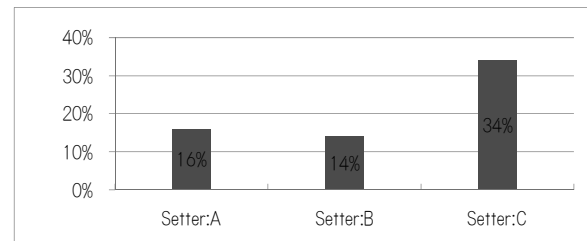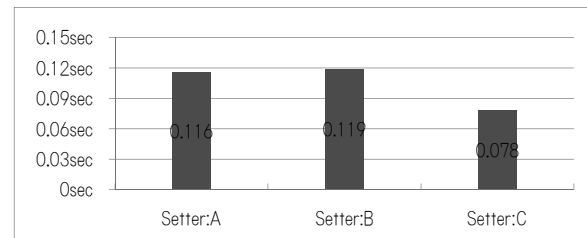

Figure-3：Success rate in target

Figure-4：Standard deviation of toss speed

A high correlation coefficient was observed between the success rate and the accuracy of the toss speed. As a result, it is cleared that the stability of the reaction in the timing ability influences the accuracy of the toss speed and consequently improving the accuracy of the toss.

【conclusion】

It was clarified to the skill improvement that not only a technical element but also basic timing ability were needed on volleyball setter in coaching field.

The present international condition of the activity of data strategy in volleyball

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Key words：Analyst, Volleyball, Intelligence, Strategies, Technical activity

Abstract

【Purpose】

In addition to reporting the current international condition of the strategy of using technical data for volleyball, this paper will reveal the challenges that the present activity of data strategy faces, and will suggest ideas for the better utilization of information.

【Introduction】

Nowadays volleyball is often the field of information war which is making use of IT. It is not unusual today to see a personal computer on the bench and an analyst or coaches checking the immediate information through an income, a sort of transceiver. It is easier to adopt technical activity such as scouting in volleyball than in other sports.

【Summary of the activity of data strategy in a team】

The technical activity by analyst today plays significant roles not only in scouting during the term of game but also in the field of the data strategy through the support for planning new training plans for a team, organizing practice courses, and creating new tactics.

【Analysis of the current condition at international level】

In the Beijing Olympic Games, many teams had their own analysts and they were engaged in the activity of data strategy such as the analysis of the opponent's tendency by making good use of IT equipments including video camera and personal computer. Among 12 women national teams in Beijing Olympic Games, 9 teams that are Brazil, America, Italy, Serbia and Montenegro, Russia, Poland, Venezuela, Kazakhstan, and Japan used "Data volley" and "Data video" in their technical activities such as scouting. The rest of 12 teams that are China, Cuba, and Algeria did not seem to use personal computer or other IT even though they were videotaping the games.

【Analysis of the current condition at domestic level (Japan)】

In V・premium league, the top national league in Japan, there has been a rapid increase in appointing the new post called analyst which indicates the staff for collecting and analyzing data in the recent couple of years.

On the other hand, men's Japanese national team did not have an analyst who could work full time. It was only Japan who did not have full-time analyst among all the men's national teams in Beijing Olympics.

As an original approach by Japan, Japan Volleyball Association (JVA) has been examining the possibility of technical activities using SMART-system since 2006. SMART-system is an image data based system developed by Japan Institute of Sports Science (JISS), and this system allows you to keep, search, and browse images of sports via the internet.

【Consideration and suggestions for the future】

Japan ended Beijing Olympic Games with fifth place. Even though this record is the same as the last Athens Olympic Games, there was dramatic progress in the relationship between the team, especially the head coach and the analyst. After Athens Olympic Games, Japanese women national team placed a full-time analyst for the first time. Almost of Asian teams don't compose an analyst as a team delegation. This is a big difference between Asian teams and a lots of European teams they are leading the world in volleyball. What is demanded for analyst hereafter is to function as think tank. The experiences of continuously seeing world standard volleyball are necessary to build a system in which the property of information is used not only to reinforce the national team but also to train and promote players of the next generation and coaches. For this purpose, we need to promote training and saving capable analysts, and to share the information by analyst as the property of the organization, and moreover, we must consider an environment where the information can be sent to the outside.

Lastly, there is a possibility that the territory of analyst and coach will gradually overlap. In the real situations, analyst is no longer the staff who simply analyzes data, and will be required to function as a coach for strategies who can support training the team, organizing practice, and planning strategies. When every analyst reaches the same level of providing objective information, what is needed next may be high ability of subjective analysis. It is quite significant to find something different from others and point out them. In order to achieve this, we have to, of course, improve the quality of analysts. At the same time, the device and effort to enhance the ability of utilizing data among supervisor, coach, and players will be also required.

An examination of psychological characteristics in junior high school volleyball players
-Focus on athletic motivation-

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[Purpose]

It is a great advantage to have good physical skills, technical skills and psychological skills to make a successful performance in athletic competition. And, It is meaningful that demonstrate the psychological characteristics of adolescent junior high school students who are susceptible age. Therefore, the purpose of this study was to analyze psychological characteristics of current boys and girls junior high school volleyball players focus on there performance levels, and to get useful information with coaching.

[Method]

The subjects were 297 junior high school volleyball players（108 boys and 189 girls）belonging in Y Prefecture in Japan. Their volleyball career was experienced 2.9 ± 1.8 years. There are 48 players（24 boys and 24 girls）who were selected to the national junior high school volleyball team. Their volleyball career was also experienced 5.6 ± 2.2 years. All subjects were administered TSMI (Taikyo Sport Motivation Inventory) questionnaire made by Matsuda at al.(1982).

[Result and Consideration]

TSMI had to reexamine structure of factors because this questionnaire was developed about 30 years ago. So TSMI was conducted factor analysis and 12 factors with 92 items were found which were named［challenge to goal and difficulty］, ［practice eagerness］,［causal relationship to effort］,［fight］,［mental toughness］,［Anxiety of failure］,［anxiety from stress］,［incompatible with coach］,［adaptation to coach, mental interest］,［direct to win］, and［values of athletics］ extracting from Matsuda in 1982. To consider differences of performance level between Y Prefecture's players and members of the national junior high school players, these groups were separated and compared respectively. As a result, overall, scores of［fight］and［mental interest］in selected the national junior high school team were significantly higher than Y Prefecture's players. On the other hand, scores of［anxiety from stress］and［Anxiety of failure］in Y Prefecture's players were significantly higher than the others. So these results show that players who were selected the national junior high school volleyball team have a strong［fight］and they are interested in volleyball, and also supported previous research by Matsuda et al.. It was suggested that players who are high performance level are in good mental conditions even in junior high school students.

[Value of this research]

This research suggests that new 12 factors and 92 items have a potential to utilize for another research of athletic motivation.

Comparison of kinematics of backward overhand setting in different levels of volleyball setters

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Key Words：trunk angle, upper limb motion

The purpose of the present study was to investigate the kinematic differences in backward overhand setting among different levels of setters. Four collegiate volleyball setters participated in this study as volunteer. They performed backward overhand setting from two different positions（BP [Base Position]：3 m toward the center from right side line, LP [Left Position]：6 m toward the center from right side line）. Cinematographic recordings of the setting were obtained with two synchronized high speed digital video cameras（250 Hz）. To compute the jumping height and the angle of upper limb joints, we digitized several segmented points（head：tree points, upper body：nine points, and lower body：10 points）by using a motion analysis device, and obtained the three dimensional coordinates. A skilled setter jumped vertically with less deviation to horizontal plane compared to unskilled setters in the two different positions. Furthermore, the skilled setter tossed a ball with greater shoulder horizontal abduction and the external rotation, less shoulder abduction, and less elbow extension than the unskilled setters. These results indicate that the better backward overhand setting lie in the vertical jumping, the shoulder horizontal abduction and external rotation, irrespective of the positions. These motions could be unpredictable for opponent blockers which the ball would set.