



2º CICLO EM DESPORTO PARA CRIANÇAS E JOVENS

**Repensando os fatores subjacentes ao sucesso  
desportivo e a identificação de talentos: O caso da  
Seleção Nacional Japonesa de Voleibol feminino**

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com vista à obtenção de grau de Mestre  
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**Orientador:** Professor Doutor José Afonso

**Coorientador:** Professor Doutor Rui Marcelino

**Jorge Luis Sovero Vargas**

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## RESUMO

A obtenção de altos níveis de rendimento está associada a diversos fatores, que facilitam a existência de múltiplos caminhos para a atingir. Todavia, os programas de deteção e seleção de talentos tendem a perspectivar um percurso linear, unidimensional, nomeadamente destacando as características antropométricas de modo (quase) exclusivo. No caso do voleibol, um dos fatores usualmente sobrevalorizados nestes processos é a altura. Porém, acreditamos ser legítimo questionar o que sucede para que uma seleção nacional de voleibol feminino – no caso, o Japão – apresente sistematicamente equipas de baixa estatura e, não obstante, se encontre no topo dos rankings mundiais há já várias décadas. Deste modo, visámos objetivar fatores tático-técnicos emergentes do jogo através da comparação dos perfis de jogo da equipa do Japão e da média das outras equipas. Foram analisados 15 jogos (56 sets - 7176 contatos de bola) referentes à fase final do *World Grand Prix 2014*, entre as equipas do Brasil, China, Bélgica, Turquia, Rússia e Japão. Os resultados evidenciaram que o Japão apresenta uma probabilidade de ações superiores de jogo com distribuidora na zona de ataque (27.12;  $\pm 11.37\%$ , pequena magnitude), distribuição na zona A (4.48;  $\pm 4.03\%$ , pequena magnitude), utilização do serviço em salto flutuante (20.42;  $\pm 3.79\%$ , magnitude muito grande), ataques por zona 2 (13.09;  $\pm 5.56\%$ , magnitude moderada), tempo de ataque 2 (61.89;  $\pm 29.67\%$ , grande magnitude) e combinação de ataque simples (6.62;  $\pm 4.03\%$ , magnitude moderada), enquanto exibiram probabilidades inferiores de jogar em KIII (-12.07;  $\pm 7.34\%$ , magnitude moderada), utilizar sistema defensivo de duas linhas (-7.55;  $\pm 7.64\%$ , magnitude moderada) e apresentar zero bloqueadoras em oposição ao ataque (-42.06;  $+21.28\%$ , grande magnitude). A partir destes resultados, encetámos uma discussão sobre as suas implicações para as filosofias e metodologias inerentes aos programas de deteção e seleção de talentos e à necessidade de respeitar variedade de percursos para o alto rendimento.

**Palavras chave:** deteção de talentos, seleção de talentos, percursos para o alto rendimento, expertise.



## ABSTRACT

The obtainment of high levels of performance is associated to several factors which facilitate the existence of multiple pathways to achieve them. Nonetheless, programs for talent detection and selection tend to promote linear, unidimensional views, namely highlighting the anthropometric characteristics in an (almost) exclusive way. In the case of volleyball, one of the usually overvalued factors in this process is height. Therefore, we believe that it is legitimate to ask how and why one national team of women's volleyball – in this case, Japan – is able to present systematically low values for average height while at the same time placing itself on the top of world rankings for several decades. As such, we aim to analyze emerging tactical-technical factors in the game through the comparison of game profiles of Japan team and the mean of other teams. Fifteen matches (56 sets and 7,176 ball contacts) referring to the finals of the World Grand Prix 2014 (played between the teams of Brazil, China, Belgium, Turkey, Russia and Japan) were analyzed. Results showed that Japan presented a greater likelihood of higher gameplays with the setter in the front row (27.12;  $\pm 11.37\%$ , small magnitude), setting in zone A (4.48;  $\pm 4.03\%$ , small magnitude), utilization of float jump serve (20.42;  $\pm 3.79\%$ , very large magnitude), attacking through zone 2 (13.09;  $\pm 5.56\%$ , moderate magnitude), attacking with tempo 2 (61.89;  $\pm 29.67\%$ , large magnitude), and using simple attack plays (6.62;  $\pm 4.03\%$ , moderate magnitude), while exhibiting lower likelihood of gameplays in KIII, (-12.07;  $\pm 7.34\%$ , moderate magnitude), utilization of two-lined defensive systems (-7.55;  $\pm 7.64\%$ , moderate magnitude), and having zero blockers opposing the attack (-42.06; +21.28%, large magnitude). From this, we embarked on a discussion about the implications to the philosophies and methodologies inherent to programs concerning talent detection and selection. The need to recognize the validity of multiple alternative paths to high performance was made very clear by our results.

**Keywords:** talent detection, talent selection, paths to high performance, expertise.



# I - Introdução



### 1.1. Justificação e pertinência do estudo

O propósito basilar que suporta a construção e pesquisa em modelos de identificação, deteção e/ou seleção de talentos redonda na vontade de otimizar a obtenção, a longo prazo, de elevado rendimento, num tríplice intento de economizar o investimento temporal, financeiro e de esforço (Pankhurst, 2013; Vaeyens, Güllich, Warr, & Philippaerts, 2009). Baseando-se na perspectiva de que é possível, em certa medida, predizer o rendimento futuro com base em parâmetros atuais, busca-se uma idealização dos percursos para o alto rendimento, conjugada com os fatores que, mais precocemente, poderão denunciar o êxito posterior (Cervera, Jiménez, Molina, Lorenzo, & Leite, 2012; Lorenzo, Jiménez, & Lorenzo, 2014). Alinhavada com esta lógica, é encetada uma análise retrospectiva do perfil histórico de prática daqueles que hoje praticam desporto ao mais alto nível, bem como uma análise das características que, nesse contexto, os distinguem dos seus pares (Ericsson, Krampe, & Tesch-Römer, 1993; Macnamara, Hambrick, & Oswald, 2014). Iremos tornear a complexa questão em torno do debate genética versus envolvimento, mormente porquanto tende a ser redutora e a desconsiderar a multiplicidade de significados passíveis de serem atribuídos ao conceito de envolvimento (Ericsson, Roring, & Nandagopal, 2007; Hambrick, Oswald, et al., 2014), bem como a tendência para se ignorar a *epigenética* (Ehlert, Simon, & Moser, 2013; Hambrick, Altmann, et al., 2014).

Um dos modelos evolutivos da formação ao alto rendimento mais popularizados é o da prática deliberada, proposta inicialmente por Ericsson et al. (1993) e hoje defendida por diversos autores (Hayman, Polman, Borkoles, & Taylor, 2013; Macnamara et al., 2014; Platz, Kopiez, Lehmann, & Wolf, 2014). Uma das teses focais desta perspectiva assenta na ‘regra’ dos 10 anos ou 10.000 horas de prática deliberada para se alcançarem níveis de prestação de elite. Porém, esta tese deriva duma simplificação e romantização populares e não é, necessariamente, correta, a quantidade de prática não é o único factor que diferencia atletas de elite. Com efeito, existe uma elevada divergência no número de anos ou de horas necessários para se alcançar a expertise (Ackerman, 2014); essa divergência relaciona-se com variabilidade interindividual, diferenças que

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variam amplamente em dimensão e algumas limitam o repertório comportamental do indivíduo, mas, igualmente, com a natureza da modalidade e com o seu estado evolutivo, número de praticantes, entre outros fatores (Ackerman, 2014; Hambrick, Altmann, et al., 2014; Pankhurst & Collins, 2013; Walker, Nordin-Bates, & Redding, 2010). Acresce que a qualidade da prática assume, neste contexto, um fator decisivo, operando como catalisador ou inibidor do processo evolutivo (Hayman, Borkoles, Taylor, Hemmings, & Polman, 2014; Hodge, Henry, & Smith, 2014; Vaeyens et al., 2009). Por último, nem todos os jovens se tornam atletas de elite (Ackerman, 2014). Considere-se, com efeito, que existe um significativo número de atletas que, apesar de experienciar uma prática contínua e deliberada, não consegue alcançar o alto rendimento desportivo (Hambrick, Oswald, et al., 2014; Hayman et al., 2013; Hüttermann, Memmert, & Baker, 2014). Diversos fatores concorrem para limitar o seu percurso: limitações físicas, lesões, primeiras experiências e períodos críticos e envelhecimento (Ackerman, 2014). Neste sentido, não constitui surpresa que modelos alternativos tenham emergido, nomeadamente: o Modelo de Desenvolvimento da Participação Desportiva (Côté, 1999), o Modelo Diferenciado de Superdotação e Talento (Gagné, 2004), o Modelo do Ambiente de Desenvolvimento do Talento Desportivo (Henriksen, Stambulova, & Roessler, 2010), entre outros.

O Modelo de Desenvolvimento da Participação Desportiva (MDPD) de Côté (1999) considera a influência das famílias no desenvolvimento do talento, onde aspectos como o prazer, diversão e motivação se refletem no desenvolvimento do atleta de elite. A relevância da diversificação desportiva e do jogo deliberado nas etapas iniciais da participação desportiva. A esta segue-se uma inevitável etapa de especialização, assumida por algum grau de compromisso com o desporto por escolher e, finalmente, a fase em que o compromisso é assumido na sua totalidade. Desta forma, o MDPD defende com convicção a diversificação desportiva e o jogo deliberado enquanto percursos compatíveis com a obtenção de futuros rendimento de elite (Hayman et al., 2014; Moesch, Hauge, Wikman, & Elbe, 2013; Williams & Ford, 2008) e realça a importância da transferência de aprendizagens anteriores (Ackerman, 2014).

O Modelo Diferenciado de Superdotação e Talento de Gagné (2004) estabelece a diferença entre dois conceitos: *a)* 'superdotação', em referência às capacidades naturais ou aptidões; e *b)* talento, referente às capacidades desenvolvidas ou destrezas. Mais notavelmente, este modelo procura interligar as duas dimensões, considerando a presença de catalisadores de índole intrapessoal (aspectos físicos, motivação, vontade, autogestão e personalidade) e ambiental (meios, pessoas, recursos, eventos), que atuam como moderadores positivos ou negativos, ou seja, transformam ou não as aptidões em talento (Gagné, 2013).

Um modelo mais contemporâneo, o Modelo do Ambiente de Desenvolvimento do Talento Desportivo, proposto por Henriksen et al. (2010), afirma-se enquanto modelo ecológico, realçando a influência do contexto no qual que o atleta desenvolve. Num triplo sentido, configura-se com uma perspectiva holística: *a)* domínio desportivo e não desportivo; *b)* consideração de micro e macro níveis do processo de preparação desportiva; e *c)* o desenvolvimento (passado, presente e futuro) do meio ambiente. Este modelo apresenta uma perspectiva mais abrangente e multidimensional do processo de identificação e seleção de talentos, realçando fatores como a interação indireta dos atletas dentro do clube, condições prévias do processo de treino, desenvolvimento e realização individual/coletiva, a cultura desportiva e organizacional, entre outros (Henriksen, Larsen, & Christensen, 2014).

A complexidade deste percurso para o alto rendimento deveria, desde logo, avisar-nos acerca das sérias limitações às nossas pretensões em prevermos o desenvolvimento futuro dos atletas. Efetivamente, a precisão para deteção precoce de jovens talentos está limitada pela influência de considerável variação interindividual na formação e maturação biológica (Campitelli & Gobet, 2008; Detterman, 2014; Nikolaidis, Ziv, Lidor, & Arnon, 2014). Ademais, diferentes desportos poderão exigir distintos percursos para o alto rendimento. Nomeadamente, enquanto o engajamento precoce parece ser comum à maioria dos desportos, não é pedra basilar em todos (Barynina & Vaitsekhovskii, 1992; Côté, Baker, & Abernethy, 2007); de igual modo, certos desportos promovem a especialização precoce, enquanto outros admitem percursos pautados por uma

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especialização tardia (Carison, 1988; Lidor & Lavyan, 2002; Moesch, Elbe, Hauge, & Wikman, 2011). Esta problemática complexifica-se pelo reconhecimento das divergências, dentro duma mesma modalidade, em função do sexo e da função específica (Lidor, Côté, & Hackfort, 2009).

No limite, então, deveria existir um modelo de deteção de talentos para cada função específica, sexo e características individuais, algo que dificilmente será exequível. A cautela deverá ser reforçada, ainda, pela taxa de falsos positivos e negativos derivados de esmagadora maioria dos programas sistemáticos de deteção e seleção de talentos (Cervera et al., 2012; Lorenzo et al., 2014; Pankhurst, 2013; Vaeyens et al., 2009). Por último, admite-se que a perspetiva vigente, monolítica, possa não ser a mais adequada. Com efeito, é possível e, até, provável, que, dada a enorme variabilidade interindividual e as tremendas divergências no tipo e qualidade da prática, sejam admissíveis diversos percursos alternativos para o alto rendimento numa dada modalidade. Dado que um erro de seleção pode significar um avultado desperdício de recursos e de tempo despendidos pelas federações (Cervera et al., 2012; Lorenzo et al., 2014; Pankhurst, 2013; Vaeyens et al., 2009) a rendição a um modelo monolítico poderá constituir um risco desnecessário e demasiado elevado.

Com efeito, a filosofia tradicional subjacente à seleção de talentos, sobretudo a eliminação precoce daqueles que, em fases iniciais, não alcançam os mínimos necessários para serem selecionados, redundando numa rotura radical dos grupos, havendo um sobreinvestimento em alguns, aliado a um subinvestimento noutros (Bottoni, Gianfelici, Tamburri, & Faina, 2011; Buekers, Borry, & Rowe, 2014). Daqui resulta, não raramente, uma profecia autocumprida, na medida em que os selecionados terão à sua disposição as melhores condições de treino, enquanto os restantes dificilmente o terão, além de poderem desmotivar e desistir (Buekers et al., 2014; Côté, Lidor, & Hackfort, 2009; Hambrick, Altmann, et al., 2014). E, apesar dos diferentes estudos sugerirem fortemente que o futuro atleta de êxito se origina de uma combinação quase perfeita de um grupo variado e diversificado de competências, sobretudo ressaltando que o processo de deteção de talentos centrado nas competências

intrínsecas deve ser de carácter multidimensional (Anshel & Lidor, 2012; Barreiros, Côté, & Fonseca, 2013; Buekers et al., 2014; Lidor et al., 2009), a realidade tem seguido um caminho diverso. Existe uma ânsia de priorizar cada uma destas variáveis e, frequentemente, reduzir os modelos a enfoques unidimensionais ou uni-paradigmáticos, focando-se, quase exclusivamente, em fatores antropométricos, entre os quais a altura se destaca num conjunto alargado de desportos (Aouadi et al., 2012; Ayan, Bektas, & Erol, 2012; Bojikian & Böhme, 2008; Malousaris et al., 2008; Mohamed et al., 2009)

Olvidam-se, nesta lógica, os fatores técnicos, táticos e psicossociais, que tão relevantes são para a obtenção de elevados rendimentos desportivos (Anshel & Lidor, 2012; Barreiros et al., 2013; De Bruin, Rikers, & Schmidt, 2007; Fleck, Case, Puhl, & Van Handle, 1985; Gould, Dieffenbach, & Moffett, 2002; Lidor & Ziv, 2010; Martín-Matillas et al., 2014). Acresce que os investigadores devem avaliar cuidadosamente a parte estatística dos estudos em relação ao tema, necessária para validar quaisquer resultado, que até à data não foram tomadas em conta, isto é, o paradigma em si não foi devidamente questionado. Neste contexto, realçam-se aspetos como a reduzida dimensão das amostras, a limitação do nível de talento, as limitações inerentes à validade e à fiabilidade das medidas de rastreio, bem como a má interpretação da literatura sobre as capacidades e diferenças individuais (Ackerman, 2014).

No caso específico do voleibol, tem existido uma pressão esmagadora no sentido de serem selecionados quase exclusivamente os atletas mais altos (Aouadi et al., 2012; Bojikian & Böhme, 2008; Palao & Santos, 2004; Veitía, 2013; Zadraznik & Dervisevic, 2011). Na verdade, no voleibol, como em outros desportos (e.g. basquetebol), a altura é extremamente importante para superar a altura da rede (Aouadi et al., 2012). Constituindo o remate a principal arma ofensiva do jogo de voleibol (Castro, Souza, & Mesquita, 2011; Costa, Mesquita, Greco, Ferreria, & Moraes, 2010; Marcelino, Mesquita, & Afonso, 2008; Palao & Santos, 2004; Sterkowicz-Przybycień, Sterkowicz, & Žak, 2014), é natural que a altura emerja como decisiva nesta modalidade, beneficiada, ainda, pela capacidade de salto dos atletas (Sheppard, Borgeaud, & Strugnel, 2008; Sheppard et al., 2011; Vint & Hinrichs, 1996). Porém, Lidor and Ziv (2010)

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desenvolveram um trabalho de revisão com trinta e um artigos sobre as características físicas, atributos fisiológicos e habilidades técnicas de atletas adolescentes femininos e masculinos de voleibol, sugerindo que o voleibolista adolescente de êxito possui as seguintes características: elevada estatura aliada uma relativamente alta massa corporal; uma capacidade de salto significativa; são rápidos e ágeis; e uma notória diferença no rendimentos dos gestos técnicas comparado com seus pares menos qualificados. Ou seja, mesmo considerando apenas um pequeno conjunto de fatores, rapidamente se percebe que o talento é um constructo multidimensional, não podendo ser reduzido à altura. Estes resultados são reforçados pelas conclusões do estudo de Rikberg and Raudsepp (2011), nos quais também os fatores técnicos e motivacionais emergiram como relevantes.

Na senda desta linha de raciocínio, ocorreu-nos que a seleção sénior feminina do Japão tende a conseguir resultados de relevo ao mais elevado nível de competição, apesar de ser tipicamente uma seleção baixa. Para verificar se haveria correção nesta análise, procedemos a uma análise dos resultados do último World Grand Prix (edição de 2014), uma das maiores provas mundiais de voleibol sénior feminino, englobando todas as melhores seleções do mundo e sendo uma prova de elevado prestígio. De acordo com as nossas expectativas, verificou-se que a seleção japonesa, que alcançou o 2º lugar na classificação final, tem a menor média de altura global, apenas igualada pela Tailândia (Tabela 1). Com efeito, apresenta um défice de 13 centímetros para a equipa mais alta.

<b>Ranking de alturas</b>	<b>Equipa</b>	<b>Altura (cm)</b>
<b>1</b>	Holanda	187
<b>2</b>	Sérvia	187
<b>3</b>	Croácia	186
<b>4</b>	Bulgária	186
<b>5</b>	Turquia	186
<b>6</b>	Rússia	186
<b>7</b>	China	186
<b>8</b>	EUA	185
<b>9</b>	Alemanha	185
<b>10</b>	Cazaquistão	184
<b>11</b>	Polónia	184
<b>12</b>	Canadá	184
<b>13</b>	Bélgica	184
<b>14</b>	República Checa	184
<b>15</b>	República Dominicana	183
<b>16</b>	Itália	183
<b>17</b>	Austrália	182
<b>18</b>	Cuba	182
<b>19</b>	Brasil	182
<b>20</b>	Porto Rico	181
<b>21</b>	Argentina	181
<b>22</b>	Coreia do Sul	180
<b>23</b>	México	179
<b>24</b>	Quênia	178
<b>25</b>	Peru	177
<b>26</b>	Argélia	175
<b>27</b>	Tailândia	174
<b>27</b>	<b>Japão</b>	<b>174</b>

Tabela 1. Média de altura das equipas.  
World Grand Prix 2014.

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Este poderia, contudo, constituir um caso isolado, uma exceção. Todavia, constata-se que as seleções femininas do Japão vêm alcançando nas provas internacionais e em diferentes escalões etários, êxito continuado nas provas internacionais, êxito esse acompanhado, invariavelmente, duma reduzida estatura (Tabela 2).

	Campeonato Mundial de Voleibol Feminino Sub-18 – 2013			Campeonato Mundial de Voleibol Feminino Sub-20 – 2013			Campeonato Mundial de Voleibol Feminino Sub-23 – 2013		
Rk. Mérito	País	Altura	Rk. Altura 20 e.p.	País	Altura	Rk. Altura 20 e.p.	País	Altura	Rk. Altura 12 e.p.
1	China	185.9	1°	China	183.9	5°	China	184.8	2°
2	USA	185.0	2°	<b>Japão</b>	<b>174.0</b>	<b>18°</b>	República Dominicana	184.8	3°
3	Brasil	181.8	9°	Brasil	182.0	9°	<b>Japão</b>	<b>175.9</b>	<b>10°</b>
4	Peru	176.2	15°	Itália	182.4	8°	USA	183.3	5°
5	<b>Japão</b>	<b>171.9</b>	<b>19°</b>	Turquia	181.5	11°	Turquia	183.4	4°
6	Sérvia	182.3	7°	Rússia	186.6	2°	Itália	184.9	1°
7	Polónia	182.3	8°	Sérvia	185.2	4°	Brasil	179.5	8°
8	República Dominicana	181.2	10°	República Dominicana	182.9	6°	Alemanha	183.3	6°
9	Turquia	182.4	6°	Bulgária	182.6	7°	Cuba	182.8	7°
10	Itália	185.4	3°	China Taipé	172.5	19°	Argentina	176.0	9°

Tabela 2. Ranking em provas recentes nas categorias inferiores.

A obtenção continuada de elevados resultados ao mais alto nível de voleibol feminino traduz-se num atual quarto lugar no ranking mundial de seniores femininos (última atualização pela FIVB em Outubro de 2014), segundo lugar em sub-20 e, finalmente, quinto lugar em sub-18. Todos os dados foram recolhidos do *site* da FIVB ([www.fivb.org](http://www.fivb.org)). Perante este quadro, configura-se a premência duma análise crítica aos modelos monolíticos de deteção e seleção de talentos, usando o voleibol por base de estudo.

## **1.2. Problema e objetivos do estudo**

Corporizando a crítica efetuada previamente, iremos questionar a supremacia de modelos de detecção baseados em fatores antropométricos, nomeadamente a altura, mesmo em desportos nos quais esses fatores são considerados, tradicionalmente, como inerentes e necessários à obtenção de elevados resultados desportivos. Nomeadamente, buscaremos fatores tático-técnicos, emergentes do jogo, que permitiram diferenciar o Japão das restantes seleções femininas de voleibol, auxiliando na busca de explicações para o seu sucesso, apesar da sua baixa estatura.

Em função dos resultados obtidos, tentaremos descortinar que implicações poderão ser retiradas para a detecção e seleção de talentos nas categorias de base. Mais do que buscar a invalidação dos modelos baseados em fatores antropométricos, intentaremos a criação de propostas alternativas, isto é, na ausência dos fatores antropométricos adequados, de que forma poderão as equipas desportivas, ainda assim, trilhar caminhos passíveis de abrirem portas ao alto rendimento desportivo.

## **1.3. Estrutura do trabalho**

A tese encontra-se dividida em quatro capítulos, cada qual cumprindo propósitos distintos: I – Introdução; II – Estudo empírico; III – Considerações Finais; e IV – Referências bibliográficas.

O capítulo I é caracterizado pela introdução do tema e justificação do nosso trabalho de investigação, fundamentando-a e estabelecendo o quadro conceptual de base.

O capítulo II consiste da nossa investigação propriamente dita, traduzida na produção dum artigo científico submetido a uma revista científica indexada com revisão de pares, constituindo o núcleo da tese. Em jeito de síntese, o estudo aborda as diferenças entre o Japão e restantes seleções num conjunto de variáveis de jogo, buscando fatores explicativos para o seu sucesso, pese embora a sua baixa estatura.

## I - Introdução

No capítulo III serão tecidas as considerações finais do trabalho, buscando avançar com contributos para a pesquisa e prática ao nível do treino, bem como da deteção e seleção de talentos. Apontaremos, ainda, limitações ao presente estudo e vias futuras de investigação que se afiguram relevantes neste contexto.

Por último, o capítulo IV, contendo as referências bibliográficas.

## II – Estudo empírico



**Title:** Rethinking talent identification: The case of the women's Japanese Volleyball Team

**Authors:** Jorge Vargas<sup>1</sup>; Manuel Loureiro<sup>1</sup>; Pantelis Nikolaidis<sup>2</sup>; Lorenzo Laporta<sup>1</sup>; Rui Marcelino<sup>3</sup>; José Afonso<sup>1</sup>

1 – University of Porto – Faculty of Sport (Portugal)

2 – Hellenic Army Academy – Department of Physical and Cultural Education (Athens, Greece)

3 – Research Center in Sports Sciences, Health and Human Development (Portugal)

**Abstract**

**Purpose:** Talent identification usually follows a one-dimensional focus, namely based on anthropometric features, despite being well known that there are multiple paths to sports expertise. In sports such as volleyball, height usually stands out, but the presence of the Japanese Women's Volleyball Team among the elite makes us question such assumptions and consider the possibility of alternative paths to success. **Methods:** All fifteen matches between the six National Teams competing at the Women's Volleyball World Grand Prix Finals of 2014 were analyzed, in a total of 56 sets and 7176 ball possessions. Participating teams were Japan, Brazil, China, Belgium, Turkey and Russia. **Results:** Our data suggested the existence of differences between Japan's gameplay and the other five teams' gameplay, namely the likelihood of higher gameplays with setter in the front row (27.12;  $\pm 11.37\%$ , small magnitude), setting in zone A (4.48;  $\pm 4.03\%$ , small magnitude), utilization of float jump serve (20.42;  $\pm 3.79\%$ , very large magnitude), attacks through zone 2 (13.09;  $\pm 5.56\%$ , moderate magnitude), attack tempo 2 (61.89;  $\pm 29.67\%$ , large magnitude), and simple attack plays (6.62;  $\pm 4.03\%$ , moderate magnitude), while exhibiting lower gameplays in Kill, (-12.07;  $\pm 7.34\%$ , moderate magnitude), two-lined defensive systems (-7.55;  $\pm 7.64\%$ , moderate magnitude), and zero blockers opposing the attack (-42.06;  $+21.28\%$ , large magnitude). **Conclusion:** Sports success can be achieved even when a core feature of mainstream performance models (e.g., height in volleyball) is lacking. In the current study, we provided evidence that game variables may allow performing at the highest levels of performance while surpassing limitations with regard to height. Implications for talent detection models are discussed.

**Keywords:** performance, expertise, match analysis.

## Introduction

Elite-level sport attracts considerable the attention of the general population and of the media, thereby being invested with important economic and political consequences (20). Allied with the human appeal for transcendence and for accomplishing outstanding performances (24), this fascination with sport has generated a wide body of research on the paths to achieving sports expertise (28). Naturally emerging from this need, the field of talent identification and/or selection has merited broad attention from the scientific community (1, 40). Regardless of following a strict deliberate practice approach (26) or alternative approaches to expertise (22), talent identification programs aim at an early signalling of features suggesting the potential for achieving expert performance levels in the future (25). The reasoning supporting this line of thought is that early identification of a talent may allow the sport system to provide that talent with greater support and training conditions from an early stage, hopefully translating into optimal performances later on (36). Talent identification programs therefore follow a backwards logic: first, they identify the factors behind success at the highest levels of performance; then, they attempt to understand how stable and predictable those factors are in time (21).

In possession of such information, models are created in attempting to understand how soon can a relevant factor be identified. Notwithstanding, the efficacy of talent identification programs has been seriously criticized. Namely, the inconsistencies between the different approaches, the lack of serious thought with regard to psychosocial variables, and the extremely reduced rate of effectiveness have been highlighted (2). In sports such as volleyball, height is usually deemed a very important factor for playing at the highest levels (39). As height is a relatively stable feature and presents a predictable evolution in time, due to its strong genetic determination (10), attempts have been made to predict adult height early on the players' development (7). This constitutes a perfect example of a physical feature that may overwhelm all other characteristics and thereby culminate in simplistic and monolithic models. Hence, height will be the main point for our analysis, as the literature suggests that this factor is required for achieving elite levels of practice and playing (27), and talent identification

programs applied to volleyball usually underline the importance of this feature (15), with few exceptions demonstrating that this feature may not discriminate talented players (38).

In line with the perspective of multiple paths towards sports expertise and the need to reconsider how talent identification is conceptualized (40), we believe it is possible to find examples of volleyball teams performing at the highest competitive level despite not having sufficient height; indeed, despite being considerably shorter than their opponents. Finding such examples – even if only one – would suffice to provide evidence for the need of alternative talent identification criteria and models. In fact, not much can be done to improve individual height, although it is possible to search for taller athletes. But even so, demographic variation will impose limits and certain countries will have natural advantages over others (18). Nonetheless, the mere possibility of following different paths and of compensating the lack of one strong predictor of success through other means delivers a powerful message.

Our analysis will focus on the Japanese National Women's Volleyball Team. In the FIVB ranking, the Japanese team is placed 4<sup>th</sup> in Seniors (Adults) and 3<sup>rd</sup> in Junior and Youth ([www.fivb.org/en/volleyball/index.asp](http://www.fivb.org/en/volleyball/index.asp); accessed on 2 December 2014), denoting that it systematically performs among the best in official international competitions, namely Asian Championship, World Championship, World Grand Prix, Olympic Games, World Cup, and World Grand Champions Cup. In the 2014 edition of the World Grand Prix, a highly prestigious competition where the best 28 national teams worldwide participate, Japan was placed 2<sup>nd</sup> in the final ranking. However, when an analysis of height was conducted, Japan ranked 27<sup>th</sup> (tied with Thailand) out of 28 teams, with an average height of  $174.0 \pm 8.4$  cm (mean  $\pm$  standard deviation). The tallest team (Netherlands), in contrast, had an average height of  $187 \pm 5.6$  cm. Only six out of 28 teams had an average height below 180.0. Consequently, it is legitimate to ask how can Japan compensate the lack of height? What factors assist Japan in its regular elite-level performances? Knowledge of such factors can possibly aid in outlining different models for talent identification.

## Rethinking talent identification: The case of the women's Japanese Volleyball Team

Therefore, the aim of the present study was to analyse the Japanese National Women's Volleyball Team plays and what differentiates this from the other competing teams. Potentially, performance indicators demarking the Japanese team from the remaining competitors will assist in establishing new avenues for talent identification programs in volleyball. Furthermore, it will inform talent identification in general that several paths are possible to achieve elite performance.

### **Methods**

#### *Sample*

All fifteen matches between the six National Teams competing at the Women's Volleyball World Grand Prix Finals of 2014 were analysed, in total of 56 sets and 7176 ball possessions. Participating teams were Japan, Brazil, China, Belgium, Turkey and Russia. The local University Ethics Committee provided institutional approval for this study.

#### *Instrument*

The matches were recorded and broadcast in high-definition (1080p) in the Laola.tv website. Viewpoint is laterally placed, aligned with the net, and with camera turning to focus mostly on the team in possession of the ball.

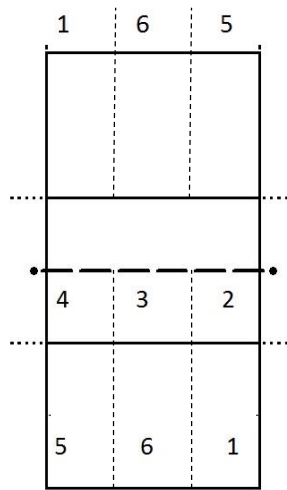
#### *Variables*

*Game complex* comprised five categories: a) *Complex I*, "side-out" or attack after serve-reception, comprising the actions of serve reception, attack setting and attack (34); b) *Complex II*, "side-out transition" or "counterattack", comprising serve, attack defense (block and dig), counterattack setting, and counterattack (11); c) *Complex III*, "transition" or "counterattack of counterattack", includes counterattack defense (block and dig), counterattack setting, and counterattack (35), d) *Complex IV*, "attack coverage" or "attack protection", including defense after deflection of the opponent's block, setting from attack coverage and counterattack, and can follow any other game complex (23); and e) *Complex V*, including "free ball" and 'downball', whenever the opponent

struggles to build the attack and an easy ball can be expected in anticipation, therefore presenting specific schemas of team organization (16).

*Setter's row* allows identification of whether the setter is in the front row (positions 2, 3 or 4) or in the back row (positions 1, 5 or 6). When in front row, the setter has two attackers also in the front row; when in back row, the setter has three attackers available in the front. Therefore, this factor is likely to change the dynamics of the attack (34).

For *serve type* we adapted the classification proposed by Costa, Afonso, Brant and Mesquita (11), establishing three categories: a) jump serve (implies ball rotation); b) float jump serve (without ball rotation); and c) ground serve (serve without jumping). Analysis of *serve trajectory* considered three beginning points (behind the official zones 1, 5 and 6) and six endpoints, corresponding to the six official game zones (Figure 1). Therefore, trajectories are identified through using two numbers. For example, 56 means serve from zone 5 towards zone 6. Since short serves (e.g., those directed towards zones 2, 3, and 4) were extremely reduced in number (26 occurrences out of 2423 serves, corresponding to only 1.07%), we decided to group them together; hence, zones 4, 3 and 2 will be merely reported as 'S' (for 'short').



**Figure 1 - Serve zones (beginning and endpoints)**

*Setting zone* was divided into A (all attack options available), B (middle-player can still attack, but some attack combinations are not possible to execute,

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e.g. plays involving the crossing of attackers), and C (only high sets towards the extremities of the court or to the defensive zone are available) (34).

*Attack zone* comprises the six zones of the court as defined by the FIVB, numbered 1 to 6 counter-clockwise. For *attack tempo* we followed the categorization of Afonso, Mesquita, Marcelino and Silva (5): a) tempo 1 (the attacker jumps during or slightly after the set, possibly taking one step after the set); b) tempo 2Q (the attacker takes two steps after the set); c) tempo 2S (the attacker takes three steps after the set); and d) tempo 3 (the attacker waits after the set, and only then starts a three-step approach).

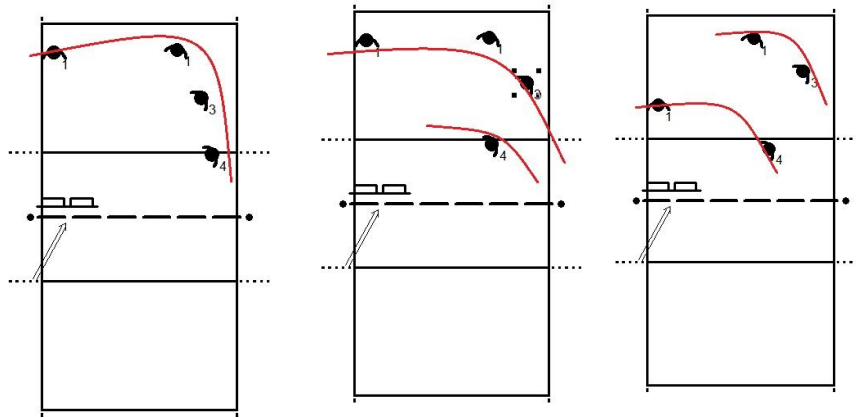
According to Papadimitriou, Pashali, Sermaki, Mellas and Papas (37) *attack combination or play* is defined as the intentional collaboration with more than your player connected at time and space to execute the proposed goals. We adapted the work of Afonso and Mesquita (3): a) simple play (middle-attacker attacks tempo 1, remaining players attack tempos 2 or 3 in their positions); b) zone overload (middle-attacker attacks first tempo and the attacker nearest to him attacks first or second tempo in a proximal space); and c) crossing (one of the wing-hitters crosses behind the middle-attacker to attack in a more interior position). Attack combinations were registered even the set would activate an attacker not participating in the combination.

For analysis of *attack efficacy* we used the an adaptation of the categorization proposed by Palao and Ahrabi-Fard (34), evaluating the attack in relation to its success and to the options that the opponent had for counterattacking: error (0), all team attack options (1), middle attacker cannot attack (2), only high sets towards the extremities of the court available or ball returned directly towards the attacker's court (3), and point (4).

For *block opposition* with simplified the categorization of Afonso and Mesquita (4). The following categories were considered: a) no-blocking (B0); b) single block (B1); c) double block (B2), broken double block (B2B); and d) triple block (B3).

*Number of defensive lines* consists in the number of curved imaginary lines formed by groups of players (or, occasionally, only one player), starting from the

net to the endline (see Figure 2). The number of defensive lines was registered for complex V also.



**Figure 2 - Example of defensive lines**

### *Statistical procedures*

Descriptive statistics, using mean and standard deviations, were used to inform about frequency of occurrence of the different variables. The comparison between performance of the Japanese team and the performance of the other teams (considered as average values of Brazil, China, Belgium, Turkey and Russia) were assessed via standardized mean differences, considered as the effect sizes (ES), computed with pooled variance and respective 90% confidence intervals (CI) (19). Data were analysed for practical significance using magnitude-based inferences. We used this quantitative approach because traditional statistic approaches often do not indicate the magnitude of an effect, which is typically more relevant for athletic performance than any statistically significance effect (19). To reduce bias, the raw values from all the variables were normalized to the total number of executions performed by the respective team. Threshold values for ES were  $>0.2$  (small),  $>0.6$  (moderate),  $>1.2$  (large) and  $>2$  (very large). Uncertainty in each effect was expressed as 90% confidence limits and as probabilities that the true difference was substantially positive and negative. These probabilities were used to make a qualitative probabilistic mechanistic inference about the true difference: if the probabilities of the difference being substantially greater and smaller than the smallest worthwhile change ( $0.2 \times$  baseline between-teams SD) were both  $>5\%$ , the difference was reported as

## Rethinking talent identification: The case of the women's Japanese Volleyball Team

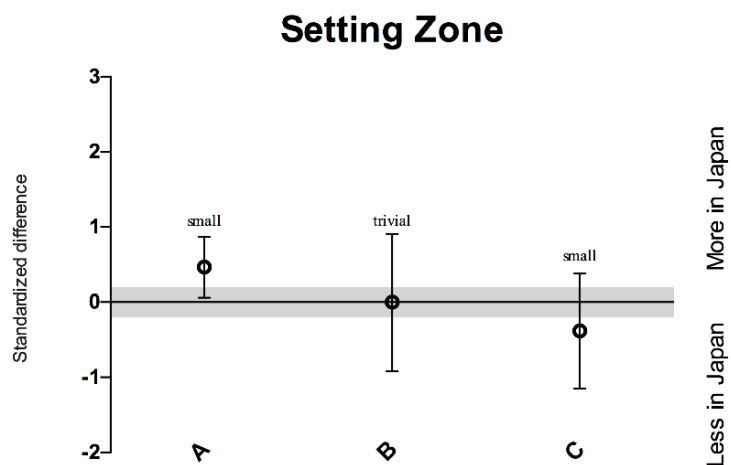
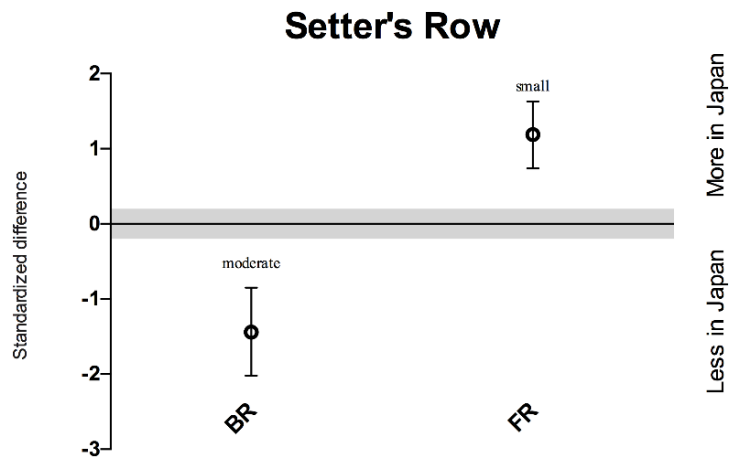
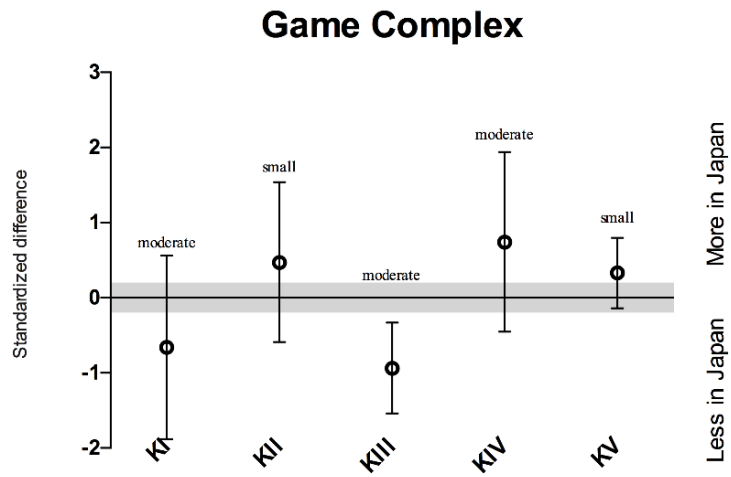
unclear; the difference was otherwise clear and reported as magnitude of the observed value. The scale was as follows: 25-75%, possible; 75-99%, very likely; >99%, most likely.

### *Reliability analysis*

Reliability of the observation and coding of game variables was calculated using Cohen's Kappa. The main observer was a level III volleyball coach with several of years of experience in the sport. Intra-observer reliability was conducted around one month after the initial observation of the chosen set of plays. Inter-observer reliability included the observation of a set of plays by an independent observer who was also an experienced volleyball coach. In both cases, 1335 plays were reanalysed, corresponding to 18.60% of the sample. For intra-observer reliability, Kappa ranged from 0.803 to 0.980. Inter-observer reliability was conducted after re-categorization of some variables, and therefore provided superior values, ranging from 0.913 to 1.000. Thus, all values exceeded the threshold of 0.75 suggested in the literature (14).

### **Results**

Descriptive data is presented in the appendix. Here, we focused on comparative analysis only. Our data suggested the existence of differences between Japan's gameplay and the other five teams' gameplay. Results showed that Japan presented very likely (-12.07;  $\pm 7.34\%$ ) (% of difference in means;  $\pm 90\%CL$ ) lower gameplays in complex III (transition), with moderate magnitude, and likely (11.43;  $\pm 17.14\%$ ) higher gameplays in complex V (freeball or downball), with small magnitude, comparatively to the other teams (Panel 1).



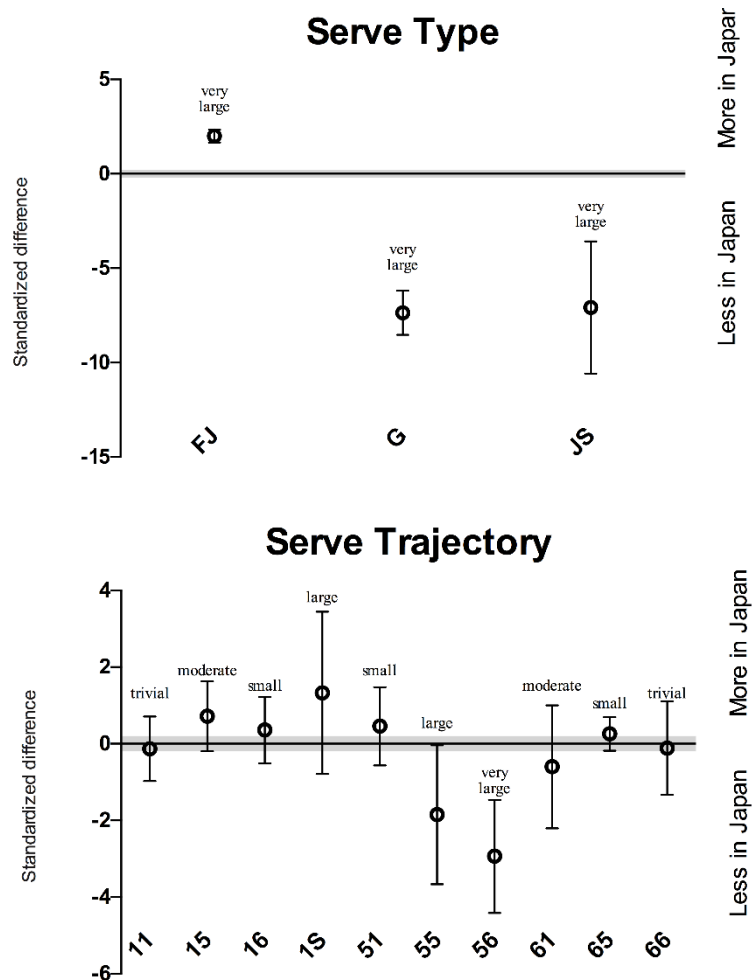
**Panel 1 - Game complex, setter's row and setting zone**

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Data further revealed that, unlike every other team, the Japanese side presented most likely (27.12;  $\pm 11.37\%$ ) higher gameplays with setter in the front row, with small magnitude, in comparison with the other teams (Panel 1). Conversely, Japan exhibited most likely (-21.10;  $\pm 7.63\%$ ) lower gameplays with setter in the back row, with moderate magnitude.

Japan also seemed to have an improved quality of the first contact, as their team played likely (4.48;  $\pm 4.03\%$ ) more gameplays in setting zone A than its opponents, albeit with small magnitude (Panel 1).

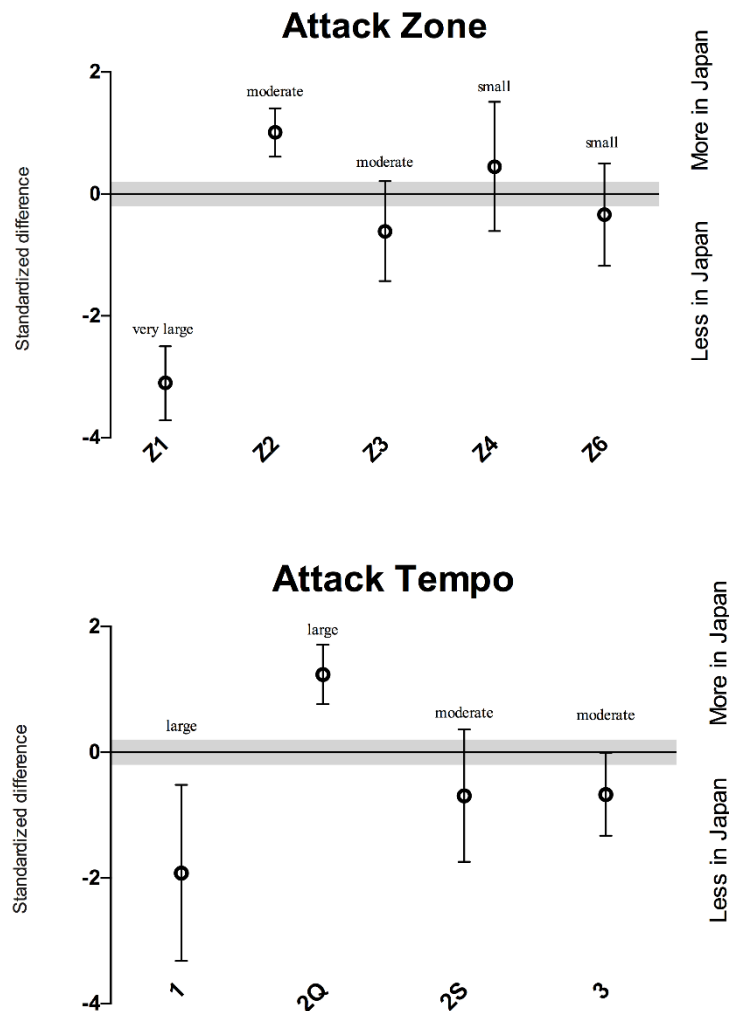
With regard to serve type, the Japanese team had a most likely utilization of float jump serve (20.42;  $\pm 3.79\%$ , very large magnitude), while very likely not using the ground serve (-98.84;  $\pm 0.89\%$ , very large magnitude) or the power jump serve (-98.58;  $\pm 5.74\%$ , very large magnitude) as often as their opponents (Panel 2).

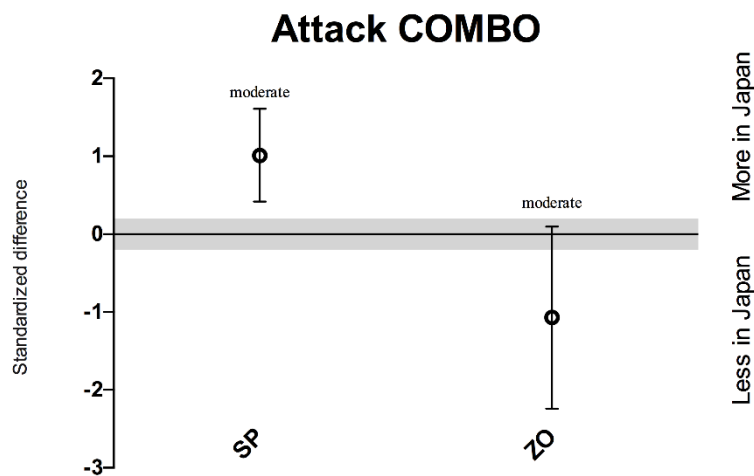


Panel 2 - Serve type and trajectory

As for serve trajectory, few differences were apparent between Japan and the remaining teams (Panel 2). Still, it is possible to highlight that Japan likely did not use serves from position 5 towards position 5 (-75.67;  $\pm 45-59\%$ , large magnitude), and very likely (-80.02;  $\pm 17.98\%$ , very large magnitude) presented lower gameplays where they served from position 5 towards position 6.

Concerning *attack zone*, Japan most likely (-78.57;  $\pm 6.53\%$ , very large magnitude) presented lower gameplays using attack through zone 1, while presenting very likely (13.09;  $\pm 5.56\%$ , moderate magnitude) higher gameplays deploying attacks through zone 2 (Panel 3).



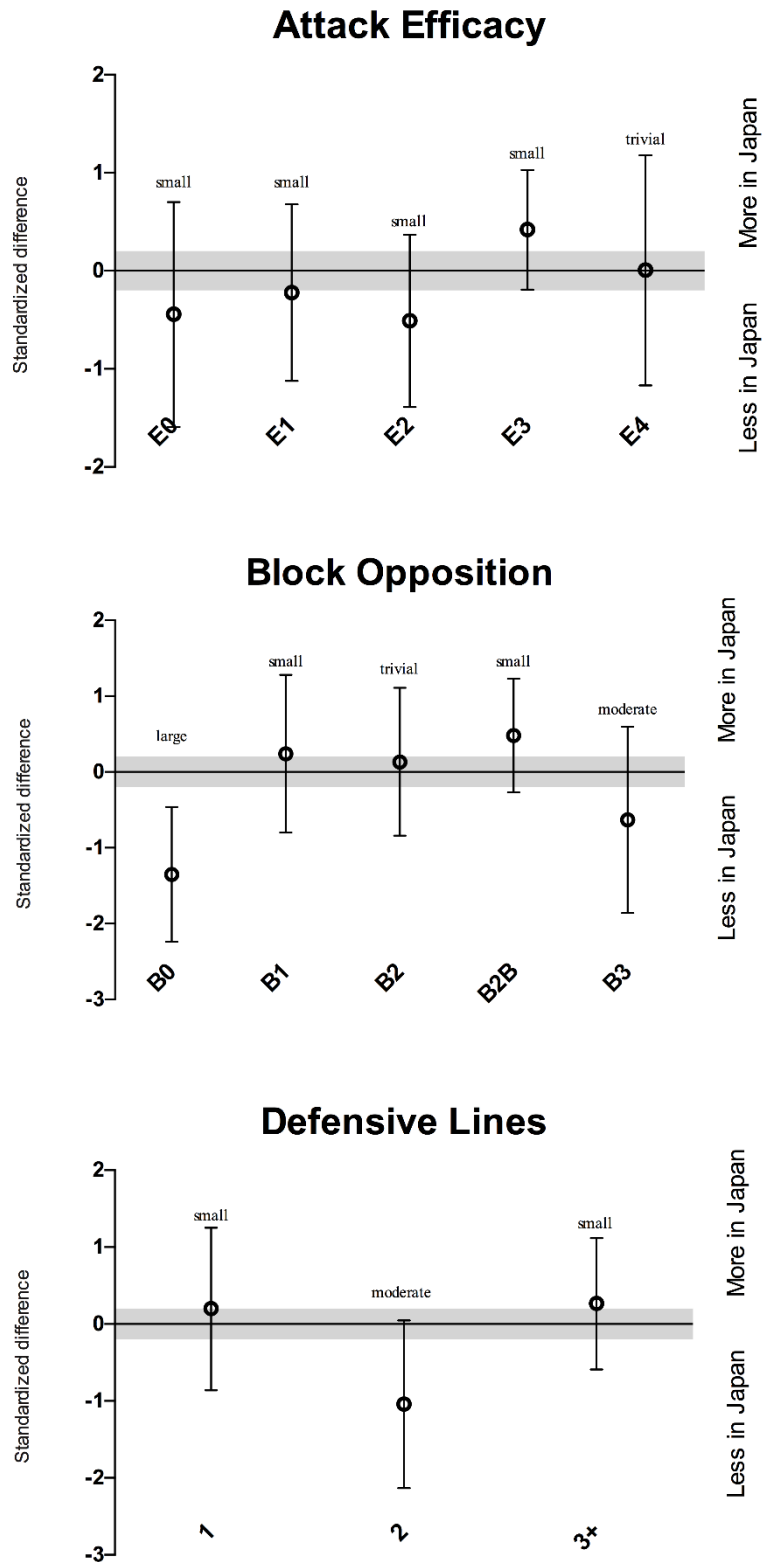


Panel 3 - Attack zone, tempo, and combination

Analysis of *attack tempo* revealed that Japan most likely (61.89;  $\pm 29.67\%$ , large magnitude) attacked more frequently using tempo 2, while very likely (-42.90;  $\pm 23.97\%$ , large magnitude) producing lower gameplays using tempo 1, and likely lower (-15.06;  $\pm 13.72\%$ , moderate magnitude) using tempo 3 (Panel 3).

With regard to *attack combo*, the Japanese team very likely (6.62;  $\pm 4.03\%$ , moderate magnitude) produced higher gameplays using simple plays, in comparison with their opponents. Conversely, Japan likely (-53.46;  $\pm 43.55\%$ , moderate magnitude) used lower frequencies of plays involving zone overload when attacking (Panel 3).

Data for *attack efficacy* provided unclear trends (Panel 4). As for block opposition (also in Panel 4), the Japanese team showed to very likely (-42.06;  $\pm 21.28\%$ , large magnitude) have a lower frequency of gameplays having zero blockers opposing the attack.



Panel 4 - Attack efficacy, block opposition and defensive lines

## Rethinking talent identification: The case of the women's Japanese Volleyball Team

Finally, Japan was shown to be less likely (-7.55;  $\pm 7.64\%$ , moderate magnitude) use defensive systems composed of two lines of defence (Panel 4).

### **Discussion**

Talent identification and/or selection are deemed pillars of the sports system, as this framework supposedly promotes the optimization of the sports preparation process, thus benefitting high-level competitive stages (36). However, and despite solid criticisms to the efficacy of the talent identification and/or detection paradigm having arisen in the literature (2), mainstream talent identification proposals currently have to deal with two major inconsistencies. The first is that although research on expertise has shown that there are multiple possible paths to achieving high-level performances (9), talent identification is usually conducted considering physical and/or physiological features exclusively, or at least having a very strong weight on the overall analysis (17). The second inconsistency arises internally, as research within the field of talent identification has been suggesting that psychosocial indicators may be much more determinant for accomplishing high-level performances than physical indicators (13), and similar results have been demonstrated for talent transfer (6). Unfortunately, such theoretical perspectives are not being sufficiently incorporated into empirical research, and the search for physical and physiological predictors of performance remains paramount (17). Even experienced coaches often fail to acknowledge the relevance of tactical and psychological aspects for performance (30). Time has come to perhaps reconsider the nature and type of predictors used for talent identification. Instead of monolithic approaches to talent identification, a multiple-model approach is suggested, respecting the diversified paths to expertise and the inter- and intra-individual differences in features and in rate of development (1, 13). A multi-model approach will better respect the multidimensional nature of talent (21).

Here, we focused on the Japanese Women's National Team of Volleyball, since it has a regular presence at the highest levels of international competitions and figures consistently among the first ranked teams in the world. Despite such impressive records, this is a team that is substantially shorter than all other

opponents at such level, having presented the lowest average height of all the 28 teams participating in the 2014 Women's World Grand Prix. Still, the Japanese team ranked 2<sup>nd</sup> in the final classification of this competition. In line with our search for alternative paths for expertise, we attempted to unfold game-related actions that assist in establishing a difference between this team and their opponents in a high-profile international competition (World Grand Prix Finals of 2014). Hopefully, this would also provide relevant insights to how we frame and understand talent detection in this sport.

Indeed, our analyses revealed a number of differences between Japan's gameplay and the other teams' gameplay. Specifically, we found differences of very large magnitude for serve type (higher likelihood of using float jump serve, and lower for ground serve and power jump serve), serve trajectory (lower utilization of serves from position 5 towards position 6), and attack zone (with lower gameplays deploying attacks through zone 1). There were also differences in gameplay with large magnitude of effect, especially with regard to serve trajectory (lower utilization of serves from position 5 towards position 5), attack tempo (higher utilization of tempo 2 and lower of tempo 1), and block opposition (lower likelihood of Japan using zero blockers when facing the opponent's attack). In addition, differences with moderate magnitude of effect were unfolded for game complex (lower gameplays in complex III), setter's row (lower gameplays with setter in the back row), attack zone (higher gameplays using zone 2), attack tempo (lower gameplays using tempo 3), attack combination (higher gameplays using simple attack plays, with lower utilization of zone overload), and number of defensive lines (with lower gameplays deploying two lines of defense). Finally, there were further differences, although of small magnitude, namely in game complex (higher gameplays in complex V), setter's zone (higher gameplays with setter in the front row), and setting zone (higher gameplays with setting in zone A).

There are clear indications that the Japanese women's team presents distinct game patterns, moving away from the tendencies and patterns of the other top-level teams in selected game variables. As we have selected only a handful of game variables, the possibility that additional differences exist in other

## Rethinking talent identification: The case of the women's Japanese Volleyball Team

game variables has to be considered. Perhaps herein lies part of the explanation behind Japan's success despite being one of the shortest teams playing at this level – and being the most successful of that group of short teams. This reasoning seems to be in line with the notion that there are multiple paths to expertise, and that performance at the highest levels of competition is compatible with different performance models (21). Consequently, talent identification or detection models should consider multiple paths, even within the same sport and the same specific playing function (6, 40). In particular, such models should consider alternative paths to success when the main path is not realistic (e.g., when your team is clearly shorter in a sport where height is a very relevant factor).

Notwithstanding, can our results concerning high-level performance provide hints as to which factors should be considered in talent identification and detection? We believe so. First and foremost, eye-hand coordination, especially when combined with depth perception, may be of paramount importance. This has already been suggested by literature in the domain of motor learning (8, 31), but is seldom recognized and included in talent detection programs. The Japanese team has higher gameplays setting in zone A, denoting a superior quality of first contact. Quality of first contact is highly recognized as one of the most important aspects for achieving solid performances at the highest levels of competitive volleyball (12, 32), and research has been conducted relating the quality in this action with depth and trajectory perception, most notably in serve-reception (37). Therefore, perhaps talent identification programs in volleyball should consider analyzing the quality of serve-reception from young ages.

The ability to play under certain speed constraints also emerged as relevant. For example, Japan almost never gets into defensive situations with zero blockers, unlike the other teams. This implies a solid set of reading skills and movement speed that allow the Japanese blockers to always mount some type of opposition to the opponent's attacks. This suggests that specific reaction time (leading to proper decision-making in game-specific contexts) is relevant (33), and further denotes the need to generate habituation to quick attack plays. This perspective seems to be legitimated by the higher likelihood of Japan playing with tempo 2 quick and lower likelihood of using tempo 3. Overall, the team's attack

plays are usually quicker, in average, than the opponent's plays (although the overall attack patterns are largely more based on simple attack plays, without crossings or zone overloading). So, specific complex reaction time and speed of movements seem to emerge as relevant factors for consideration under the context of a talent identification program in girls' volleyball (29). Also, this reinforces the need to further explore visual accuracy under dynamic settings, as faster attack balls produce trajectories that are more flattened and less high than slower ball trajectories; this will, in turn, imply differences in visual processing when preparing the attack (3).

## **Conclusion**

Talent identification and/or detection programs attempt to optimize the development of future elite athletes. Notwithstanding, most of them tend to be quite monotonic, focusing on a narrow group of variables, usually of the anthropometric and/or physiologic variety. But, as we have shown, it is possible for a team to perform at the highest level even when lacking supposedly determinant features of a certain sport (e.g., height). Evidence suggests that there are alternative routes to success, which should lead to criticism of unidimensional talent detection models and promote the development of alternate working philosophies, in order to promote the best out of athletes and/or teams that lack certain anthropometric features.

## **Conflict of Interest**

The author report no conflict of interests with regard to this research.

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## Appendix

**Descriptive statistics for game complex, setter's row and setting zone.**

	<b>JPN</b>	<b>BEL</b>	<b>BRA</b>	<b>CHI</b>	<b>RUS</b>	<b>TUR</b>	<b>Difference in mean (%; ± 90% CL)</b>	<b>Uncertainty in true differences</b>
<b>Game complex</b>								
KI	57.00±12.23	72.60±13.35	54.80±21.87	73.80±17.08	76.00±18.71	84.80±15.88	-7.98; ±14.23	Unclear
KII	75.20±13.68	64.60±21.73	80.60±13.16	88.60±23.86	82.80±19.63	94.40±25.97	7.49; ±17.49	Unclear
KIII	49.20±4.60	63.80±12.24	54.00±14.18	61.40±16.71	67.60±22.35	84.60±13.13	-12.07; ±7.34	Very likely negative
KIV	10.60±5.13	7.00±2.55	8.60±7.57	7.60±6.50	7.20±2.28	11.20±3.90	45.41; ±93.08	Unclear
KV	15.60±5.22	12.00±6.20	18.60±8.85	16.80±6.38	15.60±6.84	18.40±5.73	11.43; ±17.14	Likely positive
<b>Setter's Row</b>								
BR	84.40±16.62	107.60±8.38	114.40±39.18	131.20±23.09	129.20±27.94	158.00±31.30	-21.10; ±7.63	Most likely negative
FR	104.80±17.20	98.00±41.89	87.20±23.85	101.60±42.42	106.60±40.57	117.80±43.62	27.12; ±11.37	Most likely positive
<b>Setting Zone</b>								
A	59.80±10.38	59.20±13.61	58.20±16.72	63.40±12.97	57.00±15.30	75.40±17.70	4.48; ±4.03	Likely positive
B	21.20±4.66	15.80±3.19	23.60±14.96	18.40±5.94	27.20±4.60	32.20±9.47	-0.05; ±24.30	Unclear
C	43.80±7.60	50.20±10.80	38.40±13.69	58.60±20.06	53.60±17.17	57.60±17.08	-6.04; ±11.70	Unclear

**Descriptive statistics for serve type and trajectory.**

	<b>JPN</b>	<b>BEL</b>	<b>BRA</b>	<b>CHI</b>	<b>RUS</b>	<b>TUR</b>	<b>Difference in mean (%; ± 90% CL)</b>	<b>Uncertainty in true differences</b>
<b>Serve Type</b>								
FJ	75.00±13.29	48.60±19.17	79.20±13.99	59.20±16.87	62.80±18.25	94.00±26.28	20.42; ±3.79	Most likely positive
G	0.00±0.00	5.40±5.46	0.20±0.45	15.40±6.73	20.00±7.52	0.00±0.00	-98.84; ±0.89	Very likely negative
JS	0.00±0.00	10.40±3.21	0.60±1.34	13.80±5.81	0.00±0.00	0.00±0.00	-98.58; ±5.74	Very likely negative
<b>Serve Trajectory</b>								
11	9.20±1.10	8.20±3.56	12.40±6.35	15.60±5.94	7.60±6.11	11.60±4.83	-7.38; ±48.24	Unclear
15	22.00±13.62	11.20±8.07	20.60±5.77	10.20±6.34	11.40±9.61	20.00±10.10	50.88; ±83.02	Unclear
16	10.80±1.48	8.40±3.05	10.00±1.58	7.20±3.42	9.60±3.85	16.20±9.04	16.51; ±44.19	Unclear
1S	2.00±1.87	0.20±0.45	0.60±0.89	0.00±0.00	0.20±0.45	0.60±0.55	-	-
51	11.40±6.27	8.00±4.74	10.80±7.66	10.00±4.69	5.80±1.10	10.20±5.26	29.37; ±78.74	Unclear
55	1.40±2.07	9.80±5.17	8.80±2.28	12.80±8.47	9.60±1.34	4.80±4.71	-75.67; ±45.59	Likely negative
56	2.20±1.64	10.00±3.67	5.40±2.70	15.20±6.61	11.20±5.54	6.80±2.95	-80.02; ±17.98	Very likely negative
5S	0.20±0.45	0.60±0.55	0.20±0.45	0.00±0.00	0.20±0.45	0.20±0.45	-	-
61	3.60±2.88	5.60±3.85	4.80±2.86	5.80±3.42	7.60±4.88	8.00±4.64	-38.47; ±103.58	Unclear
65	5.60±1.34	0.60±0.55	3.40±3.51	3.80±2.77	11.20±6.94	5.00±2.92	24.18; ±46.23	Unclear
66	6.40±3.78	1.80±1.30	3.00±2.45	7.80±3.63	8.40±5.03	10.60±7.02	-7.77; ±94.17	Unclear
6S	0.20±0.45	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	-	-

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### Descriptive statistics for attack zone, tempo, and combination

	JPN	BEL	BRA	CHI	RUS	TUR	Difference in mean (%; ± 90% CL)	Uncertainty in true differences
<b>Attack Zone</b>								
Z1	0.80±0.45	0.00±0.00	3.80±1.79	7.80±4.49	9.00±2.92	3.20±2.17	-78.57; ±6.53	Most likely negative
Z2	42.40±8.08	43.60±6.80	37.00±13.29	36.80±12.11	42.20±10.57	35.00±8.92	13.09; ±5.56	Very likely positive
Z3	10.80±5.31	9.60±2.51	12.40±2.19	20.60±7.89	8.60±3.85	17.20±5.45	-23.82; ±28.70	Unclear
Z4	56.00±6.04	42.80±13.52	49.60±17.64	60.60±13.35	58.60±14.67	77.80±17.80	4.28; ±10.38	Unclear
Z5	0.00±0.00	0.40±0.55	0.40±0.55	0.00±0.00	0.00±0.00	0.00±0.00	-	-
Z6	12.80±3.70	19.60±5.22	11.80±7.53	8.00±3.67	11.40±3.65	21.60±3.85	-8.39; ±19.91	Unclear
<b>Attack tempo</b>								
1	11.80±5.40	15.60±3.21	24.00±3.54	22.40±3.65	11.80±2.95	23.20±4.92	-42.90; ±23.97	Very likely negative
2Q	48.60±14.45	29.00±10.12	34.80±8.29	29.20±10.47	26.20±20.95	35.80±25.76	61.89; ±29.67	Most likely positive
2S	18.60±7.23	18.20±1.30	22.80±18.10	19.40±7.09	33.60±16.46	30.80±6.87	-24.99; ±33.95	Unclear
3	38.80±7.82	45.40±7.96	26.60±10.14	54.80±18.31	54.00±8.00	56.80±17.94	-15.06; ±13.72	Likely negative
<b>Attack Combo</b>								
CR	0.00±0.00	0.40±0.55	0.40±0.55	6.40±3.91	0.00±0.00	0.00±0.00	-	-
SP	109.60±13.79	99.60±17.56	88.60±34.54	105.80±27.83	113.00±21.10	131.60±20.11	6.62; ±4.03	Very likely positive
ZO	7.60±4.62	8.20±4.15	18.20±2.49	14.20±8.79	12.20±12.44	13.80±12.28	-53.46; ±43.55	Likely negative

**Descriptive statistics for attack efficacy, block opposition and defensive lines**

	<b>JPN</b>	<b>BEL</b>	<b>BRA</b>	<b>CHI</b>	<b>RUS</b>	<b>TUR</b>	<b>Difference in mean (%; ± 90% CL)</b>	<b>Uncertainty in true differences</b>
<b>Attack Efficacy</b>								
E0	17.40±7.73	21.40±3.97	13.80±8.17	17.80±2.68	19.60±5.94	24.40±7.89	-10.73; ±26.56	Unclear
E1	8.60±2.61	9.00±5.15	6.80±2.68	9.20±2.39	11.40±10.14	15.20±5.89	-10.40; ±42.46	Unclear
E2	9.40±2.70	11.60±3.91	9.00±2.55	10.00±4.53	13.00±5.61	12.80±3.70	-15.44; ±24.62	Unclear
E3	39.00±9.64	35.00±9.27	35.40±16.35	41.40±15.18	33.20±6.98	42.80±5.89	8.18; ±12.27	Unclear
E4	45.80±7.76	37.60±11.08	46.20±12.13	53.80±13.83	49.00±13.02	56.00±19.01	0.17; ±22.09	Unclear
<b>Block Opposition</b>								
B0	9.00±2.92	17.40±5.59	12.00±4.06	15.40±3.36	16.80±4.66	19.20±8.53	-42.06; ±21.28	Very likely negative
B1	25.20±8.04	22.80±5.97	22.00±3.24	26.80±7.60	14.40±3.65	35.20±8.07	8.01; ±36.97	Unclear
B2	68.20±8.23	58.60±13.28	59.20±23.09	71.20±23.44	92.80±29.58	88.00±20.10	1.86; ±13.62	Unclear
B2B	20.00±8.51	18.20±9.47	23.40±20.38	18.80±12.15	9.40±5.13	13.00±4.42	27.18; ±49.25	Unclear
B3	5.00±7.97	8.80±6.94	4.40±6.58	8.20±7.79	5.80±6.06	10.60±9.71	-51.82; ±93.97	Unclear
<b>Defensive Lines</b>								
1	24.80±10.35	14.00±7.48	46.80±10.76	32.00±11.02	18.20±9.42	20.40±8.26	8.58; ±49.52	Unclear
2	80.00±17.13	87.60±17.39	81.80±26.35	108.60±25.62	111.60±36.30	146.40±23.13	-7.55; ±7.64	Likely negative
3+	14.20±6.34	23.20±9.96	6.60±3.21	9.20±2.95	20.80±14.81	9.00±1.22	13.70; ±47.97	Unclear



## III – Considerações Finais



O objetivo nuclear deste trabalho de investigação consistiu em questionar a supremacia dos atuais modelos predominantes de detecção e seleção de talentos, mormente a sua base largamente suportada nas características antropométricas e/ou fisiológicas. Pretendemos dar a conhecer uma exceção que nos convida a refletir sobre os paradigmas dominantes, em linha com o reconhecimento de que são diversos os caminhos potencialmente originadores ou facilitadores da obtenção de elevados níveis de prestação desportiva (Campitelli & Gobet, 2008; Ericsson, Krampe, & Tesch-Römer, 1993; Kulasegaram, Grierson, & Norman, 2013; Macnamara, Hambrick, & Oswald, 2014; Platz, Kopiez, Lehmann, & Wolf, 2014). Reconhecemos, neste domínio, que áreas como a psicológica, onde fatores como o prazer, diversão e motivação afloram no atleta de elite, são determinantes (Fleck, Case, Puhl, & Van Handle, 1985; Hayman, Borkoles, Taylor, Hemmings, & Polman, 2014; Lidor & Ziv, 2010), embora largamente negligenciadas na área da detecção e seleção de talentos.

O nosso estudo focou-se na modalidade do voleibol, onde a altura parece assumir-se como um fator determinante para o sucesso (Aouadi et al., 2012; Ayan, Bektas, & Erol, 2012; Malousaris et al., 2008; Marcelino, Afonso, Cicero, & Mesquita, 2014; Martín-Matillas et al., 2014; Sheppard et al., 2011). Concomitantemente, este reconhecimento redundou em modelos de identificação e detecção de talentos orientando-se para essa e outras características antropométricas. A seleção feminina do Japão convida-nos, porém, a questionarmos as nossas assunções e pré-conceitos. A nossa esperança é, ao realçarmos este caso excepcional no voleibol, possibilitar a abertura de uma brecha em todo o edifício conceptual em torno do conceito de *talento desportivo*, possivelmente impelindo pesquisadores a verificarem se fenómenos semelhantes ocorrem noutras modalidades. Consequentemente, examinámos fatores tático-técnicos emergentes do jogo e que possibilitassem, eventualmente, diferenciar a seleção japonesa das restantes seleções.

Entre as variáveis que emergiram como diferenciadoras da prestação da seleção japonesa encontram-se: a) menor número de jogadas em KIII (-12,07;  $\pm$  7,34%) e maior em KV (11.43;  $\pm$  17,14%); b) recurso praticamente exclusivo ao serviço flutuante com salto (20.42;  $\pm$  3,79%); c) quase total ausência de serviços

### III - Considerações Finais

da zona 5 para a zona 6 (-80,02;  $\pm$  17,98%) e reduzida utilização de serviços de zona 5 para zona 5 (-75,67;  $\pm$  45-59%); *d*) maior probabilidade de jogarem com distribuidora na zona ofensiva (27,12;  $\pm$  11,37%) e menor na zona defensiva (-21,10;  $\pm$  7,63%); *e*) maior probabilidade da distribuição ocorrer na zona A (4,48;  $\pm$  4,03%); *f*) menor utilização da zona 1 no ataque (-78,57;  $\pm$  6,53%) e maior utilização da zona 2 (13,09;  $\pm$  5,56%); *g*) maior utilização do tempo 2 rápido no ataque (61,89; 29,67  $\pm$ %), acompanhada de escassa utilização do tempo 1 (-42,90;  $\pm$  23,97%) e utilização menos provável do tempo 3 (-15,06;  $\pm$  13,72%); *h*) maior utilização de jogadas de ataque simples (6,62;  $\pm$  4,03%) e menor de jogadas com sobrecarga de zona (-53,46;  $\pm$  43,55%); *i*) na sua oposição ao ataque adversário, raramente se encontravam em situações com zero bloqueadoras (-42,06; + 21,28%); e *j*) menos provável utilização de duas linhas defensivas (-7,55;  $\pm$  7,64%).

Decorrente dos dados obtidos, podemos identificar determinadas componentes que poderiam ser consideradas nos programas de deteção e seleção de talentos. Primeiramente, emerge a importância da relação entre a coordenação óculo-manual e da percepção de profundidade (Binsted, Chua, Helsen, & Elliott, 2001; Neggers & Bekkering, 2002), patentes na qualidade do primeiro toque (maior utilização da zona A). Os estudos na modalidade indicam que a qualidade do primeiro toque constitui a base que suporta a eficácia do ataque, encontrando-se intimamente relacionada com a vitória das equipas (Bergeles, Barzouka, & Nikolaidou, 2009; Costa, Afonso, Barbosa, Coutinho, & Mesquita, 2014). Com o advento dos *eye trackers*, é possível realizar testes de seguimento visual, envolvendo percepção de profundidade, desde tenra idade (Lee, 2010; Miles, Vine, Wood, Vickers, & Wilson, 2014; Savelsbergh, Haans, Kooijman, & Van Kampen, 2010)

Os dados sugerem, igualmente, e em sintonia com o ponto precedente, que a capacidade de leitura de indicadores visuais relevantes e reação aos mesmos se afigura determinante na performance. Por exemplo, a eficácia da organização do bloco japonês, especialmente o facto de ter menor probabilidade de não conseguir colocar bloqueadoras em oposição ao ataque adversário, aponta para um elevado nível de tempo de reação e de capacidade de antecipação-

coincidência (específicos da modalidade) das atletas (Nuri, Shadmehr, Ghotbi, & Attarbashi, 2013; Sanders, 2011). Acresce que a velocidade de jogo também emergiu num outro contexto: o Japão jogou maioritariamente em tempo 2 rápido e com menor probabilidade em tempo 3, parecendo confirmar a necessidade de ataques rápidos promoverem um aumento da eficácia desta ação (Castro, Souza, & Mesquita, 2011; Costa et al., 2014). Novamente, o tempo de reação emerge como relevante, para além da velocidade de execução, fatores que sugerem uma delicada atenção na avaliação da percepção visual das futuras selecionadas (Allard & Starkes, 1980; Mroczek, Kawczyński, Superlak, & Chmura, 2013).

Apesar dos contributos aportados pelos nossos dados – embora, reconhecidamente, preliminares e dimensionalmente incompletos –, os programas de deteção e seleção de talentos raramente consideraram estas vertentes que extravasam os fatores antropométricos e/ou fisiológicos e, adicionalmente, as poucas habilidades que lhes merecem consideração ocasional tendem a ser avaliadas em ambientes previsíveis, desfasados da realidade do jogo (Lidor, Côté, & Hackfort, 2009). Estas evidências despoletam a necessidade de se encetar uma profunda reflexão sobre a validade dos modelos vigentes de identificação e deteção de talentos, que não respaldam a existência de caminhos alternativos para o sucesso desportivo (Ericsson et al., 1993; Gabbett, Georgieff, & Domrow, 2007; Gabbett & Seibold, 2013). Provas multidimensionais, avaliação regular e progressiva (não somente aos selecionados do momento, mas também aos que estejam à margem dos primeiros momentos de seleção) e programas que reconheçam a complexidade e pluralidade dos processos de desenvolvimento são necessários para uma evolução do desporto (Buekers, Borry, & Rowe, 2014; Vaeyens, Güllich, Warr, & Philippaerts, 2009).



## IV - Referências Bibliográficas



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