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Impact of Performance indicators on success for various set patterns in Volleyball.

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1. Introduction

- Volleyball consists of 3-5 almost independent sets.
- Marcelino et al.(2009) show that winning a set is directly related to some performance indicators.
- Analyzing all sets of any volleyball tournament contains also sets where there are substantial differences between the performances of two teams. These sets increase the number of significant performance indicators when all the sets are considered.
- The main purpose of the current study is to find those critical performance indicators that distinguish between winning and losing teams at different types of sets in Elite Men's Volleyball.
 - A secondary purpose is to define if significant Performance Indicators remain constant throughout the match (from set to set)

2. Method

- Data were collected from 175 sets played during the 2009 Men's European Volleyball Championship in Turkey.
 - Set type categorization was statistically accomplished through k-means clustering (Norusis, 2006) and produced 3 clusters according to final score difference.
 - 2 points (ambivalent sets), N=55
 - 3-5 points (safe sets), N=64
 - >5 points (unbalanced sets), N=56
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2. Method

- Set statistics were collected by a team of experts working for the C.E.V.
 - Reliability of the data collection and entry was checked by an independent observer with repeated measures in a random sample of 35 sets.
 - The intraclass correlation coefficients proved to be at highly acceptable levels (>0.90)
 - Wilcoxon tests were used to compare 12 performance indicators between winning and losing teams within each type of set. The level of significance was set at $p < 0.05$.
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2. Method

- Consideration of percentage of the following twelve parameters:
 - SRVErr, SRVPts
 - PASSErr, PASSPos, PASSExc, PASSPos+PASSExc.
 - ATTErr, ATTBlo, ATTErr + ATTBlo, ATTPts
 - BLCKpoints/set points
 - OPPErr/setpoints
 - Take into consideration the variables in terms of the percentage of the total execution of each skill, something that allows to compare the teams' profile to one another regardless of the duration of the set.
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3. Results

Performance Indicator	All sets (n=175)		Ambivalent sets (N=55)	
	Winners Mean±SD	Losers Mean±SD	Winners Mean±SD	Losers Mean±SD
SRVErr%	,145±,068**	,174±,082	,142±,065	,165±,068
SRVPts%	,057±,049***	,034±,037	,046±,049	,045±,039
PASSErr%	,052±,054***	,086±,069	,060±,051	,064±,066
PASSPos%+PASSExc%	,669±,148**	,623±,136	,657±,144	,658±,130
PASSExc%	,456±,168	,427±,145	,449±,156	,448±,135
PASSPos%	,213±,132	,196±,116	,208±,122	,210±,126
ATTErr%	,060±,047***	,089±,053	,072±,050	,072±,049
ATTBlo%	,076±,052***	,124±,060	,093±,055	,107±,054
ATTErr% + ATTBlo%	,136±,065***	,213±,073	,165±,062	,179±,061
ATTPts%	,536±,091***	,443±,100	,536±,092***	,492±,081
BLOCKpoints/set points	,135±,061***	,099±,071	,122±,058	,107±,069
OPPERR/set points	,263±,087	,274±,105	,258±,082	,250±,097

Significantly different to losing team: * p<0.05, ** p<0.01, *** p<0.001

3. Results

Performance Indicator	Safe sets (n=64)		Unbalanced sets(N=56)	
	Winners Mean±SD	Losers Mean±SD	Winners Mean±SD	Losers Mean±SD
SRVErr%	,159±,072	,180±,090	,133±,066**	,176±,085
SRVPts%	,057±,053	,038±,037	,067±,042***	,019±,031
PASSErr%	,057±,052*	,089±,074	,040±,058***	,105±,061
PASSPos%+PASSExc%	,669±,148**	,603±,136	,680±,153*	,612±,138
PASSExc%	,450±,154	,409±,155	,469±,195	,427±,143
PASSPos%	,218±,147	,194±,111	,211±,125	,185±,112
ATTErr%	,056±,047***	,089±,051	,053±,044 ***	,105±,054
ATTBlo%	074±,051***	,119±,055	,061±,047***	,146±,065
ATTErr% + ATTBlo%	,131±061***	,208±,067	,114±,063***	,251±,074
ATTPts%	,512±,084***	,451±,095	,564±,091***	,384±,094
BLOCKpoints/set points	,131±,058	,098±,074	,152±,062***	,093±,070
OPPERR/set points	,279±,094	,277±,107	,251±,081	,293±,108

Significantly different to losing team: * p<0.05, ** p<0.01, *** p<0.001

3. Results

Performance indicators	All sets (N=175)	Unbalanced sets (N=56)	Safe sets (N=64)	Ambivalent sets (N=55)
SRVErr%	**	**		
SRVPts%	***	***		
PASSErr%	***	***	*	
PASSPos%+PASSExc%	**	*	**	
PASSExc%				
PASSPos%				
ATTErr%	***	***	***	
ATTBlo%	***	***	***	
ATTErr% + ATTBlo%	***	***	***	
ATTPts%	***	***	***	***
BLOCKpoints/set points	***	***		
OPPERR/set points				

Significantly different to losing team: * p<0.05, ** p<0.01, *** p<0.001

3. Results

Performance Indicator	1 st set (N=46)	2 nd set (N=46)	3 rd set (N=46)	4 th set (N=28)	5 th set (N=9)
SRVErr%		*			
SRVPts%			***		
PASSErr%	*		***		
PASSPos%+PASSExc%			*		
PASSExc%					
PASSPos%					
ATTErr%	***	*	*		
ATTBlo%	***	**	***	***	
ATTErr% + ATTBlo%	***	**	***	***	*
ATTPts%	***	***	***	***	
BLOCKpoints/set points	*			**	
OPPERR/set points					

Significantly different to losing team: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4. Conclusions

All sets	Unbalanced sets	Safe sets	Ambivalent sets
9	9	6	1
			Attack kill%

- Critical performance indicators reduces as the score difference gets lower.
- Attack is the more important skill in men's elite volleyball (Zetou et al., 2007; Laios & Kountouris, 2005; Marelic et al., 2004). The more difficult the set, the more decisive the capacity of teams to take points from attack.

4. Conclusions

- Errors in Pass are more important than precise passes (Lobietti et al., 2006).
 - Serve is important only in unbalanced sets.
 - There is no real difference between excellent and good pass.
 - We can reduce the width of the scale of record for pass and consequently for serve.
 - Block is getting more important as the match continues to 4th set.
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5. References

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Thank you for your attention!
