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Original Article

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#### Cardiac structure and function of elite volleyball players across different playing positions

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BACKGROUND: Volleyball is a popular Olympic sport but has been little studied. Volleyball players have very distinct roles based on their playing positions. The present study aimed to investigate and compare cardiac functions and structure in elite volleyball players across different playing positions.  
METHODS: Left ventricular structure and function were measured using echocardiography in 60 male professional volleyball players (30.6±3.6 years) across five playing positions including libero, opposite players, outside hitters, middle blockers, and setters.  
RESULTS: Significant differences in most echocardiographic variables were observed among different playing positions, including left ventricular (LV) internal dimension, posterior wall thickness, intact ventricular septum, stroke volume, cardiac output, end-diastolic volume, ejection fraction, and fractional shortening (all p<0.01). End-systolic volume was not different among positions (p=0.167). The opposite players demonstrated greater LV dimension and thickness as well as systolic function than players in other positions (p<0.05). Stroke volume in the setters was significantly lower than those of the opposite players and outside hitters (p<0.05). Regression analysis showed that the playing position independently predicted most of the echocardiographic variables (p<0.05).  
CONCLUSIONS: LV adaptations in volleyball players vary widely according to their playing positions. The opposite players had the most pronounced LV adaptations compared with player in other positions.

KEY WORDS: Volleyball; Athlete’s heart; Cardiac adaptation; Left ventricular hypertrophy