

## Left Ventricular Adaptations of Elite Volleyball Players Based on the Playing Position

**Authors :** Shihab Aldin Al Riyami, Khosrow Ebrahim, Sajad Ahmadizad

**Abstract :** Hemodynamic changes and ventricular loading during exercise lead to left ventricular (LV) hypertrophy. In athletes, volume load induces enlargement of the LV internal diameter and a proportional increase of wall thickness; while, pressure load would induce thickening of the ventricular wall. These adaptations are not similar in all athletes and are related to the types of sport. Volleyball players have different types of activity and roles based on their playing. Therefore, their physiological adaptations and requirements are different. The aim of the current study was to investigate the LV adaptations in elite volleyball players based on their playing position. Sixty male elite volleyball players (age,  $30.55 \pm 3.64$  years) from Brazil, Serbia, Poland, Iran, Colombia, Cameroon, Japan, Egypt, Qatar, and Tunisia were investigated (from all five volleyball play positions). All participants had the experience of at least 3 years of participation at a professional level and international tournaments. LV characteristics were evaluated and measured using the echocardiography technique. Statistical analyses revealed significant differences ( $P < 0.05$ ) among the five groups of players for LV internal dimension (LVID), posterior wall thickness (PWT), and intact ventricular septum (IVS). Post-hoc analysis showed that opposite position players had significant higher value of LVID, PWT, and IVS when compared with other players, including outside hitter, middle blocker, setter, and libero ( $p < 0.05$ ). Additionally, in libero players, PWT was significantly lower when compared with other players ( $p < 0.05$ ). Based on the findings of the present study, it is concluded that LV adaptations in volleyball players are related to their playing position and that the opposite players had the highest LV adaptations when compared to other positions.

**Keywords :** athletes, cardiac adaptations, echocardiography, heart, sport

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