

**Abstract:** Cardiac dimensions have been shown to differ between the sexes in response to physical activity, specifically in left ventricular internal diameter, wall thickness, and mass (6, 9, 21, 22). These adaptations are collectively referred to as “Athlete’s heart.” The cause for these sex differences in athlete’s heart remains unknown, however. This study sought to examine whether cardiac dimensions differ between untrained males and females to determine if athlete’s heart morphologies occur in response to training adaptations or if a sex-linked mechanism underlies the differences. A total of 115 college-aged males and females were recruited for participation in the study. Participants consisted of male and female athletes from crew, basketball, and swim teams, as well as untrained males and females. All participants underwent dual-energy x-ray absorptiometry scans for body composition, electrocardiogram measures, echocardiographic imaging, and completed a 1-mile timed run to estimate aerobic fitness. Left ventricular internal diameter (LVID), interventricular septal wall thickness, posterior wall thickness, left ventricular mass (LVM), stroke volume (SV), and left ventricular volumes were compared between all groups. Cardiac structure and function was greater in trained compared to untrained individuals. Furthermore, trained males exhibited greater cardiac structural and functional components than similarly trained females. Untrained males demonstrated greater cardiac structure and function than untrained females. This data suggest that sex differences may account for cardiac dimensional differences in athletes. More research is needed to determine the exact cause for these differences, whether due to hormonal cues or another underlying mechanism.