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# Impact of Playing Level on Vascular Adaptation in Rugby League Players

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## ABSTRACT

**Purpose:** There is substantial evidence for vascular adaptation in endurance athletes. However, little research exists for athletes that use a combination of resistance and endurance training. This study aimed to assess the vascular adaptation in professional rugby league athletes in comparison to age-matched university rugby league players. **Methods:** Players from the same professional club ( $n = 9$ ) and university ( $n = 9$ ) were recruited. Heart rate, diameter and blood flow in the carotid artery were assessed at rest using Doppler ultrasonography and repeated immediately following a sport specific exercise protocol lasting ~23 min. **Results:** The professional players displayed a significantly lower heart rate at rest ( $P = 0.003$ ) but all other ultrasound measures were not significantly different between the groups. The exercise-induced change was not statistically significant for arterial diameter and heart rate, but the professional players exhibited a smaller relative increase in blood flow ( $P = 0.021$ ). There was a significant positive association between blood flow and fat free mass in the professional players at rest ( $r = 0.817$ ,  $P = 0.004$ ) and post exercise ( $r = 0.805$ ,  $P = 0.004$ ). Conversely, the university players displayed a significant negative relationship at rest ( $r = -0.580$ ,  $P = 0.050$ ), though not post exercise ( $r = -0.442$ ,  $P > 0.05$ ). **Conclusion:** Our data are the first to suggest the existence of chronic vascular adaptations to playing rugby league, improving from university to professional level.

## Key Words:

Carotid artery; Arterial diameter; Blood flow; Mixed Resistance-Endurance training