



1.1 Differential Changes in Peripheral and Central Blood Pressure from Adolescence to Adulthood

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ABSTRACT

Introduction: In adults, aging is associated with a rise in blood pressure (BP) and a disproportionate increase in central systolic blood pressure (cSBP) relative to brachial SBP (bSBP) (i.e. reduced aortic to radial pulse pressure amplification (PPamp)). But changes in brachial and central BP have not been studied in the transition from adolescence to early adulthood when PPamp is greatest. We therefore investigated changes in BP over this age period in a large population-based birth cohort.

Methods: 1835 participants (1099 female) in the Avon Longitudinal Study of Parents and Children (ALSPAC) underwent repeat clinic examination, including measurements of brachial and central BP, aged 17 yrs and 24 yrs. Measures at 17 to 24 yrs were compared with paired *t*-tests.

Results: Aged 17 yrs the difference between bSBP and cSBP was 19.7 ± 4.7 mmHg, while at 24 yrs the difference was 18.2 ± 4.6 mmHg (age interaction $p < 0.001$). From 17 to 24 yrs diastolic BP increased, bSBP decreased and cSBP increased, PPamp decreased while augmentation index (AIx) increased (Table 1).

Conclusion: There is a substantial difference between bSBP and cSBP in adolescence and young adulthood, but PPamp decreases over this age period. This results in a fall in bSBP despite a rise in cSBP between age 17 and 24. Previous studies in youth may have mis- or under-estimated changes in BP due to changes in PPamp.

Table 1

Variables	Mean \pm SD at 17	Mean \pm SD at 24	Difference (95% CI)	<i>p</i>
bSBP (mmHg)	116.2 \pm 11.5	115.3 \pm 11.0	-0.93 (-1.4, -0.47)	0.001
cSBP (mmHg)	96.5 \pm 0.2	97.1 \pm 0.2	0.58 (0.17, 0.99)	0.006
DBP (mmHg)	64.5 \pm 0.2	66.6 \pm 0.2	2.1 (1.7, 2.5)	<0.001
PPamp (mmHg)	21.0 \pm 0.1	18.9 \pm 0.1	-2.10 (-2.5, -1.9)	<0.001
AIx (%)	100.8 \pm 0.3	103 \pm 0.3	2.14 (1.41, 2.87)	<0.001