

## Reference Values of Aortic Augmentation Index in a Large Healthy Population Aged 3-18 Years

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**Basics:** Aortic pressure augmentation caused by pressure wave reflection is a physiologically important phenomenon. The aortic augmentation index ( $Aix_{ao}$ ) increases with age in adults and the increased  $Aix_{ao}$  is a strong predictor of cardiovascular morbidity and mortality. However, the pressure waveform in infants and children are similar to those in older adults, and thus the  $Aix_{ao}$  is higher in this group. Consequently the determination of reference values of  $Aix_{ao}$  in a large population of healthy children and adolescents is very reasonable.

**Aims:** To determine the reference values of  $Aix_{ao}$  in children and adolescents and to find the possible physiological mechanisms of the enhanced aortic pressure wave reflection during childhood.

**Methods:**  $Aix_{ao}$  were measured by a new non-invasive, occlusive, oscillometric method (Arteriograph, TensioMed Ltd., Hungary) in a healthy population aged 3-18 years with normal BMI and with normal blood pressure (1802 males, 1572 females). Smoothed percentile curves from 3<sup>th</sup> to 97<sup>th</sup> were determined using LMS method. Results were analyzed by Student's t-test.

**Results:** The physiological changes of  $Aix_{ao}$  measured in healthy population are shown in Figure 1. and 2. The  $Aix_{ao}$  decreased with age in both genders. From the age of 14 years the  $Aix_{ao}$  were significantly lower in males than in females ( $p < 0.02$ ), and this difference had become even more pronounced from age of 15 years ( $p < 0.001$ ). Assessing the background of these gender differences in  $Aix_{ao}$  we have found that the changes of the median of  $Aix_{ao}$  are exactly identical to the changes of the median of body height.

**Conclusions:** This is the first large population study involving 3374 healthy subjects aged 3-18 years which describes the physiological changes of  $Aix_{ao}$ . Our data provide supporting evidences that the pressure waveforms in infants and children are markedly elevated and similar to those with advanced age. This very interesting phenomenon can entirely be explained by the differences in body height (aortic length) with ageing. In children with the shorter body height (aortic length) the reflected wave returns earlier and increases the augmentation index ( $Aix_{ao}$ ), not because of the stiffer arterial system.

Figure 1.

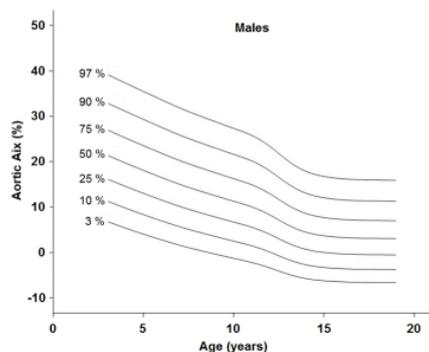


Figure 2.

