Young Male Voices at the Peripubertal Stage: clinical study suggests missing voice stage?

Work in Progress

Martin Ashley, Gary Butler and David Howard

Abstract

A growing number of studies confirm that the use of increasingly powerful computer driven analysis of voice quality suggests that voice assessment can be a valid, reliable and above all non-intrusive method of assessing male puberty. The potential for larger scale studies of male puberty than are possible through invasive examination is attractive. The authors have collaborated on a smartphone app that indicates pubertal stage through an easy to administer analysis of the speaking fundamental frequency (SF_0). In order to test the validity of the method, use of the app was added to the protocol for assessment of boys presenting at a paediatric clinc. SF_0 readings were compared with conventional measures such as testicular volume and Tanner staging.

Testicular volume of 4ml was identified in the study as a critical value corresponding to an SF_0 of 200Hz. Testicular volume is understood to increase only slowly during childhood, the value of 3ml being stated by a number of authorities to be indicative of early pubertal onset. Similarly, voice pitch remains relatively stable during childhood at values well above 220Hz. Results indicate a peripubertal phase as testicular volume rises to between 3 and 4ml and SF_0 falls to a region between 200 and 220Hz. The study found some evidence of progression from Tanner G stage 1 to G stage 2 (early genital enlargement) during this period, but early appearance of pubic hair (PH staging) had no demonstrable relationship. High androgen sensitivity in genetalia and larynx may account for early changes prior to the critical values of 4ml and 200Hz.

The authors propose further investigation of the peripubertal phase in boys aged between eight and ten with a view to establishing the significance of a peripubertal voice stage.