Register measurements in puberty

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With stroboscopy it is hardly possible to see register shifts in pubertal boys even if there is a very clear acoustical change of a whole octave, as demonstrated in a video film at the Voice symposium 1988 in NY, USA (1).

Phonetography is a valuable tool to measure the tone range and the dynamic range in puberty. An example of pre-pubertal and post-pubertal boys’ voices is shown in Fig. 1 (longitudinal investigation, (2)). In that study the phonetograms were compared with hormonal and pubertal development, a pubertal boy having a serum testosterone level of more than 10 nmol/l. Many other studies have been made on the development of voice where phonetography seemed to be the best tool (3).

Electroglottography is another valuable tool. The method has been used already by us in the Thomaner choir in Leipzig.

The new tool: High-speed films compared with acoustical measurements, electroglottography and kymography show very interesting differences between the acoustical and electroglottographical measurements in our example. The example with phonetography includes the two upper registers with phonetograms (of childhood), and the two lower registers (of an adult) of a 17-year old boy, Fig. 2, and the upper register shift is seen electroglottographically at 500 Hz. Acoustically around 10 cycles are changed before the electroglottographical shift, Fig. 3. The kymographic film corresponds to the electroglottographical picture, Fig. 4. The analysis were made in the middle of the vocal cords with 2000 pictures/sec. (Wolf inc.). The acoustical change is related to the tuning of the upper vocal tract.
Additional tool:
Download: Phonetogram area measurement program
www.mpedersen.org up front program of phonetography.
Unpack and use the exe file to install. The README.doc is a how to for the analysis.

Figure 3. Acoustically around 10 cycles are changed before the electroglossographgical swift, at the register shift.

Figure 4. The kymographic film corresponds to the electroglottogaphical picture.

References

