SNORS+ / SNORS

Super Nasal-Oral Ratiometry System

Nasal anemometry measures nasal airflow during speech. This provides a measure of velopharyngeal closure. Anemometry is an established technique in the UK, but it has limitations – sensitivity to speech loudness and slow response of the sensors.

SNORS is also an anemometry system, assessing velopharyngeal closure. However, unlike conventional nasal anemometers, SNORS measures both nasal & oral airflow, which provides a much better assessment of the *degree* of closure. This is achieved by calculating the percentage of airflow that is nasal, thus virtually eliminating the volume factor. In addition, SNORS uses fast sensors, which allow the very rapid movements of the velum to be detected. SNORS comprises a mask and electronics unit (the SNORS+ base unit) plus a PC.

Masks are lightweight and transparent, and both adult and child (4+ years) sizes are available. They are simply held snugly over the nose and mouth by the patient or therapist. The electronics unit has just one adjustment – a volume control, which is easily set to provide a suitable recording level.

SNORS incorporates easy-to-use software, running under Windows 95/98®, which provides real time displays for therapy, as well as controlled tests for assessment and measurement of outcome. In addition to providing a graphical display, SNORS calculates "nasalance". Nasalance is the ratio of nasal airflow to total airflow (expressed as a percentage), and should not be confused with the acoustic nasalance figure provided by some speech-based systems. The aerodynamic nasalance, used by SNORS, provides a measure of effective velopharyngeal closure, whereas the acoustic nasalance measure relates more to perceived nasality than degree of closure. Both measures are useful and complementary.

Laryngograph

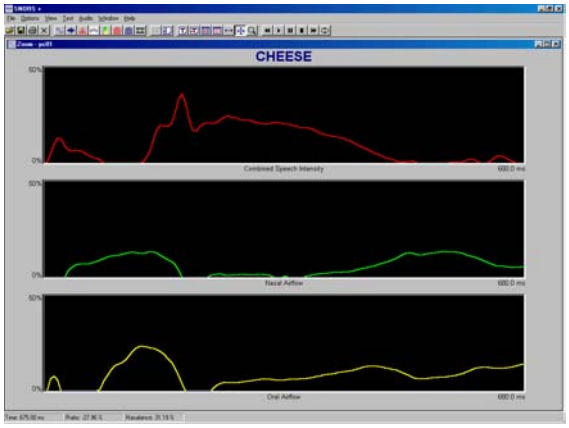
Laryngograph Ltd.
1 Foundry Mews, London, NW1 2PE
Tel: +44 (0)20 7387 7793 Fax: +44 (0)20 7383 2039
E-mail: lx@laryngograph.com
www.laryngograph.com

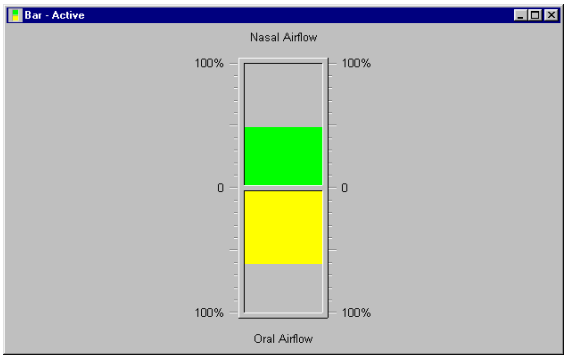
CASE STUDY USING SNORS

By Alison Main[1], BA (Hons), Dip CCS, MSc, MRCSLT

The patient, PC, was a 23-year-old male, who has a long and vague history. He had a primary repair of his unilateral right complete cleft of the lip and palate, in New York, at an early, but indeterminate age. He has a moderate hearing loss in the right ear, and a mild loss in the left. He reports that he has had speech and language therapy in the past, but not since his latest surgery: two years prior to referral, he had a pharyngoplasty, in France, and continues to receive orthodontic treatment there. He remained moderately hypernasal, and was referred for SNORS assessment and treatment as it was felt that he would respond well to this type of therapy.

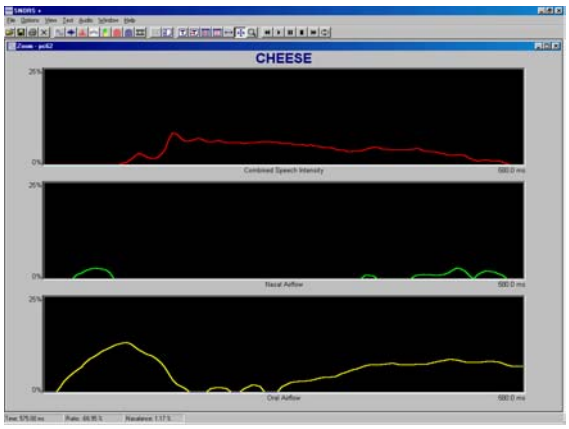
The initial assessment of PC showed that he was able to make velopharyngeal closure, but he did not maintain this. When observed using a pen torch, he could voluntarily contract his velum/pharynx, and appeared to make closure when doing so. Using SNORS in assessment, this is the sort of result that we obtained. The plot – for the word cheese – shows speech intensity (red), nasal airflow (green) and oral airflow (yellow) plotted over time. There is a lot of nasal escape during the release of the affricate. He pauses after this and all airflow stops, and throughout the rest of the word, nasal airflow increases and then peaks during exhalation at the end of the word. He had a nasalance of 31%.





We used SNORS as biofeedback in therapy. The requirement for velopharyngeal closure for each sound was explained to him. Once he was aware of what was required, the use of biofeedback helped him to know when closure was happening, to become aware of exactly what was happening in his mouth, and any sensation that accompanied that. He was then encouraged to increase the duration of closure, as we progressed from single sounds to words, to phrases, and finally to sentences. Small adjustments that PC tried could be seen to either work or not. A visual image helped with self-monitoring: initially he could see what was happening and was repeatedly asked to explain what was happening, and what that felt and sounded like. We gradually withdrew the visual image. Because during therapy we could see and record changes and improvements, PC was encouraged to continue, and was very motivated to work hard.

The final assessment, after six sessions of therapy, showed, for the same example word, cheese, greatly reduced nasal escape during the affricate, and complete closure during the vowel. The nasalance figure has dropped from 30% to 1%, which is within normal limits according to our preliminary measurements of normal speakers.



Follow-up assessment, one month later, showed further improvement: virtually no nasal airflow during the whole word cheese. Nasalance is now down to under one percent.

[1] Alison Main is a Speech & Language Therapist at the Western Infirmary, in Glasgow.