

# Diaphanoscopy of the paranasal sinuses (Halloween in ENT Practice)



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Since time immemorial, humans have tried to enhance the limited capabilities of their sense organs. It would be a clear advantage to be able to see through objects and discern what lies inside or behind them! This concept of transillumination remained a dream until technological advances (particularly electric lighting) made it possible not only to focus light but also to send it through seemingly opaque bodies.

A Breslau dentist, Julius Bruck (1840–1902), was the first to use what he called *diaphanoscopy* as an aid to medical examination in 1867. He developed two additional instruments: his *stomatoscope* (from *stoma* meaning *mouth*) for illuminating teeth, and his *urethroscope* to light up the bladder.

## First the larynx...

Notwithstanding Bruck's seminal work, the first use of medical transillumination was otorhinolaryngological. The pioneering laryngoscopist, Johann Nepomuk Czermak (1828–1873) conducted extensive research using this technique from 1858 onwards. A robust light source was positioned externally on the larynx, whilst conventional indirect laryngoscopy was performed using a mirror. He also performed endolaryngeal surgery using adjuvant external illumination.

## ... then the paranasal sinuses

There is still controversy as to who first used transillumination as a diagnostic method on a routine basis in the paranasal sinuses. Contenders for the title are Vincence Conzolino from Milan and Rudolph Voltolini (1819–1889) from Breslau. The Warsaw-based laryngologist, Theodor Heryng (1847–1925) was a significant player in the adoption of transillumination as a diagnostic tool. He wrote a seminal paper entitled, 'The Electric Transillumination of the Maxillary Sinus in the Case of an Empyema,' [1] and invented a good, simple transilluminator (Figure 1).

Initially many (including Medical Officer of Health, Dr Karl Vohsen (1858–1926) from Frankfurt), were very sceptical, finding it too imprecise and difficult to interpret. This cynicism was probably due to the poor luminosity of the early instruments. As technology enhanced the brightness of the basic transilluminators, 'double diaphanoscopes' appeared, allowing for the simultaneous examination of both frontal sinuses (Figures 2–4). When light sources improved, however, and longer-lasting carbon filament lamps superseded the original extremely hot and highly unreliable platinum filament lamps, transillumination of the paranasal sinuses became a straightforward, expedient and diagnostic tool.

Transillumination was cost-effective too. All it required was a compact darkroom (devoid of windows and with taped keyholes) at a time when few practitioners could afford X-ray machines. From 1890 to approximately 1960, despite its inherent limitations, transillumination of the paranasal sinuses became commonplace in ENT outpatient clinics, until it was superseded by more sophisticated imaging modalities, including X-ray, ultrasound, computed tomography and volume tomography.

## Outlook

Transillumination is seldom used in the 21st century. If intraoperative navigation is not available, the light of a 45° endoscope introduced into the frontal recess can act as an optimal means of illuminating the entire frontal sinus and demonstrating any remaining cells. Otherwise, so-called diaphanoscopy has become obsolete in the diagnostic armamentarium of contemporary rhinologists.

It is not dead, however. Our grandchildren still illuminate pumpkins from the inside with candles, for Halloween purposes!

Who knows what future diagnostic procedures will render the opaque transparent to our eyes?

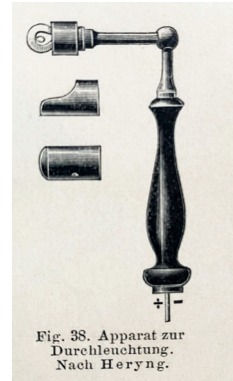


Figure 1: Early transilluminator of the Warsaw rhinologist, Theodor Heryng [2].

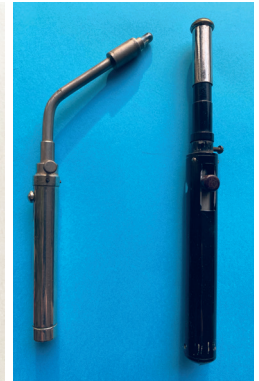


Figure 2: Contemporary diaphanoscopes.



Figure 3: Double diaphanoscopes were also created, allowing for the simultaneous examination of both frontal sinuses.

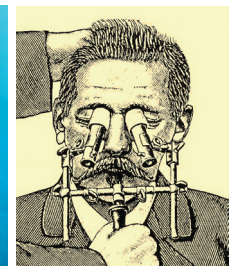


Figure 4: Synchronous transillumination of frontal sinuses [3].

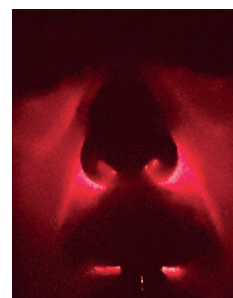


Figure 5: Clear maxillary antra.



Figure 6: Halloween diaphanoscopy.

### Editors' note:

The term 'diaphanoscopy' – from the Greek word, διαφανής (diafanos) meaning transparent – is a term used on the continent of Europe to denote transillumination.

### Author's note:

My grateful thanks go to my friend and colleague, John Riddington Young, for translating this paper into good King's English.

### References

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4. van Gangelen G. *Keel-, neus- en oorheelkunde*. Leiden: H. E. Stenfert Kroese; 1946.