ATMOS
MedizinTechnik

ATMOS H.A.S.I. Filter

Higher-contrast display in colposcopy

Exactly what I need

INITIAL SITUATION

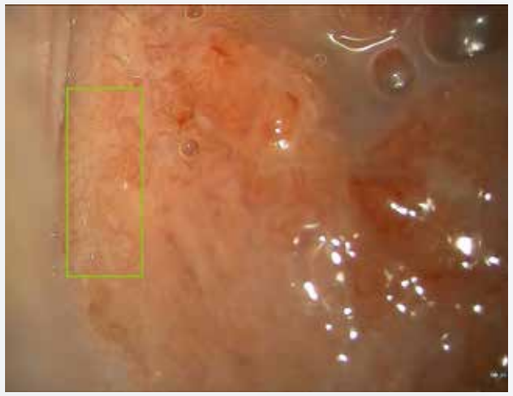
Abnormal results of cervical cancer screenings represent indicators for colposcopy. The aim is to identify and treat serious pre-stage cervical cancers and thereby prevent invasive carcinomas. A colposcope with an excellent lens, distinctive resolution, detailed zoom and a high-contrast green filter is necessary for this purpose.
It allows a practised examiner to reliably identify serious changes such as “atypical vessels”, “rough mosaic” and “rough granulation”. The capillary indicators of “mosaic and granulation” are, in their respective versions, indirect indicators of high proliferation pressure in the epithelium and result from congested blood flow in the capillaries of the mucosa. Atypical vessels per se appear most commonly in areas of invasive carcinomas; in rare cases, they can also be seen during a cervical intraepithelial neoplasia (CIN III). In order to identify these atypical vessels and the specified capillary indicators, the examiner requires a green filter with the highest possible contrast between vessels and the mucosa. The best way to achieve this is to adapt the light used for the colposcopy to the absorption and extinction spectrum of the vessels to be emphasised – in this case above all haemoglobin and its derivatives. The green filters that have been used so far increase this contrast fairly well in the range of halogen lighting. However, the introduction of LED lighting has made it possible to amplify several absorption maxima. As well as an absorption maximum of approx. 550 nanometres, i.e. in the green wavelength range, haemoglobin also has an absorption maximum of around 450 nanometres in the blue range. The starting point for developing a new filter was to adapt it to both absorption maxima and to determine whether this would increase the contrast.

DR. MED. CHRISTOPHER KOßAGK

- Specialist for gynaecology and obstetrics
- Colposcopy diploma since 2008
- AGCPC-certified dysplasia surgery
- Board member of the “Arbeitsgemeinschaft für Zervixpathologie und Kolposkopie e.V.“ (the German Working Group for Cervical Pathology and Colposcopy)

DESIGN AND PERFORMANCE OF THE OBSERVATION

The newly developed Haemoglobin Absorption Spectral Imaging (H.A.S.I.) filter incorporates both of the specified absorption maxima. Initial results, as in “a first look” through this filter, have already been documented and assessed. Preparations are currently underway for a systematic study based on a sufficiently large number of cases.
For a first evaluation of an optimised sample, patients were prospectively examined with the “ATMOS i View COLPO” study colposcope, which contains the H.A.S.I. filter and works with a specially designed, patented LED light. A clarification colposcopy had been indicated for these patients due to abnormal results in their cervical cancer screenings. The colposcope was first run with a conventional green filter and then with the H.A.S.I. filter, after which the images were compared. The examinations were conducted by two gynaecologists, both of whom had held a colposcopy diploma for several years. The suspicious areas were documented on colpophotograms (native image, conventional green filter, H.A.S.I. filter, pre-acetic acid image) and the contrast was then evaluated mathematically. A computer program recorded the colour values in the red, green and blue ranges for each pixel in an image. On the basis of the colour differences with neighbouring pixels, it was possible to determine the calculated contrast in several measuring areas that appeared suspicious in the image due to vascular changes.



ROI - Region of Interest

ROI without filter

ROI green filter

ROI H.A.S.I. filter

ASSESSMENTS OF THE H.A.S.I. FILTER

This initial assessment has confirmed the working hypothesis that the H.A.S.I. filter in combination with specially designed LED light can display vascular changes with approx. 20 percent more contrast when compared to the conventional green filters that have been used for colposcopy so far. Vessels in and on the mucosa are displayed more clearly. A good contrast makes it easier for trained examiners to detect atypical vessels and the capillary indicators of “rough mosaic” and “rough granulation”, as they are more distinctive in the display. Even before the pre-acetic acid test, it is possible to display areas of rough change and possibly perform a targeted smear test here before the acetic acid can take effect and influence the cytological assessment.

THE H.A.S.I. FILTER (“HAEMOGLOBIN ABSORPTION SPECTRAL IMAGING“)

- H.A.S.I. increases the contrast between vessels and the mucosa
- Better contrast enables better detection of vascular changes and capillary indicators

SUMMARY AND OUTLOOK

Initial examinations using the H.A.S.I. filter have confirmed the hypothesis that it will considerably increase contrast in comparison with traditional filters. When compared to the conventional green filter, the H.A.S.I. filter demonstrates on average 20 percent better contrast for vascular changes. This hypothesis now needs to be corroborated by a prospective evaluation.

Scan the QR code to go straight to the ATMOS i View website.

A first look through the H.A.S.I. filter
As of October 2018
Dr. med. Christopher Koßagk

ATMOS
MedizinTechnik

ATMOS MedizinTechnik GmbH & Co. KG

Ludwig-Kegel-Str. 16
79853 Lenzkirch / Germany

Phone +49 (0)7653-689-0
Fax +49 (0)7653-689-190
E-mail info@atmosmed.com

www.atmosmed.com