

**Instruction Manual**  
**for the systematic documentation**  
**of the skin surface with the**  
**HEINE DELTA 20<sup>®</sup> Documentation System**



**Our thanks go to Dr. Herbert Kirchesch of Cologne, Germany, without whose invaluable contribution this Instruction Manual could not have been produced.**

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## Introduction

The success rate in the diagnosis of pigmented skin lesions is about 65% for less-experienced practitioners, or about 80% for Dermatologists with some experience, rising to 90% for experienced Specialists, a result which compares well with computer-aided diagnosis. The inevitable remaining margin of error, which often leads to a decision to excise when not completely sure, needs to be reduced to a minimum.

The photo-documentation of pigmented skin structures gives the dermatologist a valuable basic method of continuously improving his accuracy of diagnosis. Only a well-documented, dermatological image of the Nevus allows the examiner to compare his diagnosis with the histological result. Also, only a series of comparative images from repeated exams over time allow an early diagnosis of a developing malignant melanoma.

Digital photography is the method of choice for optimum image documentation in Dermatology. The main advantages of the HEINE DELTA 20<sup>®</sup> Documentation System are:

- \_ Instant availability of very high quality images, therefore better information for doctor and patient.
- \_ More flexibility of procedures and work-flow in the exam room.
- \_ The camera is equally well-suited for both full-body and for dermatoscopic photography.

To begin with image documentation in a dermatology practice, you need some experience in the differential diagnosis of pigmented lesions as well as some basic knowledge of photography. It is important that a systematic work-flow pattern is established in your practice in order to assure the best-possible image quality, image management and reliable retrieval of the nevus image in the case of follow-up exams.

The introduction of a new, special software must also be accompanied from the beginning by the establishment of a new work-flow in the routine running of the practice. This manual has been compiled with the intention of assisting you in taking this first step to get the best out of the HEINE DELTA 20<sup>®</sup> Documentation System.

## Quick Guide to Dermatoscopy with a digital camera

- \_ Screw the photo-adaptor on to the camera.
- \_ Switch the camera on.
- \_ Select automatic on the camera.
- \_ Adjust the DELTA 20 Dermatoscope eyepiece to the 'camera' position.
- \_ Connect the photo-adaptor to the DELTA 20 and hold the camera in your left hand (for right-handed users).
- \_ Switch on the handle of the dermatoscope.
- \_ Moisten the lesion and the contact plate with disinfectant or dermatoscopy oil.
- \_ Place the contact plate gently on the lesion.
- \_ Gently press the camera control half-way so that the automatic focus operates.
- \_ Zoom to get the required photo format.
- \_ Take the photo.

Read the instructions for the HEINE DELTA 20<sup>®</sup> carefully and take the time to read the following instructions.

### 1. Basics of the HEINE DELTA 20<sup>®</sup> Dermatoscopy System

#### 1.1 The components

The HEINE DELTA 20<sup>®</sup> consists of the following components:

- \_ HEINE DELTA 20<sup>®</sup> Dermatoscope for fitting to a HEINE handle as power source.
- \_ Contact plate: Large (23mm), or small (8mm).
- \_ HEINE adaptor cord 1.3m.
- \_ HEINE battery or rechargeable handle.
- \_ HEINE photo adaptor.
- \_ Digital camera (contact HEINE for recommended camera models).

**The HEINE DELTA 20<sup>®</sup> PC system** allows you to carry out visual exams, whole-body photos, dermatoscopic photos and digital documentation specifically-designed to meet the needs of the dermatologist - all this with just one instrument system.

**The HEINE DELTA 20<sup>®</sup> PC Dermatoscope** features wide angle optics to give an extended field of view with clear, crisp focus edge to edge. Compared with conventional scopes, the light from the 6 white LEDs is much brighter. You can use a 2.5V battery - or a 3.5V rechargeable handle as a power source.

**The contact plates** are autoclavable. The large contact plate (23mm) is used for normal exams, the small contact plate (8mm) for areas of the body which are difficult to reach. Both plates are equally-suitable for visual use and for digital photography.

**The adaptor cord** (Fig.1) connects the HEINE DELTA 20<sup>®</sup> to the handle. This simplifies single-handed digital photography by giving you more freedom of movement.

**The HEINE BETA<sup>®</sup> handles** (Fig.1 and 2) are available for 2.5V battery - or 3.5V rechargeable use. They can also be used to power a complete range of other HEINE diagnostic instruments.

**The HEINE photo adaptor** (Fig.1 and 2) connects the dermatoscope firmly to the digital camera. It allows the dermatoscope head to rotate relative to the camera. The position of the focusing ring is not affected by this, so that you always get clearly-focused images. The photo adaptor can be instantly fitted or removed with one hand, making it ideal for everyday use in dermatology.<sup>1)</sup>

<sup>1)</sup> The HEINE photo adaptor is designed to fit cameras with a 28mm lens thread, e.g. Nikon Coolpix 4300.



**Fig. 1** Adaptor cord for one-handed operation



**Fig. 2** Dermatoscope attached to camera by photo adaptor

The instructions provided with the HEINE DELTA 20<sup>®</sup> and photo adaptor give useful information on using and cleaning the instrument.

## 1.2 Technical requirements in the exam room

### 1.2.1 First Steps

We recommend that all members of the practice team agree on the procedure for systematic image and data management. This will ensure that the system works effectively in the daily routine. It is important that the whole team understands what is to be done and how.

Get to know the camera and keep the instruction leaflet handy. Install the software. Agree on a standard procedure and stick to it.

### 1.2.2 Important settings for the camera

The following tips will assure the best possible image quality for dermoscopic photography:

- The Zoom function: Use this to select the image format you prefer.
- The Shutter Release: This usually has many functions including autofocus, luxmeter, and shutter release.
- Auto Feature: This is the simplest way to good results. Lux measurement and focusing are done automatically.
- Date/ Time settings: This is important for good documentation later.
- Manual mode: This mode lets you carry out a manual white balance to correct the colour of the image if desired to obtain a neutral colour tone ( see also 1.4).
- Pixel Density: The greater the density, the better the resolution and the higher the capacity needed to store the image.
- Sensitivity and aperture selection: Always use the same sensitivity for photography to ensure that the images which result are of similar colour. In the manual mode always use the same aperture setting.
- Contrast: this can be used to improve contrast on the border of the image.  
Read the camera instructions on this point.

### 1.2.3 Ideal conditions for photography in the exam room

The ideal exam room should have a free-standing examination couch and neutral-coloured bright ceiling lights. This is important to optimize camera exposure and lighting parameters and will give high-contrast whole-body images in the automatic mode.

In general, an exam room provides enough light but an additional exam light such as the HEINE HL 5000® is useful if the subject is not well-lit.

A PC placed close to the top end of the couch makes it easier to compare new images with those made in previous sessions and to explain them to the patient.

### 1.2.4 The ideal equipment

The following equipment is recommended for digital documentation of lesions:

- \_ HEINE DELTA 20® Dermatoscope with NT 200 charger and BETA rechargeable handle.
- \_ HEINE photo adaptor to connect the camera to the dermatoscope.
- \_ Digital camera with at least 3mio pixel.
- \_ Compact Flash memory card (64MB or more).
- \_ Card reader for a simple transfer of data to your PC.
- \_ PC with enough storage capacity.
- \_ CD-Rom for storage and data security: You can store up to 1000 to 2000 images on a CD, depending on file size.
- \_ A second charged battery for the camera as a back-up.

Recommended additional equipment:

- \_ Camera Tripod
- \_ TV-Graphic Card for your PC to give you an instant view of the image on the screen. This uses the signal from the digital camera to generate and show the image.
- \_ Video extension cord.
- \_ A good colour printer.
- \_ Internet connection.
- \_ A HEINE adaptor cord.

## 1.3 Pre-selected camera settings

The camera offers a basic choice between two different settings:

1. Automatic: This is ideal for full-body or torso photography. The flash operates automatically.
2. Manual: For dermatoscopic photography without flash but with manual white balance adjustment. With some cameras it is possible to record short video sequences in this mode.

### 1.3.1 Full-body photos

We recommend using the maximum resolution. This is useful for recognizing important details like a change in the shape of a nevus.

For full-body photos we recommend at least 3mio pixels (Fig. 3). In Fig.4 you see a magnified detail from Fig.3 ( Fig.3 was taken using a high pixel setting and this makes recognition of details of the nevus possible).

If the camera is used on automatic, the colour usually corresponds to the normal visual colour impression of the body. If not, there may be some colour shift caused by the room lighting.

For full-body photos you need good lighting. The usual distance from the patient is about 1m, the photo format can be selected with the camera Zoom. Most photos are made in the standing position without a tripod, looking down at the patient at an angle of about 45°.



**Fig. 3** Torso image (2048 x 1360 pixel)



**Fig. 4** Selected section at maximum magnification

### 1.3.2 Dermatoscopic Photos

You should always take a torso or full-body photo before dermatoscopic photography and, when photographing several nevi, always record the order in which they are made (see 2.3).

Dermatoscopic photos can be made in the auto mode, but the best quality is achieved in the manual mode (Fig. 5). The following settings have produced good results in the past:

<b>For Canon SLR-Adaptor</b>	<b>For Nikon SLR-Adaptor</b>	<b>For Olympus SLR-Adaptor</b>
- ISO: 400	- ISO: 400	- ISO: 400
- Program: TV	- Program: M	- Program: S
- Exposure: 1/40s	- Exposure: 1/40s	- Exposure: 1/40s
- White balance: manual	- White balance: manual	- White balance: manual

It is important to stick to the selected order of dermatological photography and to use the same procedure in follow-up exams. This will avoid confusion or mistakes in attributing the lesions to their respective images.



**Fig. 5** Dermatoscopic image

### 1.3.3 Clinical Photos

Clinical photos can be taken at a distance of a few centimeters with the macro feature. Reflexes from the lesion can be reduced by varying the distance and the angle of the camera to the lesion.

## 1.4 Colour correction

The human eye adapts automatically to ambient light (colour temperature), so that gray or white objects always appear as neutral. The digital camera needs help to be able to adapt, but is able to measure the colour temperature and can correct for this with the help of pre-selected correction or adjustment, the so-called “white balance”.

The DELTA 20 Dermatoscope features special white LEDs, which produce light, the colour temperature of which is close to daylight. Slight variations in tone can occur and, in rare cases, lead to a slight shift in colour. Most cameras do not have a pre-set white balance setting for white LEDs. Those which have a manual white balance control can be set to allow for this as described in the camera instructions. To do this, please use the white card, which is included in this manual under appendix 2.

#### **Please note:**

- 1) To carry out a manual white balance, be sure to have the camera fitted with the photo adaptor and the DELTA 20 Dermatoscope ( see 1.1).
- 2) For best results, we recommend that each DELTA 20 Dermatoscope should be set up in this way to ensure that the images produced by each instrument are directly comparable.

To avoid variations in colour between the image on the PC screen and those produced on your printer, we recommend the use of standardized reference colour charts which are available from your local camera dealer both in paper or digital form.

## 1.5 Focusing

Ideal conditions for the best results in the autofocus mode are good lighting and a lesion which has a high-contrast structure. If this is not the case, we recommend the following steps to ensure good results:

In full-body photos, the camera may focus on some high-contrast object close to the patient rather than on the patient, e.g. a patterned wall or tiled floor. Ideally, the patient should be photographed on a neutral white background such as a paper couch roll.

Low-contrast lesions can also be difficult to focus. We recommend the manual mode for these cases. With some practise, the lack of contrast or pigmentation can be overcome by focusing first on a high-contrast object like the edge of a sheet of white paper on a dark background and, holding the shutter release in the halfway position, moving across to focus the nevus and releasing the shutter .

## 2. Documentation of the skin surface

Photo-documentation and systematic observation of lesions over time makes early diagnosis of malignant melanoma possible. The amount of work involved varies from patient to patient. In some cases, it may only be necessary to document part of the body and, in others, it may make sense to document the whole body. The main difference in the work involved can be summarized as follows:

- \_ A torso or part-documentation involves just a small number of nevi.
- \_ A full-body documentation may be necessary and justified with high-risk patients to ensure early diagnosis of malignant melanoma.

Both of the above must be part of a systematic work-flow pattern ( see appendix 3) to ensure that the images are correctly-stored and can be retrieved easily. Important elements of this structure include:

- \_ The suspect nevi should be identified and marked by the dermatologist.
- \_ The order in which the nevi are photographed must be agreed.
- \_ Dermatoscopic photos.
- \_ Full-body and/ or torso photos should be taken.
- \_ A body map should be made.

### 2.1 The suspect nevi should be identified and marked by the dermatologist.

The suspected nevi should be marked on the patient's body and recorded on the body-map (see appendix 1). To simplify later identification, the order of photography should be recorded on the body-map as follows:

- \_ Linear and horizontal,
- \_ from left to right,
- \_ from top to bottom and
- \_ from back to front, starting upper left on the patient's right front side.

All the suspect nevi should be marked and numbered and the body-map should be given an identification number (see Fig.14, e.g. Nr.10927) and photographed.

### 2.2 Torso Documentation

Torso documentation involves at least two photos:

- \_ An overview of the relevant part of the body.
- \_ At least one dermatoscopic and one close-up clinical photo of the nevus.

## 2.3 Full-body Documentation

In [6] we include a description of a system to document the whole body with 24 photos. This method is demanding in terms of the work and photographic skills and equipment available to the examiner. The following describes a less-complicated method, which also gives complete documentation of the body with 8 photos. It involves 4 photos of the patient lying on his back and 4 on his stomach in the following order:

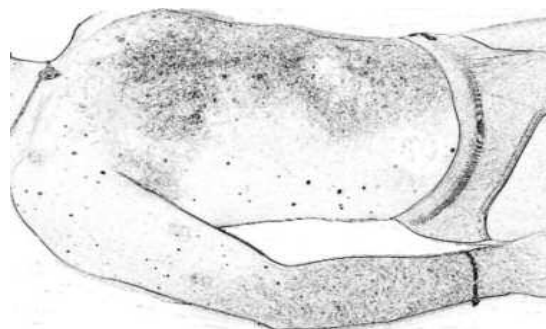
1. Front right upper Fig. 6
2. Front right lower Fig. 9
3. Front left lower Fig. 7
4. Front left upper Fig. 10
5. Back left upper Fig. 8
6. Back left lower Fig. 11
7. Back right lower Fig. 12
8. Back right upper Fig. 13

The patient should lie on the couch in the appropriate position for both sets of 4 photos.

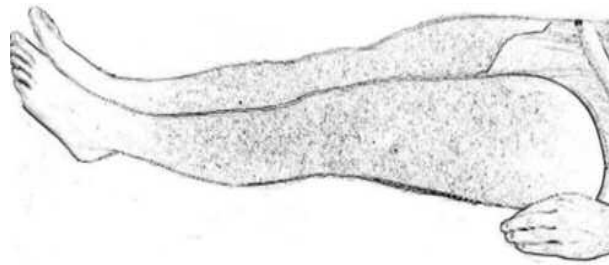
The upper body region extends from the neck to the hips. The lower body region extends from above the hips to the toes. To ensure patient anonymity, the face is not included.

Depending on the position of the lesions, the patient positions may need to be changed slightly. It is essential that all lesions are photographed.

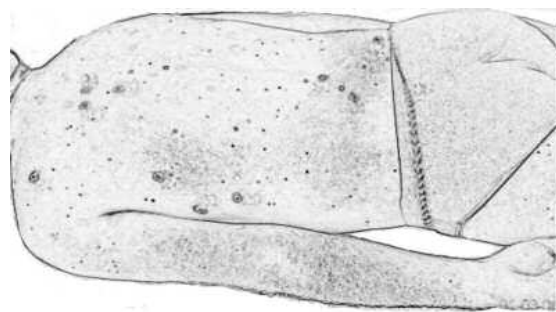
The order of photography should also be adhered to in the case of follow-up exams to simplify comparison of the nevi with earlier images.



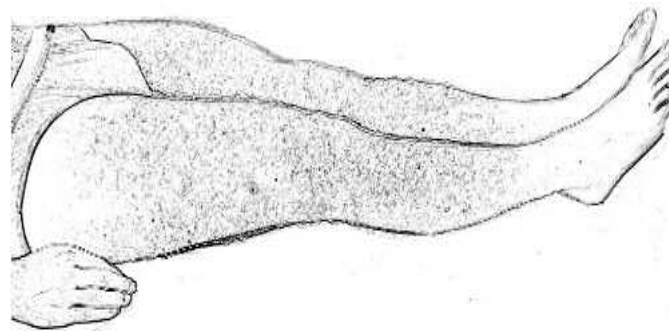
**Fig. 6** Front right upper



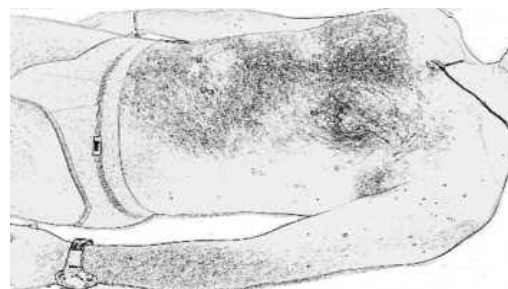
**Fig. 7** Front left lower



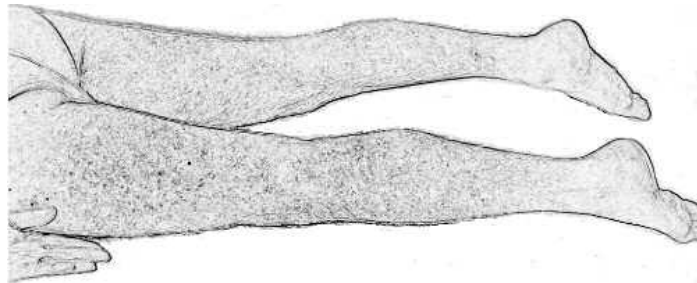
**Fig. 8** Back left upper



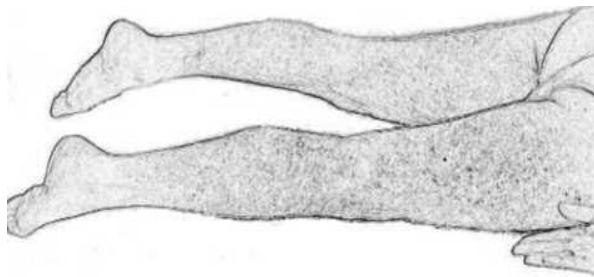
**Fig. 9** Front right lower



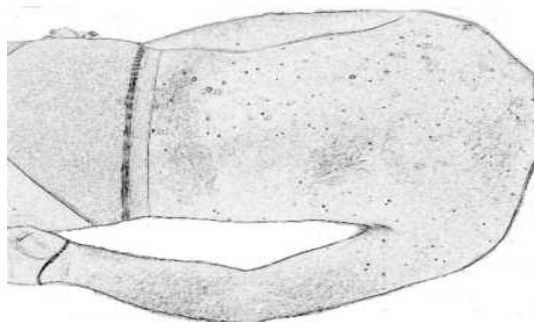
**Fig. 10** Front left upper



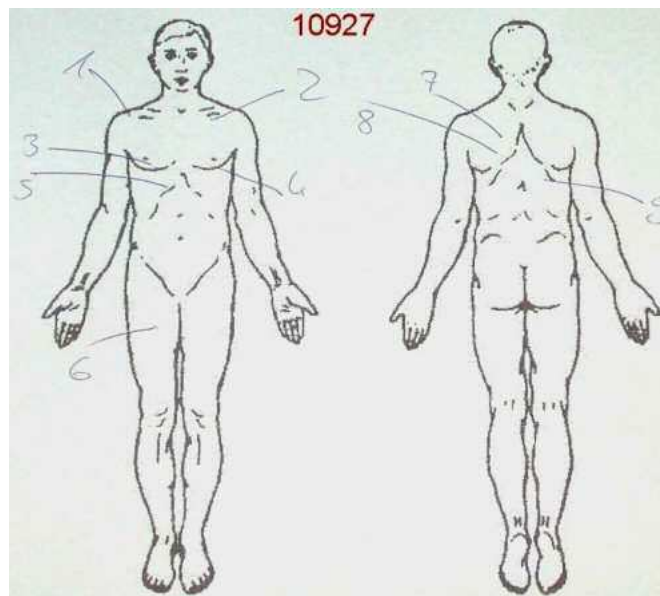
**Fig. 11** Back left lower



**Fig. 12** Back right lower



**Fig. 13** Back right upper



**Fig. 14** Example of a marked and numbered body-map of patient 10927

**2.4 Image management without special software**

The image management system must provide reliable identification of the individual nevi with regard to:

- \_ The patient
- \_ Date the photo was taken
- \_ Location on the body

A structured sub-file should be created for each patient with the patient's identification Nr. (e.g. patient Nr.10927 as in Fig.14).

The date on which follow-up images are made can be noted as a suffix to the patient file or can be indicated by a letter e.g. 10927c for the third follow-up exam. Additionally, a new master file should be created at the beginning of every new year.

The identification of the nevus and its position is assured by the body-map and the full-body images. The full-body and dermatoscopic images and the body-map should be attributed to the appropriate file and the images named accordingly.

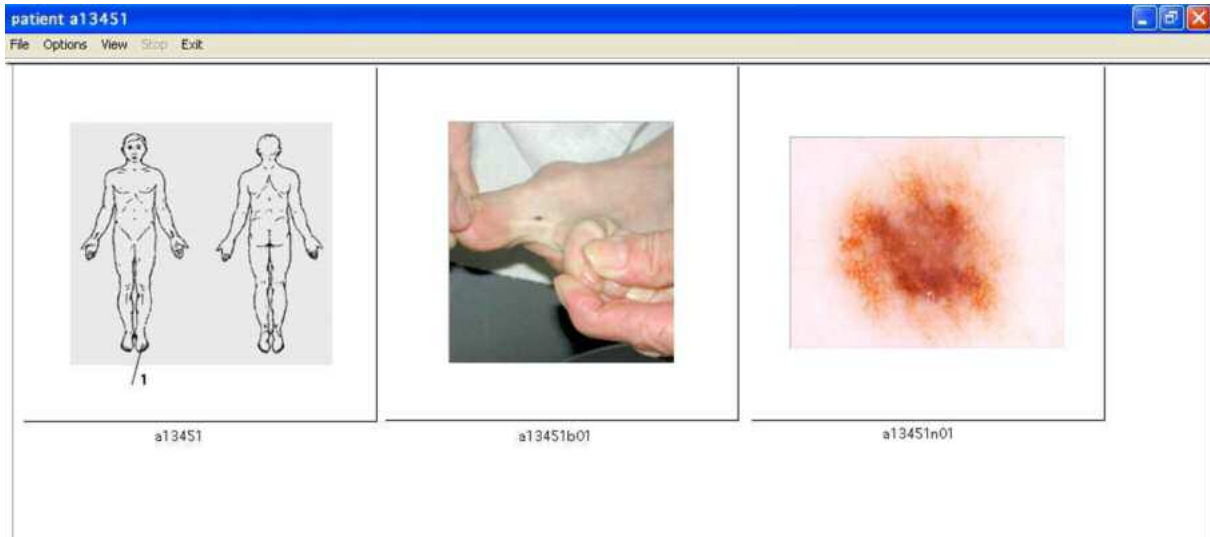
**2.4.1 Identification of files by name**

The following standard format guarantees the identification and location of a nevus during subsequent exams:

WXXXXXYZZ

- W = a (first follow-up exam)  
= b (second follow-up) etc.
- XXXXX = Patient Nr.
- Y = n (dermatoscopic photo - nevus)  
= b (body-map)
- ZZ = image Nr. (number of the nevus on the body-map)

In **Fig.15** we give an example of documentation of a part of the body in a file structure.



## 2.5 General software for photo-documentation

Many manufacturers offer documentation software with the following functions:

- \_ Titles or descriptive texts on or next to the image
- \_ Zoom function
- \_ Comparison of two images next to each other
- \_ Contrast enhancement

Some digital cameras include a simple software program of this kind.

### 3. Work-flow in documentation

Appendix 3 includes a poster showing a typical work-flow chart.

### 4. Literature

#### Dermatoscopy books and atlases

[1] *Farbatlas der Dermatoskopie*

Stolz, W., Braun-Falco, O., Bilek, P., Burgdorf, W., Landthaler, M.  
2. Edition, 2002, Blackwell

[2] *Dermatoskopie von Hauttumoren. Auflichtmikroskopie - Dermoskopie - Digitale Bildanalyse*

Blum, A., Kreusch, J.F., Bauer, J., Garbe, C.  
2003 with CD-ROM.  
Steinkopff Verlag, Darmstadt

[3] *Auflichtungsmikroskopie und Sonographie in der Dermatologie. CD- ROM*

Bruckbauer, H.  
for Windows 9.x/NT4/2000 or MacOS  
Ecomed Verlag, 2002

[4] *Auflichtmikroskopische Vitalhistologie Dermatologischer Leitfaden*

Schulz, H.  
Springer Verlag 2002

[5] *Kompendium der Dermatoskopie*

nach Stolz, W., Heine Optotechnik

#### Publications:

[6] *Total-body photographs of dysplastic nevi*

Slue W, Kopf AW, Rivers JK.  
Arch Dermatol 1988; 124(8):1239-1243

[7] *Systematic digital body photographs for surveillance and early detection of skin cancer in teledermatology*

Kirchesch, H.  
Abstracts of: Skin Cancer and Photoaging Meeting, Rome - April 4-6, 2002  
Exp Dermatol  
Volume 11 Issue 1 Page 96 - February 2002

[8] *Die Anwendung digitaler Fotodokumentations-Verfahren bei onkologischen Patienten in der dermatologischen Praxis*

12. Jahrestagung der Arbeitsgemeinschaft Dermatologische Onkologie, Erfurt  
Kirchesch, H., Eichhorn, A.  
Akt Dermatol Aug/Sept 2002, 28, p 323

## 5. Appendices

### Appendix 1: Full-body map

Fig 16 shows the body-map. This can be photographed and used as a matrix for computer image documentation .

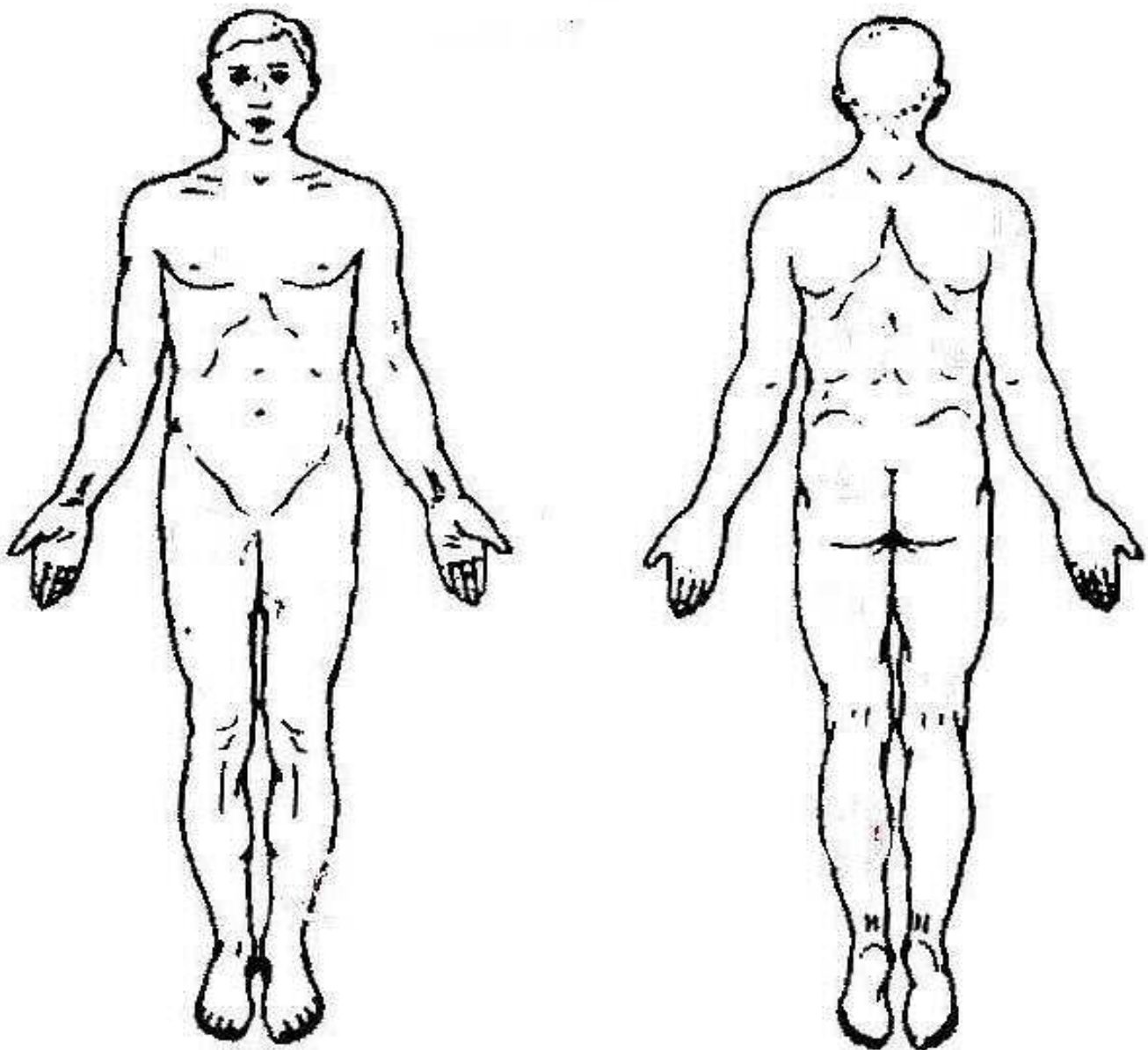


Fig. 16 Body-map

## **Appendix 2: Card for manual white balance adjustment.**

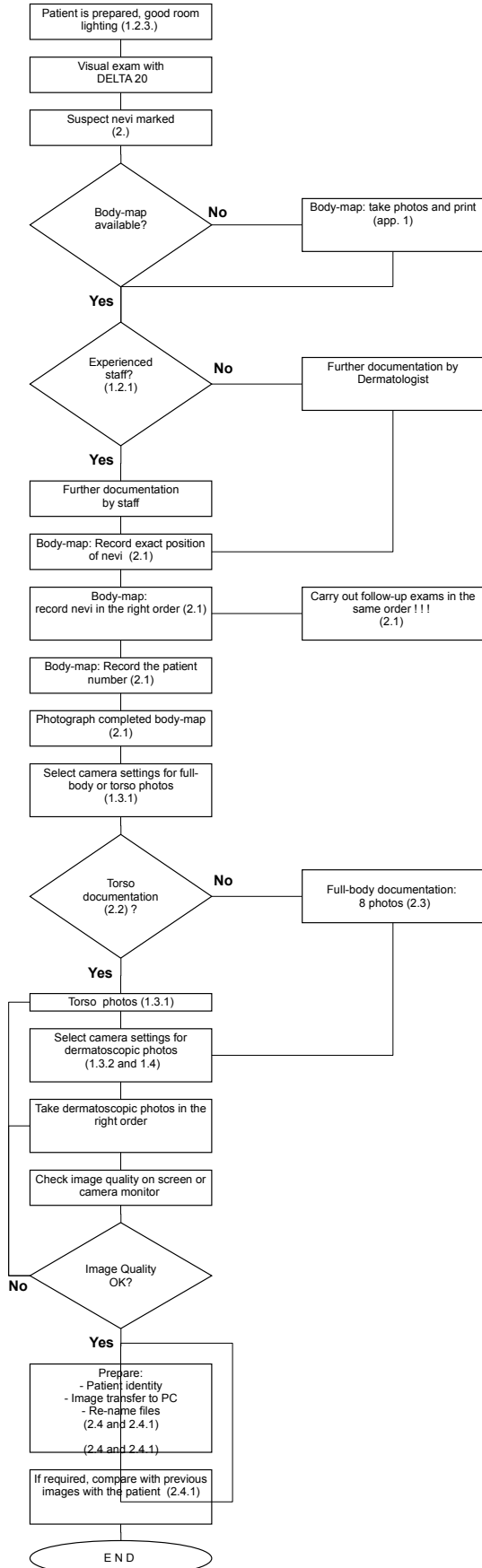
See also 1.4.

## **Appendix 3: Work- flow chart for photo- documentation.**

The poster shows a typical work-flow chart for digital photo-documentation. The references to the various sections of the text are useful for training purposes.

## Work-flow chart for photo-documentation

(Originator: H. Kirchesch, 2002 [8])



	Who is involved?		
	Patient	Dermatologist	Member of staff
Body-map: take photos and print (app. 1)	x	x	
Further documentation by Dermatologist			x
Further documentation by staff	x	x	(x)
Body-map: Record exact position of nevi (2.1)	x	x	(x)
Body-map: record nevi in the right order (2.1)	x	x	(x)
Body-map: Record the patient number (2.1)	x	x	(x)
Photograph completed body-map (2.1)	x	x	(x)
Select camera settings for full-body or torso photos (1.3.1)	x	x	(x)
Full-body documentation: 8 photos (2.3)	x	x	(x)
Torso photos (1.3.1)	x	x	(x)
Select camera settings for dermatoscopic photos (1.3.2 and 1.4)	x	x	(x)
Take dermatoscopic photos in the right order	x	x	(x)
Check image quality on screen or camera monitor		x	
Image Quality OK?		x	
Prepare: - Patient identity; - Image transfer to PC; - Re-name files (2.4 and 2.4.1)		x	(x)
If required, compare with previous images with the patient (2.4.1)	(x)	x	