THE INFLUENCE OF MEDICAL PHOTOGRAPHY’S WESTMINSTER REPRODUCTION RATIOS ON STANDARDIZATION IN FORENSIC PHOTOGRAPHY – AN OPINION

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PHOTOGRAPHY

Forensic

Different aims
Different objectives

Medical

Legal purpose
FORENSIC PHOTOGRAPHY

Final photographic product (may only be the beginning)

Photographer’s involvement in a legal system that might want to know

WHY, WHERE, HOW, WHEN and under WHAT CONDITIONS the images were taken
Forensic photographs must meet the following:

- Technical qualities
- Sharpness of detail
- Clarity of image
- Use of lighting
- Perspective
- Accuracy of reproduction of both colour and form
The medical photograph…

• provides a precise record
• is comparable with others taken over a period of time
• is obtained with the least inconvenience to the patient
• meets the intention of the request
• is in accord with current methods of presenting medical data
STANDARDIZATION FACTORS

• Film emulsion / Digital
• Lighting
• Backgrounds
• Viewpoint
• Scale
• Perspective

• Colour
• Processing
• Printing
• Presentation
• Orientation (forensic)
• Identification (forensic)
STANDARDIZATION REQUIRES WORKING TO PRE-DETERMINED RULES
The scale of reproduction must be constant for any given area both at the recording and printing stage.
WESTMINSTER REPRODUCTION RATIOS FOR STANDARD ANATOMICAL REGIONS
### REPRODUCTION RATIOS

<table>
<thead>
<tr>
<th>Section</th>
<th>35mm format</th>
<th>55mm lens</th>
<th>105mm lens</th>
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<tbody>
<tr>
<td>Full length</td>
<td>1:50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chest</td>
<td>1:15</td>
<td>1:15</td>
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</tr>
<tr>
<td>Abdomen</td>
<td>1:15</td>
<td>1:15</td>
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</tr>
<tr>
<td>Forearms</td>
<td>1:15</td>
<td>1:15</td>
<td></td>
</tr>
<tr>
<td>Both feet</td>
<td>1:10</td>
<td>1:10</td>
<td></td>
</tr>
<tr>
<td>Head and neck</td>
<td></td>
<td></td>
<td>1:10</td>
</tr>
<tr>
<td>Face</td>
<td></td>
<td></td>
<td>1:8</td>
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<tr>
<td>Both eyes</td>
<td></td>
<td></td>
<td>1:4</td>
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<tr>
<td>Genitalia</td>
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<td></td>
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<tr>
<td>Teeth</td>
<td></td>
<td></td>
<td>1:2</td>
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<tr>
<td>Single eye</td>
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<td>1:1</td>
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</table>
View from above. Diagram explaining why photographs taken from different distances show different contours of the head. Short-distance photographs do not show coronal contours and portions of the head.
THE HEAD AND FACE

Views:

- Antero-posterior (AP)
- Postero-anterior (PA)
- Left and Right oblique (45° to median plane)
- Left and Right Lateral (90° to median plane)
- Inferior (Worm’s-eye view)
- Superior (Bird’s-eye view)
• STANDARD REPRESENTATIONAL VIEW
• IMAGINATIVE EVIDENTIAL AND TEACHING VIEW
FRANKFURT HORIZONTAL / PLANE

- A plane defined by three osteometric points, the right and left porion points and the left orbitale. These osteometric points are at the top of each external auditory meatus and the bottom of the orbital margin.
- It is used to systematically orient the skull. (Convention held in Frankfurt in 1884)
MEASURING LINEAR PROJECTIVE DISTANCES

The Head and Face should be photographed in the standard antero-posterior and lateral positions. The position of the head should be standard (in Frankfurt Horizontal).
COMPARISONS BETWEEN FACES MAY BE MADE TO:

- identify offenders
- identify missing persons
- confirm or refute claims of identity
- study the relationship between the skull and the overlying soft tissue
- develop diagnostic methods for facial syndromes
FACIAL LANDMARKS

Can be used:

• to establish points of reference
• to identify features defining the cranial-facial geometry of humans
• to perform reconstructive or corrective surgery
• by forensic artists to identify the remains of individuals, or when they compose age-adjusted photographs of missing children
<table>
<thead>
<tr>
<th><strong>LANDMARKS</strong></th>
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</thead>
<tbody>
<tr>
<td>Glabella (g)</td>
</tr>
<tr>
<td>Trichion (tr)</td>
</tr>
<tr>
<td>Eurion (eu)</td>
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<tr>
<td>Vertex (v)</td>
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</tbody>
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### CRANIOFACIAL SURFACE / SKELETON LANDMARKS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Landmark</th>
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<tbody>
<tr>
<td>v</td>
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<tr>
<td>tr</td>
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<td>endocanthion</td>
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<td>frontotemporale</td>
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<td>sci</td>
<td>superciliare</td>
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ORIENTATION

• Different angles can cause unnecessary confusion
• Consider:
  (a) camera to the subject
  (b) area of interest on the body
  (c) orientation of individual body parts
  (d) standardization rules
POSITIONING OF SKULL

• Skull holding jig
• Pan-and-tilt device
• Camera mount
• Supporting rails
STANDARDIZATION OF SKULL PHOTOGRAPHS IN PERSONAL IDENTIFICATIONS BY PHOTOGRAPHIC SUPERIMPOSITION

- Relationship between the image of the unidentified subject and the original photographic portrait
- Central projection (distance between camera and the head or skull that resembles the distance of the original photograph)
- Posture
- Magnification
- Perspective
BITEMARK EVIDENCE

- Standardized photography
- Scale of reference
- Teeth models and wax base
- Overlays
- Fluorescent image analysis
- Changes in the dermal and epidermal tissues
- Toneline bitemark photography
- Use of videotape
- Use of alternative light source – 450nm
COMPARISON PHOTOGRAPHY BASED ON STANDARDIZATION IS CRITICAL IN FORENSIC SCENE RECONSTRUCTION
• ACCURATE MEASUREMENTS
• COMPARISON PURPOSES
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