IMI National Guidelines
A Guide to Good Practice

Rhinoplasty and Septorhinoplasty

These guidelines have been developed by the Institute of Medical Illustrators, in consultation with specialist advisors. They should be considered a guide to good practice, providing a baseline for auditable standards. If necessary, adaptations may be made to take into account your local conditions.

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**Introduction**

Patients requiring rhinoplasty (an operation to alter the appearance and sometimes the function of the nose), or Septorhinoplasty, (an operation on the septum, the cartilage that separates the two nostrils), are often referred by clinicians to the medical photography department for photographs to be taken of their face and nose. Rhinoplasty and Septorhinoplasty procedures are usually performed under general anaesthetic by plastic, maxillofacial and cleft surgeons, rhinologists and otolaryngologists.

The medical photographs should be of high quality and accuracy as they are required by surgeons for the following purposes:

- Analysis and diagnosis.
- Perioperative planning.
- Preoperative and intraoperative documentation.
- Postoperative documentation and evaluation.
- Medical records.
- Medical teaching and publications.
- Medicolegal documentation.
- Surgical development.
- Audits for surgical quality.

**Preparation of studio and equipment**

The essential aspects of preparing the studio and equipment are presented in this section.

**Standardisation**

Medical photographs should provide clinicians with accurate, high quality, detailed images of patient conditions, which can be used for clinical evaluation. Therefore, it is recommended that Standardised Representational Photography (SRP) is used to obtain images that maintain consistency, accuracy and repeatability. The only variance in a series of standardised medical photographs taken over time should be in the patient’s appearance or condition; everything else such as the patient positioning, viewpoint, perspective, lighting, lens magnification, reproduction ratio, image reproduction, colour, contrast and background, should remain consistent with rigorous standardisation.

**Background**

The studio background should be neutral, either black or evenly lit white. The background should be placed at a distance that is far enough behind the patient so that shadows do not fall on it, and to provide enough space for the background lighting. Different lighting setups are required for a black background (Figure 1), and a white background (Figure 2).
Lighting
In the studio, it is recommended that Anterior Posterior (AP) facial views are taken with two key lights which are both positioned at 45° to the patient, slightly above head level, in order to prevent facial shadows. For the oblique and lateral views, it is important to position one of the key lights anteriorly towards the nose, to prevent shadows being cast across the face, while the other key light remains at 45° to the patient. Large diffuse reflectors, beauty dishes, soft boxes and shoot through umbrellas may also be used to reduce some of the harshness and contrast. As a high level of detail must be obtained, a maximum depth of field is required. Therefore, the overall light source must be sufficient for using an aperture of at least f/16.

Lighting setup for black background
When using a black background, two rim lights (also positioned at 45° to the patient) are essential for separating the patient from the background. A hair light positioned above the patient may also be used in addition to the rim lights. The lighting diagram for this setup is illustrated in Figure 1.

Figure 1. Position of studio lighting on a black background
Lighting setup for white background

When a white background is used, the two back lights are used to evenly illuminate the background, see Figure 2.
Camera

The recommended camera to use is a digital camera with a full-frame 35mm CMOS sensor with manual controls. Cameras with sensors smaller than 35mm (also known as APS-C sensors), can also be used, but they capture a narrower field of view than full-frame 35mm cameras, and this must be considered when using standard reproduction ratios.

Reproduction ratio

To provide clinicians with comparable photographs and for clinical auditing and evaluation purposes, the magnification ratio should be standardised. This can be achieved by applying the Westminster Scale that states the reproduction ratio of the whole face is 1:8, providing a suitable working distance of just over 1 metre when using a full-frame camera with a 100 mm or 105 mm lens, and the close-up views 1:4.

To obtain the same field of view using crop frame cameras with an APS-C sensor, reproduction ratio and focus distance all need to be considered and adjusted. For example, to capture the same full-frame 35mm field of view of a patient’s face at a reproduction ratio of 1:8 from a focus distance of around 1 metre with a sensor that has a crop factor of 1.5x, a 60mm macro lens with a reproduction ratio of 1:12 is required. A lens with a shorter focal length is used in these instances to enable the perspective and focus distance between the patient and photographer to remain as consistent as possible regardless of whether a full-frame 35mm camera or a crop frame camera is used. The reproduction ratios for full-frame 35mm cameras and cameras with a crop factor of 1.5x / 1.6x are listed in Table 1.

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Table 1. Reproduction ratios for full-frame 35mm cameras and cameras with crop factors of 1.5x / 1.6x
The Patient

Patient preparation
The following steps should be taken to prepare the patient for the photography session:

- After introducing yourself, explain what is required of the patient during the photography session and the reason why the photographs are being taken.
- Check the patient has given informed consent for photography and that they understand what they have consented to.
- Facial views require the patient’s hair to be tied back off the face so that a clear facial outline is visible. Discrete hair clips or bands which are either easy to clean or disposable should be made available to the patient.
- The patient should remove any spectacles and facial jewellery, such as nose studs, earrings and nose rings (if possible). Also, any items of clothing that obscure the patient’s neckline should be removed or adjusted sufficiently to show a clear outline of the neck. In addition, be mindful that certain ethnic or religious groups may have beliefs that limit their removal of jewellery or clothing, such as head scarves.
- Minimal make-up may be accepted, providing it does not obscure the appearance of the patient’s facial anatomy. Ideally the patient should be make-up free, if possible.

Patient and camera positioning
Both the patient and photographer should be positioned correctly, in a standardised manner, to produce consistent photographs. This can be achieved by:

- Ensuring the patient has suitable supportive seating that can be adjusted to account for the height of the patient. Markers on the floor may be used to fix the position of the chair to assist in obtaining repeatable views.
- Instructing the patient to sit upright, with their head held straight and both feet placed firmly on the floor. If the patient is leaning back in their chair or posturing with slouched shoulders, the correct head alignment using the Frankfort plane will not be possible. Also some patients may be conscious of their appearance or have an abnormal head posture, causing them to tilt their head. In these instances, do not compensate for this by tilting the camera as the patient’s head will not be in the correct anatomical position.
- Checking that the camera and camera lens are parallel to the patient to reduce any image distortion which is often a consequence of poor positioning. The photographer should be stood or seated level with the patient. The camera lens axis should be horizontal and the camera back vertical.
- Using the grid in the camera viewfinder as a guide for positioning (if available). The Frankfort horizontal plane runs along the lowest point of the orbital arch to the upper margin of the auditory opening (tragus).
- The mid-vertical grid line should be aligned with the mid-sagittal plane or median plane of the face and the mid-horizontal grid line should be aligned with the Frankfort horizontal plane (Figure 4).
Figure 3. Position of the Frankfort horizontal plane (Vetter, 1992)

Figures 4. Incorrect patient preparation and positioning.

Figure 4:

- The patient’s head is tilted downwards, so correct head alignment using the Frankfort/Reid planes cannot be achieved. The patient should also be asked to remove their earrings.
- As the patient’s hair is not tied back and their ears are not visible, finding the accurate location of the Frankfort/Reid planes for head alignment is not possible. Jewellery should also be removed.

Standardised recommended sets of images for Rhinoplasty and Septorhinoplasty are demonstrated in figures 5a, 5b and 5c.
Rhinoplasty and Septorhinoplasty views

**Standard facial views at 1:8**

- Right lateral
- Anterior posterior (AP)
- Left lateral

**Optional facial views at 1:8**

- Right oblique
- Left oblique
- Skyline
- Superior/Bird’s eye view (BEV)

Figure 5a. Standardised rhinoplasty and Septorhinoplasty views: full-face
Figure 5b. Standardised rhinoplasty and Septorhinoplasty views: close-up nose
Figure 5c. Standardised rhinoplasty and Septorhinoplasty views: close-up nose (landscape)

**Standard basal/ worm’s eye views (WEV), inferior at 1:4** (Figure 5c)

Basal/ Worm’s eye view (WEV) - the head should be tilted back so that the nasal alar is parallel to the lens.

Inferior - this view requires a less elevated position to include more of the nasal bridge.

**Standard skyline, superior/ BEV at 1:4** (Figure 5c)

Skyline - this view demonstrates the brow and tip of the nose; the eyes and chin should not be included.

Superior/ Bird’s eye view (BEV) - ask the patient to lower their head forward below the horizontal mid-plane, so that the entire nasal bridge can be photographed.
Quick Reference Guide
Rhinoplasty and Septorhinoplasty views

- Check that the patient has given consent for photography.
- Check the lighting and background and set the reproduction ratio.
- Ask the patient to tie their hair back and remove jewellery.
- Ask the patient to sit up straight and adopt the correct posture.
- Position the patient’s head central to the camera frame.
- Align the patient’s head using the Frankfort horizontal plane.
- Check that the camera and camera lens are parallel to the patient.
- Align the camera so that the lens axis is horizontal and the camera back vertical.
- Set the orientation (portrait or landscape) according to the views required.
- Move towards or away from the patient to achieve sharp focus.
Acknowledgements

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Figures

Illustrations prepared by the authors and working group (except where stated).

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Quick Reference Guide: full set of all rhinoplasty and septorhinoplasty views