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Measurement of nasal displacement by photography

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Abstract
A simple photographic method of assessing a commonly encountered nasal deformity has been devised. The method described is of use in quantifying a subjective appearance and in assessing the result of surgery.

Introduction

A method of measuring the displacement of the nasal bones by photography has been devised. It may have application in the assessment of nasal fractures and in quantifying the results of surgery. The method uses a simple principle of perspective.

Apparatus and method

A tripod mounted single lens reflex camera with a 70–150 mm macro lens and a 20 mm extension ring is used. The lens is set on macro at 105 mm to produce a photograph of the whole of the nose at a distance of 50 cm from the front of the lens.

A specially constructed bracket is attached to the front of the lens. This consists of a brass plate which screws onto the lens ring mounted within a freely rotating outer plate to which are attached two aluminium rods. Plastic ear pieces attach at a distance of 50 cm and a curved steel stablizing rod is mounted at a halfway position (Fig. 1).

Twenty-five mm adhesive paper dots are mounted on 26 mm surgical tape 8 mm apart. An ink line marks the midpoint on the top of the strip of tape. The tape is stuck onto the skin of the nose so that the ink line is midway between the inner canthus of the right and left eye at the level of the nasion.

The subject is asked to hold the ear pieces of the bracket tightly into the external auditory canals. Fine adjustment of the position of the head is made whilst looking through the viewfinder lens of the camera. Slight flexion extension adjustment may be required to ensure that the whole of the nose is in the picture.

The colour slides so obtained are projected onto a paper screen. A horizontal line is drawn between the inner canthi (line x–y in Fig. 4(i) & (ii)). Lines parallel to this line are drawn across the widest diameter of the dots (lines a and b in Fig. 4(i) & (ii)). The ratio of the apparent diameter of the two dots gives a measure of the displacement of the nasal pyramid since the apparent diameter of the circles will be the same as the true diameter when the angle subtended with the observer is 90° but will reduce to zero as the angle approaches 180°. Photographs were obtained pre- and post-operatively of patients undergoing manipulation of nasal fracture.

Examples

Figures 2(i) and 2(iii) show the displacement of the nose photographed pre-operatively. Figs. 2(ii) and 2(iv) show the post-operative result. The pre-operative measurement of a/b is 0.9 cm/1.4 cm and the post-operative measurement is 1.0 cm/1.1 cm. This represents a change in the ratio from 1.55 to 1.20. In Figures 3 (i)–(iv) and Figures 4 (i) and (ii) a/b measures 1.5 cm/0.8 cm pre-operatively and 1.1 cm/1.0 cm post-operatively. This is an improvement in the ratio from 1.88 to 1.10.

Discussion

The aesthetic appearance of the nose is by definition subjective. The method is in itself partly subjective since the photographer must position the tape such that the ink line appears in the middle of the intercanthal line. The method can be considered as a way of quantifying an appearance. The method will not determine the most satisfactory position of the nose on the face since this is always

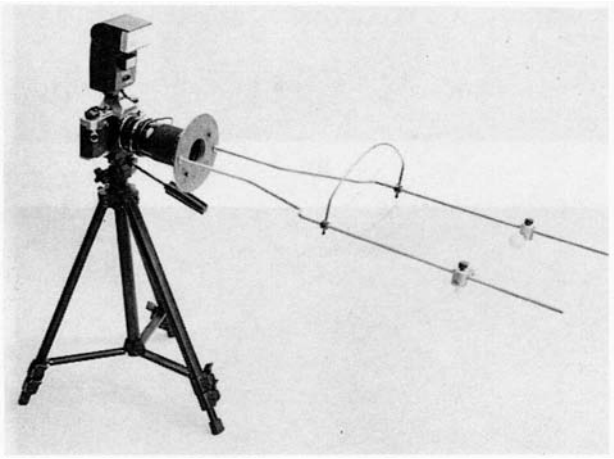

FIG. 1
Photograph of the camera and bracket.

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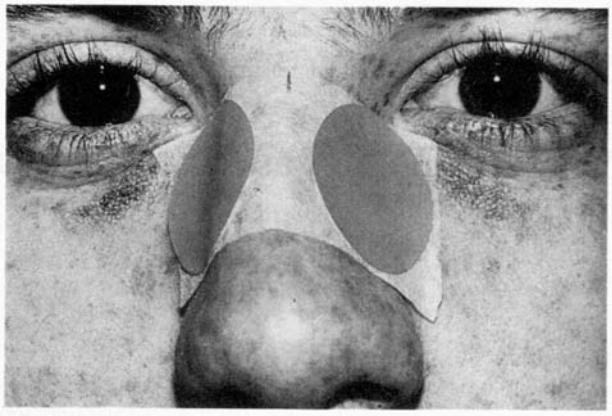
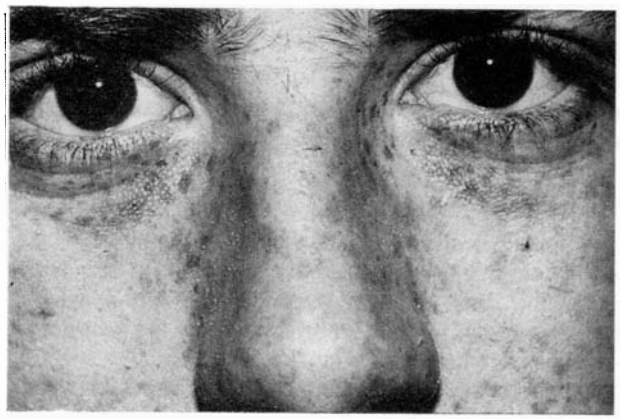
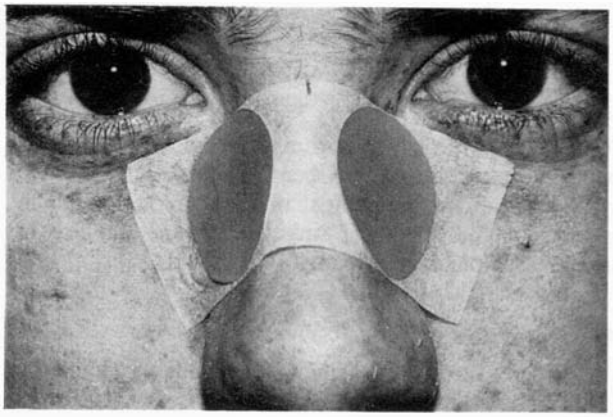
(i)



(iii)



(ii)

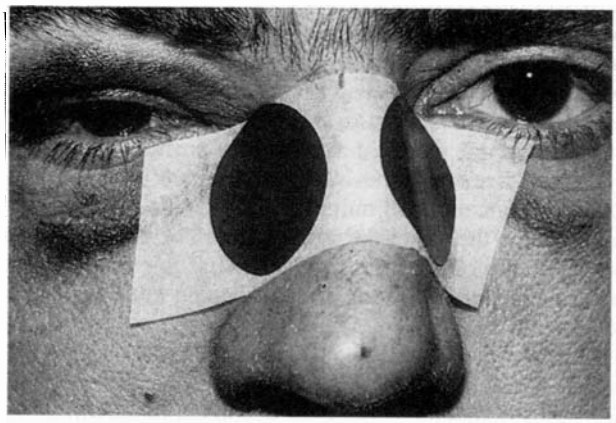


(iv)

FIG. 2

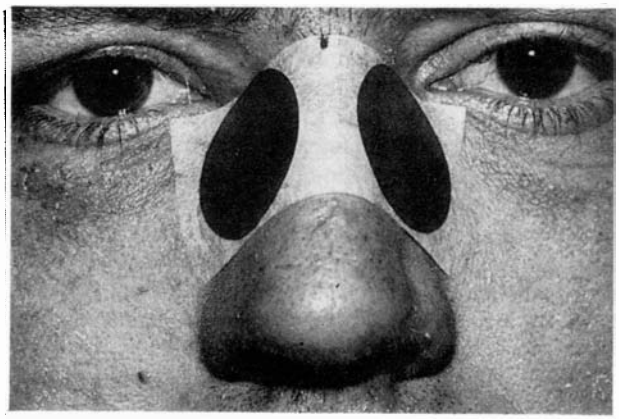
(i)–(iv). Pre- and post-operative pictures of a patient with a mildly displaced nose.

(i)



(iii)

(ii)



(iv)

FIG. 3

(i)–(iv). Pre- and post-operative pictures of a patient with a severely displaced nose.

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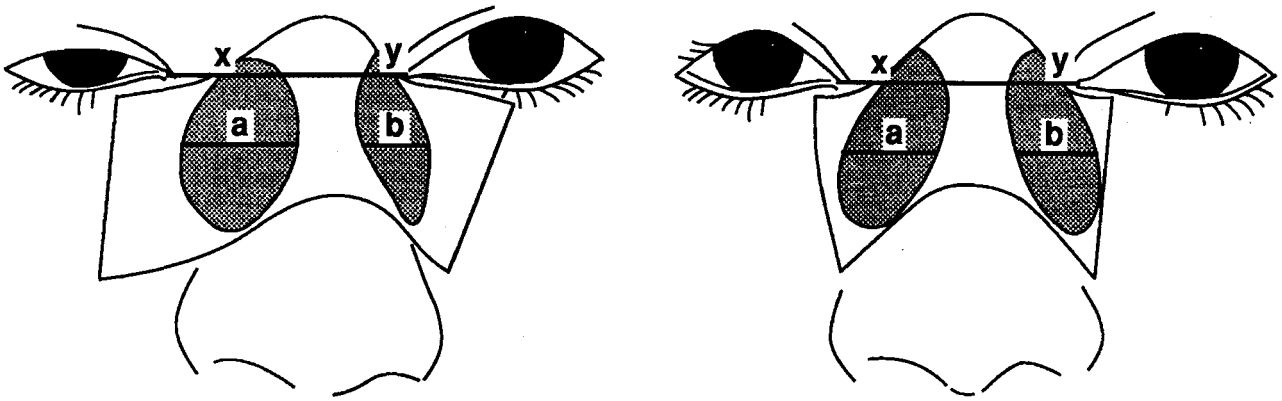

FIG. 4

(i), (ii). Line drawing illustrating the method of calculating the nasal perspective in the second patient. The ratio a/b approaches unity as the symmetry of the nose increases.

likely to be a matter of opinion. In any case beauty cannot be measured and a minor degree of nasal asymmetry may give a more pleasing appearance on a particular face. The method simply measures deviation of the nasal bones from the anatomical position. The lens bracket ensures that the position of the camera is the same for pre- and post-operative photographs. Hump and tip abnormalities are not measured using this method.

Previous workers have used rather crude measures of nasal deviation. Murray *et al.* (1984) subjectively assessed nasal deviation as being greater or less than half of one nasal bridge width. Others have employed more sophisticated photographic techniques to assess facial contours (Karlan, 1979). The method described was developed as a means of assessing nasal fractures and of the results of surgery to correct the deformity. It has been found to be simple to use and helpful in measuring the success or otherwise of nasal manipulation and rhinoplasty.

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Murray, J., Maran, A., Mackenzie, I., Raab, G. (1984) Open v. closed reduction of the fractured nose. *Archives of Otolaryngology,* **110:** 797–802.

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