

AN APPLICATION OF HOLOGRAPHY IN MEDICINE AND DENTISTRY
THE MEASUREMENT OF REFLECTION HOLOGRAMS OF PLASTER
FACEMASKS

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Abstract

The precise measurement of the human face is difficult both because of its complex form and the problem of defining landmarks that are anatomically relevant. A number of authors have reported techniques to measure the relationship₁ of facial morphology including anthropometric, cephalometric_{2,3} and most recently stereophotogrammetric or biostereometric methods. This paper will report a non photogrammetric technique for measuring plaster face masks and their holographic images. The results of each set of measurements will be compared.

Introduction and Background

Burke has reported extensively on the measurement of faces from a series of identical twins, using stereophotogrammetric techniques developed with Beard⁴.

A set of plaster face masks was obtained of one individual which were recorded at the age of six years and subsequently at various time intervals until the age of twenty one. These were measured on the Reflex Metrograph₅ at University College London. Landmarks as defined by Burke⁵ were used and the results of his twins study were compared graphically with those of this study. In general terms they both showed similar growth trends.

The Reflex Metrograph⁶ is an instrument that allows direct measurement in three dimensions of objects up to a maximum of 300 mm. It works on the principle that the image of an object, when viewed in a mirror, is as far behind the reflecting surface as the object is in front. Using a pinpoint of light (measuring mark), which is adjustable and orthogonally arranged behind the mirror, the operator identifies the previously defined landmarks and records their position in all three dimensions. The data is processed by a microprocessor using appropriate software.

Using a portable camera a set of reflection or Denisjuk⁷ type holograms was recorded of the plaster face masks. Suitably mounted and illuminated with a mercury lamp the holograms were measured on the same Reflex Metrograph. The results and the comparison of the measurements with the original plaster face mask data will be presented.

References

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