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DECLARATION

I, Michelle Marizan Roelofse declare that this thesis is my own unaided work. This thesis is being submitted for the degree of Master of Science in Anatomy at the University of Pretoria, Pretoria. It has not been submitted before, for any degree or examination at any other University.

_____

_____ day of _____ 2006

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For Johan and Hannetjie Roelofse

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SUMMARY

The identification of a person from his/her photograph for forensic purposes is extremely difficult (e.g., in cases of bank robberies or ID book fraud). Facial identification can be achieved through morphological methods, metrical methods or superimposition. However, very little data on facial variation of South Africans is available. The aim of this study was thus to analyse the metrical and morphological characteristics of the faces of South African black males, for the purpose of facial identification. Where possible the morphological characteristics of the South African black males were compared to those of other population groups.

Facial photographs of 200 volunteers from the Pretoria Police College, taken in norma frontalis, were used. The subjects were 20–40 years old. Subjects younger than 20 years and those with facial deformities were excluded. Fourteen standard facial landmarks were identified on the photographs. From these, a total of 13 measurements were taken to the nearest 0.5 mm, using a digital sliding calliper. The measurements were then used to calculate 12 different indices. Indices were used to nullify the effect of absolute size. Standard ranges were calculated for each index. These ranges were then used to classify the different measured facial features into categories, e.g., small/narrow, average and large/wide.

Eight morphological features were also analysed on each face. Each feature was divided into different categories, describing variants of the feature. The metrical, as well as the morphological data was then used to create various combinations of facial characteristics. The frequency of occurrence of these combinations was calculated for the study population.

Results showed that the most common features for the study population were oval or inverted trapezoid facial shapes, intermediate size nose with a down turned septum tilt and intermediate size mouth with a flat V-shaped cupid's bow. The eyes were situated closely together. Some of the rare or absent features included round or square facial shapes and leptorrhin (narrow) noses with an upturned septum tilt. Matching these features on facial photographs would probably be most useful during cases of disputed identification.

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OPSOMMING

Die uitkenning van ‘n persoon vanaf sy/haar foto, vir forensiese doeleindes, is verskriklik moeilik (bv. in gevalle van bankrowe of ID boek bedrog). Gesigsuitkenning kan gedoen word deur morfologiese metodes, metriese metodes of superimponering. Daar is egter min data oor die variasie in Suid-Afrikaanse gesigte bekikbaar. Die doel van hierdie studie was dus om die gesigseienskappe van Suid-Afrikaanse swart mans metries en morfologiese te bestudeer, vir doeleindes van gesigsuitkenning. Die morfologiese eienskappe sal, waar moontlik, vergelyk word met dié van persone van ander bevolkingsgroepe.

Gesigsfoto’s van 200 vrywilligers van die Pretoria Polisie Kollege was gebruik. Alle individue is afgeneem in die norma frontalis posisie. Die proefpersone was 20-40 jaar oud. Proefpersone jonger as 20 jaar en met gesigsdefekte was uitgesluit. Veertien standaard gesigslandmerke is geïdentifiseer op elke foto. Tussen hierdie 14 landmerke is 13 afmetings geneem met ‘n digitale skuifpasser tot die naaste 0.5 mm. Die afmetings is gebruik om 12 indekse te bereken. Indekse is gebruik om die effek van absolute grootte te elimineer. Standaardreekse is bereken vir elke indeks. Hierdie reekse is gebruik om die verskillende gesigskenmerke in kategorieë te klassifiseer, byvoorbeeld klein/smal, gemiddeld en groot/breed.

Agt morfologiese gesigskenmerke is ook geanaliseer. Elke kenmerk is verdeel in verskillende kategorieë, wat die variasies van die kenmerk beskryf. Verskillende kombinasies van gesigskenmerke is geskep deur die metriese sowel as die morfologiese data te gebruik. Die frekwensie van verspreiding van hierdie kombinasies is bereken vir die studiebevolking.

Die resultate het getoon dat die mees algemeenste eienskappe ovaal of omgekeerde trapesoïede gesigsvorms, ‘n gemiddelde grootte neus met ‘n afwaartse septum en ‘n gemiddelde grootte mond met ‘n plat V-vormige bolip is. Die oë was na by aan mekaar. Van die seldsame eienskappe sluit in ronde of vierkantige gesigsvorms en smal neuse met ‘n opwaartse septum. Die vergelyking van hierdie seldsame eienskappe sal die mees bruikbaarste wees tydens sake waar uitkenning in dispuut is.

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FOREWORD

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LIST OF ABBREVIATIONS

AAPA ..... American Association of Physical Anthropologists

ABIS ..... Automated Biometric Identification System

Ah ..... Total abdominal height

al .....Alare

a-p ..... Anterior-posterior

As .....Arm-span

Bi.....Bi-iliac diameter

CCD ..... Closed Circuit Digital

ch..... Cheilion

Chc..... Chest circumference

cm .....Centimetre

DNA ..... Deoxyribonucleic Acid

en..... Endocanthion

ex..... Exocanthion

F.A.C.E.S ..... Facial Analysis Comparison and Elimination System

g..... Glabella

gn .....Gnathion

go..... Gonion

ICC .....Interclass Correlation

ID ..... Identification Document

IT ..... Information Technology

li ..... Labiale inferius

ls..... Labiale superius

Max..... Maximum

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Min ..... Minimum

mm ..... Millimetre

MRC ..... Medical Research Council

n ..... Nasion

PCA ..... Principal Components Analysis

S ..... Stature

Sh ..... Sternum height (Sh)

sn ..... Subnasale

SPAN ..... Symmetry Perceiving Adaptive Neuronet

sto ..... Stomion

tr ..... Trichion

UK ..... United Kingdom

USA ..... United State of America

v ..... Vertex

zy ..... Zygion

2D 2-Dimensional

3D 3-Dimensional