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# Minor physical anomalies as an indicator of the state of health in female

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Several quantitative and qualitative minor physical anomalies have been studied in healthy females (Latvian residents). All characteristics were compared between two ethnically different subgroups – Latvians (group 1) and non-Latvians (group 2). Statistical analysis of these characters ( $p < 0.05$ ) showed no significant differences between the two groups.

**Key words:** minor physical anomalies (MPAs), genetic condition, female health, anthropometrical measurements

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## INTRODUCTION

This pilot study was aimed at investigating minor physical anomalies (MPAs) in female Latvian residents. Examination of minor physical anomalies was part of a larger study investigating female health status in Latvia. A minor physical anomaly is generally considered of little or no medical or cosmetic significance. However, clinically healthy individuals with MPAs may benefit from a genetic counselling, because individuals with one or more minor malformations are more likely to have an unnoticed major anomaly. Recognition of minor anomalies might lead to the early detection of a genetic condition. Minor physical anomalies should be relevant for the evaluation of the condition of health in general also, because abnormal physical features may signal for some health problem. MPAs could be identified in body areas with complex and variable features such as face, eyes, ears, nose, mouth, and hand. The traits studied were those that persist throughout the life and thus could be observed in adult life. Clinically healthy 17–26-year old females were invited to participate in this study. Subjects were evaluated for facial and cranial features, and clinodactyly. Measurements were taken of the inner canthal distance, interpupillary distance, and length of the philtrum, head circumference, and head length. Observations were made about presence or absence of epicanthic fold, shape of palpebral fissure, and presence or absence of

clinodactyly. All parameters were compared for Latvians and other nationalities living in Latvia. Descriptive and inferential statistics have been used for interpretation of the results.

## MATERIALS AND METHODS

The subjects of this study were clinically healthy females. Minor physical anomalies were measured and observed in a group of 51 Latvian females aged 17–26. The age is significant, since some features are present at birth and others evolve with time [1]. Volunteers were invited to the Department of Medical Biology and Genetics of Rīga Stradiņš University for answering a questionnaire and measurement taking. The questionnaire included information on age and ancestors of the individuals in three generations. For this study 49 females were considered. Two individuals were excluded because of missing data. Considering that the population of Latvia is ethnically heterogeneous, it seemed important to compare craniofacial parameters between ethnically different groups. For this reason two ethnically different samples were used in the study – Latvians in at least 3 generations (group 1) and ethnically diverse individuals (group 2). Of the 49 females studied, 24 were Latvians and 25 of other nationalities. The groups were age-matched. The mean age in group 1 was  $20.75 \pm 1.189$  and in group 2  $20.74 \pm 1.573$  years.

All measurements were made by one observer and performed with the GPM Anthropological Instruments, Siber Hegner & CO. AG. Anthropometrics using specialized but simple measuring devices has several ad-

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vantages: it is simple, non-invasive, cheap and based on direct measurements [1]. The traits studied were those that could be observed in adult individuals (*i.e.* are persistent throughout the life). Several traits were observed quantitatively. Quantitative assessment of craniofacial features is useful in the evaluation of the person's MPAs. Interpupillary distance was measured as the distance between the pupils, philtrum length – as the distance from the columella to the vermillion, inner canthal distance between the inner corners of the eyes, head length was measured as the greatest distance from the glabella to the opisthocranium, and head circumference was measured at its largest area above the eyebrows and ears and around the back of the head (through the glabella and opisthocranium). Examination of these traits requires minimal physical contact. This is especially advantageous in the assessment of sensitive individuals [2]. All measurements are given in centimetres. Descriptive and inferential statistics have been used for interpretation of the results. Some other craniofacial structures cannot be defined by measurements, as they must be described qualitatively on the base of anthropological definitions [3]. This includes observation of presence or absence of clinodactyly (curved fifth finger), presence or absence of epicanthic fold, and shape of the palpebral fissure (up/down).

## RESULTS

Measurements of 49 individuals were obtained. We studied the quantitative craniofacial parameters including interpupillary distance, intercanthal distance, philtrum length, head circumference, and head length. Craniofacial measurements, separately for group 1 and group 2, are shown in Table.

Analysis of measurements showed no statistically significant differences between group 1 and group 2. However, differences in the range for some measurements between the groups were observed. Wider ranges in group 1 in comparison with group 2 were ob-

served for interpupillary distance, head circumference, and head length (Figs. 1, 4, 5). In respect of these traits, group 1 is more heterogeneous than group 2. Other measurements (intercanthal distance, the length of the philtrum) showed very little or no differences in the range (Figs. 2, 3). The other dysmorphic characteristics (presence or absence of epicanthic fold, the shape of the palpebral fissure, and clinodactyly) were studied qualitatively. In both groups, individuals with epicanthic fold were observed; in group 1 they comprised 8.3% and in group 2 – 8.0%, and no statistically significant differences between the two groups were found ( $p = 0.966$ ).

From the individuals studied for palpebral fissure, 56.5% in group 1 and 62.5% in group 2 had a downslanting palpebral fissure ( $p = 0.545$ ). Only one individual in group 2 had the upslanting palpebral fissure. Clinodactyly in the study cohort was not observed.

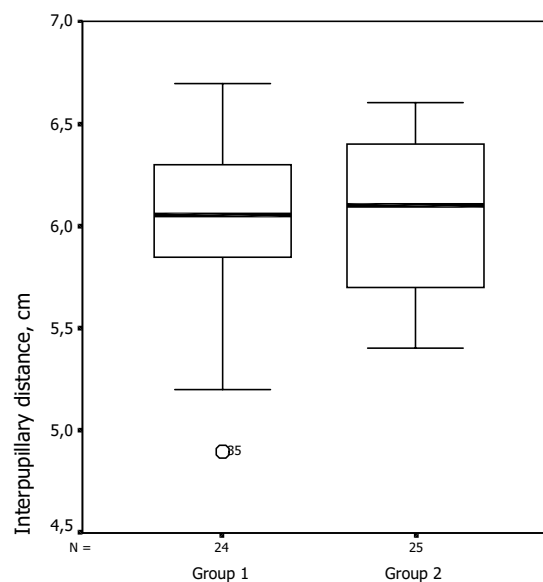


Fig. 1. Interpupillary distance (cm) in group 1 and group 2

Table. Craniofacial measurements in clinically healthy females							
Character	Group	Mean	SD	Significance (p)	Min.	Max.	Range
Interpupillary distance	Group 1	6.0229	0.40108	0.963	4.90	6.70	1.80
	Group 2	6.0417	0.36673		5.40	6.60	1.20
Intercanthal distance	Group 1	2.9708	0.32768	0.565	2.50	3.90	1.40
	Group 2	2.9125	0.36779		2.10	3.50	1.40
Length of the philtrum	Group 1	1.2604	0.24977	0.794	0.70	1.90	1.20
	Group 2	1.2438	0.24553		0.80	1.80	1.00
Head circumference	Group 1	55.429	1.3902	0.960	52.0	59.0	7.0
	Group 2	55.421	1.2642		53.3	58.0	4.7
Head length	Group 1	18.508	1.1186	0.206	17.0	23.0	6.0
	Group 2	18.108	0.9713		16.6	20.5	3.9

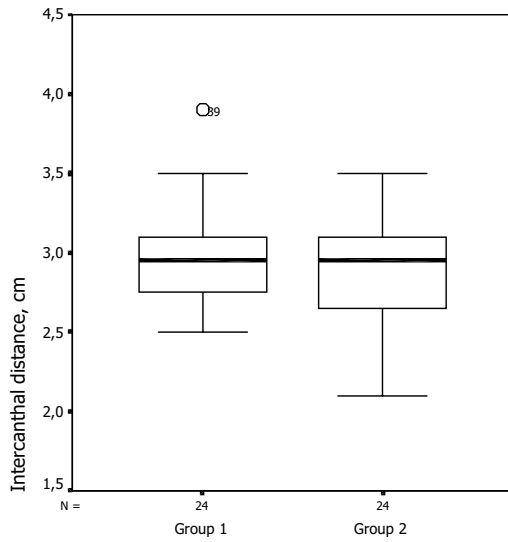


Fig. 2. Intercanthal distance (cm) in group 1 and group 2

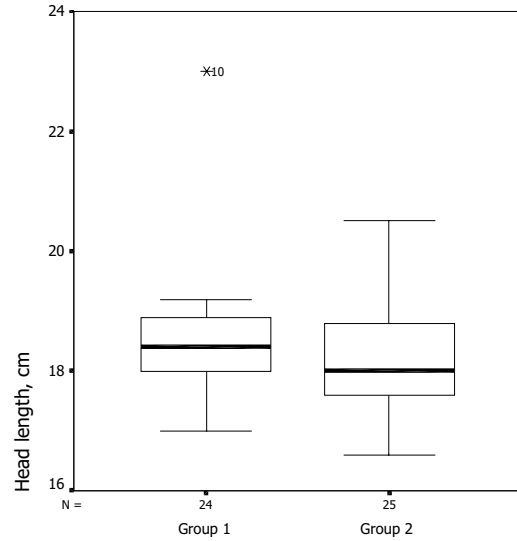


Fig. 5. Head length (cm) in group 1 and group 2

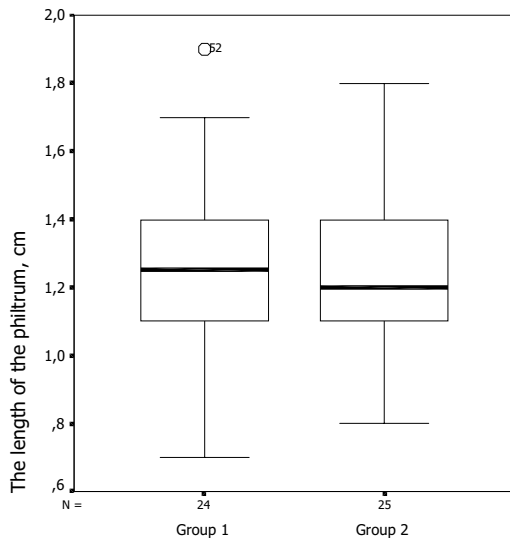


Fig. 3. The length of the philtrum (cm) in group 1 and group 2

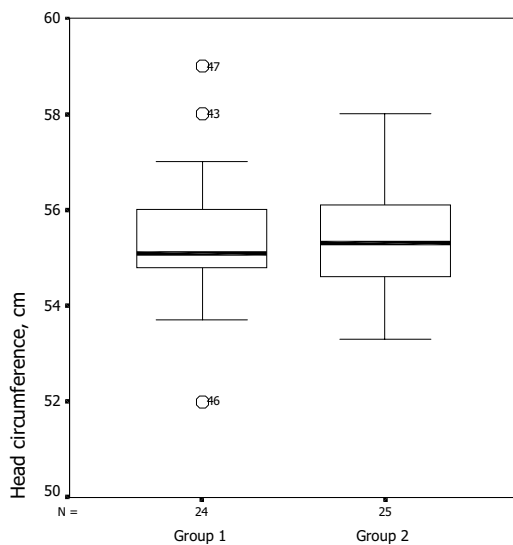


Fig. 4. Head circumference (cm) in group 1 and group 2

### DISCUSSION

This study examined the presence of MPAs in healthy females (Latvian residents). In some references it is shown that minor anomalies occur in the normal population at low frequencies [3]. On the other hand, deviations from normal values to the physician can be indicative of a health problem. *E.g.*, patients with psychotic disorders had the skulls that were more brachycephalic [4], a relationship between abnormalities of the mouth and schizophrenia has been reported [5]. Some authors [6] have shown that patients with late- or early-onset schizophrenia and unipolar depression were found to have significantly more MPAs than normal subjects. Some human teratogens are associated with a pattern of minor and major anomalies [7]. A clearcut association between craniofacial anomalies and health status impels us to start examination of MPAs in Latvian population. Some investigators [8] reported on different anthropometrical values in different populations, however, several others [9] suggested that genetic factors exert a substantial influence on the interindividual differences in body shape and configuration, and considering the ethnically heterogeneous population of Latvia it seemed important to compare craniofacial features between Latvians (group1) and other nationalities (group 2).

Our measurements and observations show that the presence of MPAs is not influenced by ethnical background. Therefore, it is likely that the existing ranges are sufficiently consistent to allow assessment of females for MPAs from different ethnic groups, using the same anthropometrical standards.

## CONCLUSIONS

1. Our results show that ethnical background does not influence the presence of minor physical anomalies in healthy females (Latvian residents).

2. As variations in minor physical anomalies can be indicative of a health problem, our results may contribute to the evaluation of females' health status and genetic consultation.

3. Additional measurements are needed to be convinced that assessment of Latvian females for MPAs from different ethnic groups is possible using the same anthropometrical standards.

## ACKNOWLEDGMENTS

We thank all participants for patience and support of our investigations.

Received  
10 October 2002

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