

## Morphometric Asymmetry of the Size of “Upper Fan” of the Facial Skull at Adults

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### Abstract

Facial asymmetry is common in humans. Significant facial asymmetry causes both functional as well as esthetic problems. Precise diagnosis and treatment of facial asymmetry are important in orthodontics. The aims of this study were to determine the asymmetry characteristics of the upper part of the facial skull in adults. The results of the study show the asymmetry of upper part of skull in both, males and females, however, is more pronounced in males.

### Introduction

The term “asymmetry” is used to make reference to dissimilarity between homologous elements, altering the balance between structures. Facial asymmetry is common in the overall population and is often presented subclinically [1,2]. Significant facial asymmetry causes both functional as well as esthetic problems [1,3,4]. The fact of asymmetry of the external structure of the human face and body was known to artists and sculptors of the ancient world and was used to give expression and spirituality to their works. It is a fact, the facial asymmetry is caused by changes in the soft tissues, muscles and bones of the skull [2,5-7]. Orthognathic surgery is performed for the correction of the skull asymmetry. Additional surgical procedures may be required to increase or reduce the volume of skeletal and soft tissue components on both sides to achieve

better symmetry [2]. The study of this issue is relevant and dictated by the requests of anthropology, neurosurgery, maxillofacial surgery and forensic medicine.

## **Aim of the Study**

The aim of the research is to study the asymmetry of the “upper fan” of the facial skull at adults.

## **Materials and Methods**

The material of investigation was 100 computer tomograms of skulls at adults in the age of 22-60 years old (50 male and 50 female) belonging to residents of the Western Belarus. All the objects of research had no mechanical damage of the skull and systemic diseases of the skeleton.

We used the “fan” method of craniometry to study the asymmetry of the facial skull. The “upper fan” allows assessing the asymmetry of the features in the upper part of the facial skull. On the both, right and left halves of the face, all distances were measured from the nasion, called N-point, which is located on the nasolabial suture. In the study, we have used other points also: the top of the frontal tuber (Ft), the zygion (Zyg) - the most prominent point on the zygomatic bone, the infraorbital foramen (Fio), the most lateral point of the piriform aperture (P1), and the lower point of the piriform foramen (Pi).

The digital data of the study were statistically processed with the help of the program Statistica 13.

## **Results and Discussion**

Five sizes of the “upper fan” were measured in pairs (on the right/left) to identify the sizes asymmetry. As a result of measurements, in males the distance from the nasion to the point at the top of the frontal tuber (N-Ft) on the right side is 1.03 times longer than on the left one ( $p < 0.05$ ). In female, the same distance also is longer (in 1.02 times) on the right side. The distances N-Zyg and N-Fio did not differ significantly between males and females on the both sides (Table 1).

The distance from the nasion to the point on the right lateral edge of the piriform aperture (N-P1) in male is significantly larger (in 1.03 times) than to the left one ( $p < 0.05$ ). In female, the same distance does not differ significantly on both sides.

The distance from the nasion to the lowest point of the piriform aperture (N-Pi) in males was in 1.2 times larger on the right side than on the left ( $p < 0.05$ ). There is no any asymmetry of this distance in females (Table 1).

**Table 1:** Dimensions of the facial skull in the “upper fan” (for men)

No	The dimension	Side	In males	In females
1.	Distance from the nasion to the point at the top of the frontal tuber (N-Ft)	Right	62,51±1,2*	64,86±0,78*
		Left	60,74±0,96*	63,45±0,53*
2.	Distance from the nasion to the most prominent points on the zygomatic bone (N-Zyg)	Right	63,97±0,89	62,89±1,2
		Left	64,19±0,85	60,82±0,93
3.	Distance from nasion to the infraorbital foramen (N-Fio)	Right	31,68±0,71	29,83±0,55
		Left	33,06±0,71	30,57±0,92
4.	Distance from the nasion to the most lateral point on the edge of the piriform aperture (N-Pl)	Right	33,03±0,56*	29,48±0,5
		Left	32,14±0,64*	29,55±0,6
5.	Distance from the nasion to the lowest point of the piriform aperture (N-Pi)	Right	49,72±0,69*	46,32±0,5
		Left	41,12±0,75*	46,56±0,4

\* - significant difference ( $p < 0.05$ ).

## Conclusions

The results of the study show the asymmetry of upper part of skull in both, males and females. However, the asymmetry of the facial skull is more pronounced in males.

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