The Association between Body Mass Index and Craniometrical Parameters in Slovak Population (Original paper)

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Original Article

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Abstract:

Anthropometry can detect shape changes over time. This is important to diagnose acquired malformations. The term surface anthropometry is

used in this paper to refer to the measurement of the facial surface features (1). One of the major reasons patients seek orthodontic treatment is to improve their facial appearance (2). Currently, two non-invasive methods can be used to collect quantitative soft tissue facial data in three dimensions: direct; conventional anthropometry; digital/computerized anthropometry. Body mass index except of important impact to the craniofacial parameters also has a significant influence on e.g. the blood pressure (cardiovascular risk) (3, 4).

The aim of this study is to find any association between the mean values of craniofacial and BMI.

The study

The sample consisted of 100 patients (50.0% men, 50.0% women) aged between 18-32 years (mean age 23.09±2.70 years) attending dental surgeries in Bratislava (2013 – 2016). In this paper these craniofacial parameters were analyzed: nose breadth, bi-entocanthion breadth, bi-zygomatic breadth, bi-gonial breadth, total facial height, mouth breadth, morphologic face height, upper-lip height, lower-lip height and pupils – mid-face (right). The analyzed group of patients included measurements provided by directed anthropometry

Table 1: Mean, minimum and maximal values of craniofacial parameters according to BMI (n=100)

Craniofacial Parameters	Study Group			Mean	Median	Min	Max	p
			n	x (SD)				
al-al (cm) nose breadth	BMI [kg.m^{-2}]	18.6-24.9	83	3.45 (0.36)	3.40	2.64	4.60	**0.018**
		> 25.0	14	3.70 (0.33)	3.70	3.20	4.28	
en-en (cm) bi-entocanthion breadth	BMI [kg.m^{-2}]	18.6-24.9	83	2.98 (0.38)	2.90	2.30	4.00	0.432
		> 25.0	14	3.06 (0.34)	3.17	2.37	3.60	
zy-zy (cm) bi-zygomatic breadth	BMI [kg.m^{-2}]	18.6-24.9	83	12.54 (0.99)	12.60	10.50	14.30	**0.031**
		> 25.0	14	13.33 (1.19)	13.05	11.02	15.80	
go-go (cm) bi-gonial breadth	BMI [kg.m^{-2}]	18.6-24.9	83	11.22 (0.95)	10.90	10.00	13.80	0.489
		> 25.0	14	11.50 (1.42)	10.55	10.00	13.80	
n-gn (cm) total facial height	BMI [kg.m^{-2}]	18.6-24.9	83	11.71 (0.89)	11.80	9.50	13.70	**0.001**
		> 25.0	14	12.55 (0.73)	12.80	11.50	13.70	
ch-ch (cm) mouth breadth	BMI [kg.m^{-2}]	18.6-24.9	83	5.04 (0.45)	5.00	3.41	6.00	**0.001**
		> 25.0	14	5.42 (0.30)	5.36	4.75	5.92	
sn-gn (cm) morphologic face height	BMI [kg.m^{-2}]	18.6-24.9	83	6.32 (0.71)	6.40	4.60	8.30	**0.041**
		> 25.0	14	6.79 (0.74)	6.74	5.50	8.31	
Ls-Stm (cm) upper-lip height	BMI [kg.m^{-2}]	18.6-24.9	83	0.70 (0.22)	0.70	0.10	1.20	0.495
		> 25.0	14	0.64 (0.28)	0.59	0.20	1.02	
Stm-Li (cm) lower-lip height	BMI [kg.m^{-2}]	18.6-24.9	83	1.04 (0.17)	1.03	0.56	1.50	0.588
		> 25.0	14	1.06 (0.11)	1.05	0.81	1.22	
Pupils- mid face (right) (cm)	BMI [kg.m^{-2}]	18.6-24.9	83	3.41 (0.30)	3.46	2.50	3.94	0.884
		> 25.0	14	3.42 (0.30)	3.50	2.80	3.70	

(PDAA) and from 3D scan (P3DAS). We have expected that participants with a BMI > 25 will have a higher amount of fat in the face than participants with a BMI 18.6-24.9. The data were analyzed by the statistical program SPSS.

Mean values of craniofacial parameters according to BMI are presented in **Table 1**. The differences between BMI 18.6-24.9 and BMI > 25.0 had significant effect on the evaluation of nose breadth (3.45±0.36 cm vs. 3.70±0.33 cm; P=0.018), bi-zygomatic breadth (12.54±0.99 cm vs. 13.33±1.19 cm; P=0.031), total facial height (11.71±0.89 cm vs. 12.55±0.73 cm; P=0.001), mouth breadth (5.04±0.45 cm vs. 5.42±0.30 cm; P=0.001) and morphologic face height (6.32±0.71 vs. 6.79±0.74 cm; P=0.041).

In conclusion BMI > 25.0 had significant impact on high proportions of facial tissue than BMI 18.6-24.9 in this parameter: upper-lip height in relationship with these parameters; the nose breadth, bi-zygomatic breadth, total facial height, breadth and mouth morphologic face height.

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