WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 8, Issue 12, 369-374. Review Article ISSN 2277– 7105

PROPORTIONS AND RELATIONSHIP IN THE HUMAN BODY- A REVIEW ARTICLE

Dr. K. Ramkumar[1]*, Dr. C. Sabarigirinathan[2] and Dr. S. B. Bargavishri[3]

[1]*Associate Professor & Head, Department of Dental Surgery, Govt. Royapettah, Hospital, Kilpauk Medical College, Chennai.

[2]Professor & Head Department of Prosthodontics, Tamil Nadu, Govt. Dental College & Hosptal, Chennai.

[3]Senior Intern, Govt. Royapettah, Hospital, Chennai.

Article Received on
03 Sept. 2019,

Revised on 23 Sept. 2019,
Accepted on 13 Oct. 2019,

DOI: 10.20959/wjpr201912-16051

***Corresponding Author**
Dr. K. Ramkumar
Associate Professor & Head, Department of Dental Surgery, Govt. Royapettah, Hospital, Kilpauk Medical College, Chennai.

INTRODUCTION

Human body is one of the God's wonderful creation. The function of the human body can be compared all the mechanical device. The car runs with fuel and other mechanical device whereas the human body can walk and run with help of muscle, bone and nutrition. A computer keeps in memory with various storage device on the other hand brain with its small size can remember lot of things with unlimited storage. The way by which the shape of the body formed has lot of proportion and relationship. The shape head is proportionate to the shape of face. The various part of the face like eyes, nose, ear, teeth are proportionate to each other. The changes happened in the morphology of the facial parts can be easily recognised by the human eye even it is minor. The patients seeks the Cosmetologist, Plastic surgeon, Dental surgeon for correcting the discrepancy in the morphology. The relationship and proportion does not stop with the head and face only it can be extended to the entire body. This article discuss about the various relationship and proportions in the human body.

Weight-for-height (W/H)

W/H is a relationship established between the weights to height. This index requires the details on height and weight of the individual and has advantage of not requiring age data. Low W/ H relative to the child of same age and sex is referred as *thinness*. Extreme case of low W/H are commonly referred as wasting.[1]

Height-for-age (H/A)

The relationship of height for age reflects the cumulative linear growth. Low H/A referred to as shortness and extreme case of low H/A referred to as stunting. H/A is primarily used as a population indicator rather than for individual growth monitoring.[1]

Mid-upper arm circumference (MUAC)

MUAC is a measure of the diameter of the upper arm, and gauges both fat reserves and muscle mass. It is primarily used for children, but can also be applied to pregnant women to assess nutritional status. Measurement is simple and requires minimal equipment. MUAC has therefore been proposed as an alternative index of nutritional status, in particular in situation where data on height, weight, and age are difficult to collect.[1]

Body mass index (BMI)

BMI is a measure to define overweight and thinness. BMI is defined as the weight in kilos divided by the square of height in meters. In developing countries, the BMI is primarily used with age-independent cut offs to identify chronic energy deficiencies (or obesity) in adults. Although there is some scope for using BMI for adolescents, the index varies with age for children and teens, and must therefore be interpreted in relation to BMI-for-age reference charts.[1]

Proportions and relations in tooth selection

Tooth selection for the completely edentulous patient is challenging task, dentist depend on various factor like shape of the face, arch and other ratios and proportion. Several anatomic measurements such as the inter commissural width, bizygomatic width, inter-alar width, and interpupillary distance have been proposed to aid in determining the correct size of the anterior teeth.[2] The size of the central incisors as a proportion of skill measurements has been used, including length (1⁄20 skull length) and width (1⁄16 bizygomatic width). Temperamental theory classify the patient in to four category upon the temperament and therefore aesthetics. Dentogeic theory consider SPA factor –Sex, Personality and Age in selection of the tooth.[2] The geometric theory by Leon William is one the famous one followed in selection of the teeth. The theory correlate when the outline of the face is inverted it correspond to the maxillary central incisor. The details of the various anthropometric measurement for selecting the tooth is shown in table IV.

Cephalic index

This index describe about the size of the skull, it establish a relationship between the length and the breadth of the skull. The formula for measuring the cephalic index is Maximum breadth X 100/Maximum cranial length. The maximum Antero posterior diameter is measured from glabella to Opisthocranion (or) Inion and the maximum transverse diameter is measured from the parietal eminence (Euryon) from left side to right side.[3] The head shape (Cephalic index) is classified in to five types using Martin saller scale ultrabrachycephalic, hyperbrachycephalic, brachcephalic, mesocephalic, and dlichocephalic.[4] The values of the cephalic index is shown in table 1.

Facial index

The facial index prosopic index is calculated by the following formula-Proscopic index (PI) = Facial length/Facial width x 100. The above index was determined on the basis of international anatomical descriptions. Based on this index, the types of face shapes were categorised according to Banister's classification-Hypereuriprosopic (very broad face), Euriprosopic (broad face), Mesoprosopic (round face), Leptoprosopic (long face) Hyperleptoprosopic (very long face)[5] Fig 1. The details are given in table 2.

Table No 1: BMI cut –offs for adults over 20 years (proposed by WHO Expert Committee).

BMI range	Diagnosis
<16	Under weight (grade 3 thinness)
16 – 16.99	Under weight (grade 2 thinness)
17- 18.49	Under weight (grade 1 thiness)
18.5 -24.99	Normal range
25.0 – 29.99	Over weight (pre – obese)
>30	Obese

Table No II: Classification of head types according to Martin and Saller (1957).

Head type	Range index	
	Male	Female
Dolichocephalic	71.0 – 75.9	72.0 - 76.9
Mesocephalic	76.0 – 80.9	77.0 – 81.9
Brachycephalic	81.0 – 85.9	82.0 – 86.4
Hyperbrachycephalic	86.0 – 90.9	86.5 – 91.9
Ultrabrachycephalic	91.0 – X	92.0 - x

Table No III: Facial index.

Face Shape	Prosopic index (PI range)
Hypereuriprosopic (very broad face)	≤ 79.9
Euriproscopic (broad face)	80 – 84.9
Mesoproscopic (round face)	85 – 89.9
Leptoproscopic (long face)	90 – 94.9
Hyperleptoproscopic (very long face)	≥ 95

Table No IV: Anthropometric index for tooth selection.

Anthropometric measurement	Formula
Total width of upper interiors	*Bizygomatic width* /3.36
Total width of lower anterior	$\frac{4}{5}$ *th the width of upper anteriors*
Berry's Biometric index The width of maxillary central incisor	*Bizygomatic width* /16
Berry's Biometric index The width of maxillary central incisor	*Length of face* / 20
H.Pound's formula The width of maxillary central incisor	*Bizygomatic width* / 16
H.Pond's formula. The length of the maxillary central incisor	*Length of face* / 16

Table No 5: Proportion and relationship in the face.

Head type	Face type	Arch form	Tooth shape
Dolichocephalic (Long head)	Leptoproscopic (Taper face)	V -Shape	Taper tooth form
Mesocephalic (Medium size)	Mesoprosopic (sqaure face)	U-Shape	Square tooth form
Brachycephalic (Broad)	Euryoproscopic (oval face)	Ovoid	Oval tooth form

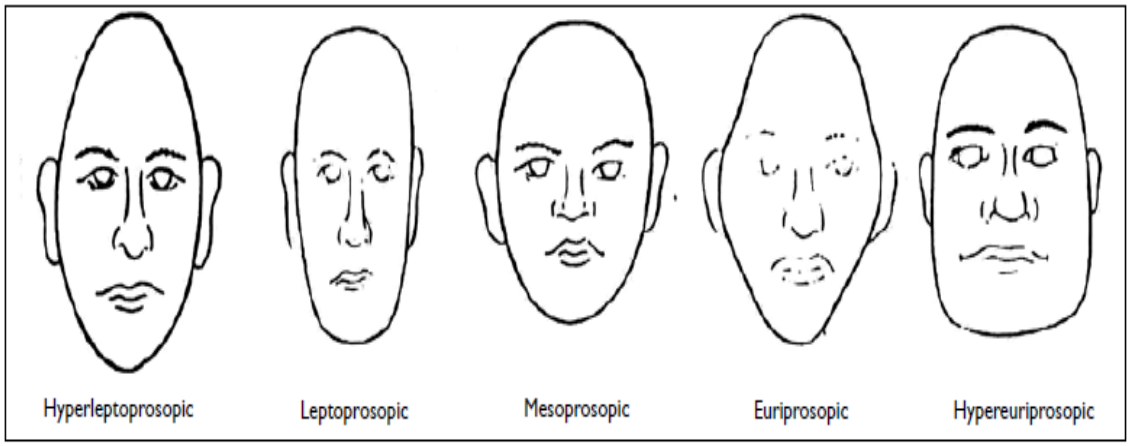

Fig 1: facial forms.

DISCUSSION

Anthropometry is measurement of the human body like size of the skull, face from, teeth size, arch form and other parts of the human body. The measurement establish a relationship with in the population and specific to the race and region .The size of the skull is established by cephalic index. An interesting proportion and relationship between parietal bone thickness and cephalic index is discussed here. The bone harvesting and grafting is very important in the reconstructive surgery. The donor sites for bone harvesting can be from maxilla, mandible, iliac crest and ribs are mostly common site for bone harvesting. Skull is also one of the site for bone harvesting in which the parietal bone is most commonly preferred. A study was conducted to correlate the relationship for the thickness of the parietal bone and the cephalic index. The study establish a positive correlation between the CI and thickness of the parietal bone. The bone harvesting should be performed in the medial and posterior thirds of the parietal bone in dolichocephalic and Mesocephalic individuals.[6] The relationship between cephalic index, the face form, arch form and tooth shape is shown in the table 5.The details in the table 5 shows the development of skull, face, arch, and tooth has a proportionate relationship, hence the shape and morphology are in golden proportion to each other. The relation between the weight/height, height/age, mid arm upper circumference, basal metabolic index are well established index, clearly support the proportion and correlation in the human body.

CONCLUSION

The proportion and relationship in the human body helps the medical profession to find any variation in the morphology. The treatment planning in correcting the discrepancy is assessed and evaluated using the proportion and relationship.

REFERENCES

1. Anthropometric Measurement – Kyle Casadei, John kiel, Stat Pearls, 2019, January.
2. Ankita Rawat- Evaluation of Relation between Bizygomatic Width and Mesiodistal Dimension of Maxillary CentralIncisor in Indian Population: An *In Vivo* Study, International Journal of Scientifi c Study, 2015; 3: 6.
3. Twisha Shah, Manish B Thaker, Shobhana K Menon Assessment of Cephalic and Facial Indices: A proof for Ethnic and Sexual Dimorphism. J Forensic Sci Criminol, 2015; 3(1): 101. doi: 10.15744/2348-9804.2.401.
4. Martin R, K Saller (1957) Lehrbuch der anthropologie. Gustav Fischer Verlag, Stuttgart.

5. Jahanshahi M, The effect of ethnicity on facial anthropometry in Northern Iran, Singapore Med J 2008; 49: (11-940).
6. Atson Carlos de Souza Fernandes, Dimensional analysis of the parietal bone in areas of the parietal bone in areas of surgical interest and relationship between parietal thickness ane cephalic index J Oral Maxillofac Surg 2011.