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Asymmetry in length, Weight& Circumference of Upper Limb Bones in Telangana State.

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Abstract: *The lack of uniformity in the length, weight and mid shaft circumference of long bones of upper limb can be attributed to the type of movements performed by individual during life. The present study reports the positive evidence of Right sided dominance in the weight, length and circumference of 15 pairs of upper limb bones collected from skeletons of Telangana population in south Indian Region of India. Length was measured on an osteometric Board and weight measured on Automatic Balance. Mean length of Humerus, Radius and Ulna was greater on the right side than the left side. Mean weight of humerus, radius and ulna are also greater on right side. Mean circumference of mid part of shaft of humerus was greater on right side and for radius and ulna on right side. In overall the present study reveals that right dominance in Telangana population.*

Key words: *upper limb bones, length, weight, circumference.*

I. Introduction

Most of the long bones of the body are developed by endochondral ossification. The Growth of the Long bones in length mainly depends upon the cells present in the proliferative zone of epiphyseal plate. The endochondralossification extends into calcified zones of adjacent growth cartilages, which are continually replaced by the longitudinal interstitial growth of their proliferative zone cells. The growth of the diameter depends mainly on the continuous deposition in sub periosteal region of the bone as periosteal ossification [1].Growth of the bone is influenced by vitamins, minerals, hormones and genetic factor.

II. Material And Methods.

Material for the present study contributed 15 pairs of upper limb bones of unknown sex. Humerus, radius and ulna of both sides are collected from Department of Anatomy, Kamineni Institute of Medical Sciences, Narketpally. **Inclusion criteria**- Dried bones are collected from unclaimed macerated skeleton.
Exclusion criteria -Broken, diseased and damaged bones were excluded from the study.
Methods -Length of the bone was measured using osteometric board. Weight is measured by automatic weighing balance, circumference is measured using Vernier caliper.

III. Results

The absolute parameters of Length, Weight and circumference of mid shafts of both sides of upper limb long bones are presented in tables.
TABLE 01 depicts the side dominance parameters of Humerus.
TABLE 02 depicts the side dominance parameters of Radius.
TABLE 03 depicts the side dominance parameters of Ulna.
The Mean, SD and P values of both side Upper limb long bones were mentioned in TABLE 04.
Mean length of humerus, radius and ulna was greater on the right side than the left side, the difference on both sides for humerus is significant ($p<0.038$).
Mean weight of humerus, radius and ulna are also greater on right side, the difference was significant for humerus ($p<0.164$) and radius ($p<0.144$) .Mean circumference of mid part of shaft of humerus was greater on right side ($p<0.963$) for radius and ulna on right side ($p<0.074$, $p<0.397$).

TABLE 01

		Right- Humerus		Left-Humerus		
Sl.no	Length	Circumference	Weight	Length	Circumference	Weight
1	32	7	100	29.5	8	100
2	32.5	8.2	190	31	7	110
3	35	8	180	28.5	6	70
4	32.5	9.2	100	31.5	7.2	65
5	30	6.2	70	31.5	8.2	190

6	31.5	7.5	120	27.5	6.2	70
7	31	8	200	32	7.5	190
8	33.5	8.2	210	32	8.5	170
9	31.5	8	210	31.5	8	110
10	32	8.5	130	29	7.5	170
11	30.5	8	130	33.5	7.2	130
12	32	8.2	130	24.5	7.5	120
13	31	7.2	200	32.5	8	85
14	31	8.5	190	33	7.5	90
15	27.5	8.5	200	26.5	7.2	90
Sum	473.5	119.4	2232	454	111.5	1760

TABLE 02

		Right- Radius.		Left-Radius		
Sl.no	Length	Circumference	Weight	Length	Circumference	Weight
1	22.5	5.3	50	24.5	4.7	50
2	24	5.3	55	23.5	4.5	50
3	21.5	6	50	23	6	55
4	25.5	5.5	55	26.5	5.2	55
5	24	6	60	26.5	5	65
6	24.5	6.2	65	24	5	45
7	25.5	6	52	24	5.3	40
8	24	6.5	50	21.5	6	50
9	25	6	55	26	5.5	55
10	23.5	4.2	65	25	5	50
11	23	6.2	50	23.5	5	50
12	25	6.2	50	22	5.3	50
13	25.5	4.2	60	23.5	5	50
14	23.5	5.2	50	20.5	5.1	45
15	25.5	6.5	65	24	6	50
Sum	362.5	85.3	832	358	78.6	771

		Right- Ulna		Left-Ulna		
Sl.no	Length	Circumference	Weight	Length	Circumference	Weight
1	27	6.5	50	25	5	50
2	26	6	55	27.5	6	60
3	25.5	6.3	55	22	4.2	50
4	24.5	5.5	60	25	5.5	55
5	29	5.3	55	26.5	5.5	50
6	27.5	5.5	50	26	5.5	55
7	27.5	6.5	55	28	5.1	50
8	27	5	75	23.5	6	52
9	25	6.5	60	26.5	6	50
10	23	4.5	55	27.5	6	55
11	25	6	55	28.2	6.3	45
12	28.5	5.5	55	27.5	5.3	50
13	26.5	6.5	70	26	6.2	55
14	26.5	5.5	60	27.5	5.2	60
15	22.5	6.5	80	26	6	45
Sum	391	87.5	890	393.2	83.8	782

TABLE: 04. The Statistical Significance of MEAN+/-SD and P values of Length, Circumference and Weight of Right and Left Humerus, Radius and Ulna.

Parameters	Right	Left	
Humerus	Mean+/-SD	Mean+/-SD	P=
Length	31.56+/-1.66	30.26+/-2.59	0.038
Circumference	7.96+/-0.70	7.43+/-0.68	0.963
Weight	148.8+/-58.8	117.33+43.46	0.164
Radius			
Length	24.16+/-1.21	23.86+/-1.72	0.384
Circumference	5.686+/-0.73	5.24+/-0.45	0.074
Weight	55.46+/-6.01	51.40+/-4.79	0.144
Ulna			
Length	26.06+/-1.85	26.21+/-1.70	0.620
Circumference	5.83+/-0.64	5.58+/-0.56	0.397
Weight	59.33+/-8.78	52.13+/-4.51	0.078

IV. Discussion

Many researchers have demonstrated asymmetry in length of long bones of upper limbs and lower limbs along with weight of long bones. According to Tonka Cuk (2001) [2].Asymmetry is more pronounced in the upper extremity than lower because we use our arms in countless one handed or both handed and bilateral asymmetry of the humerus is reflecting the hand performance. According to Pande BS (1971)[3],Taylor (1977) [4] right dominance of long bones are considered as congenital phenomenon. According to Prives MG (1960) [5] the dominance pattern could be influenced by postnatal adaptation and physical work. Latimer HB (1965) [6], Ingalls NW (1931) [7] these authors observed the predominance of right dominance in the upper limbs than lower limb long bones

V. Conclusion

The present study conducted on long bones of upper limb in Telangana population concluded that the Bones of right upper extremity are longer and heavier and dominant. These results are suitable only for selected samples because shortage of samples that were available for this study. The right dominance of upper extremity seems to be dominated by the left cerebral hemisphere. The lack of uniformity in the asymetry, in the length, weight and circumference of mid shaft of long bones of upper limbs can be attributed to the type of movements performed by individual during life.

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References

[1]. Standring S. Gray's Anatomy. The Anatomical basis of clinical practice. 40th ed. Edinburg. Elsevier Churchill Livingstone. 2008; (5): 95.
[2]. Tonka Cuk, Petra Leben – Seljak, MarijaStefancic. Lateral Asymmetry of Human long bones.Variability and Evolution. 2001; (9): 19 – 32.
[3]. Pande BS, Singh I, One sided dominance in the upper limbs of human fetuses as evidence by asymmetry in muscle and bone weight. J Anat 1971; 109: 457 – 459.
[4]. Taylor JR, Halliday MJ, Limb Assymetry. J Anat 1977; 124: 520 – 521.
[5]. Prives MG, Influence of Labour and sports upon Skeleton structure in man. Anat Rec 1960; 136: 261.
[6]. Latimer HB, Lowrance EW, Bilateral asymmetry in weight and in length of Human bones. Anat Rec 1965; 152: 217 – 224.
[7]. Ingalls NW, Observations on bone weights. Am J Anat 1931; 48: 45- 98.