Technical Note

Proportions of the Human Body Segments for Use in Design of Artificial Limbs

The following article, written long ago, which I found among other professional notes, is intended to show prosthetists a way to determine length measurements of amputated limbs for bilateral amputees. We have used this method in Germany during and after the First World War successfully in Veterans Hospitals and Shops as guidelines.

The knowledge of the symmetry and proportions of segments of the human body is essential for the prosthetist when both legs or both arms have been amputated and no measurements of the missing limb are available.

The normal human body varies in height, form, weight and posture, but, still there is a certain constancy in the proportions between lengths of segments of the legs, arms, and other parts of the body.

Painters or sculptors know this, and use the knowledge when painting pictures or forming statues. Painters, for instance, use the length of the face and the hand as a measuring unit, while the sculptor prefers the length of the foot.

Prosthetists can use both forms in their work, and it will help greatly in finding missing measurements in case of bilateral amputations. Following is a list of measurements based on these findings and used by the prosthetists in Germany:

3 times the foot length equals length from tuber ishi to floor

4 times the foot length equals length from crest of ilium to floor

5 times the foot length equals length from axilla to floor

2 times center of knee joint minus 1 times center of the ankle joint to floor equals center of hip joint to floor

3 times center of knee to floor equals center of shoulder to floor

4 times center of knee to floor minus 2 times center of ankle joint to floor equals the height of a man

1 times center of hip joint to floor equals half the height of a man

1 times center of hip joint to center of knee joint equals the length from center of knee joint to center of ankle joint

1 times center of knee joint to floor equals length from nipple to center of hip joint

1 times center of hip joint to axilla equals center of shoulder joint to wrist joint

Distance from 1st cervical to 5th lumbar vertebra equals 1/3 height of man

1½ times the length from middle finger tip to wrist joint equals foot length

1 times the foot length equals the length from center elbow to center of wrist

Distance from middle of palm to center of elbow joint equals length from center of elbow joint to top of acromium

3 times the foot length equals distance from acromium to middle finger tip

Distance from left finger tip to right finger tip (outstretched arms) reveals the height of a man

3 times the foot length equals the length from top of acromion to middle of finger tip

The width of a hand equals half the length from center of wrist joint to the middle finger tip.

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