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Measuring Tape That Measures Body Water, Dry Lean Mass, Skeletal Muscle Mass and BMR

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ABSTRACT

This paper includes the description of a measuring tape, the world's first anthropometric device, which determines the human body composition even at tissue and molecular levels, within a minute.This invented tape remains very light in weight, non-clinical, non-invasive, non-electric, and eco-friendly. Even the pregnant women, pacemaker holders, sick, obese or bedridden people can use this flexible measuring tape.This device functions without use of battery or any other power supply. The users get the accurate results, instantly. This invention helps determine PBF and Body Fat Mass, FFM, Skeletal Muscle Mass (SMM), Total Body Water (TBW), Intracellular Water (ICW), Extracellular Water (ECW), Dry Lean Mass (DLM), Proteins, Minerals, Body Cell Mass (BCM), Bone Mass (BM), Basal Metabolic Rate (BMR), BMI value, Visceral Fat Mass (VFM), Trunk Fat Mass, Waist Circumference to Body Height Ratio (WHtR), and Age Peak Height Velocity (in the growing children). In the case of users more than 12 years old, the present invention requires Body Height, Waist Circumference and Body Weight to give the results. Only APHV measurement needs the user's Age.

Key Words:*Measuring tape, body composition, body water, dry lean mass, BMI, anthropometric device*

INTRODUCTION

BIA (Bioelectrical Impedance Analysis) machines or BIA scales use electrical method to measure body composition. All these BIA machines remain dependent on external power supply or batteries.The users have to take the result printouts and read the complex data for doing the comparative study.The well-equipped BIA machines are very costly**[1]**.In the case of pregnant women, pacemaker holders, sick, obese or bedriddenpeople, these machines have limited applicability.

Anthropometric methods or tools are easy to use. These are eco-friendly and affordable. But these anthropometric methods are local or at least regional assessments of human body composition resulting in a '2C-model, or 2-component model'**[2]**. The 2C-model cannot measure total body water (TBW), dry lean mass (DLM), skeletal muscle mass (SMM), etc. The available anthropometric tools cannot determine the body composition at tissue and molecular levels.

Therefore,the needy people want a device that must beaffordable &flexible like ananthropometric tool, and sharp & accurate like well-equipped BIA machine. The present invention includes all these features.This invented device (a unique measuring tape)remains very affordable, flexible, fast, intensive, accurate, and easy to use. The human body composition values measured or reproduced by this device remain very close to the values measured by DXA, MRI and Inbody 770. This device is invented by Khwaja Ahmad Shadab, an Indian researcher. For this work, the IPR process is going on. This invention has 'patent pending' status.

STRUCTURE

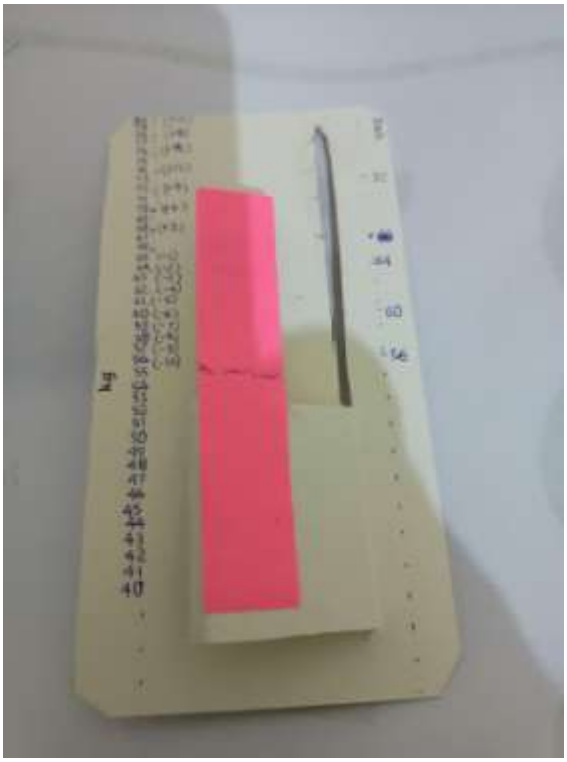
This measuring tape, also known as IzanaMeasuring Tape, remains composed of specific components. The users measure their body height and waist circumference through this tape. The users need not see the anthropometric chart or perform calculations separately to find the value of waist circumference to body height ratio (WHtR). An arrangement attached to the specific part of this measuring tape helps users get quickly the value of their waist circumference to body height ratio. And at the same time, the arrangement converts the WHtR value into body fat mass percentage or portion and shows the body composition values. The developed empirical relationships help make these arrangements.The users need not wait for taking the result printouts. The users need not put in extra effort to collect the printed data for doing comparative study. This measuring tape does not remain dependent on

external power supply or batteries.The following figure depicts the rough structure of this measuring tape.

This new invention helps determine PBF and Body Fat Mass (FM), Fat Free Mass (FFM), Skeletal Muscle Mass (SMM), Total Body Water (TBW), Intracellular Water (ICW), Extracellular Water (ECW), Dry Lean Mass (DLM), Proteins, Minerals, Body Cell Mass (BCM), Bone Mass (BM), Basal Metabolic Rate, BMI value, Visceral Fat Mass (VFM), Trunk Fat Mass, Waist Circumference to Body Height Ratio (WHtR) and Age Peak Height Velocity (APHV)(in growing children). In the case of users more than 12 years old, the present invention requires Body Height, Waist Circumference and Body Weight to give the results. Only APHV measurement needs the user's Age.

BMI ES

An invented device 'BMI ES' remains embedded to this measuring tape. This small device measures the user's BMI values. BMI ES functions as per Body height and Body weight



LinearRelationship, which is discovered after a thorough study of the anthropometric data of world population. The above figure depicts the rough structure of BMI ES.

Body Shape Algorithm

Along with measured WHtRvalue of user,**a card**helps the user identify his or her Body Shape and Body Fat Percentage, finally.The different graphic renderings of men and women help correct the values.

According to the body shape, the body fat percentage (PBF) is determined.A body shape algorithm is developed. The body fat percentage (PBF) is determined on the basis of empirical relationship.

CONCLUSION

The uniquefeatures of the present invention make it more applicable and feasible.This invention (Izana Measuring Tape) can be used as a simple anthropometric device. The user can use this flexible measuring tape while he or she remains in lying position or standing position. Its measurements can be compared with 3-component or 4-component model data for human body composition.

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7. Indian Council of Medical Research

8. The American Journal of Clinical Nutrition

9. academic.oup.com

10. www.hindawi.com

11. www.journals.elsevier.com

12. onlinelibrary.wiley.com

13. drc.bmj.com

14. journals.sagepub.com

15. Nature journals

16. National Center for Health Statistics

References:

[1]www.inbody.in

[2]Manfred J. Muller et al. (2019).“Body Composition”, Encyclopedia of Endocrine Diseases (Second Edition).