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Poster Presentation

Poster Presentations

"Force-Time Curves and Peripheral Motor Processes"	Gary Kamen, Indiana University (Formerly at St. Louis University)
"Myotemporal Constituents of a Two-Phase Simple Motor Task"	Peter McGrain, Texas Women's University Denton, Texas
"Biomechanics and Motor Learning Laboratory Activities for Undergraduates"	Kay Flatten and Sharon Mathes, Iowa State University
"A Biomechanical Analysis of the Double Back Somersault"	Tom Cross and Gail Shierman, University of Oklahoma
"The Reliability of the Handheld Planimeter for Measuring the Work Curve Parameter"	James G. Disch, Rice University James Morrow, Jr., University of Houston Jerry Diana Wilkerson, University of North Carolina
"Optimal Angle of Entry for the Grab Start"	Rod Havriluk, Indiana University (Formerly at Florida State)
"Comparison Between Male and Female in Instep Soccer Kicking"	Fouad Kamal, University of Ottawa, Canada
"The Use of Cinematographic Analysis in Neuromuscular Disorders"	M. El-Sayyad, Indiana University (Formerly from Cairo University-Physical Therapy)
"Relationships of Injuries in Teenage Powerlifting to Body Build, Techniques, Training and Experience"	Gene Brown, Michigan State University
"Instep Soccer Kick of Skilled and Novice Performers"	Lela June Stoner, University of Minnesota
"Body Control of Defense in Highly Skilled Women Athletes: A Trade-off Between Speed and Accuracy?"	Joan E. Farrell, University of Michigan
"Mechanical Analysis of the Soccer Instep Kick, NCAA Performer"	Hassan Abo Abdo, Indiana University and Helwan University (Cairo, Egypt)
"An EMG Comparison of the Contraction of Selected Muscle on Free Weight Lifts Versus Variable Resistance Machine Lifts"	James G. Disch and Dale W. Spence, Rice University and Paul Ward, Health and Tennis Corporation of America, Westminister, California
"A Qualitative Analysis of the 'Dink' in Volleyball"	Tim Vala and James G. Disch, Rice University

"Factor Analysis of Strength and Endurance Scores in Selected Muscle Groups Performing Continuous and Intermittent Maximal Static Contraction"	ToBlaine Hashizaki, McGill University, Canada
"Using Polaroid Film for Athletic Analysis"	Bill Colvin, California State University, Chico
"Incorporating Mechanical Principles into the Basic Skills Program for Physical Education Majors"	Shirley Laney, Western Kentucky University
"Pace and Grade Related to the Oxygen and Energy Requirements and the Mechanics of Treadmill Running"	Phil Henson, John M. Cooper and James E. Wilkerson, Indiana University
"Subtalar Joint Pronation: Influence of Balanced Insoles"	Gary C. Hunt, University of Maryland
"Biomechanical Factors Concerning Total Hip Replacement"	John R. Stevenson, Indiana University
"The Use of a Platform Stabilometer in Determining the Total Body Center of Gravity"	James G. Disch and Gary W. Hampton, Rice University
"The Experimental Verification of the Relation Connecting the Anthropometric Measurements Taken on Clothing to Those Taken on Body"	Syed Arif Kamal, Indiana University (Physics Department) M. El-Sayyad, Indiana University (Biomechanics)
"Kinematics of Overground and Treadmill Running"	Barry A. Frishberg, University of South Carolina
"Effect of Age on Selected Kinetic and Kinematic Parameters of Gait"	Ebtesam Gad El Mawla, Cairo University Indiana University — Physical Therapist
"Effects of the Approach Path on the Displacement of the Center of Gravity During a Vertical Jump"	Joyce A. Davis, Carleton College Larry D. Hensley, University of N. Iowa
"Identification of Characteristic Water Entry Phenomenon in Diving"	Janet Brown and Larry Abraham, University of Texas
"Selected Stretching Techniques Based on Mechanical and Neurophysiological Principles and Muscle Tightness"	Nahed Salem, Indiana University (Physical Therapist) — Cairo University Cairo, Egypt

The Experimental Verification of The Relation Connecting The Anthropometric Measurements Taken on Clothing to Those Taken on Body

SYED A. KAMAL
and
MOHSEN M. EL-SAYYAD
Indiana University

Anthropometric measurements are an essential part of School health examinations. Sometimes it is not practical to take the measurements on body and so the measurements are taken on clothing. There was no mathematical formula available to convert the anthropometric measurements taken on clothing to those taken on body.

Recently one of the authors (SAK) derived relations connecting these anthropometric measurements. There is a need to study how accurate are the theoretical predictions.

This study was conducted to check the accuracy of the theoretical relations. Ten boys and six girls between ages of 2 and 7 were studied using Callipar and Micrometer. The Breadths and Depths of chest, waist, arm, and thigh were determined by Callipars to one-tenth of centimeter and thickness of clothing measured by Micrometers, screw gauge to one-hundredth of centimeter.

Data collected was fitted to the following equations:

$$b/2a = B/2a - 1 \text{ and } d/2a = D/2a - 1$$

Where 'b', 'B' and 'd', 'D' are the Breadths and Depths taken on body and clothing respectively; and 'a' thickness of clothing.

Graphs were plotted between (B/2a) and (b/2a) as well as (D/2a) and (d/2a) and showed straight lines having slope unity. Therefore, the experimental results are in agreement with the theoretical relations. This indicates that the proposed relations are valid and can be used.

THE EXPERIMENTAL VERIFICATION OF THE RELATION CONNECTING THE ANTHROPOMETRIC MEASUREMENTS TAKEN ON CLOTHING TO THOSE TAKEN ON BODY

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INTRODUCTION

The use of anthropometric measurements as a fundamental base for the appraisal of development and physical condition is a well established practice in Physical Therapy. Assess and record, treat and assess again- physiotherapists repeat this cycle over and over during a therapeutic program. The lack of accurate and scientifically acceptable assessment has made it very difficult for the clinician to document exactly the various anthropometric measurements.

Many of the anthropometric measurements used are grossly inaccurate. Furthermore, the profession has been criticised for not objectively recording events[1]. The value of further anthropometric examinations for therapeutic purposes, however, is a controversial matter. The main obstacles for the general acceptance of more detailed anthropometric studies are lack of generally accepted selections of measurements, lack of adequate statistical material for the evaluation of such measurements and the complicated character of many of the suggested examinations with and without clothing.

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Anthropometric methods acceptable for use in physical therapy have to be simple, should not require too much time and if possible should not require special equipment. Sometimes it is not practical to take the measurements directly on body and so the measurements are taken on clothing. There was no mathematical formula available to convert the anthropometric measurements taken on clothing to those taken on body. Recently one of the authors (SAK) derived relations connecting the anthropometric measurements taken on clothing to those taken on body. There is a need to study how accurate are the theoretical predictions.

EXPERIMENT

Ten boys and six girls between the ages of two and seven years were studied using calipers and micrometer screw gauge (Fig. 1). The breadths and depths of chest, waist, arm and thigh were determined by calipers to one-tenth of a centimeter and thickness of clothing measured by micrometer screw gauge to one-hundredth of a centimeter. We define the breadth of chest as the measurement between hands and depth as thickness between the front and the back. For other parts of body equivalent definitions hold good.

DATA ANALYSIS

If b and B are the breadths taken on body and clothing respectively, d and D the depths taken on body and clothing and a the thickness of clothing, we have

$$(b/2a) = (B/2a) - 1 \qquad \text{and} \qquad (d/2a) = (D/2a) - 1$$

A computer program was constructed to calculate means and standard deviations. Graphs were plotted between (B/2a) and (b/2a) as well as (D/2a) and (d/2a) for chest and waist (Figs. 2, 3, 4 and 5).

RESULTS AND DISCUSSION

The results obtained were for a group of children in the particular age and not individual followed up. In other words the study was cross-sectional instead of being longitudinal.

The mean and the standard deviation for each variable are presented in Table 1. Data on patterns of energy expenditure and exrecise habits, as well as on seasonal variation, are lacking in the present study. Correlations of such factors may, however, partially reduce the consequence of their omission. Plots of data reveal straight lines having unit slope and y-intercept unity.

CONCLUSION

This study indicates that the anthropometric approach to physical therapy is still in its infancy. It has not yet grown up to a stage where practical conclusions may be drawn from our physical examinations. It is not yet possible to deduct specific physiotherapeutic treatment from the analysis of the anthropometric measurements, which will be one of the ultimate aims of such studies. But we believe that this approach offers some promise for the future.

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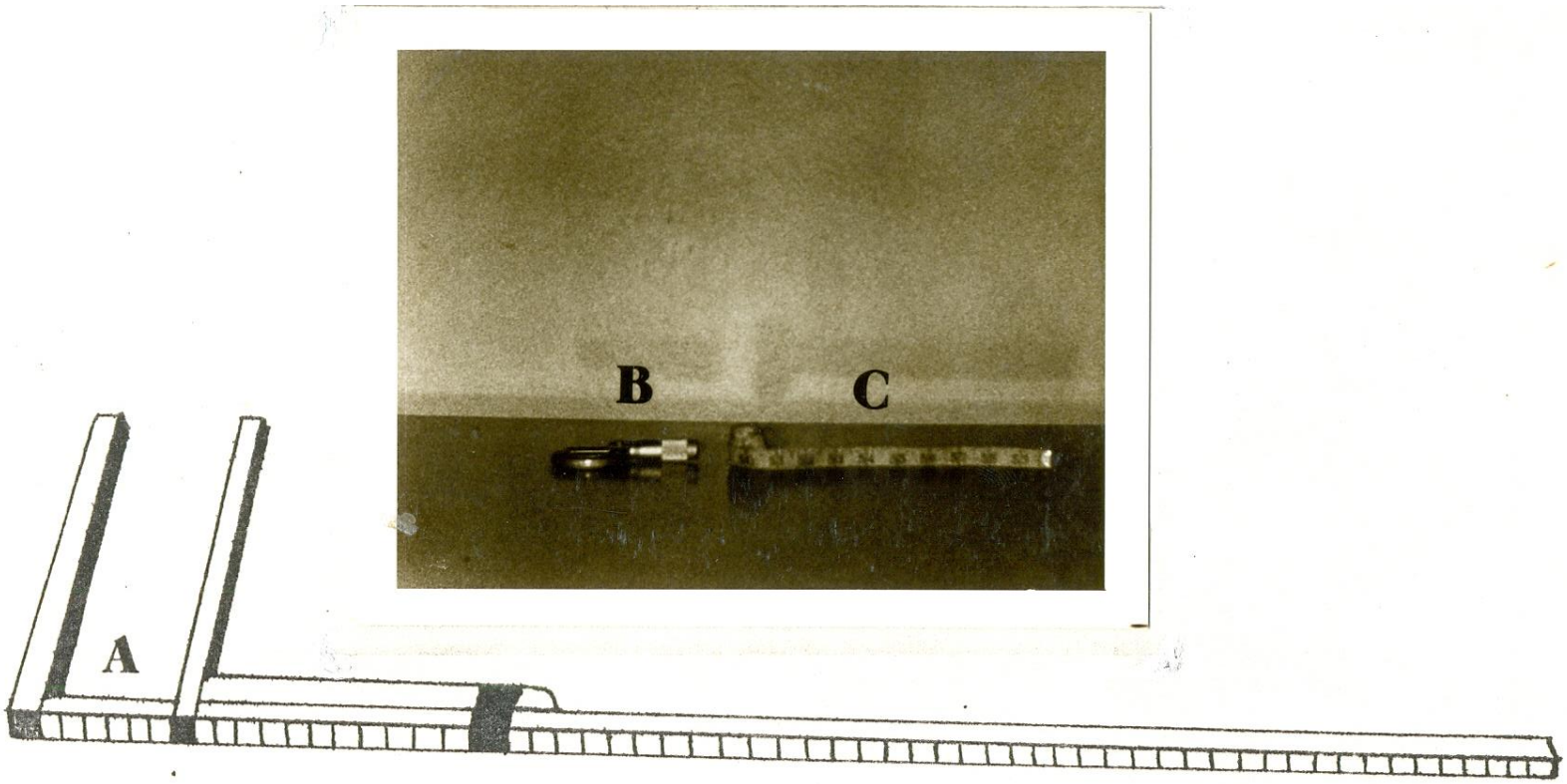
TABLE 1: MEANS AND STANDARD DEVIATIONS OF BREADTHS AND DEPTHS OF CHEST, WAIST, ARM AND THIGH

N = 16

Variables	Thickness of Clothing a cm	Breadth/Depth on Clothing X* cm	Breadth/Depth on Body x** cm	(X-x)/2a
CHEST				
Breadth	0.22 ± 0.06	13.20 ± 3.54	12.83 ± 1.70	1.02 ± 0.03
Depth	0.23 ± 0.04	12.65 ± 2.40	11.82 ± 2.27	0.98 ± 0.02
WAIST				
Breadth	0.25 ± 0.07	17.05 ± 1.37	16.35 ± 2.05	1.00 ± 0.02
Depth	0.21 ± 0.03	15.44 ± 2.81	14.29 ± 3.82	1.02 ± 0.07
ARM				
Breadth	0.24 ± 0.01	5.89 ± 0.80	3.80 ± 0.09	1.00 ± 0.01
Depth	0.23 ± 0.09	7.55 ± 1.00	6.10 ± 1.10	0.95 ± 0.06
THIGH				
Breadth	0.11 ± 0.08	5.60 ± 1.35	4.25 ± 1.09	0.96 ± 0.09
Depth	0.13 ± 0.05	4.75 ± 0.81	3.98 ± 1.44	0.83 ± 0.14

*X is B (breadth on clothing) or D (depth on clothing)

**x is b (breadth on body) or d (depth on body)



A = Callipars, B = Micrometer, C = Tape Measure

Fig. 1: EQUIPMENT USED IN THE STUDY

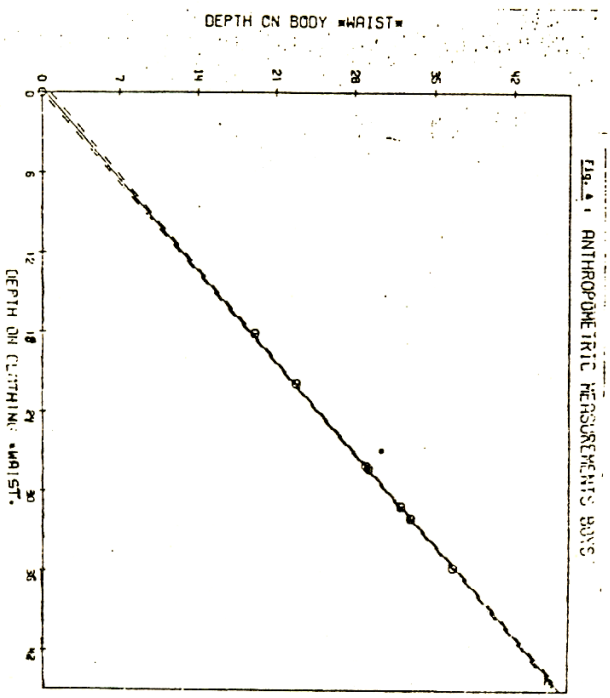
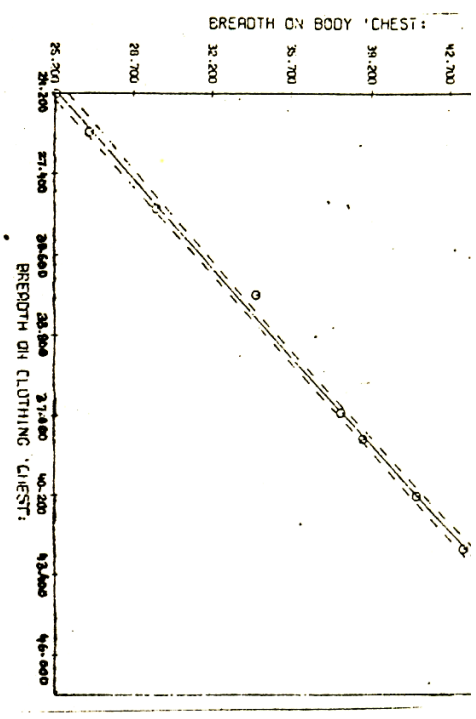


Fig. 1 : ANTHROPOMETRIC MEASUREMENTS BOYS



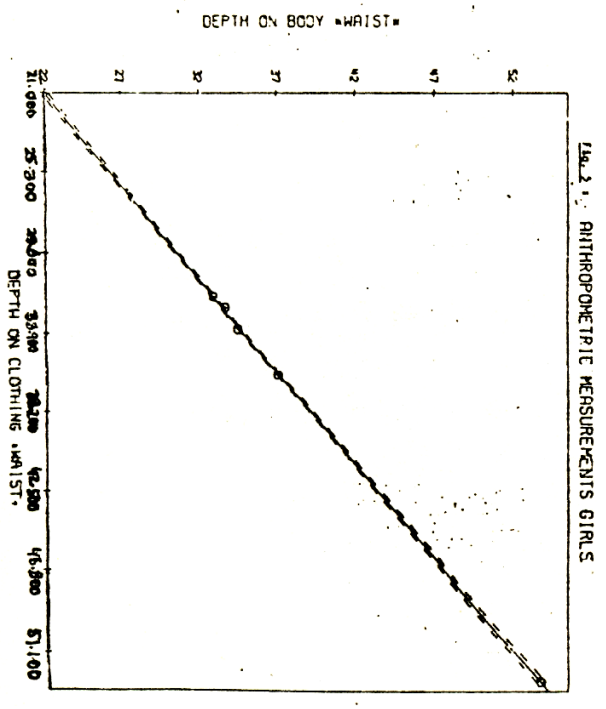
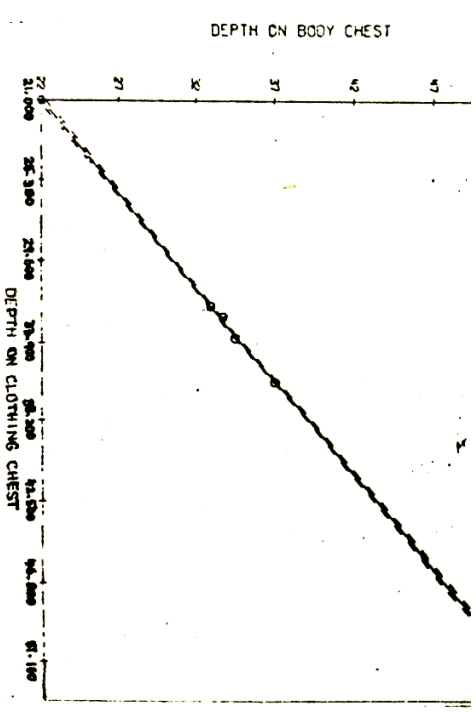


Fig. 2 : ANTHROPOMETRIC MEASUREMENTS GIRLS



January 12, 1981

Dear Sayed,

Your poster display presented at the recent biomechan symposium was well received. Many attendees stated verbally to me that they considered the posters among the best they had viewed. Congratulations to you for your imaginative and factual exhibit.

Sincerely yours,

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HPER 112-K

John M. Cooper
Professor of Physical Education
Director of Biomechanics Laboratory

JMC/nkg

The proceedings have been delayed a few weeks