

MID-UPPER ARM CIRCUMFERENCE MEASUREMENT

C.W. BINNS

The measurement of mid-upper-arm circumference (MUAC) has become widely used in the assessment of the nutritional status of children, due mainly to its relative independence of age in 1- to 5-year-old children (Zerfas 1975).

A major advance in the measurement of MUAC was the development of the insertion tape by Zerfas (1975). He also documented a number of errors associated with the use of conventional tapes, including errors in reading and recording the numerals. Additional errors may be introduced by incompletely relaxed arm muscles, failure to measure at the midpoint of the upper arm, or an incorrect tension applied to the tape. The use of a conventional tape, which is overlapped to measure, produces a small error due to angulation. The thickness of the tape may also produce a small error.

Since the standard deviation for MUAC is small, errors of this order become quite important. If, as is the case in many populations in developing countries, the mean MUAC approximates the cut-off point being used to detect malnutrition a small error in measurement will result in substantial misclassification.

When using the Zerfas tape, it becomes inconvenient and time-consuming to rethread the tape for each measurement. In addition, no solution has been proposed to standardise the tension being applied to the tape.

A new tape measure has been designed which preserves the best features of the Zerfas tape but with some added features. The prototype tapes were made from sheets of translucent plastic (Styrene) 0.5 mm thick. The thicker material allows the use of an open-ended slot rather than a window for insertion, and hence it requires less time to place around the arm. The thickness of the tape is compensated for by shifting the measurement scale. The distal end of the tape has an eyelet for the attachment of a tension-measuring device.

Using the new MUAC tape, the effect of tape tension was studied on a group of 54 six-year-old children and illustrates the need to use a standardised tension.

Effect of tape tension on MUAC

Tension	100G	200G	300G	400G
Mean MUAC (mm)	175.4	172.8	170.4	168.7

The new tape has reduced systematic errors in MUAC measurement and the use of a constant tension reduces inter-observer variation.

ZERFAS, A.J. (1975). Am. J. clin. Nutr. 28: 782.

School of Community Health, Western Australian Institute of Technology,
South Bentley, Western Australia 6102