Global evaluation of growth in a rural population: comparative analysis of shape and size

In this work the analogies and differences in shape and size between a rural school population (6-14 aged) of the Lozoya-Somosierra region (Madrid) and several recent and past Spanish populations from different environments have been studied. The results show the growth trend as well as the influences of ecological and socioeconomical factors.

Key words: growth, shape and size, Spanish population.

Introduction

For some time we have been studying the growth of schoolchildren in the North Mountains of Madrid (Ruiz and Marrodan 1983, Marrodan 1983). It is our aim in this paper to evaluate in a graphic and overall way the level of these children in relation to Spanish populations recently studied by other authors: Codina (1983), Fernandez Rico (1983) and Rodriguez (1983).

We also wish to analyze the extent to which the possible existing differences are due to the overall size of the individuals or their bodily proportions. Lastly, we wish to show the evolution of the Spanish population in the last 35 years, comparing our series with those studied by Prevosti in 1949.

Material and Methods

The sample studied by us consists of 439 schoolchildren belonging to the rural population of the region of Lozoya-Somosierra, situated in the mountains north of Madrid.

The populations with which we have been able to make comparisons, owing to the availability of data at same ages are:

- Children from Barcelona, from the urban milieu and medium socioeconomic status (Codina 1983).
- Boys and girls from the mountainous zone of Asturias, from the rural milieu (Fernandez Rico 1983).
- Girls from Leon, urban and medium socioeconomic status (Rodriguez 1983).
- Boys and girls from Barcelona, from the urban milieu and high and low socioeconomic status (Prevosti 1949).

We have used the size and shape method of Penrose (1958), and the characters used in the analysis were: stature, sitting height, biacromial width, length of arm and length of forearm.

Results (Fig. 1 and 2)

A. Comparison with present populations:

A.1. Males

— When compared with the boys from Barcelona (Codina 1983) we observe an appreciable total distance at age 6 ($C_H = 0.66$) and a medium total distance at other ages. In all cases this is due to the shape component ($C_S^2$) and not to the size component ($C_A)$ which remains constant and less than 0.1 for all age classes. (Table I.1).

The differences of shape can be explained because the boys from Barcelona present a trunk which is proportionally shorter in relation to stature. Also schoolboys from Barcelona have a greater biacromial and bicrestal width than those from Madrid. (Table II).

— When compared with those from Asturias (Fernandez Rico 1983), we find medium total distances at 6, 8 and 14 years, and appreciable at 10 and 12 ($C_H = 0.71$ and $C_H = 0.64$ respectively). (Table I.4).

From 6 to 10 years the distances in shape gradually increase, and those in size remain constant. At 12 the distance in shape is reduced and that of size increases. At 14 $C_A$ has a minimum value. In fact, the average values of the characters analyzed are similar at ages 6 and 14 in both populations (Table II), but the rate of growth is considerably different which would explain the differences in size observed in the intermediate ages.