

STUDIES IN PHYSICAL CULTURE AND TOURISM  
Vol. 13, Supplement, 2006

ŚLAWOMIR DROZDOWSKI, MAŁGORZATA MAJEWSKA, DOROTA PIETRZYK  
Department of Gymnastics, University School of Physical Education, Poznań, Poland

# CHANGES IN PHYSICAL DEVELOPMENT AND PHYSICAL EFFICIENCY IN THIRTY-YEAR CROSS-SECTIONAL RESEARCH

## INTRODUCTION

Issues concerning physical development and physical efficiency in different ontogenetic periods have been of interest to many researchers for a long time. Constant changes of living conditions exert a great influence on our physical development and the level of physical efficiency. There is a great need of research on the effects of these changes on man's physical and motor development.

The aim of this work was to outline changes of chosen morphological features and discuss the level of physical efficiency in young people aged 19-21 observed during 30-year cross-sectional research.

## METHODS

The material for the study consisted of results of annual studies of applicants for the University School of Physical Education in Poznań, conducted by the Department of Gymnastics and the Department of Anthropology and Biometry. The sample chosen for the study consisted of 464 women and 787 men, who applied for P.E. graduate programs. The following parameters were considered in the analysis: body mass and height, flexibility measured by means of trunk bend forward in a standing position, functional abdomen and lower limbs muscle strength measured by means of the time of holding legs up while hanging down on a gym ladder, and explosive strength of lower limbs measured by means of attainable jump height. The research was conducted in June of 1980, 1990 and 2000.

## RESULTS

On the basis of the obtained results it can be stated that in the researched group (both men and women), the body height was higher in the consecutive decades (Figure 1) alongside the growth of body mass (Figure 2).

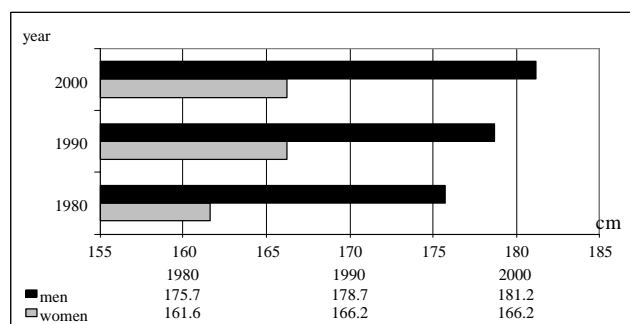


Figure 1. Body height

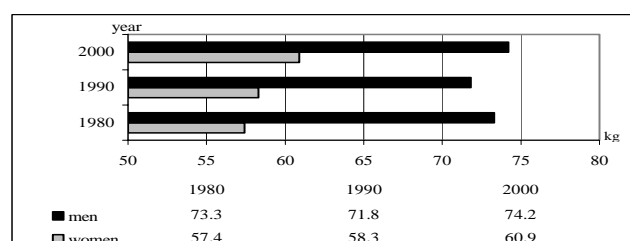
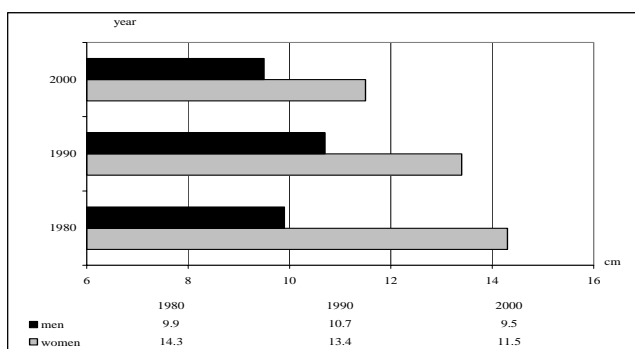


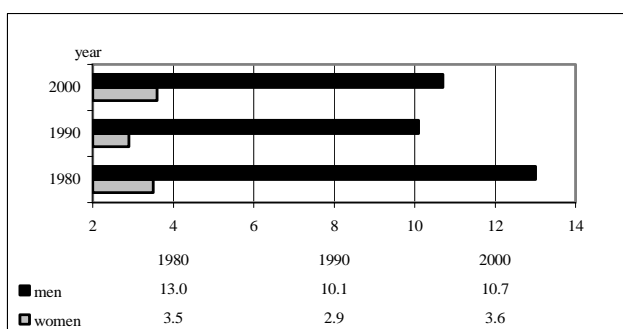
Figure 2. Body mass

The level of physical efficiency is different in each research series. The results of the flexibility test (Figure 3) are lower in the studied women. In the case of men the results were higher in the second research series, but decreased in the third one.



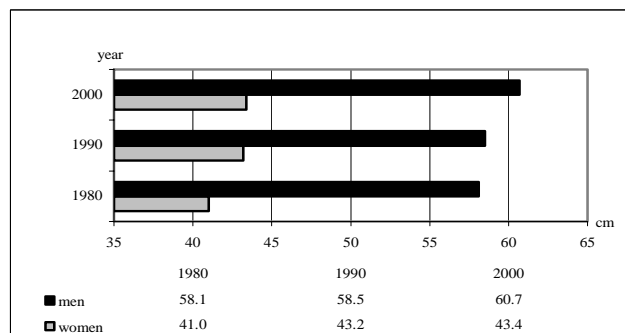
**Figure 3.** Flexibility test

In the case of functional strength of abdomen muscles (Figure 4), the results of the second research series were lower than the results of the first series in both men and women. The third series showed an increase in the functional strength of abdomen muscles in men and women alike.



**Figure 4.** Functional strength of abdomen muscles

The results of the three research series show a systematic increase in the subjects' explosive strength in men and women (Figure 5).



**Figure 5.** The explosive strength of lower limb

### Conclusions:

The obtained results display a long-term tendency of high growth in the researched group. The increase of body height in consecutive research series leads to greater body mass growth, both in men and women. The level of physical fitness is quite different in consecutive research series. In terms of flexibility we can observe a systematic decline in the value of this parameter, although women represent a much higher level of flexibility than men. As for the strength of abdomen muscles as well as lower limbs muscles men have gained better results than women. The research results of the functional strength of abdomen muscles were the highest in 2000, both in men and women. The explosive strength of lower limbs increases systematically in men, while it varies in women.

### REFERENCES

- [1] Arska-Kotlińska M., Bartz J., Wybrane zagadnienia statystyki dla studiujących wychowanie fizyczne (Statistics for physical education students), AWF Poznań 1993.
- [2] Bielicki T., Welon Z., Waliszko A., Zmiany w rozwoju fizycznym młodzieży w Polsce w okresie 1955-1975 (Changes in physical development of young people in Poland between 1955 and 1975), Monografie Zakładu Antropologii PAN, Wrocław 1981.
- [3] Drozdowski Z., Antropometria w wychowaniu fizycznym (Anthropometry in physical education), AWF Poznań 1998.
- [4] Osiński W., Antropomotoryka (Anthropomotrics), AWF Poznań 2000.
- [5] Przewęda R., Ukierunkowania poziomu sprawności fizycznej polskiej młodzieży szkolnej (The level of physical fitness of the Polish youth), Warszawa 1985.