



Somatotype Components in Judoists: a Contemporary Analysis



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INTRODUCTION AND STUDY AIM

Sport theoreticians and practitioners predominantly agree that the choice of a particular sport by a candidate should be based on their individual aptitudes (physical, psychological, somatic). Somatic predispositions can be improved through judo training and competitions, but there is a lack of high-quality international evidence concerning somatotypes in judo, which are more and more important for selection of talented individuals.

This analysis aimed to summarize the contemporary state of knowledge about somatotypes and judo.

MATERIAL AND METHODS

The analysis encompassed the data recorded in databases of Academic Search Complete, Elsevier, Sportdiscuss, Medline. This search and examination of reference lists and relevant review articles identified 21 studies involving in total 574 male judoists. In all the studies, the methodology of somatotype identification by Carter & Heath (1992) was used and mean somatotypes were presented. The mean somatotypes were presented in a somatochart. In next stage of analysis, 5 publications were excluded because they failed to present Standard Deviation values. Somatotype components (Endomorphy, Mesomorphy, Ectomorphy) were analyzed using analysis of means ANOM method (16 samples involving 311 seniors). The chart allowed for the determination of the grand mean and upper (UDL) and lower (LDL) decision limit, useful for interpretation of statistical significance of the differences between the mean from the study group and the grand mean. The authors decided not to include the analysis of the somatotypes in relation to the factor of age and gender categories because they are less frequently presented in the relevant literature.

RESULTS

Fig. 1. illustrates the mean somatograms of judo contestants from 21 studies.

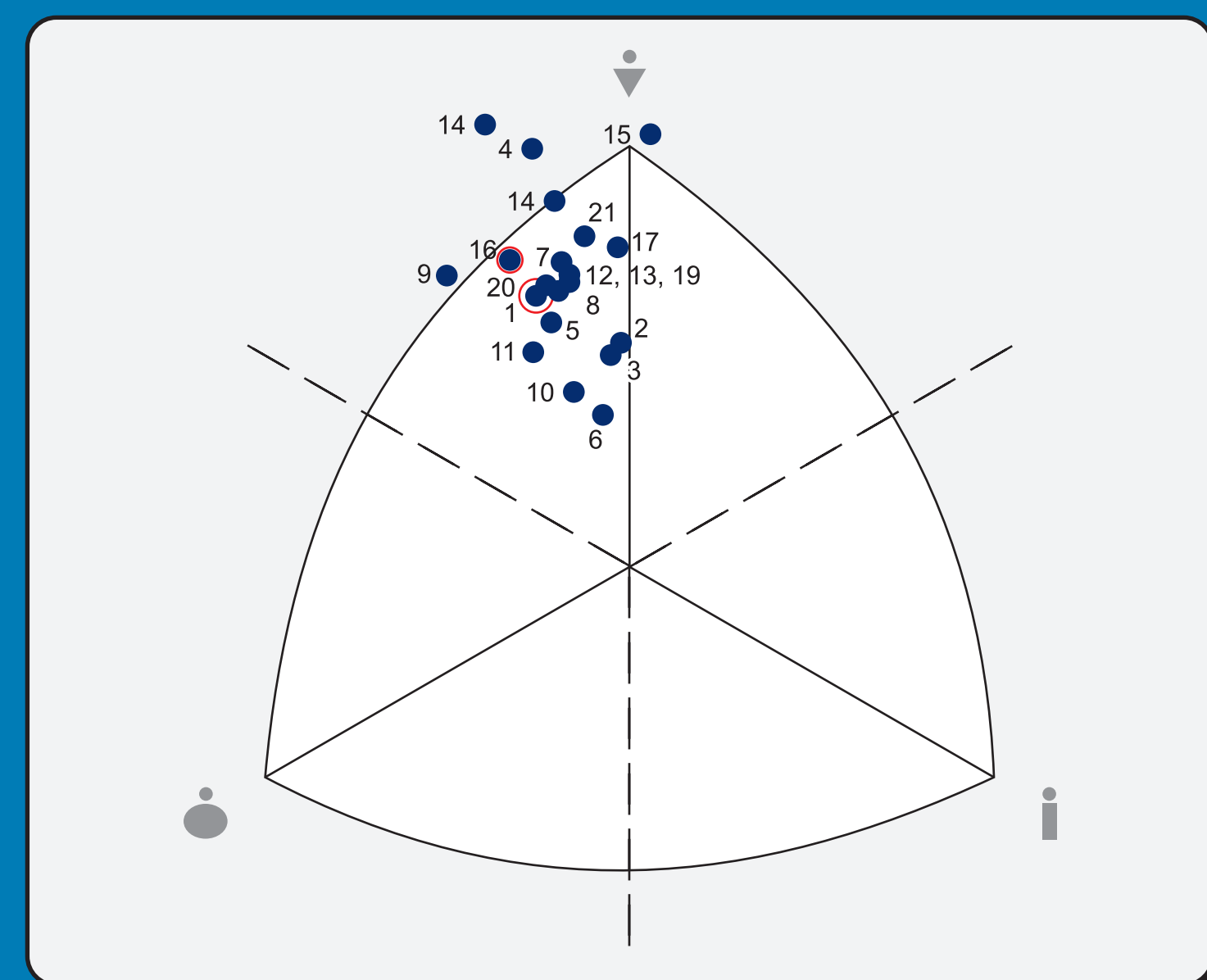


Fig. 1. Somatotypes of judo contestants: 1–Poland 2003, Sterkowicz-Przybycień, Almansha 2011 → endomorphic mesomorph; 2–Slovakia 2000, Sterkowicz-Przybycień et al. 2006 → balanced mesomorph; 3–Slovenia 2000, Sterkowicz-Przybycień et al. 2006 → balanced mesomorph; 4–Brazil 1999, Silva 1999 → endomorphic mesomorph; 5–Poland 1993–95 Krawczyk et al. 1997 → endomorphic mesomorph; 6–Poland 1990, Pietraszewski, 1998 → balanced mesomorph; 7–POL86 Kuźmicki i Charzewski 1987, elite contestants → endomorphic mesomorph; 8–POL86 Kuźmicki and Charzewski 1987, juniors → endomorphic mesomorph; 9–Korea, Dong A University, Shin 1985 → endomorphic mesomorph; 10–Belgium, Claessens et al. 1984 → endomorphic mesomorph; 11–POL83 Kuźmicki and Charzewski 1987, subelite subjects → endomorphic mesomorph; 12–World Championships 1981, Claessens et al. 1997 → endomorphic mesomorph; 13–Bolivar Games 1981, Brief 1986 → endomorphic mesomorph; 14–Japan, Kawamura et al. 1984 → endomorphic mesomorph; 15–France, Kawamura et al. 1984 → balanced mesomorph; 16–Hungary, Farmosi 1980 → endomorphic mesomorph; 17–Czechoslovakia Republic 1977, Stepnicka 1986 → balanced mesomorph; 18–Cuba 1976–1980, Rodriguez 1986 → endomorphic mesomorph; 19–Pan American Games, 1979, Chernilo et al. 1979 → endomorphic mesomorph; 20–Brazil, Araujo et al. 1978 → endomorphic mesomorph; 21–IO Montreal 1976, Carter et al. 1982; Carter 1984 → endomorphic mesomorph.

The review of the previous results obtained for judoists revealed that in 16 groups of contestants, the mean somatotype points to endomorphic mesomorph, whereas five other studies demonstrated balanced mesomorph. The results of the author's studies confirmed previous reports by other studies who investigated the morphological characteristics of Polish elite athletes who practice the sport on a competitive level (Krawczyk et al. 1997, # 5; Kuźmicki and Charzewski 1987, # 7). The characterization of Polish National Judo Team from 2003 is very close to the grand mean, which amounts to 2.73-6.32-1.58.

Mean values of the components of endomorphy, mesomorphy and ectomorphy which characterize judo contestants in different investigations were analyzed by ANOM graphical method (Fig. 2 ABC).

Two points outside the decision lines can be observed in the graph which illustrates the level of endomorphy (Fig. 2A), which means that the value of endomorphy in Koreans is significantly higher than the mean for the whole study material. The National French Team is distinguished by a substantially lower share of this component compared to the grand mean. Fourteen among sixteen group characteristics for endomorphy are contained between the lines marked by decision limits (LDL-UDL, Fig. 2A).

In the ANOM chart which represents the level of mesomorphy, three points are located above the UDL, whereas 2 points can be found below LDL. The teams from Brazil, Japan and France are characterized by statistically significant higher value of mesomorphy compared to the grand mean calculated for all the data (CL – center line). Polish National Team (# 5) and Belgian National Team (10) shows lower values than the grand mean. The analysis of variance confirmed the significant differentiation of the means ($F=6.08$; $p<0.001$). The characteristics of the Polish Team from 2003 exhibit statistically significant differences compared to the mean obtained by Japanese judoists, being a group uniform with other teams (Fig. 2B).

The ANOM chart shows that the level of the component of ectomorphy (Fig.2C) in Belgian team (10) is significantly higher than the grand mean (CL) and significantly lower in Cuban team (18). The means compared in ANOVA confirmed the observed differences ($F=3.29$; $p<0.001$). However, they do not concern Polish representation, which is a group uniform with previous studies (Bonferroni multiple comparison test).

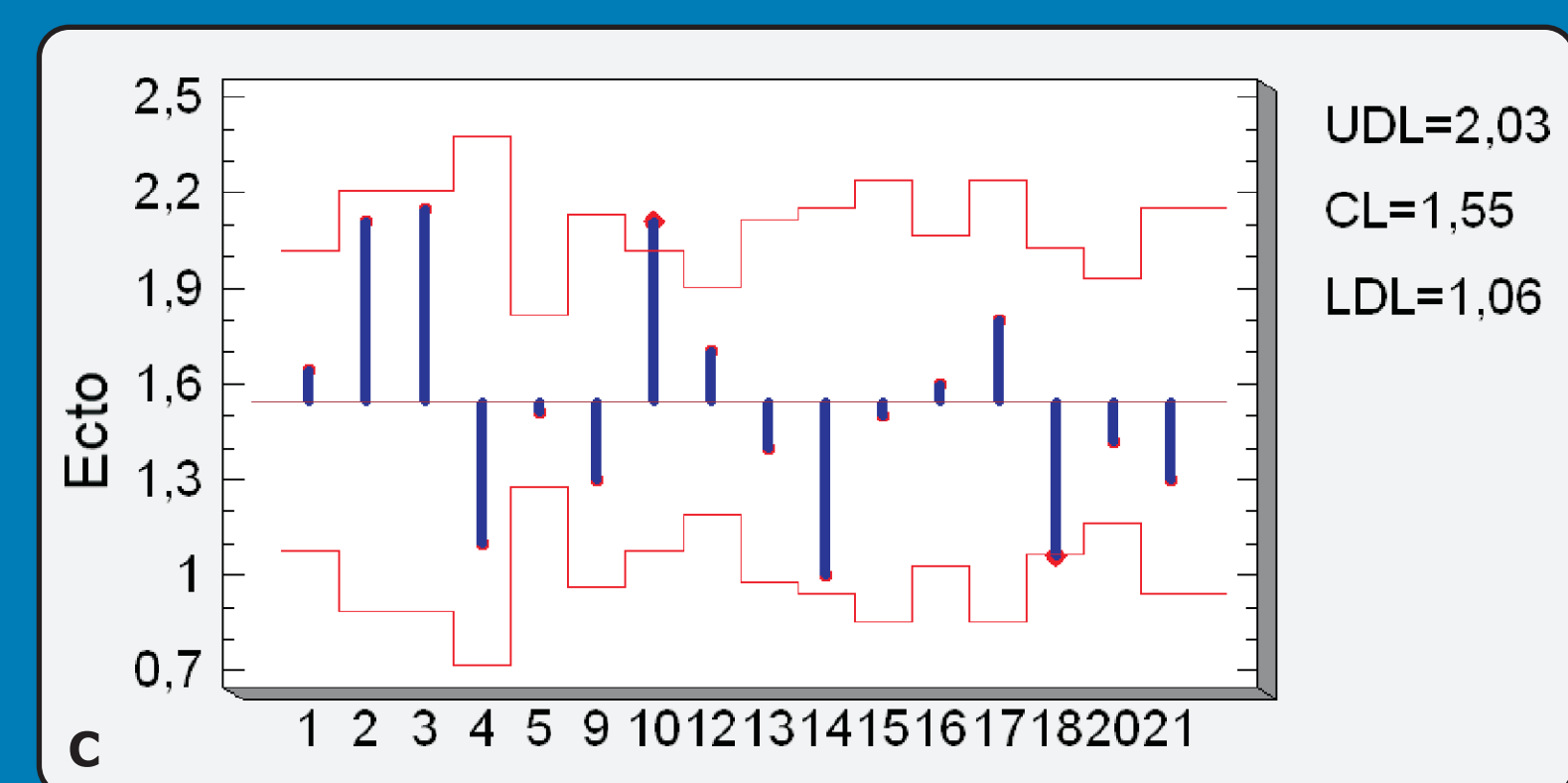
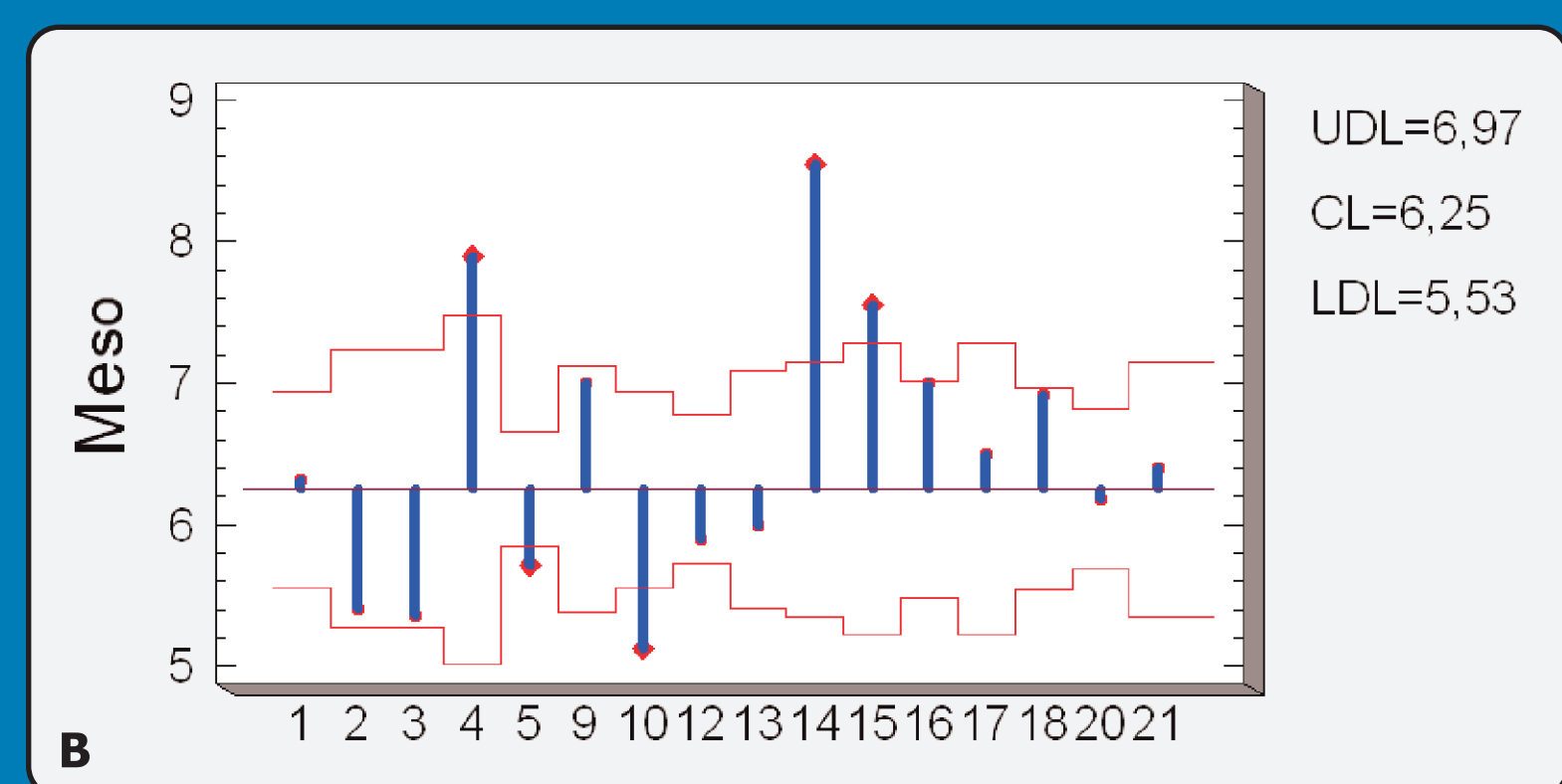
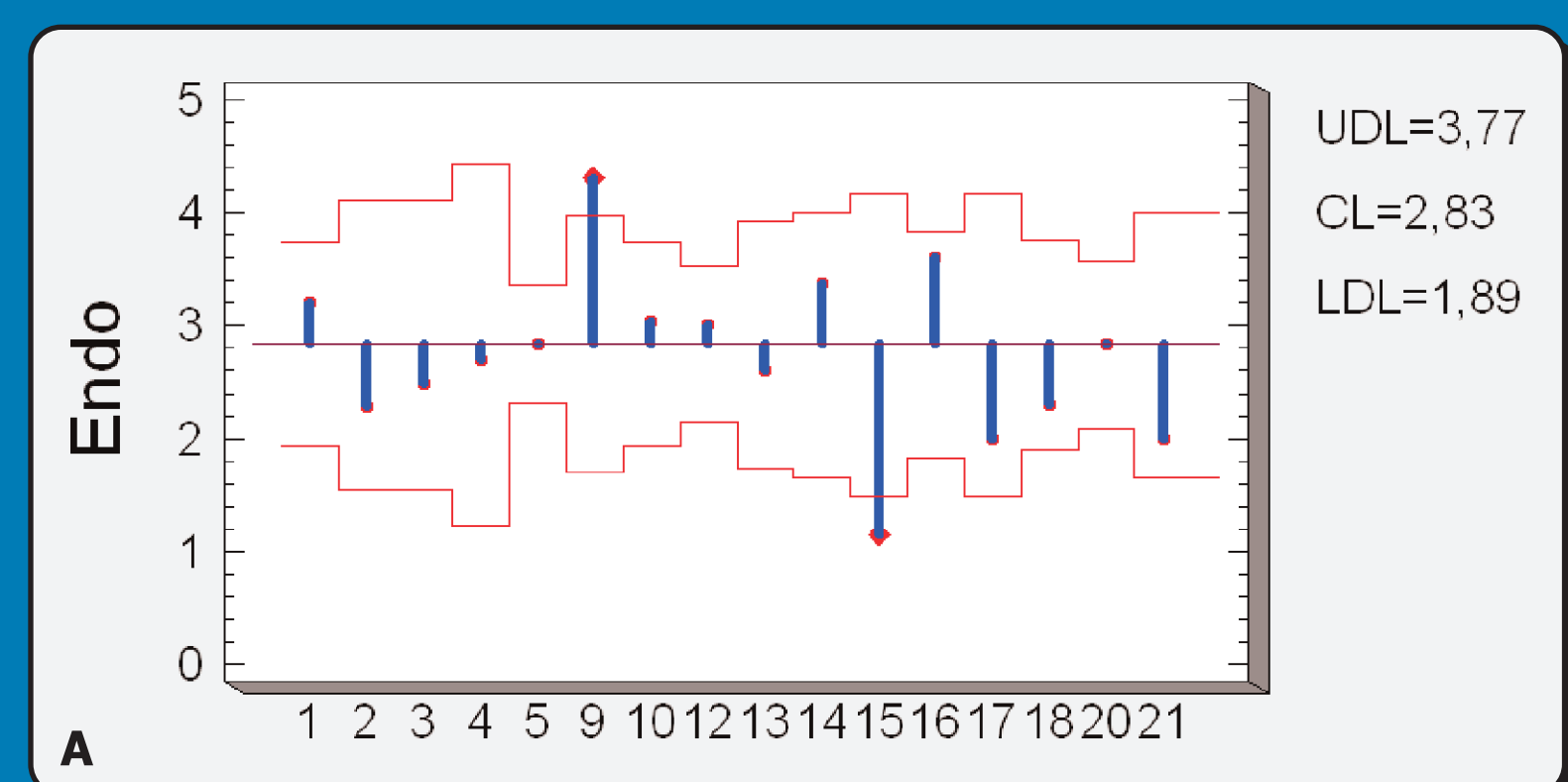


Fig. 2ABC. Analysis of mean components of the somatotype of judo contestants: 1–Poland 2003, Sterkowicz-Przybycień 2011; 2–Slovakia 2000, Sterkowicz-Przybycień et al. 2006; 3–Slovenia 2000, Sterkowicz-Przybycień et al. 2006; 4–Brazil 1999, Silva 1999; 5–Poland 1993–95 Krawczyk et al. 1997; 9–Korea, Dong A University, Shin 1985; 10–Belgium, Claessens et al. 1984 → endomorphic mesomorph; 12–World Championships 1981, Claessens et al. 1997; 13–Bolivar Games 1981, Brief 1986; 14–Japan, Kawamura et al. 1984; 15–France, Kawamura et al. 1984; 16–Hungary, Farmosi 1980; 17–Czech Republic 1977, Stepnicka 1986; 18–Cuba 1976–1980, Rodriguez 1986; 20–Brazil, Araujo et al. 1978; 21–Olympic Games Montreal 1976, Carter et al. 1982; Carter 1984.

The results obtained by Kuźmicki and Jagiełło (2000) demonstrated that the somatotype typical of judoists can be found even in the younger contestants (Fig. 3). The typical judo somatotype, endomorph-mesomorph, was found in Polish juniors (3.0-5.5-2.1), representative of Polish senior national team (2.6-6.4-1.8) and the participants of world championships from 37 countries (2.98-6.76-1.55). Balanced mesomorph somatotype (mesomorphy is dominant, endomorphy and ectomorphy are less and equal or do not differ by more than one-half unit) was found in the youngest Polish judoists (3.2-4.4-3.4) and cadets (2.8-4.9-2.8).

The somatotype in Fig. 3 illustrates the phenomenon of intensification of the component of mesomorphy with age and sport level in judo contestants.

CONCLUSION

A typical somatotype among judo contestants is endomorphic mesomorph, with dominant mesomorphy and endomorphy greater than ectomorphy. It can be concluded that many-year training and selection schemes contribute to formation of the somatotypes typical of judo contestants.

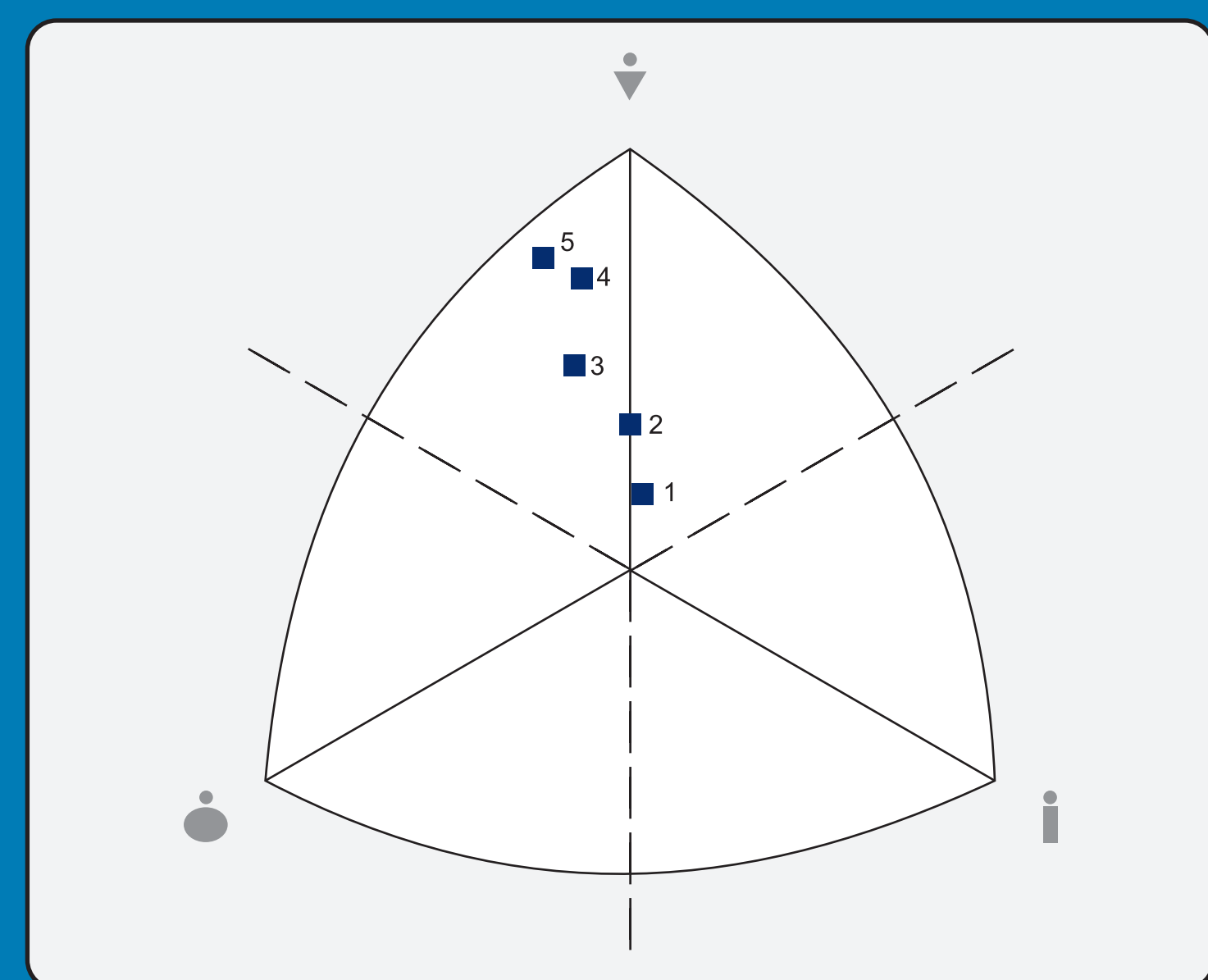


Fig. 3. Group somatotypes for judo contestants in age categories: 1–youngest judoists POL; 2–cadets POL; 3–juniors POL; 4–senior contestants POL; 5–participants of world championships.