SPORTS-SPECIFIC ANTHROPOMETRY IN JAPANESE SOCCER PLAYERS ANALYZED BY THREE-DIMENSIONAL PHOTONIC SCANNING

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Introduction

Three-dimensional (3D) scanners for human body surface were initially developed for the clothing industry. However, now they can be used for multiple anthropometric measurements in athletes: body size, shape, circumference, volume and composition (1). We applied this technology on Japanese soccer players from youth to professional. The first purpose of the study was to describe soccer-related kinanthropometry according to age and playing position. The second was to compare them with soccer players from other countries and athletes from other sports (track & field, rowing and canoeing).

Methods

A total of 159 soccer players aged from 12 to 40 yrs participated. 5 Brazilian and 4 Korean professionals were included. Body composition was measured by the Bod Pod system (LMI, Inc.). Length of upper and lower extremity and circumferences of upper arm, chest, hip, waist, thigh and lower-thigh were measured by a 3D scanner (Hamamatsu Photonics). The data were expressed as a percentage of height (%Cir).

Results & Discussion

Hip and leg %Cir were lower in GK than in FD (FW, MF, DF). When controlled for fat-free mass to height, GK showed higher upper and chest circumferences than FD. FW showed higher chest circumferences than MF and DF in professionals.

Table 1.Age related changes in %Cir in FD

Age	n	Upper-arm	Chest	Hip	thigh
U-14	59	14.5(1.0)	48.7(2.0)	53.9(2.0)	27.9(1.6)
U-17	47	15.8(1.0)	51.1(2.2)	56.5(1.8)	30.1(1.5)
U-22	29	16.4(0.8)	52.8(1.9)	56.3(1.8)	30.5(1.6)
O-23	45	16.4(1.1)	52.5(1.9)	56.5(1.7)	30.2(1.2)

In FD, hip and leg %Cir were much lower in U-14 than in U-17, U-22 and O-23,although upper-arm and chest %Cir increased with age until U-22. Similar anthropometric proportion was found in Japanese and Korean professionals. Length of lower extremity was longer and upper-arm and chest %Cir were higher in the Brazilian compared to the Asian players.

Conclusion

Upper-body muscularity based on hip and leg muscularity is a characteristic of professional FD players. This tendency is much clearer on Brazilian players. The 3D scanning could be a useful tool for identifying differences in players' kinanthropometry.

References

1. Stewart,A.D.(2010) *J Sports Sci.* 28(5): 455-457.