



Body Fat Assessed With Electrical Impedance Myography Compared With DXA In Professional Athletes



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INTRODUCTION

Electrical impedance myography (EIM) has been compared with DXA in physically active subjects, but its accuracy in professional athletes has not been explored. Therefore, the purpose of this study was to compare the body fat estimated with a commercial EIM mobile device with body fat measured with DXA.

METHODS

We evaluated the body fat percentage (BF%) of 28 professional male soccer players (19 - 34 years old, BF% 14.95 ±2.43) with a whole body DXA scan (Hologic®) and a mobile EIM device (Skulpt® Chisel). The EIM was assessed at ten anatomical sites (abdomen, biceps, calves, chest, forearms, hamstrings, lower back, quadriceps, shoulders, and triceps). The BF% was estimated for each anatomical point and for the sum of all according to the manufacturer's instructions. We calculated mean differences in BF% (DXA - EIM) and their 95% limits of agreement. DXA and EIM BF% were analyzed for correlation with intra-class correlation coefficient and compared with ANOVA and Dunnett post hoc test.

RESULTS

There were strong correlations between DXA BF% and EIM BF% assessed at abdomen, chest, lower back, quadriceps, hamstrings, and all sites. Moderate to low correlations were observed for shoulders and triceps. Biceps, calves, and forearms showed no significant correlation (Table 1). Similarly, DXA BF% was different to EIM BF% at calves and forearms only ($p < 0.05$) (Figure 1).. From the other anatomical sites, the closest mean difference with DXA was observed at hamstrings and the biggest at biceps. However, the narrowest limits of agreement were observed at quadriceps and the widest at chest (Table 1).

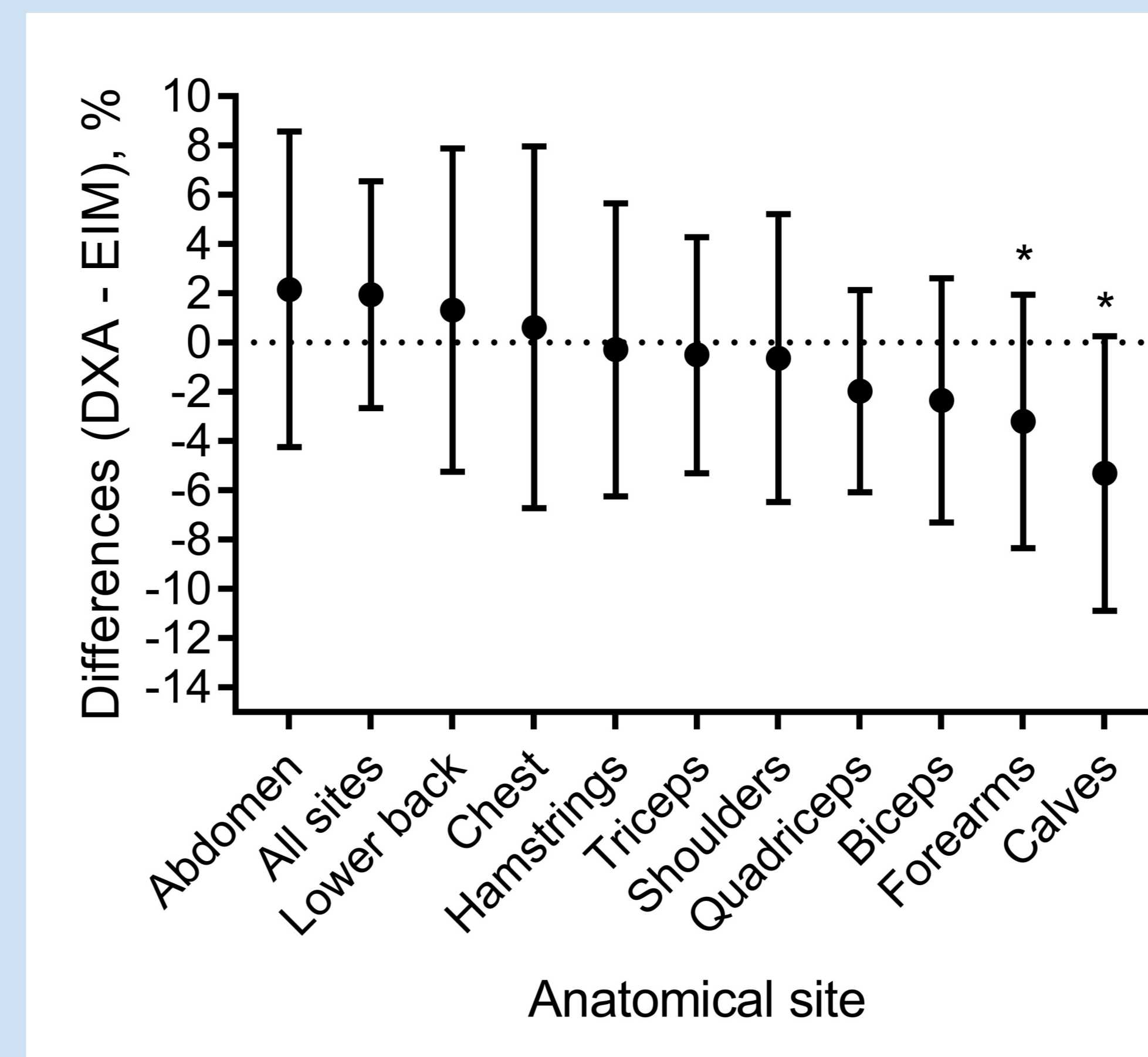


Figure 1. Differences between DXA and EIM by anatomical site. Points represent mean differences, whiskers represent 95% limits of agreement.

* Significant differences with DXA ($p < 0.05$). DXA: Dual-energy X-ray Absorptiometry; EIM: Electrical impedance myography.

Table 1. Intraclass correlation coefficient (ICC) and absolute range of limits of agreement (LA) between DXA and EIM by anatomical site ($n = 28$).

Anatomical site	ICC	Range LA
All sites	0.64	9.2
Quadriceps	0.61	8.21
Triceps	0.48	9.59
Biceps	0.13	9.91
Shoulders	0.50	11.67
Hamstrings	0.61	11.9
Abdomen	0.75	12.81
Lower back	0.62	13.12
Chest	0.67	14.67
Forearms	0.04	10.29
Calves	0.005	11.13

ICC: Intraclass correlation coefficient; Range LA: Absolute range on limits of agreement (95%).

CONCLUSIONS

The EIM mobile device was useful to accurately estimate BF%, even evaluating a single anatomical site when compared with DXA in professional soccer players. This device could be helpful for body composition assessment on the field. However, its accuracy in other athletic populations and its applicability for follow-up warrants further research.