

Fiber Type Profile and its Relation to Wilks Coefficient in Both Male and Female Powerlifters

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ABSTRACT

While powerlifters tend to display higher fast-twitch fiber content, it is unknown if this content predicts competitive performance via Wilks coefficient. **Purpose:** to 1) compare the myosin heavy chain (MHC) fiber type (FT) profiles between powerlifters and sedentary controls of both sexes, and 2) determine if fast-twitch fiber content predicts Wilks coefficient. **Methods:** Twelve actively competing powerlifters (PL; n=6M/6F; age=21±1.0y; 3.0±1.8y competing; 7.3±6.6 meets attended) and ten sedentary controls (CON; n=5M/5F; age=19.4±2.0y) underwent *vastus lateralis* muscle biopsies, with samples analyzed for MHC isoform content via mixed homogenate SDS-PAGE. Individual MHC isoform differences between group and sex were analyzed using a 3x2x2 (FT [MHC I, IIa, & IIx] x group [PL & CON] x sex [male & female]) ANOVA and MHC IIa content was compared to Wilks coefficient using Pearson correlation coefficient at p<0.05. **Results:** Male PL MHC isoform distribution was 50±6% I, 45±6% IIa, and 5±11% IIx, vs 46±6% I, 53±6% IIa, and 0% IIx in PL females. Conversely, male CON MHC distribution was 33±5% I, 38±7% IIa, and 30±8% IIx, vs 35±9% I, 44±8% IIa, and 21±17% IIx in CON females. Analysis revealed a significant FT main effect (p<.001; $\eta^2=.773$), as well as significant FT x group (p<.001; $\eta^2=.552$) and FT x sex (p=.025; $\eta^2=.127$) interaction effects with no other significant main or interaction effects. When sex-collapsed, pairwise comparisons indicated MHC I and IIa content did not significantly differ within PL, while MHC IIx proportion was significantly lower than either isoform (p<.001). Within CON, MHC I proportion did not differ from MHC IIa nor IIx isoforms; however, MHC IIa content was significantly greater than MHC IIx (p<.001). The proportions of both MHC I (p<.001) and IIa (p=.021) were significantly higher between PL groups, while MHC IIx content was significantly greater in CON (p<.001). When group-collapsed, pairwise comparisons revealed in either sex that MHC I and IIa content did not significantly differ, while MHC IIx content was significantly lower (p<.001). Interestingly, females had significantly greater MHC IIa content vs males (p=.04). Pearson correlation analysis revealed a non-significant, low negative correlation between MHC IIa content and Wilks coefficient (r =-.288; p=.364). **Conclusions:** These results illustrate powerlifters have higher MHC I and IIa proportions, as well as lower MHC IIx content compared to sedentary controls. While overall limited by sample size, MHC IIa content does not appear to be a significant predictor of powerlifting Wilks coefficient, suggesting this characteristic alone does not define powerlifter skill variations.