Is Hormonal Contraceptive Use during Adolescence a Factor in Baseline Adult Muscle Mass and Function?

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Hormonal contraceptive (HC) use is common in adolescence and emerging adulthood, while fat-free mass (FFM) and muscle strength are still accruing. Accordingly, long-term sarcopenia and dynapenia risk may be affected by the timing of this hormonal exposure. PURPOSE: We set out to evaluate whether HC use and HC type were associated with muscle characteristics in undergraduate women. METHODS: Using an electronic survey, undergraduate women were surveyed on key characteristics, including current exercise frequency, menstrual history and HC use. A subsample of respondents participated in anthropometrics and grip strength tests. Height (cm) was measured via portable stadiometer. Bioelectric impedance analysis assessed total, lean & fat mass (kg). Mid-upper arm circumferences and skinfold thicknesses (biceps, triceps, subcapular, suprailiac) were measured for use in arm muscle area (AMA) and %FFM calculations. Grip strength (kg) was measured via dynamometer. SPSS v24 was used to evaluate correlations among muscle outcomes and to perform ANOVA with covariates (α=0.05). Trends for associations were also noted (p<0.20). ANOVA tested for group differences in %FFM, arm muscle area and grip strength, evaluating HC use groups (nonHC vs. useHC) and type groups (nonHC; progesterone only=proHC; estrogen/progesterone=comboHC). Covariates included height, menstrual irregularity and current exercise frequency. RESULTS: Anthropometric and HC data were provided by n=76 (nonHC n=24, useHC n=52; proHC n=12, comboHC n=40). Left AMA correlated positively with grip strength (r=0.32, p=0.005). Grip strength was higher in useHC than nonHC (p=0.025). Contradictory trends were observed for %FFM and AMA, with lower %FFM in useHC than nonHC (p=0.105) and higher left AMA in useHC than nonHC (p=0.124). HC type trends included: greater left AMA in proHC vs. nonHC; greater grip strength & %FFM for comboHC vs. nonHC (ANOVA p<0.09, post-hoc p<0.07-0.14). CONCLUSION: It is unclear whether HC use affects musculoskeletal development during adolescence and emerging adulthood. Future research should evaluate these issues prospectively and look at long-term associations across the lifespan.

Supported in part by grants to Binghamton University from the following: Howard Hughes Medical Institute (HHMI) through the Precollege and Undergraduate Science Education Program, New York State Regional Economic Development Council, and SUNY Investment & Performance program.