



The Effects of Oral-Contraceptive Use on Aerobic Performance In Active College Aged Women

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INTRODUCTION

There is a high number of elite female athletes using hormonal contraceptives (HC), which neutralize oestrogen and progesterone fluctuations and lead to cessation of the menstrual cycle.¹ The most common type of HC used among college age females are oral-contraceptive pills (OCP). There are periodic changes in hormonal levels of eumenorrheic (normally menstruating) women, and these levels vary even more with age. HC may provide a more consistent regulation of hormones, but may have an effect on other aspects of health. In the interest of preventing injury in athletic females taking OCPs, research to determine changes in performance are of significant importance. To that end, aerobic capacity and performance are easily measurable aspects of performance that are of interest to the athletic trainer.

OBJECTIVES

This study aims to understand if the use of OCP reduces aerobic performance in physically active college age females compared to eumenorrheic women of similar performance level.

METHODS

Search Strategy:

- (hormonal contraceptives) AND (female) AND (athletics OR exercise OR sport) AND (aerobic exercise) AND (performance)

Online databases used:

- PubMed
- Cochrane Database
- Trip Database
- MEDLINE
- Additional resources obtained via review of reference lists and hand search

Inclusion Criteria:

- Public access, full text articles.
- Publication within last 10 years.
- Studies that include college age (18-25 y/o) subjects that are considered active.
- Studies comparing a contraceptive group to a regular menstruating group.
- Studies that use VO₂ performance as the main outcome measure.
- Level IV evidence or better.

Exclusion Criteria

- Studies examining outcomes other than performance, such as injury.
- Studies not limited to English language.
- Studies that include trans-women, men, or post-menopausal women.
- Studies with non-hormonal contraceptives as intervention.

RESULTS

Reference	Vaiksaar et a	Quinn et a	Gordon et a	Joyce et a
<i>Participants</i>	Recreational rowers taking OCP (21.0 ± 2.6 years), trained eumenorrheic (18.8 ± 2.1 years), recreational eumenorrheic (18.0 ± 0.9 years)	Healthy women (21 ± 3 years) who were recreationally-active (defined as 150–300 min per week of moderate intensity exercise)	Healthy, physically active women (21 ± 1.8 years)	Healthy women (21 ± 2.7 years) who were recreationally active (defined as exercising > 3 days per week for at least 30 min per session)
<i>Inclusion/Exclusion</i>	Monophasic OCP (20 µg ethinylestradiol and 75 µg gestodene) for OCP group. Women with a self-reported natural monthly MC (24–35 days), with at least 6 months of documented MC, tested during the LF and ML phases, verified by MC history and serum oestrogen and progesterone levels.	28-day combined monophasic OCP Women with a self-reported natural monthly MC (28–30 days in length) and had not taken any form of hormonal contraception for 12 months prior to the study, tested during the EF phase, verified by serum oestrogen and progesterone levels	Monophasic OCP containing 30 µg ethinyl oestradiol and 150 µg levonorgestrel Women with a self-reported natural monthly MC tested during the EF, LF, ML and LL, verified by MC history and salivary oestrogen and progesterone levels	Combined monophasic OCP Women with a self-reported natural monthly MC lasting between 28 and 30 days for at least 12 months before the study, tested during the EF phase, verified by serum oestrogen and progesterone levels
<i>Outcomes</i>	VO ₂ peak (ml·kg·min ⁻¹) and peak power (W) measured during a maximal rowing test.	Peak VO ₂ (ml·kg·min ⁻¹) and power (W) during an incremental cycle to volitional fatigue.	Peak VO ₂ (L·min ⁻¹) and power (W) measured during an incremental cycle to volitional fatigue.	Peak VO ₂ (L·min ⁻¹) and power (W) measured during an incremental cycle to volitional fatigue, and time to exhaustion on a submaximal cycling test
<i>Results</i>	Sport-specific endurance performance was not influenced by the phase of the normal menstrual cycle and the synthetic menstrual cycle of the OC users in rowers.	Cardiopulmonary parameters were similar between groups during cycling, including VO ₂ peak. no effect of OC at LT1, LT2 or exhaustion calculated as a change from baseline. The change in TSI from LT1 to LT2 was significantly different between groups.	Total VO ₂ during the final 60s of the VO ₂ max trial, significant differences were observed between OCP and n-OCP (<i>P</i> <0.05). Data suggest that the VO ₂ plateau is negatively effected by the monophasic oral contraceptive pill.	Long-term OC use negatively affects peak VO ₂ and VO ₂ at the AT.
<i>Level of Evidence</i>	2b	2b	2b	2b
<i>Support for PICO</i>	No	No	Yes	Yes

KEY: MC=menstrual cycle, FP=follicular phase, LP=luteal phase, EF=early follicular, LF=late follicular, ML=mid-luteal, LL=late-luteal, VO₂max=maximal oxygen uptake, AT=anaerobic threshold, HR=heart rate, BP=blood pressure.

RESULTS

- The literature was searched for studies of level 4 evidence or higher that investigated the effect of OCP on performance in active women aged 18-25.
- The literature search returned 7 possible studies related to the clinical question; 4 studies met the inclusion criteria.
- All studies included are cohort studies, due to the unethical risks of pregnancy associated with blinding and/or randomization.
- Three of the four studies completed a volitional exhaustion test for each trial, with the exception being Joyce et. al⁶ which used two sub-maximal tests and one volitional exhaustion.
- One of the four studies, Vaiksaar et. al³, used rowing as the means of aerobic exercise, while the remaining studies used cycling.

CONCLUSION

Ultimately, no conclusions can be made that OCP use will decrease aerobic capacity in active college aged females. There is a need for additional studies with larger cohorts to determine if there is true concern for decreased aerobic performance in active 18-25 year old women taking OCPs.

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