Isometric Endurance, limb and skin blood flow during the menstrual cycle.

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Abstract

BACKGROUND:
Limb blood flow and skin and deep tissue temperature change during the menstrual cycle. However, the impact of these changes on isometric exercise performance has not been investigated.

MATERIAL/METHODS:
Isometric endurance was assessed at contraction tensions of 20, 40 and 60% of the maximal voluntary contraction strength (MVC) of the handgrip muscles in 8 women every other day throughout their menstrual cycles (MC). For any MC, contractions were only accomplished at one of the three tensions. For contractions at 40% MVC, an additional two MC were studied during which the circulation to the forearm was occluded during the contractions in one cycle and muscle temperature stabilized and occluded in another cycle.

RESULTS:
The results of these experiments showed a small variation in endurance during the MC for contractions at 60% MVC. This effect increased at 40% and was greatest for contractions at 20% MVC. When circulation was occluded, the response was changed in both magnitude and timing during the MC showing that there was variation in muscle performance due to the menstrual cycle not due to changes in blood flow. Further, when muscle temperature was stabilized and flow occluded, there was still lower endurance at the end of the Follicular phase showing an effect of the menstrual cycle on endurance absent changes in muscle temperature and blood flow.

CONCLUSIONS:
The results show that the MC alters isometric endurance due to 1) a cyclic variation in muscle temperature, 2) direct effects of the menstrual cycle on circulation and 3) Direct effects of the MC on muscle.