

Exercise During Pregnancy: Paolone's Discoveries

For two years physical education professor, Albert Paolone, Ed.D., has been conducting research in the area of exercise and pregnancy. Paolone's co-researchers have been his graduate assistant, Judi Minnitti; Mona Shangold, M.D., of Georgetown University Hospital's Department of Obstetrics and Gynecology; Stuart Weiner, M.D., and Dennis Paul, both of Pennsylvania Hospital's Department of Obstetrics and Gynecology. Their work is receiving wide recognition.

The PBS series, *Body Watch*, devoted its ninth episode of the 1986-87 season to issues relating to pregnancy. That episode, called "Well-Conceived," featured Albert Paolone as guest. Interviewed by Suzanne Rothschild, Paolone discussed the threat of hyperthermia (abnormally high body temperature) increasing the risk of birth defects during the first trimester of pregnancy. He explained that 102 degrees is the level for increased risk of central nervous system damage to a fetus. This damage can occur when a woman doesn't realize she's pregnant, Paolone says. Therefore, he suggests that women level off their workouts if trying to get pregnant, especially during hot, humid weather.

With most of his work concentrated on heat stress, Paolone gives these additional tips to expectant mothers:

- during your first trimester, avoid exercising in hot weather and keep bath water below 100 degrees

- if exercising outdoors, do it during early morning or at night [cooler temperatures]
- exercise for one-half hour or less three times a week
- be careful when using hot tubs or saunas

When the Paolone team began their research, the objective was to determine how the fetus responds to maternal exercising. They monitored the fetal heart rate in response to maternal cycle ergometer exercise (a pedaling exercise). The result was a significant discovery—motion artifact (unreal measurements) can override the recording of the fetal heart rate during maternal exercise.

Previous research, which has also been published, shows a large decrease in fetal heart rate during maternal exercise. Normal fetal heart rate is between 120 and 160 beats per minute. However, this earlier research shows the fetal heart rate as 50 to 84 beats per minute in response to the pedaling exercise. Paolone, also an exercise physiologist in Temple's Biokinetics Research Laboratory, says that these lower numbers resulted because researchers measured pedaling rates, not fetal heart rates. "If these reported fetal heart rates had indeed been real, allowing them [the expectant mothers] to continue [pedaling] at these levels without intervention could have resulted in fetal damage or death," Paolone and Shangold presented this information via letter to the *Journal of Applied Physiology*.



tifact," a paper written by Paolone, Minnitti, Shangold, Weiner and Paul. The team presented it at the October 1986 district meeting of the American College of Obstetricians and Gynecologists in Williamsburg, Va.

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To refute the earlier research findings, Paolone and his team developed a method of measuring fetal heart rate, distinguishing it from artifact, using echocardiograms. This development was the subject of "Fetal Heart Rate Measurement During Maternal Exercise—Avoidance of Ar-