Biomedicine

Exercise-menstrual problem link?

Exercise can temporarily knock a woman's menstrual period off cycle, according to Boston University (BU) research reported in the May 23 NEW ENGLAND JOURNAL OF MEDICINE. However, the study should not be considered definitive, cautions Mona Shangold, director of the Sports Gynecology Center at Georgetown University in Washington, D.C., who has found that exercise may help women regain a normal cycle (SN: 7/5/80, p. 6).

For one month, the BU researchers monitored daily hormone levels in 28 college women who did not exercise regularly and had a history of regular menstrual cycles. They then sent the women to summer camp and had them tackle a rigorous training regimen—an initial 4-mile daily run, working up to 10 miles a day after five weeks, in addition to $3\frac{1}{2}$ hours daily of moderate sports such as biking or tennis.

Of the 28 women, only four—three of whom were on a high-calorie weight-maintenance diet — had a normal menstrual cycle during that time. All the women scaled down their exercising after completing the study, and all returned to normal cycles within six months. The researchers' conclusion? Regardless of whether the women lost weight, strenuous exercise disrupted their reproductive function. "If very active women are having trouble getting pregnant, they probably should slow down intense exercise," says exercise physiologist Gary Skrinar of BU. But Georgetown's Shangold says the study is not conclusive. "There were no controls," she says. "There are menstrual cycle changes that occur when women go on vacation or are off for the summer." In addition, she says, the level of training was beyond what most beginning runners usually attempt, something Skrinar also notes. "I'd like to try [more] gradually increasing it—I don't think we'd find as many problems," he says.

Cautions Shangold, "It's dangerous to assume women runners with menstrual problems have exercise as a cause—it may be that a serious underlying problem is not being recognized."

Magnesium as toxic shock key

Harvard University researchers report that magnesium may explain the connection between toxic shock and tampons.

Some strains of the ubiquitous bacteria *Staphylococcus aureus* produce a toxin responsible for toxic shock. The condition is marked by fever, shock and a skin rash on the hands and feet. In some people the condition can be fatal, but 95 percent of people have antibodies to the toxin and are immune to its effects.

The scientists tried to grow a toxin-producing strain in different media and found that it thrived in the presence of polyester foam, a constituent of the no-longer-marketed Rely brand of tampon. Little toxin was produced in the presence of other tampon materials, including cotton, viscose rayon and polyacrylate rayon, the last another highly absorbent material suspected of being a factor in toxic shock.

Further investigation showed that both the polyacrylate rayon and the polyester foam latch onto magnesium from the body—with the foam a better binder—and that the bacteria produce more toxin in a low-magnesium environment. They conclude that in the vagina the two superabsorbent materials, which are no longer included in tampons, create a low-magnesium environment that promotes toxin production.

Medicine capsules

- The Food and Drug Administration has approved Marinol (dronabinol) as an anti-nausea agent in cancer chemotherapy. Marinol contains the active ingredient of marijuana, and the Drug Enforcement Agency also must approve its sale.
- Last week's sale of Hughes Aircraft Co. to General Motors brings over $5 billion to its seller, the Howard Hughes Medical Institute. The Bethesda, Md., institute funds medical research.

Space Sciences

Second salvage try set for satellite

The Leasat 3 communications satellite, deployed from the space shuttle on April 13, was left stranded when the rocket motor that was to have raised it to a higher orbit failed to fire. Four days later, an attempt during the same shuttle mission to snag what appeared to be an incompletely thrown switch on the satellite went just as planned, but still the rocket did not ignite (SN: 4/27/85, p. 261). Now NASA has announced plans to try a second salvage operation—the third attempt, in other words, to get Leasat 3 into position.

It is scheduled for shuttle mission 51-I, due to take off on Aug. 24 or later, a flight that will also deploy three other satellites including Leasat 3's successor, Leasat 4. Shuttle astronauts have already performed one piece of successful satellite surgery—when they refurbished the Solar Maximum Mission satellite 14 months ago—but Solar Max carried no fully fueled rocket.

The problem with Leasat 3 was at first thought to be the failure of a timer, or "sequencer," that was to have ignited the rocket 45 minutes after deployment. Now the thought is that the sequencer may have been somehow disconnected from the electrical system completely, but the first steps of the salvage mission will be to ensure that the rocket does not ignite on its own.

After the shuttlecraft has matched positions with the satellite, astronaut James van Hoften will ride out on a platform attached to the shuttle's remote maneuvering arm, attach a grab bar to the slowly spinning satellite and use his space-suited "bare hands" to bring the spin to a halt. Then he will reposition the satellite toward fellow astronaut William Fisher, in the open cargo bay, who will lock down the original activating switch, install some "shorting plugs" to make sure the sequencer stays out of action and, just to be on the triply-safe side, insert "safing pins" so that the rocket would not fire even if it got the signal.

With the satellite rendered as inert as it can be, the astronauts—still outside the shuttle—will set about readying it for its next launch attempt. Van Hoften will remove the handle he had previously installed, replacing it with a stronger one that will allow Leasat 3 to be held in position by the manipulator arm itself. Next, Fisher will connect wires from a "remote power unit" (being developed by Hughes Aircraft Co., the satellite's builder) whose signals will be used to reposition a number of switches so that commands can get to the satellite's decoder without going through the now-silenced sequencer.

The final step will be to install an additional unit so that Leasat 3 can receive its commands from the ground. And even then, safety reigns: Lest some mishap on the ground send the rocket-firing order too soon—such as while the shuttle is still in the vicinity—the new unit, says David S. Grissom of the NASA Johnson Space Center in Houston, will not accept its first command for eight hours.

At last, van Hoften will start the satellite spinning again—again by hand—at about two revolutions per minute for stability; the arm will release its grip on the handle, and the crew will reenter the shuttle cabin, as much as six hours after they left.

Then it is back to the original question, already asked twice before: Will the rocket fire? In a dormant state since April, notes NASA, the satellite has been existing at temperatures "well below the design and test limits of the liquid and solid propellant systems, electronic units, batteries and all other components. This factor, when combined with the complexity of the modifications to be made . . . appreciably limits the chances of success."

Grissom himself is more optimistic, noting that the details of the salvage operation are relatively straightforward and have been confirmed in repeated ground tests. Meanwhile, Hughes Communications, Inc., the corporate division that is leasing Leasat 3 and three others to the U.S. Navy, expects the operation to cost it about $10 million to $20 million. Leasat 3 is insured for about $80 million, but collecting on it could have significant effects on premiums for future satellites.