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High Speed Treadmill Installed at New Bolton Center

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Nostrils flaring, mane flying and legs moving at a fast pace, the Standardbred leans into the breastplate, going at top speed. Only this horse is not racing for the finish line, it is running on New Bolton Center's high-speed treadmill during a diagnostic work-up. While the stallion is moving as if in a head-to-head contest, Dr. Tulleners manipulates an endoscope, inserted into the horses' throat through a nostril, to examine the horses' larynx. Tulleners and students watch the image on a large TV screen to detect irregularities in the airways that may explain the noisy breathing of the racer.

Opened late this summer, the Jeffords Treadmill Facility adds a new diagnostic dimension to New Bolton Center's services. The 2,000 ft² building encompasses a large two-story space, two stalls and a laboratory. The centerpiece is the high-speed treadmill, enclosed by "bulletproof" polycarbonate to protect people and horses. The building is air-conditioned and equipped with a battery of fans for not-so-hot days.

"This treadmill can attain a speed of 37 miles per hour," says Dr. Benson Martin, assistant professor of sports medicine and director of the treadmill facility. "Its running surface can be raised to duplicate an uphill slope of six degrees which forces the animal to

work harder. This allows us to simulate racing conditions. For many diagnostic procedures we need the animal to work up to 200 - 240 heart beats per minute, the heart rate at racing speed."

The speed of the running surface is controlled from a console. Horses are walked on the treadmill, up against a breast plate and are tethered. A safety harness is connected to an overhead device which automatically stops the machine should the horse stop running. The operating technician is assisted by at least one other person to keep the horse running. The equipment starts at a walking speed, then gradually accelerates to a trot and then to whatever speed is required for the diagnostic procedures.

The treadmill is a service department that is used by clinicians for detailed work-ups. "It enables us, for example, to perform a cardiovascular evaluation utilizing a radiotelemetric heart monitor while the animal is running," says Dr. Martin. "Or we can use the endoscope to observe the animal's airways while it is at racing speed. This is particularly important for noisy breathers and for evaluating 'bleeders'."

The facility is used for lameness evaluation at low and high speeds. Other clinical tests, performed while a horse is running, measure oxygen consumption, CO₂ production, lactic acid

production, respiratory flow and upper airway pressure.

The treadmill is important to researchers engaged in orthopedic studies, cardiovascular and pulmonary studies, the research involving EIPH and the work on "tying up." With the treadmill in place, racing demands can be duplicated and the horse can be hooked up to instruments to measure such functions as respiratory flow, pulmonary and arterial pressures, blood pressure, venous pressure, body temperature, oxygen consumption, CO₂ production, cardiac output, blood gases, lactic acids, glucose metabolism and oxygenation. Many of these measurements can be fed directly into the three computers, located in the laboratory adjacent to the treadmill. "This facility enhances our research abilities tremendously," says Dr. Lawrence Soma, who has studied EIPH for many years.

Plans are underway to add additional diagnostic equipment to further utilize the treadmill. Funds are being raised to purchase scintigraphy equipment so bone scans can be performed to detect causes of lameness.

The Jeffords Treadmill Facility is under the auspices of the Section of Sports Medicine which is headed by Dr. William Moyer, professor of sports medicine.

The building and the acquisition of the treadmill were made possible through the generosity of a number of anonymous donors, Dr. Peter D. Blauner, Mr. and Mrs. Jesse M. Bontecou, Mr. F. Eugene Dixon, Jr., Mrs. Richard C. duPont, Mr. and Mrs. Henry R.C. Elser, Mr. and Mrs. William Entenmann, Mr. and Mrs. M. Roy Jackson, The Jeffery Trust, Mr. and Mrs. Hardie Scott, The Sproul Foundation, Mrs. Anne French Thorington, Pennsylvania State Horse Racing Commission, F. Eugene Dixon, Jr., chairman, John A. Ballard, commissioner, Russell B. Jones, commissioner, Kenneth E. Kirchner, executive secretary, and 1990 New Bolton Center Day at the Races in Saratoga.

Treadmill Dedication



Mr. F. Eugene Dixon, Jr., chairman of the Pennsylvania State Horse Racing Commission, addresses guests during the dedication of the Jeffords Treadmill Facility in September.



Mrs. Walter M. Jeffords, Jr., with assistance from Dean Andrews, unveils the plaque noting that the Jeffords Treadmill Facility was named in loving memory of her husband.

Widener Hospital adds Laparoscopic Surgery

Surgeons at New Bolton Center' George D. Widener Hospital for Large Animals have used arthroscopes and endoscopes for a number of years. This fall two laparoscopes were added to further enhance the hospital's short procedure capabilities.

"The goal of laparoscopic surgery is to expand our diagnostic capabilities and ultimately enable us to reduce the number of major invasive surgeries we perform," said Dr. Eric Tulleners, associate professor of surgery. "For example, it may be possible to diagnose certain causes of colic, to perform an anastomosis, repair a scrotal hernia or a ruptured bladder with the laparoscope. The instrumentation provides portals that let us cut, suture or staple tissue inside the body. The incisions necessary for performing laparoscopic surgery are very small and hence the animal should recover all the more quickly. Also, the hospital stay should be considerably shorter than for conventional surgery."

In addition to the laparoscopes, the hospital acquired a new Storz light source, a new Storz camera, a larger color monitor and two new printers and a medical grade VCR. This equip-

ment integrates with the existing laser, video endoscopic, and arthroscopic equipment. "All of these different items are interchangeable, which provides a great deal of flexibility and enhances our diagnostic and treatment capabilities," said Dr. Tulleners.

Laparoscopic surgery may also play an important role in the diagnosis and treatment of reproductive problems in large animals. For example, the laparoscope may provide a less invasive method of infertility diagnosis, embryo transfer, and treatment of blocked oviducts.

The instruments also enhance the teaching and training of students and residents. "This equipment and these techniques are relatively new to veterinary medicine. Our students and resi-

dents are now able to observe, and in the case of residents, practice these techniques," said Dr. Tulleners. "Also, the new printers and VCR enable us to generate and preserve high resolution images of the various diagnostic work ups and surgical treatments. These are excellent teaching tools for students, residents, owners, trainers and referring veterinarians."

Acquisition of the laparoscopes and the other equipment was made possible through the generosity of Dr. Charles Raker, Lawrence Baker Shepard Professor Emeritus of Surgery. Eric Hibbard of Endosurge Medical, Inc. generously donated one of the laparoscopes.

