



# SCOPING It Out

## What's on the Horizon for Endoscopy and Arthroscopy

By Kristen Fischer

**A**dvancements in both endoscopy and arthroscopy continue to help physicians better see inside the human body and diagnose illnesses. From new ways of performing surgery and equipment breakthroughs, here are the latest developments in the field.

### The latest on ingestible capsule endoscopes

Last year, Olympus and Siemens announced a partnership to create a magnetically guided endoscope capsule. The patient swallows the capsule and then a joystick paired with a magnetic field maneuvers the capsule. Once in place, cameras at both ends of the capsule transmit to a viewer. A feasibility study by the Institut Arnault Tzanck

in Saint Laurent du Var in France suggests the procedure could be useful for gastric examinations and the results were published last year in *Endoscopy*. The technology is expected to be released shortly.

Volunteers participating in the study found the procedure to be fairly easy to undergo as well with 93 percent saying the examination was comfortable and 89 percent finding it easy to swallow the pill. All the patients preferred the magnetically guided capsule to the conventional gastrointestinal endoscopy.

Meanwhile, Olympus continues to improve its capsule endoscope technology and is marketing the EC Type 1 charged-couple device. It has automatic brightness control and a structure enhancement function that allows the physician to see lesions

and blood in real-time on a hand-held display while capturing images for later review and report creation. Proprietary software allows the doctor to move through 40 frames per second, automatically detects red marks and lets the physician compare four images at a time side-by-side.

### Going below the tissue with optical coherence tomography

Another breakthrough expected to have a profound impact on the endoscopy field is the Optical Coherence Tomography Imaging System (OCTIS) by Tomophase Corporation. This OCT scope, which received FDA approval in December, can take images from below tissue surfaces in pulmonary airways.

Because most lung cancers begin about 2-millimeters below the surface in the epithelium, they can't be seen by traditional surface photos. The OCT scope shoots a laser beam into tissue, and light reflected back produces a 3-D picture, so cancerous tissue can be easily identified. An OCTIS manufactured by Tomophase was recently installed for research use at the University of Texas Medical Branch in Galveston, Texas.

Ralph Johnston, president at Tomophase, says a recent National Lung Screening Trial is adding a lot of impetus for the use of the OCTIS. The study showed that patients lowered their risk of dying from lung cancer by 20 percent when they were given low-dose CT scans that identified tumors at an earlier stage.

"Since OCTIS employs light rather than radiation, it will eliminate radiation-induced cancer and be key for follow-up care," Johnston adds.

High-definition imaging, coupled with chromoendoscopy [what is this?], has vastly improved endoscopy, says Dr. Michael L. Kochman, a governing board councilor, for the American Society for Gastrointestinal Endoscopy. It makes diagnoses more accurate by better targeting areas for biopsies and offering improved identification of abnormalities. "Those two things [imaging and chromoendoscopy] are separate, but when put together, they allow for high-resolution views of the surface of the GI tract," he notes.

### Seeing cells with pCLE innovations

Kochman says that the probe-based confocal laser endomicroscopy, or pCLE, system provides images of surface colonic epithelium in during endoscopy, which can improve accuracy by letting doctors see the cellular architecture. Unlike the OCTIS, it does not penetrate the surface.

Mauna Kea Technologies has produced Cellvizio, which is the only pCLE solution on the market today. The verdict is still out as to whether this technology is clinically more effective compared to existing techniques, Kochman says.

### Using of body orifices for diagnosis, treatment of conditions

Peroral myotomy (POEM) provides a less-invasive permanent treatment for esophageal achalasia, a disorder that causes difficulty swallowing. To repair this condition, a traditional open surgery was formerly used. So far, most of the technology is being devised in Japan, but some of these procedures offer a low-morbidity advantage over existing ones.

"What we're looking at is not only the excitement associated with the technology and techniques, but also the potential of patient care improvement techniques to be disseminated and utilized," Kochman says. He hopes these technologies and developments will lead to reductions in health care costs.

### Endoscopic advancements to battle obesity

Other advancements could help obese people gain access to lower-risk procedures. Trials are being performed to decrease the capacity of the stomach and to bypass absorption areas of the small bowel so they are "maldigested deliberately," Kochman explains. Other technologies are being



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Kevin J. Parks/Mercy  
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developed to help people feel fuller, and will decrease the desire to eat more.

The goal of these advancements is to treat obesity while lowering mortality associated with some already-developed surgical procedures, and make the technologies more readily available and affordable to the masses.

"Those are some very interesting modalities, especially in view of some of the [pharmaceutical] failures in the past

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few years," Kochman says, adding that there is no magic pill to do what these endoscopic advancements may be able to achieve.

### Tissue collected intact with new biopsy needles

Biopsies may be standard practice in the endoscopy field, but even those are always being revolutionized. Cook Medical recently launched its EchoTip ProCore High Definition Ultrasound Biopsy Needle, which provides enhanced accuracy to diagnose cancers in the GI tract.

The needle is used during endoscopic ultrasound to determine a GI cancer's stage of development. Typically, a fine needle is used, but fine-needle aspiration can have limited yield and sensitivity for certain kinds of tumors or in some anatomical locations; plus it only procures a cytological sample. The EchoTip ProCore needle is able to capture tissue samples intact, allowing for a histological diagnosis rather than conventional cytological diagnosis based on individual cells. These needles can access harder to reach tissue in areas of the GI tract such as the pancreatic head, and can

Dr. Robert Marx



be used to sample submucosal lesions, mediastinal masses, lymph nodes and intraperitoneal masses.

### A Peek into arthroscopy

In the field of arthroscopy, things are just as active.

Dr. Robert Marx, a top-ranking orthopedic surgeon who practices at the Hospital for Special Surgery, says there have been changes in the way doctors perform ACL operations. Now it is a less-invasive procedure that's arthroscopically assisted and only requires one incision instead of two.

New ACL tissue can be created from the patient's existing tendon or is introduced by way of donor tissue. Sterilizing that tissue, however, has been a challenge. Radiation, which is commonly applied, can weaken the allografts.

The trend is moving toward using chemical sterilization now, Marx adds.

Another advancement is the use of low-profile reamers. This involves a straight incision instead of a circular cut. Once inside, the drill makes a circular bore into the bone, but requires less surface area to be removed from the knee. This allows the physician to get better angles for more precise drilling.

### Partial knee resurfacing offers alternative to total knee replacement

Patients with knee osteoarthritis may no longer require a total knee replace-

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ment. Dr. Marc W. Hungerford, director of joint replacement and reconstruction at Mercy Medical Center, has been performing MAKOplasty Partial Knee Resurfacing, which uses the RIO Robotic Arm Interactive Orthopedic System.

“Total knee arthroplasty or replacement remains the ‘gold standard’ for treating degenerative joint disease. It is also best suited for patients with late stage osteoarthritis—that is, where all three compartments of the knee are affected,” Hungerford said in a statement. “MAKOplasty Partial Knee Resurfacing offers a less invasive option for patients living with early to mid-stage knee osteoarthritis,” Hungerford said.

The procedure involves resurfacing the diseased portion of the knee, which spares the patient’s healthy bone and surrounding tissue. An implant is then secured to the joint so the knee can move smoothly once again.

Arthroscopic advancements aren’t all about knees, either. A report released last month showed that using arthroscopy to treat hip impingement (or femoro-acetabular

impingement)—which leads to arthritis and is recognized as a common cause for early osteoarthritis in the hip—is successful in restoring range of motion.

“This is the first study to show that in patients who are being treated for hip impingement with arthroscopy, not only do we restore their me-

chanical measurements, but by doing so, we have improved their functional range of motion across the joint,” says Dr. Bryan T. Kelly, co-director of the Center for Hip Pain and Preservation at Hospital for Special Surgery in New York.

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