

Nebraska Medical Center

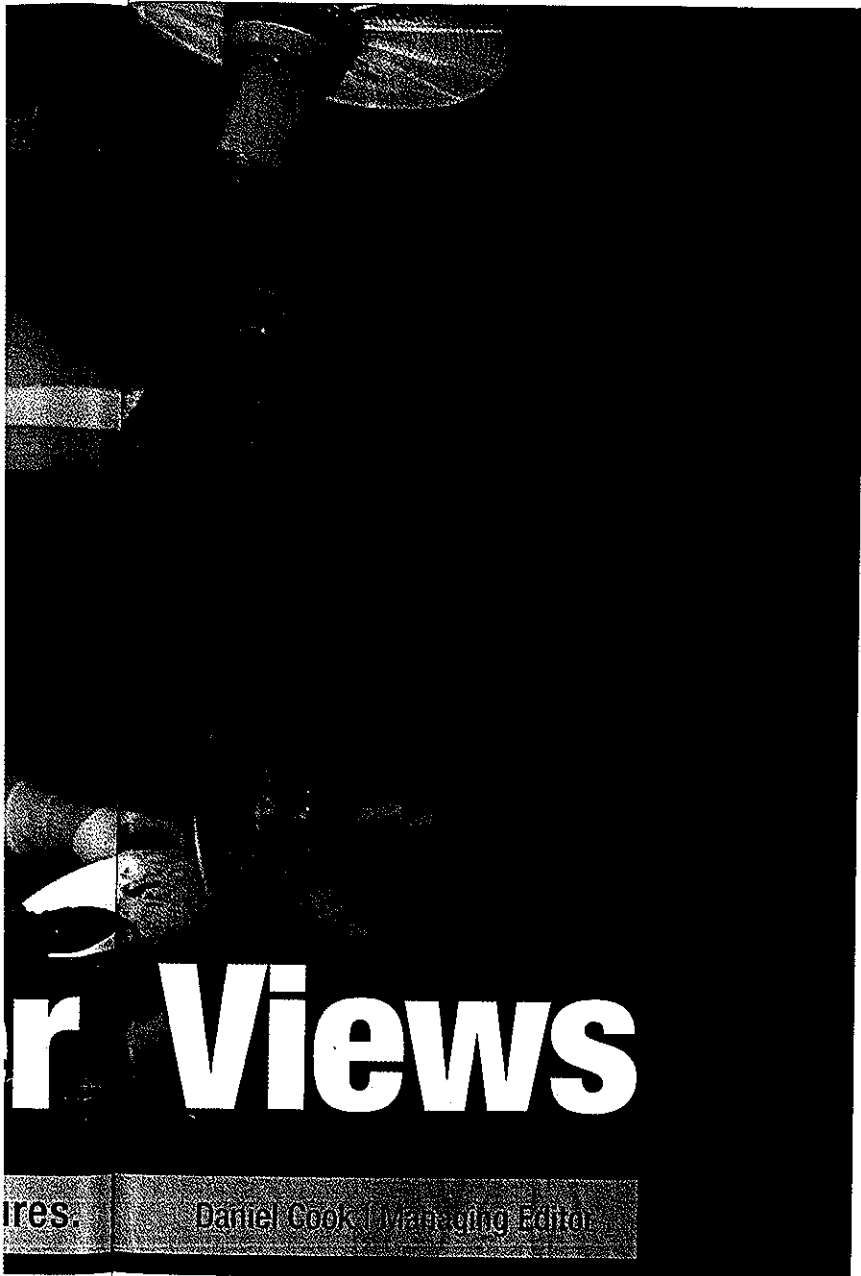
Clearer, Brighter

Improve access and outcomes during minimally invasive procedures.

The next time you order from your favorite Chinese restaurant, try eating the rice with chopsticks. No big deal, right? Now try eating it grain by painstaking grain while looking in a mirror to guide your movements. Surgeons face similar hand-eye coordination challenges during laparoscopic cases when they can't directly see or touch what they're operating on, says Dmitry Oleynikov, MD, FACS. Makes sense, then, to provide your docs with visualization- and access-aiding technologies that lower laparoscopy's degree of difficulty.

Image is everything

It's hard to show a direct link between operating in high-definition and improved surgical outcomes, but from a surgeon's perspective the difference between tracking the movement of instruments on standard-definition monitors and HD flat screens is significant and palpable, says Dr. Oleynikov, professor of surgery and director of minimally invasive and robotic surgery and the Center for Advanced Surgical Technology at the Nebraska Medical Center in Omaha. "With respect to surgeon satisfaction," he



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ires. Daniel Cook, Managing Editor

says, “the benefits of HD are easy to show.” HD makes some high-end cases easier to perform, says Paul Curcillo, MD, FACS, the director of minimally invasive surgical initiatives and development in the department of surgery at Fox Chase Cancer Center in Philadelphia, Pa., explaining that the true advantages of operating in high-def are realized during suturing and sewing. “Clipping is easy to do with old-fashioned monitors,” he says. “But high-def helps you delineate between several layers of tissue” for more accurate and effective

suture placement. High-def also improves the education of the next generation of laparoscopic surgeons, says Dr. Curcillo. “It’s so much easier to recognize anatomy and follow instruments in videos produced in HD than in the dark and cloudy images we used to work with.”

For surgeons who rely on 2D images to perform highly technical 3D surgery, HD monitors and cameras are expensive but needed technology, says Guy Voeller, MD,

FACS, professor of surgery at the University of Tennessee Medical Group in Memphis. Only some of his hospitals’ ORs have been upgraded to HD, so he’s constantly reminded — sometimes during back-to-back cases — about the difference

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— Guy Voeller, MD, FACS

between HD and standard-def images. Staring up at “wonderful, clear HD images” also means not having to strain while looking at grainy video on standard-def monitors, says Dr. Voeller, a 20-year veteran of laparoscopic surgery with permanent repetitive strain injuries to his neck, shoulders, elbows and hands to prove it. He only half-jokingly believes his eyes might be the only part of his body that doesn’t hurt as he crouches over patients.

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Smaller scopes, smaller ports

Dr. Curcillo thinks there are 2 types of laparoscopic surgeons: older docs who feel pressured to attempt advanced techniques that they’re not completely com-

fortable performing, and younger surgeons fellowship-trained on minimally invasive techniques who look for ways to optimize current technology and instrumentation in order to push the envelope of key-hole surgery, including the move to operate through fewer ports. Curved and flexible instrumentation developed and designed in recent years as the single-incision revolution gained momentum highlighted the need for putting more ergonomic and versatile laparoscopes into surgeons' hands, says Dr. Voeller.

"Manufacturers are aware that smaller platforms are better," says Patricia L. Turner, MD, FACS, an assistant professor of surgery at the University of Maryland School of Medicine and a general surgeon

at the University of Maryland Medical Center in Baltimore. She cites as an example articulating and angled scopes with flexible tips and HD camera chips that previously required 10mm ports and can now pass through 5mm incisions (although staplers still require the use of larger ports).

The diameter of trocars has decreased to correspond with the narrowing of newer instrumentation. Low-profile ports with caps just a half-centimeter above the abdominal wall — as opposed to standard trocars that sit 2 or 3cm high — offer surgeons greater degrees of freedom, letting them better maneuver instruments within the surgical cavity, says Dr. Turner. "But you might not be able to insufflate

BILE DUCT INJURIES

Mistaken Anatomy or Error of Misperception?

Ask any surgeon about the potential serious complications of laparoscopic cholecystectomy and you'll likely get the same response: bile duct injury. During a gallbladder surgery, it's not uncommon for the surgeon, believing he cut the cystic duct, to mistakenly cut the common bile duct.

"Bile duct injury is the one everyone's scared of because it can't be fixed as good as God made it and the complication is potentially very serious," says Guy Voeller, MD, FACS, professor of surgery at the University of Tennessee Medical Group in Memphis. Why do surgeons confuse the bile duct for the cystic duct and make the cut that can threaten the lives of patients if the injury goes undetected?

"Studies have shown that it's an error of misperception," says Dr. Voeller. So why are surgeons misinterpreting what they're seeing? "That's hard to say," admits Dr. Voeller, who points to a lack of surgeon ability and experience combined with what can be a difficult procedure as potentially contributing factors.



▲ FEAR FACTOR Surgeons who perform laparoscopic cholecystectomy are acutely aware of the risks involved.

Gallbladder removals are some of the most common procedures performed today, with close to 90% done laparoscopically, according to Dmitry Oleynikov, MD, FACS, professor of surgery and director of minimally invasive and robotic surgery and the Center for Advanced Surgical Technology at the Nebraska Medical Center in Omaha. Most procedures performed by surgeons who have trained over the last 15 to 20 years in minimally invasive techniques go off without a hitch, he says, but residual scarring or acute inflammation caused by an internal

infection hamper a surgeon's ability to visualize delicate structures within the abdominal cavity, which can result in "devastating consequences."

But, Dr. Oleynikov is quick to point out, you hear about issues surrounding missteps made during lap choles because so many are performed each year and sheer case volume contributes to the number of reported complications. "For the most part," says Dr. Oleynikov, "it's one of the safest procedures we perform."

— Daniel Cook

through low-profile trocars," she says. "They might not offer the functionality of standard models."

Debris, smoke and fog

Keeping a laparoscopic camera lens clear and clean during surgery is a constant — some surgeons would say annoying — challenge. Let's look at common lens-related issues and how surgeons combat them.

- **Debris.** A device that delivers airflow over a scope's tip keeps particles from affixing to the lens during surgery without it having to be removed from the abdominal cavity for cleaning. While the device doesn't work perfectly, according to the surgeons we spoke to, it's a better option than wiping down scopes several times throughout a single case. "If you added up the amount of time surgical teams spend cleaning laparoscope lenses during cases," says Dr. Voeller, "you'd end up with a huge number" that represents countless wasted minutes of valuable OR time.

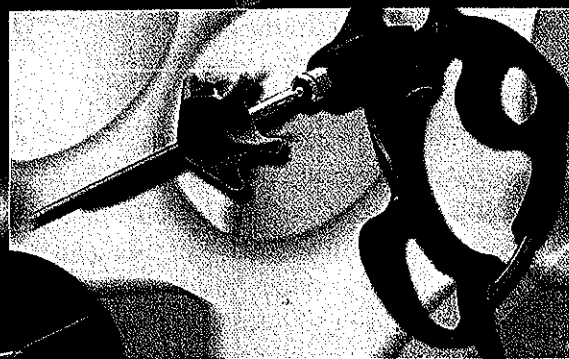
Dr. Turner says the abilities of the surgeon's assistant factors into keeping a camera lens clean. "There's a skill and learning curve to driving a scope," she says, adding that more sophisticated drivers avoid touching fat deposits and tissue with the scope's tip and know to pull back slightly when the surgeon is about to activate an ultrasonic scalpel or cautery device in order to keep bodily fluid and debris off of the lens. Multiple instrument exchanges can also dirty the trocars instruments pass

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through (Dr. Turner wipes ports clean with a cotton swab before reinserting instruments). Dual-purpose instruments — that cut and coagulate, for example — therefore help minimize repeated cleanings needed to maintain a surgeon's clear view of the surgical cavity.

- **Fog.** Endoscope warmers pre-warm the devices to body temperature, which eliminates lens fogging that occurs when cold scopes are inserted into a warm body cavity. Dr. Turner trained as a resident with scope warmers, but had to do without the devices as a fellow. When she became an attending surgeon, scope warmers became a requirement in her ORs. She now warms her scopes "religiously" before cases so the wasted time waiting for fogged lenses to clear during the first several minutes of a procedure is a "non-issue."

- **Smoke.** Robert Stone Baxt, MD, a general surgeon specializing in hernia repair and abdominal wall reconstruction in Reisterstown, Md., is more con-

cerned with maintaining his visualization of the surgical site than the aerosolization of harmful plumes within the abdominal cavity. He says evacuating smoke can shave about 5 minutes off of procedure times, which translates into big cumulative savings if you consider the value of each OR minute.

Smoke buildup in the surgical field isn't a huge problem during routine cases for Dr. Turner, who vents one of the ports if her visualization is compromised. Like many surgeons, she doesn't routinely use a smoke evacuation device — the last model she trialed sounded like "a jet engine," though she concedes that newer iterations are likely much quieter — even though she understands the dangers associated with inhaling aerosolized particulate matter.

Dr. Voeller laments the fact that the ORs in his hospitals are equipped with smoke evacuation devices, but often go unused because surgeons and surgical teams view them as unneeded and cumber-

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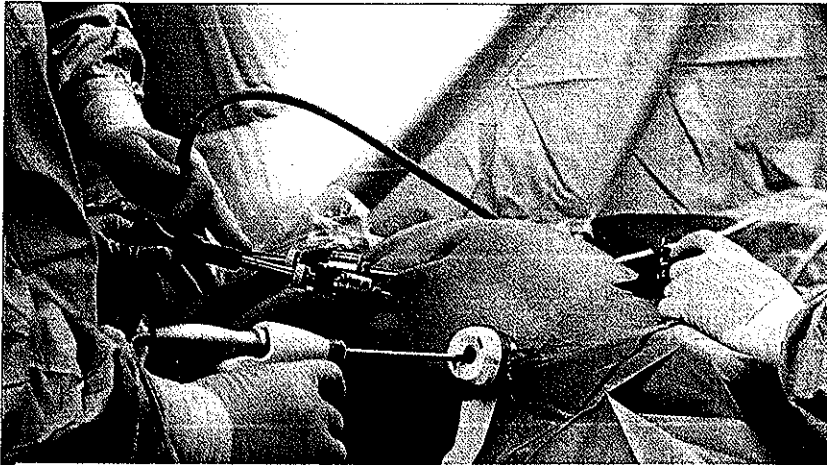
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▲ **PORT AUTHORITY** Patricia L. Turner, MD, FACS, says trocar designs can provide greater degrees of freedom within the surgical cavity.

mind the proven health risks faced by surgeons and staff exposed to harmful plumes. “We know the smoke is toxic,” says Dr. Voeller. “It’s an issue that needs to be addressed and improved upon.”

For all of keyhole surgery’s inherent challenges, Dr. Turner prefers it to open techniques, which don’t offer the incredible images of the surgical field. “I actually like the view of laparoscopy,” she says before adding a qualifier that should give you a true under-

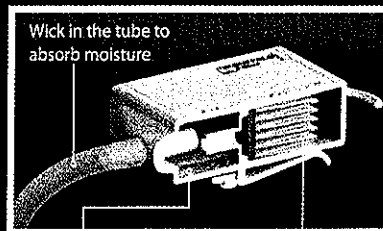
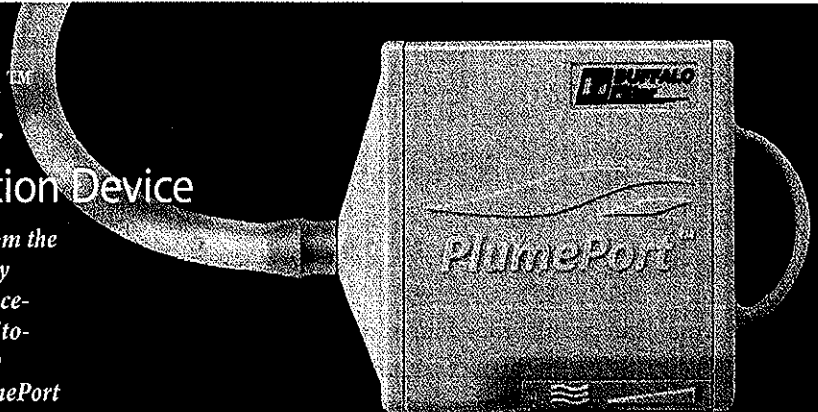
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