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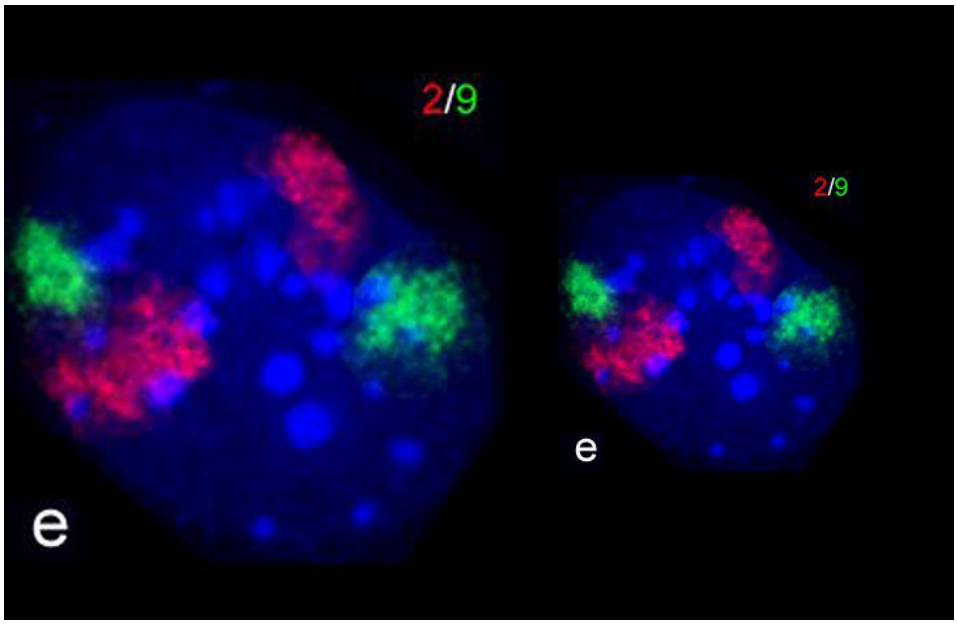
Orthopedics This Week

week in review



picture of success

breaking news

For all news that is Ortho, read on.

Orthopedic Power Rankings

Robin Young's Entirely Subjective Ordering of Public Orthopedic Companies

This Week: Both *Financial Times* and *Wall Street Journal* are saying that JNJ made a bid for Smith & Nephew. Rumored price was $11 billion or 22% higher than today's stock price. This would have a major impact on all players. SNN fits well with JNJ's DePuy and Ethicon divisions. Stay tuned.

Rank	Last Week	Company	TTM Op Margin	30-Day Price Change	Comment
1	1	Orthofix	13.51%	10.67%	So interesting how OFIX tamps down expectations then routinely exceeds them each quarter. #1 again this week.
2	2	Medtronic	32.59	7.09	MDT needs to fish or cut bait in orthopedics. JNJ's rumored bid for SNN shows that scale = profit preservation. Will MDT respond?
3	4	Alphatec	1.59	19.91	Downgraded by Zack's—who is consistently wrong. So we moved ATEC up on spot.
4	10	Stryker	24.71	6.28	Could the acquisition bug be contagious? SYK has the cash to be a player, for sure. Cojones too?
5	3	Smith & Nephew	22.83	5.79	Rejected an $11 billion offer? Last time SNN was worth $11 billion was April 2008. Down two spots.
6	5	Integra LifeSciences	15.37	(0.96)	Sixth least expensive orthopedic stock. Buyers waiting for news, any news. Moving sideways.
7	9	CONMED	9.07	4.72	Last quarter's report was stellar and clearly signaled that hospitals are back. Stage is set for next report in three weeks.
8	7	Wright Medical	6.36	2.01	With the big boys consolidating, what does it mean for WMGI or EXAC?
9	8	Zimmer	27.69	4.62	Was Biomet's disappointing report a harbinger for cross-town rival ZMH? Down one spot.
10	6	Exactech	10.79	(5.68)	Exactech is cheap, for sure. Consensus of analysts is flat sales and earnings, however.

Robin Young's Orthopedic Universe

Top Performers Last 30 Days

	Company	Symbol	Price	Mkt Cap	30-Day Chg
1	TranS1	TSON	$2.92	$61	58.7%
2	TiGenix	TIG.BR	$2.91	$90	49.3%
3	Bacterin Intl Holdings	BIHI.OB	$8.75	$314	47.1%
4	Alphatec Holdings	ATEC	$2.59	$229	19.9%
5	NuVasive	NUVA	$25.77	$1,020	14.6%
6	Orthofix	OFIX	$29.86	$529	10.7%
7	Medtronic	MDT	$36.41	$39,090	7.1%
8	Stryker	SYK	$54.32	$21,570	6.3%
9	Smith & Nephew	SNN	$50.83	$9,020	5.8%
10	CONMED	CNMD	$25.52	$718	4.7%

Worst Performers Last 30 Days

	Company	Symbol	Price	Mkt Cap	30-Day Chg
1	Kensey Nash	KNSY	$26.37	$224	-6.6%
2	ArthroCare	ARTC	$29.34	$793	-6.3%
3	Exactech	EXAC	$17.78	$230	-5.7%
4	CryoLife	CRY	$5.41	$152	-1.6%
5	Integra LifeSciences	IART	$47.25	$1,340	-1.0%
6	Johnson & Johnson	JNJ	$62.60	171,920	0.5%
7	RTI Biologics Inc	RTIX	$2.72	$149	0.7%
8	Wright Medical	WMGI	$15.20	$596	2.0%
9	*Average*			*$11,916*	*2.4%*
10	Synthes	SYST.VX	$123.54	$14,662	4.0%

Lowest Price / Earnings Ratio (TTM)

	Company	Symbol	Price	Mkt Cap	P/E
1	Medtronic	MDT	$36.41	$39,090	10.97
2	Kensey Nash	KNSY	$26.37	$224	11.55
3	Zimmer Holdings	ZMH	$52.59	$10,380	12.25
4	ArthroCare	ARTC	$29.34	$793	12.96
5	Wright Medical	WMGI	$15.20	$596	13.02

Highest Price / Earnings Ratio (TTM)

	Company	Symbol	Price	Mkt Cap	P/E
1	Alphatec Holdings	ATEC	$2.59	$229	214.98
2	Smith & Nephew	SNN	$50.83	$9,020	70.39
3	RTI Biologics Inc	RTIX	$2.72	$149	42.36
4	Symmetry Medical	SMA	$9.34	$336	28.13
5	CONMED	CNMD	$25.52	$718	19.62

Lowest P/E to Growth Ratio (Earnings Estimates)

	Company	Symbol	Price	Mkt Cap	PEG
1	Orthofix	OFIX	$29.86	$529	0.60
2	NuVasive	NUVA	$25.77	$1,020	0.74
3	Medtronic	MDT	$36.41	$39,090	1.21
4	Zimmer Holdings	ZMH	$52.59	$10,380	1.26
5	Smith & Nephew	SNN	$50.83	$9,020	1.39

Highest P/E to Growth Ratio (Earnings Estimates)

	Company	Symbol	Price	Mkt Cap	PEG
1	Alphatec Holdings	ATEC	$2.59	$229	3.98
2	Kensey Nash	KNSY	$26.37	$224	3.46
3	CONMED	CNMD	$25.52	$718	2.48
4	CryoLife	CRY	$5.41	$152	2.27
5	Johnson & Johnson	JNJ	$62.60	$171,920	2.19

Lowest Price to Sales Ratio (TTM)

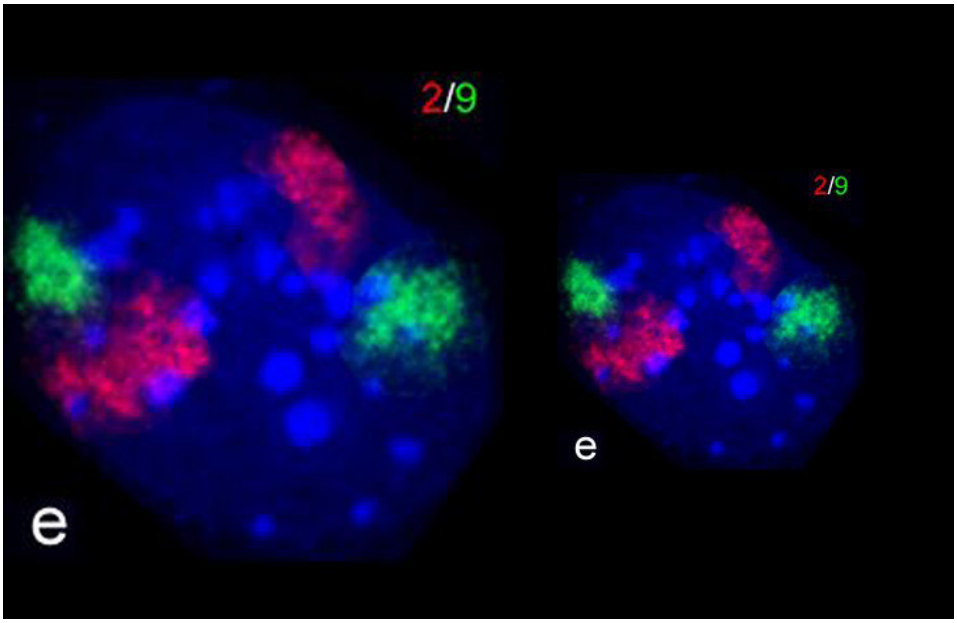
	Company	Symbol	Price	Mkt Cap	PSR
1	RTI Biologics Inc	RTIX	$2.72	$149	0.91
2	Orthofix	OFIX	$29.86	$529	0.93
3	Symmetry Medical	SMA	$9.34	$336	0.98
4	CONMED	CNMD	$25.52	$718	1.01
5	Wright Medical	WMGI	$15.20	$596	1.20

Highest Price to Sales Ratio (TTM)

	Company	Symbol	Price	Mkt Cap	PSR
1	TiGenix	TIG.BR	$2.91	$90	321.16
2	Bacterin Intl Holdings	BIHI.OB	$8.75	$314	24.91
3	Mako Surgical	MAKO	$14.10	$480	13.00
4	Synthes	SYST.VX	$123.54	$14,662	8.13
5	Stryker	SYK	$54.32	$21,570	3.03

Remarkable Stem Cell News From Shanghai

By Robin Young



Wikimedia Commons Mayer et al., BMC Cell Biology 2005

The 3rd Annual World Congress of Regenerative Medicine and Stem Cells 2010 in Shanghai last month (December) was the stem cell version of the Shanghai Exposition. Stem cell news on steroids, in other words. While China's burgeoning research output was front and center, the rest of the world also showed up and put on display a vast array of clinical techniques, strategies and new research about the use of stem and progenitor cells (usually mesenchymal stem cells) in patients, at their bedside.

The range and variety of clinical presentations was more extensive than anything we've seen in the U.S. For this short article, we will describe and discuss the nerve and cartilage regeneration papers. Suffice it to say, the work being performed in places like Kuala Lampur, Malaysia, the United Arab Emirates, and France are changing medicine. All of these clinical activities are being performed under the regulatory structure of both the institution and the government. Because this is different (not better or worse, just different) than FDA rules, the manner and style in which these cells are being incorporated into orthopedic treatment plans is very encouraging.

In the United States, the occasional paper emerges that provides a hint at the coming stem cell revolution (for example Dr. S. Robert Rosbruch, Chief of Limb Lengthening and Complex Reconstruction Service at the Hospital for Special Surgery, used bone marrow derived stem cells to treat arthritic sub-talar ankle joint—"…this will change my practice, because when someone comes in, I'm going to think twice about offering just a routine sub-talar fusion, and really pose this [stem cell injection] as an option"). But at the Shanghai World Congress, the range of clinical information was extraordinarily extensive.

For our own New York Stem Cell Summit, we've invited some of the Shanghai presenters and it should deliver, we think, one of our best meetings yet.

Regenerating Articular Cartilage in the Knee

Dr. Khay-Yong Saw (Liverpool University School of Medicine 1979-1984, FRCS in Edinburgh 1989, Masters in Orthopaedic Surgery Liverpool University Medical School, founder and

Dr. Khay-Yong Saw

senior partner Kuala Lumpur Sports Medicine Centre) has changed his practice since incorporating stem cells to treat arthritic knees. His technique is interesting and blends several existing techniques with the application of autologous stem cells. While Dr. Saw did present his paper, in private conversations he described in great detail how he now incorporates stem cells in virtually every patient with chondral defects.

Dr. Saw is conducting an ongoing clinical trial to assess the results of a particular technique for treating chondral defects with a combination of subchondral drilling, hyaluronic acid (HA) and autologous, concentrated stem cells. Dr. Saw works closely with his hospital's hematologist to obtain the stem cells.

Dr. Saw presented data for 180 patients with full thickness chondral defects. Each patient was treated with arthroscopic subchondral drilling (in a tighter formation than typical subchondral drilling). Following surgery, each patient was place on a continuous passive motion (CPM) machine two hours per day for a period of four weeks and was on partial weight bearing for the first six weeks.

Dr. Saw harvested blood from his patients and then concentrated the mesenchymal stem cells (autologous peripheral blood stem cells – PBSC) by using the process of apherisis one week after surgery. Dr. Saw collected and concentrated enough material to create 8 mls of harvested PBSC. He then combined the PBSC with 2 mls of HA and injected the stem cell cocktail into the operated knees of his patients one week after surgery.

The remainder of the harvested PBSC were divided into vials and cryopreserved for future injections.

In total, Dr. Saw injected each patient five times with PBSC + HA into the intra-articular capsule—one per week. Dr. Saw and his technicians took serial MRI scans and in five patients conducted a second look arthroscopy with chondral core biopsy. He followed his patients for up to 30 months.

Dr. Saw's MRI scans showed that each patient's subchondral bone healed and the chondral defect filled in—which is a strong indicator of articular cartilage regeneration. For those patients who had a second look arthroscopy with chondral core biopsies, Dr. Saw confirmed that each patient had grown articular cartilage with hyaline cartilage. Each patient in the study showed an improved IKDC score (International Knee Documentation Committee score is a standardized questionnaire which is used by patients to self-report the status of their knee).

In Arthroscopy, Vol 25, No 12 (December), 2009: pp 1391-1400, Dr. Saw wrote an article describing this same approach on a goat model. That study also demonstrated that this technique will regenerate articular cartilage in the knee.

For Dr. Saw, this approach has changed his practice. He is routinely treating chondral lesions using this technique—namely, with a single arthroscopic procedure followed by post-operative intra-articular injections of autologous stem cells combined with HA.

Femoral Head Treatment

In another paper, Dr. Dewei Zhao, professor in the Department of Orthopedics, Affiliated Ahongshan Hospital of Dalian University, China, presented data from using bone marrow mesenchymal stem cells (BMMSCs) to treat osteonecrosis of the femoral head (ONFH).

Dr. Haluk Deda

In this study Dr. Zhao randomly assigned 100 patients with early stage ONFH to BMMSC treatment or core decompression (CD). Each patient receiving the BMMSC treatment received 2x106 autologous subtrochanteric bone marrow derived and cultured BMMSCs.

Each patient's radiographic stage of ONFH was measured according to Association Research Circulation Osseous classification, Harris hip score (HHS) and the osteonecrotic volume in the femoral head was assessed both preoperatively and post-operatively at 3,6,12 and 24 months.

How did the patients do? At 24 months 51 out of the 53 BMMSC-treated hips had their ONFH delayed or avoided entirely a femoral head collapse due to osteonecrosis. By contrast, of the 47 non-BMMSC treated hips (core decompression) 10 progressed to higher osteonecrotic stages and were treated with either vascularized bone grafting (n=5) or total hip replacement (n=5).

Treating Paralysis and Nerve Trauma

Probably the most dramatic presentation of the Shanghai meeting was Dr. Haluk Deda's video presentation of his treatment of traumatic spine cord injuries. Dr. Deda treated nine patients with chronic complete spinal cord injury (SCI) impairment scale (AIS) grade A.

In his videos, Dr. Deda first demonstrated the complete nature of each patient's paralysis. They were paralyzed.

Each patient was injected in the neck with autologous bone marrow derived progenitor cells.

The transplant protocols were approved by the hospital's ethical board and all information and written consents about the patients were provided to the ministry of health after treatment.

Patients who were included in the test had only one single spinal cord lesion. All patients had injuries that were six months or older. No patients were included who'd had an anatomical transaction of the cord as confirmed with MRI or patients who required mechanical ventilation or had a preexisting serious medical condition.

Dr. Deda aspirated 100-150ml of bone marrow from the iliac crest of each patient and then sent the samples to Aastrom Biosciences in Michigan for further culturing. Dr. Deda performed a complete laminectomy one vertebra above the injured site and one vertebra below the injured site in order to provide sufficient access to the injured spinal cord.

Dr. Deda then located avascular and 'safe' areas for stem cell injection. 0.1 ml of stem cells were injected using a 21 gauge needle attached to a 1-ml syringe in multiple sections of the damaged spinal cord.

All nine patients completed the protocol with no adverse events. At three weeks each patient was reporting increased muscle strength, movement and sensation to ASIA grade B or C and the MRIs of some of the patients suggested nerve regeneration.

Most dramatically, Dr. Deda provided videos at three weeks, six months and 12 months showing the formerly paralyzed patients moving in swimming pools, lifting legs and arms and demonstrating back movement. One patient even returned to work, typing.

Dr. Deda showed each patient's video in a sequence that started with the preoperative demonstration of paralysis and then a progressive partial recovery from paralysis at three weeks, three months and so on. The visual impact of watching formerly paralyzed patients demonstrating movement was much more powerful than the statistical report. The audience of scientists and clinicians were audibly astonished at Dr. Deda's report.

Certainly, Dr. Deda was careful to use patients who were younger and whose cord traumas were of a particular type. Still, Dr. Deda's research showed clearly that autologous stem cells are a viable option for treating certain kinds of spinal cord injuries including those that result in paralysis.

Dr. Deda's CV includes: Ankara University Medical School 1980, postdoctoral research fellow at Baylor College of Medicine, further postdoctoral research at University of London institute of Neurology, then Hanover Medical School, Nordstadt Hospital Department of Neurosurgery in Germany, then University of Arkansas in 1994, University of George Washington 1996 and full professor Ankara University. Creator of the Halman Neurtherapy Center in DHCC in United Arab Emirates in 2009.

New York Stem Cell Summit

In total there were about 260 presentations in Shanghai by researchers and clinicians from China, Japan, Korea, Vietnam, United Arab Emirates, Turkey, Norway, USA, Italy, Taiwan, Australia, Brazil, Malaysia, Canada, Belgium, Egypt, UK, France, Poland, Singapore, Portugal, Switzerland, Iran, Russia, Israel, Chile and the Netherlands.

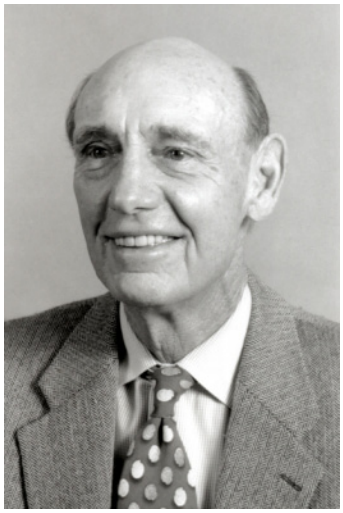
While allograft stem cell products are the predominate commercial form of stem cell therapy in the United States, the rest of the world is rapidly adopting autologous (blood or bone marrow derived) stem cell therapies for a broad range of indications.

For more information regarding the quickly evolving world of stem cell therapies, we look forward to seeing you at the New York Stem Cell Summit scheduled for March 1, 2011 (**www.stemcellsummit.com**). ◆

Top Five Orthopedic Events in 2010

By Walter Eisnerr

"The year 2010 was huge for orthopaedics," wrote S. Terry Canale, M.D., in the December issue of *AAOS Now*, the American Academy of Orthopaedic Surgeons' monthly publication. Canale is the publication's editor-in-chief.



S. Terry Canale, M.D.

"It started with a bang—the massive earthquake in Haiti that made heroes out of ordinary orthopaedic surgeons. As the year progressed, we had to contend with healthcare reform, clinical guidelines that could actually change clinical practices, and increased scrutiny on orthopaedic practices—from the use of pain pumps and platelet-rich plasma to the increase in SLAP [superior labrum from anterior to posterior] surgeries and a drop in the use of metal-on-metal hip implants," wrote Canale.

Canale, in *AAOS NOW* named the top ten orthopedic developments of 2010. Also noted special attention paid to surgeons who neglected to disclose their ties to industry and the shift in ownership of orthopedic practices.

RRY Publications/Wikimedia Commons/Morguefile

Here is Canale's list (with our paraphrasing):

1. Helping Haiti
2. Financial and other disclosures
3. Off-label (physician-directed) treatments
4. Farewell to the independent physician?
5. "Obamacare"
6. Pain pumps and the chondrolysis controversy
7. SLAP repair scrutiny into possible procedural overuse
8. Platelet-rich plasma efficacy debate
9. Clinical practice guidelines for periprosthetic joint infection of the hip and knee and vertebroplasty
10. Red flags regarding metal-on-metal (MoM) hip implants

In detail, then, here are our picks for the top five orthopedic news stories for 2010.

Haiti

"Who wouldn't be proud of the hundreds of orthopaedic surgeons who... went down to the Caribbean, not to vacation, but to work under some of the most appalling conditions imaginable," wrote Canale

He noted that within 48 hours of the earthquake in January, AAOS fellows were either on their way to Haiti or had contacted the academy about volunteering.

More than 500 AAOS members traveled to the island to provide immediate care. Many physicians, hospitals, and manufacturers donated supplies. "In

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the aftermath of the earthquake, surgeons operated wherever they could, including performing surgery outdoors using car headlights to illuminate the operating field," Canale added.

One news report noted that almost a third of patients at one makeshift hospital would die of "Crush Syndrome" without surgery. Patients were dying of sepsis from untreated wounds. Large numbers of those patients needed amputations.

But perhaps no story about the difficulties encountered by the surgeon volunteers was as graphically demonstrated as the efforts led by David Helfet, M.D., and Dean Lorich, M.D. from New York's Hospital for Special Surgery.

Within hours of the quake, Helfet's team was on its way to Haiti in a Synthes plane. They were joined by physicians from New York-Presbyterian Hospital and began working round the clock.

The day-by-day account and graphic photos taken and shared by Lorich brought the orthopedic disaster home in a very visceral way to our readers. Lorich and Helfet didn't mince their words upon their return to New York when they publicly criticized the U.S. government for not acting quickly and effectively enough to provide security and logistical support to the volunteers racing to the disaster.

The call for help from Haiti was unprecedented and immediate. Those in the orthopedic community that answered the call, shined brightest in the moment of greatest need.

Disclosure

"None of us enjoyed reading headlines such as '*Doctors given millions fail to disclose device-industry ties, study shows*'… Even if the relationship is totally legitimate and, in fact, may be beneficial to patient care, the fact that it wasn't revealed created problems," wrote Canale.

It wasn't just the failure of full disclosures by some surgeons as they took to the podium at society meetings and authored papers for medical journals that created problems. It was actual disclosures that, by the end of 2010, resulted in sensational stories in the *Wall Street Journal* and *Bloomberg News* about surgeon payments. Medtronic began to voluntarily disclose annual payments in May and disclosed that it paid more than $15.7 million in royalties and consulting fees to U.S. physicians in the first quarter of the year.

Those disclosure provided fodder to some news organizations as they attempted to connect the dots between spine surgeon income and volumes of "questionable" spine surgery. As we pointed out in *OTW* (Reclaiming the Patient Outcome Argument, January 4, 2011), in response to the articles, a lack of a "batting average" for individual surgeons' success rates leaves patients and payers guessing if surgeries are likely to be successful.

Off-Label (Physician-Directed) Use

Canale wrote that off-label use made headlines this year, particularly in the pharmaceutical area, where big cases were decided and hefty fines levied against manufacturers accused of promoting drugs for unapproved uses.

"In some ways, physicians may be ahead of regulators in expanding the use of some materials to support patient safety. For example, antibiotic cement has only limited approval for use—in the second stage of a two-stage total knee arthroplasty revision. But in an effort to reduce periprosthetic infections, many surgeons are regularly using it for primary arthroplasties."

Canale says he believes that the most important aspect of this issue is informed consent. "There's nothing wrong with physician-directed use of a drug or device to improve outcomes, but the physician ought to know what he or she is doing, ought to share that information with the patient, and ought to keep the [FDA] informed of any problems through its MedWatch system."

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In spine, we saw the off-label use of BMPs (bone morphogenic proteins) continue to be the poster child for regulators, personal injury lawyers, payers and media as an example of surgeons using products because of relationships with manufacturers.

Farewell to the Independent Physician?

Perhaps no issue has the potential to change the landscape of medical delivery more than the trend of the hospital employment of physicians.

The weight of this trend was brought home in September when Medtronic CEO Bill Hawkins told investors, that while the device companies still market to surgeons, hospitals are increasingly becoming the main focus of sales efforts.

More hospitals are acquiring physician practices, have more physicians on staff and are responding to reimbursement pressures associated with healthcare reform legislation. Hawkins said hospital technology committees are starting to work with their physicians to cut costs and at the same time, hold those physicians more accountable for total costs.

Canale wrote that some experts are pointing to younger surgeons "who have different priorities than my generation of surgeons and who don't want to take night or weekend emergency call, do want to work regular hours, and would rather a hospital shoulder the administrative, regulatory, and medical-legal burdens of running a practice. A recent national survey of 2,400 physicians found that nearly 3 out of 4 were planning on retiring, working part-time, closing their practices to new patients, becoming employed and/or seeking nonclinical jobs in the next 1 to 3 years."

"With the demise of fee-for-service payments under PPACA [Affordable Care Act] and the changing demographics of both orthopaedic surgeons and their patients, this is a trend that's likely to continue," predicted Canale.

We saw some surgeons, seeking to maintain their independence, respond by finding new ways to keep control of their practices by starting physician-owned distributorships and physicians from Tyler, Texas, headed to federal court to fight provisions limiting their ability to own and operate their own hospitals.

In a year-end review of the orthopedic sector, BMO Capital Markets analyst, Joanne Wuensch wrote that according to the MGMA Physician Compensation and Production Survey Report 2010, ~55% of responding practices were hospital-owned, from ~25% in 2002, while the share of physician-owned responders declined from ~70% to less than 40%. She noted Boston Scientific management estimated the percentage of hospital-owned practices could eventually level off at upwards of 70%-75%.

Wuensch says there are several downsides for device manufacturers. "Resulting vendor consolidation may limit the arm-wrestling power of a smaller market participant... It also could result in increased pricing pressure: while changes to Medicare reimbursement rates are one direct and quantifiable variable affecting pricing, the creation of accountable care organizations (ACOs) and gain-sharing programs could have long-term effects that may be harder to evaluate and project."

Introducing "Obamacare"

"Although the healthcare reform act does extend coverage to millions of

Americans and contains a number of positive provisions designed to improve patient access to care and increase insurance coverage, many believe that it will do little to stem rising healthcare costs or improve the quality of care," wrote Canale.

Canale noted that the act provides funding for comparative effectiveness research, studies into improving quality of care, and the transition to electronic medical records, but fails to address the issue of comprehensive tort reform and does nothing to fix the broken Medicare Sustainable Growth Rate formula.

He also noted the creation of an Independent Payment Advisory Board, restrictions on physician hospital ownership, and mandates participation in the Physician Quality Reporting Initiative.

AAOS opposed the passage of the Act and the academy's president, Joseph Zuckerman, M.D., got into a very public squabble with President Obama over comments the president made about scalpel-happy surgeons. The opposition by the Specialty Societies was at odds with support of the bill by the American Medical Association and exposed a big split in the physician community over reform.

2011

Looking into the new year, what issues are likely to emerge?

We think that issues relating to disclosure, negotiating with reimbursers over the consensus definition of medical reasonableness or necessity for specific procedures and the increasingly unsettled distribution system for orthopedic implants will make headlines all this year.

To read the entire text of Dr. Canale's article, click here:

http://www.aaos.org/news/aaosnow/dec10/clinical1.asp ◆

International Orthopedics: Women's Work

By Elizabeth Hofheinz, M.P.H., M.Ed

While they didn't go to climb Mount Everest, some say that the trip to Nepal was the high point of their careers. The women of WOGO—Women Orthopaedist Global Outreach—have been planting their flag around the world since 2006, helping women to overcome joint disease and disability, and to live more fulfilling lives.

Dr. Audrey Tsao, a total joint surgeon in private practice at the Sun Valley Orthopaedic Surgeons in Arizona, states, "Several of the female orthopedic surgeons met while working on a Zimmer design team. We—Drs. Jennifer Cook, Robyn Hakanson, Rinelda Horton and myself—developed a bond, and soon decided that we wanted to reach out to women in need around the world. WOGO was born, and then developed into an Operation Walk team with the addition of Dr. Amanda Marshall and on this inaugural trip, Dr. Debra Thomas"

Women Orthopaedist Global Outreach

Building on a foundation, WOGO members took the advice of those at Operation Walk and set their sights on Nepal. Dr. Tsao: "We chose Nepal in part because it is considered to be 'female friendly,' meaning we would hopefully encounter fewer cultural or professional barriers than in other countries. Also, Operation Walk had done a trip there in 2005, and had established some relationships that we could build upon."

The WOGO team landed in Kathmandu in September 2010 at the end of the rainy season—which meant that they were starting their work in particularly hot, humid circumstances. Dr. Tsao recalls, "The reality is that there were no flush toilets at the hospital, and that the electricity was barely more than a mass of dangling wires. These conditions were 'muted out,' however, by the incredible warmth of the people, and their extraordinary determination to get well. I was in awe of the Nepalese patients; even individuals with severe arthritis deformities used very little pain medication. They would walk with what we would consider a 'non walk-

"I was in awe of the Nepalese patients; even individuals with severe arthritis deformities used very little pain medication. They would walk with what we would consider a 'non walkable' knee and were, in general, back on their feet and doing two flights of stairs a couple of days after surgery. There were no excuses and no complaints."

able' knee and were, in general, back on their feet and doing two flights of stairs a couple of days after surgery. There were no excuses and no complaints."

Even in a resource-limited environment, both patients and surgeons were creating an atmosphere of excellence. Dr. Tsao says, "The sites were carefully screened to ensure that we would have enough patients to treat as well as three or four dedicated ORs. We brought all of our own personnel and equipment, including supplies for anesthesia, sterilization, medications, etc. People ended up traveling from nearly all parts of the country. We were able to perform 44 total knee replacements in three and a half days; we then rounded on patients for several days in the morning and evening so that we could ensure it was safe for them to go home."

Not satisfied with the "swoop in and save" strategy, the surgeons of WOGO brought knowledge so that—eventually—their input won't be needed. "Many Nepalese surgeons, nurses, and students observed the surgeries, and several surgical residents scrubbed in (depending on the procedure). We transferred as much knowledge as possible during those times, but also addressed the issue of physical therapy (PT). While they had some staff familiar with PT, such postop care was really a luxury. We taught the nurses about PT, as well as the patients and the family members. It was astounding and heartening to see the contribution that the families made to patient care. It was the family who brought the patients food, transported them, changed their dressings, etc."

Although one of Dr. Tsao's most vivid memories was being chased by livestock (!), her most important memories are likely those that involve passing on knowledge to her Nepalese peers. "We held a day long seminar on primary total knee replacement where we discussed indications for surgery, surgical techniques, complications, and postoperative care. Most participants had some experience with these surgeries, but we were able to widen their knowledge base, especially regarding operative techniques. One thing that we couldn't help with is the ongoing access to care. Some patients travel several days to reach the hospital, something that really becomes an issue if that person has to return to the hospital for a complication such as wound drainage. Even now—via email or text messaging—we are continuing to help our Nepalese colleagues with this as far as digging down into what is truly a problem requiring hospital treatment and what the patient can handle at home with the help of family."

Part of the WOGO goal was to have as wide of an impact on young Nepalese females as possible. "Several of our team members went to a girl's school and spent time speaking with the students about life choices, careers, and practical steps towards their dreams. We were pleased to be able to serve as examples of what is possible for women."

Thinking ahead by looking back, Dr. Tsao states, "While we were well equipped and organized, the next time we make such a trip I would make some adjustments to our equipment. For example, we naturally feel safe using the anesthetic machines that are found in our hospitals in the U.S. Abroad, however, we decided to use spinal anes-

"Some patients travel several days to reach the hospital, something that really becomes an issue if that person has to return to the hospital for a complication such as wound drainage. Even now—via email or text messaging—we are continuing to help our Nepalese colleagues with this as far as digging down into what is truly a problem requiring hospital treatment and what the patient can handle at home with the help of family."

thesia because on-site equipment was not as up to date. Also, I would prefer to bring our own portable sterilizer. As it was, if someone dropped something on the floor that was it for 24 hours. Our Nepalese colleagues did invite us back, and we hope to be able to return in the not too distant future."

Dr. Rinelda Horton, an orthopedist with Kaiser Permanente Mid-Atlantic Medical Group in Maryland, also did her best to provide training and inspiration to those on the other side of the world. A bit of a cultural anthropologist, Dr. Horton says, "When we first arrived I was surprised to find that women seemed to be treated rather like second class citizens. Both on the airplane and at the hotel—not at the hospital—women were jostled around a bit and we had to 'fight' our way off the elevator. Staff, patients, and families we encountered at the hospital displayed no such behavior, however. But the reality for women in Nepal is that there is a greater need for joint replacement, but they are not first on the list for surgery because of their place in society."

Women Orthopaedist Global Outreach

Anyone on the list, male or female, could be waiting awhile, says Dr. Horton. "I did not get the impression that most orthopedists in the country were doing joint replacements. Even if they were, they were not using the newest techniques. For example, with hip replacements we in the U.S. use porous implants that allow the bone to grow into the prosthesis, while in Nepal they still use cement routinely. We brought the newest implants that are available today in the U.S., with Zimmer donating the Flex knee and the Gender Knee. It was frustrating to see someone with a bad deformity who obviously needed a knee replacement, but because the deformity was so severe it would require revision implants that include augments and stems. Shipping was so expensive that we only had one revision set available, which was reserved for emergencies or in case there were any intraoperative complications."

"There were some patients who really needed an operation, but because of the complexity of the surgery and the lack of revision implants available we were unable to perform their surgery. In these cases, we tried to get braces sent over, so at least they would have some support. For revisions and complex primary joints there are so many trays that have to be shipped in just for one case. Therefore, we just focused on routine cases that wouldn't need revision implants. By doing the more routine cases we were able to help more patients. Early on we had to decide whether to help one patient by doing the revision or many patients by doing the more routine cases. We felt it was better to help more patients and thus have a greater impact."

It was a revitalized and appreciative Dr. Rinelda Horton who returned to Maryland after the trip. "My cases here in the U.S. seemed rather easy upon my return. In Nepal, the batteries went out the first day and there were times when we had no suction. Many times we had to substitute things. For example, we reused OrthoWrap sheets to hold a leg; we also repeatedly reused pop-off sutures. Additionally, since we didn't have a routine bone hook we had to take another instrument—an 'Army Navy'—something normally used for retracting tissue—and use it like a bone hook. In the end, it all worked out."

The surgeons, both those in Nepal and those visiting from WOGO, know that sterility is an ongoing issue. Dr. Horton notes, "Some issues are that many people in the hospital are wearing flip flops and that patients are required to bring their own blankets. Because of this and other sterility problems, patients tend to be on antibiotics longer in Nepal than in the U.S. Another important issue that we would like to help out with is the expense of preoperative testing (something the patients must pay for). It seemed that many people who needed surgery were not able to go through with it because they could not afford this testing."

Dr. Horton concludes, "We were very privileged to become part of the Nepali world, if only for a short period of time. Hopefully, we left a positive footprint or two."

For more information on Women Orthopaedist Global Outreach, please visit http://www.wogo.org/ ◆

company

Biomet Sales Growth Flatlining

RRY Publcations LLC

Biomet's sales growth flatlined during the company's second quarter of 2011. Net sales were $698.3 million for the quarter.

Reported knee sales were up 1%, while hips and spine declined by 1% and 3%, respectively. The company's bright spot was a 21% increase in sales of extremities.

Biomet 2Q11	Sales $ in million	% Change
Net Sales	$698.3	flat
Reconstructive		up 1%
Hips		down 1%
Knees		up 2%
Spine		down 3%
Extremities		up 21%

Source: Biomet

Jeff Binder, Biomet's president and CEO, put the best spin on the quarter when he told analysts on January 6, that he was pleased with the company's operating cash flow for the first half of the year and a strong adjusted EBITDA margin of 37.8% of net sales.

"We believe that market growth rates for orthopedic reconstructive products continued to be depressed in the quarter. However, an improving economy, favorable demographics and product innovation should stimulate long-term market growth and we continue to make significant research and development investments to address unmet clinical needs across our business."

Denhoy: Sounding the Alarm

Raj Denhoy, Jeffries & Company analyst, wrote in an investor note that "Biomet sounds the alarm in orthopedics."

"Biomet's results…were not encouraging, showing a further slowdown in both hips and knees. The company's commentary on price worsening and mix beginning to recede, to the point where it cannot offset price, was of particular concern, in our view," said Denhoy. Biomet's hip franchise, according to Denhoy, continues to be negatively impacted by surgeons' continued movement away from metal-on-metal implants.

Denhoy noted the company's hip and knee growth decelerated sequentially. "Results saw a step down with constant currency hip growth at 0% and knee growth just 3%; both were a step down from 2% and 5% in F1Q11 and 8% and 13% in F4Q10. U.S. growth was 0% in hips and 3% in knees, down from 4% and 6% in F1Q11 and 8% and 11% in F4Q," added Denhoy.

The company reported gross debt of $5.946 billion as of November 30, 2010, and cash on hand was approximately $229 million.

—WE (January 7, 2011) ◆

legal

Physician-Owned Hospital Beats Deadline

A group of orthopedic and spine surgeons in Dallas beat the clock on New Year's Eve before their plans for investing in their own hospital turned into a pumpkin.

morgueFile.com

The *Dallas News* reported on December 31 that the Methodist Hospital for Surgery beat the federal deadline of getting their facility licensed and approved in time to get their Medicare provider number before a new law prohibiting physician ownership in hospitals receiving Medicare funds took effect on January 1, 2011.

Executives at the Methodist Health System began planning a 32-bed orthopedic and spine hospital a year ago. But because the hospital had physician investors, the project was a risk of not meeting the deadline.

In the original plans, the $60 million, 100,000-square-foot hospital was going to open in January 2011.

When the new health care law was signed into law on March 23, the hospital and investors had to decide if they should scrap the project or work faster to try and beat the deadline.

"As soon as we knew the deadline date, we had an all-hands-on-deck meeting," Michael Arvin, Methodist's chief development officer told the News. "We all looked at each other and said we're going to work backwards from Dec. 31, 2010."

According to the article, the decision to proceed was made at an April 1 meeting. Everyone necessary for completing the hospital was assembled. At the table were physician investors, the developer, architect, the company that would manage the hospital and the community's planning and zoning department.

Accelerated Development Plan

The group implemented an accelerated development plan. The construction company doubled its usual pace for such projects, using two 10-hour shifts for six days a week. The architect used new technology that allows architectural drawings to sync with construction drawings in real time and produced the necessary information for general contractors to proceed at a quicker pace.

The hospital secured a state-required Certificate of Occupancy on October 1 and received licenses from the Texas Department of Health, allowing it to open for business in early December.

At the end of November, federal surveyors inspected the facility for two days and on Wednesday, December 29; the hospital learned that it had been issued a Medicare provider number.

Given the track record of physician-owned hospitals, the quality of orthopedic and spine care in Dallas improved that day.

—WE (January 4, 2011) ◆

biologics

Bunnies Grow Biological Joints

Bunny rabbits, hopping around on their new shoulders in a University of Missouri laboratory, may be the harbingers of a revolution in human joint replacement.

Three researchers from the University of Missouri and Columbia University have created fully functioning biological joints, both bone and cartilage, in rabbits. They believe biological joint replacements for humans are not far in the future.

As reported in *Lancet Magazine* in September 2010, Dr. James Cook, a researcher in the University of Missouri College of Veterinary Medicine and School of Medicine, Department of Orthopedic Surgery, along with engineer- colleagues from Columbia University, doctors Clark Hung and Jeremy Mao, created new cartilage and bone in rabbits using a biological "scaffold" in the animals' joints.

The study was led by Mao while Cook participated on the implant design and performed the surgeries on the rabbits using a technique similar to that for human shoulder replacements. Cook removed the entire humeral head, or the ball part of the ball-and-socket shoulder joints from the rabbits, and

Dr. James Cook, named America's Best Vet and Director of University of Missouri Orthopaedic Lab source: Josh Nichols MIZZOU WIRE

Wikimedia Commons

replaced them with scaffolds modeled by CT scans to be exactly like those that had been removed. The scaffolds on half of the 24 rabbits were infused with a growth factor, which encouraged the host's own cells to become cartilage and bone cells. An advantage to this technique, notes Cook, is that it avoids the need to harvest and implant stem cells.

Cook told *OTW* that cartilage and bone began to grow in the scaffolds on both groups within about four weeks but that the tissues in the rabbits that had received the infused growth hormone were of "better quality" and these animals resumed weight-bearing and functional use of their limbs faster and more consistently than those without. "This is the first time we have seen cartilage regeneration using this type of scaffold," he said.

After four months, cartilage had formed in all of the rabbit's scaffolds creating a new, functional cartilage surface for the humeral head. Cook and his team observed no complications or adverse events after surgery and the new tissue regeneration was associated with excellent limb use and shoulder health, indicating the procedure is both safe and effective. The next step is to study the technique in larger animals.

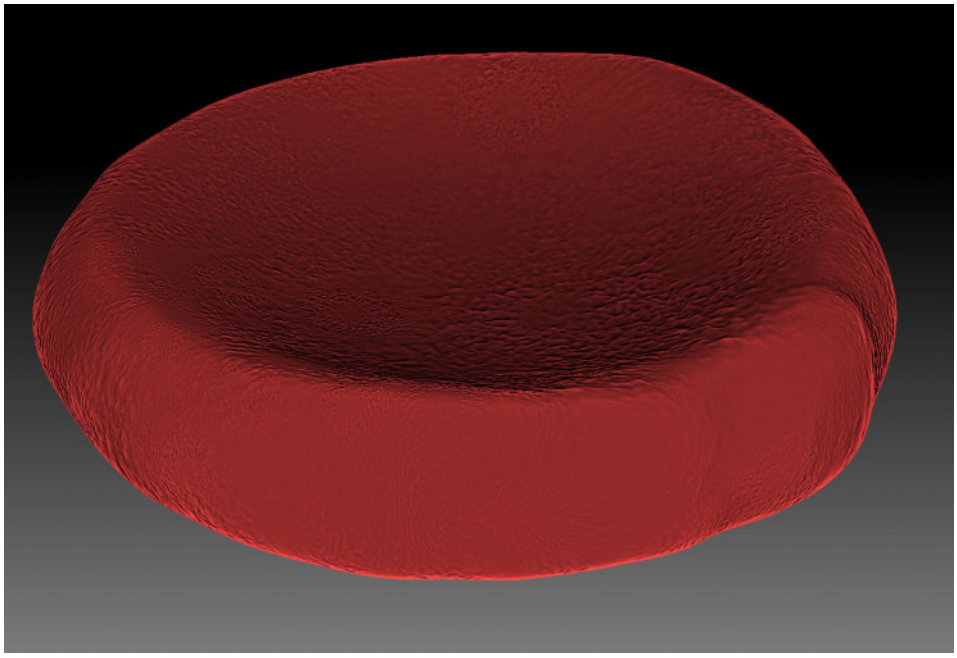
—BY (January 5, 2011) ◆

Platelet Rich Matrix No-Go in Test

As anyone who has had an injured shoulder repaired knows, torn rotator cuffs, after reinsertion on the humerus, are very slow to heal. Doctors, observing this, have wondered if a growth factor augmentation with a platelet-rich fibrin matrix might speed up the healing process. Eight orthopaedic surgeons in Italy collaborated on a study to assess the efficacy and safety of growth factor augmentation during rotator cuff repair. They reported their results on December 15, 2010, in the *American Journal of Sports Medicine*. The results were released online prior to publication. The principal investigators were R. Castricini, UG Longo, M. DeBenedetto, N. Panfoli, P. Piarni, R. Zini, N. Maffulli and V. Cenaro

Using a computer-generated sequence, the researchers randomly assigned eighty-eight patients with rotator cuff tears who were scheduled to have arthroscopic rotator cuff repair to one of two groups. One group of 43 was assigned to have the surgical repair without augmentation. The second group, of 45 patients, received augmentation with autologous platelet-rich fibrin matrix (PRFM).

The surgeons were looking for postoperative differences in the Constant score between the two groups


3D model of a human blood cell/Nikola Ubavic/Wikimedia Commons

plus the integrity of the repaired rotator cuffs as they were evaluated by magnetic resonance imaging. The Constant score is a scoring system shoulder rating scale evaluating shoulder pain (15 points), activities of daily living (20 points), range of movement (40 points) and power (25 points). A possible total score is 100 points which indicates an asymptomatic and healthy individual.

All of the patients were followed-up after 16 months. The researchers found no statistically significant differences between the two groups in the total Constant score or, when they compared the arthroscopic repair with or without PRFM, in the magnetic resonance imaging tendon score.

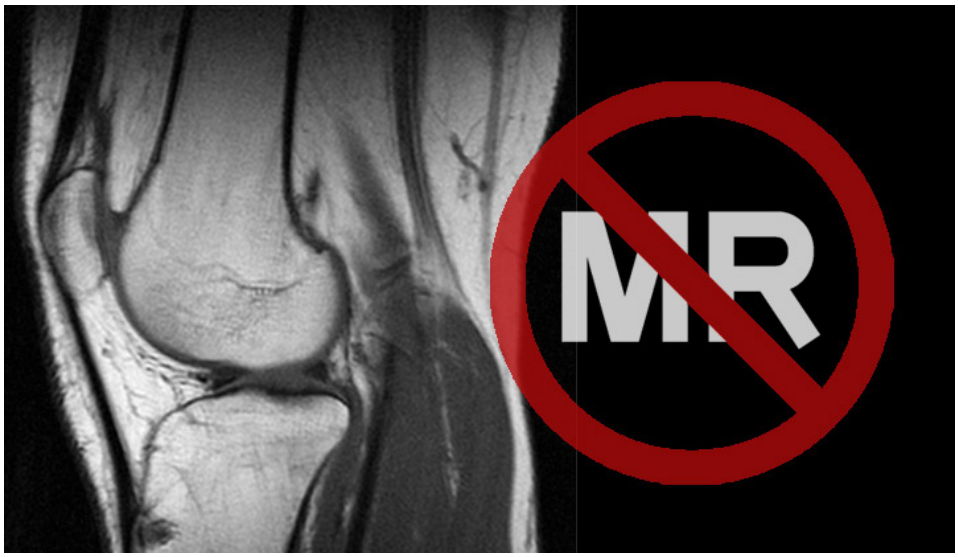
The results of the Italian study did not support the use of autologous PRFM for augmentation of a double-row repair of a small or medium rotator cuff tear to improve the healing of the rotator cuff. It is important to note that the results of this study are applicable only to small and medium rotator cuff tears. It remains possible that PRFM may be beneficial for massive rotator cuff tears. Also, given the heterogeneity of PRFM products now available, it is possible that other preparations may be more effective.

—BY (January 4, 2011) ◆

large joints

OA Docs Not Following Guidelines

Alas, when it comes to clinicians who care for osteoarthritis (OA) patients, it seems that the manual is gathering dust on the shelf. Researchers have found that clinicians are likely not following standard care guidelines that are based on current medical evidence. Specifically, they found that physicians were prescribing medications for pain and inflammation, or opting for surgical interventions rather than recommending weight loss plans or exercise programs to OA patients. Details of this study are available in the



WolfWings; Test21/Wikimedia Commons

January 2011 issue of *Arthritis Care & Research*.

Dr. David Hunter from the University of Sydney in Australia and New England Baptist Hospital in Boston, Massachusetts, and colleagues reviewed how standard clinical practice diverges from evidence-based recommendations in the management of OA.

The authors found that therapeutic interventions are primarily aimed at reducing pain and improving joint function by using therapies that target symptoms, but do not facilitate improvement in joint structure or long-term betterment of the disease.

The typical indications for a surgical approach in treating OA are debilitating pain and major limitation of functions such as walking, working, or sleeping. However, prior studies have shown that up to 30% of some surgical procedures are inappropriate and recent recommendations suggest routine arthroscopy for knee OA management should be avoided—something not reflected in clinical practice.

The study team also noted an overuse of inappropriate diagnostic imaging instead of clinical diagnosis based on history and physical examination. Based on current guidelines imaging should be reserved for instances where a diagnosis is unclear and radiography could rule out other diseases that may produce similar symptoms.

Dr. Hunter told *OTW*, "It is difficult to identify the major factor behind the unnecessary surgeries and it is likely that multiple factors are involved. The main concern from a surgical perspective is the frequency with which arthroscopic surgery is still done for people with knee OA despite convincing clinical evidence that it is no better than a placebo. Arthroscopic debridement and lavage for knee OA is still the most common orthopedic procedure. Some factors that may explain this is the desire on the part of the patient for a quick fix to their pain and on the part of the surgeon to provide an operation to patients wanting help with their disease management. The more complex concern is what can be done to stop these unnecessary surgeries. Some efforts are being made by payors (insurance companies) to stop funding these, but we need to better educate clinicians referring patients to surgeons about the efficacy of surgical intervention as well as promote informed decision making among patients."

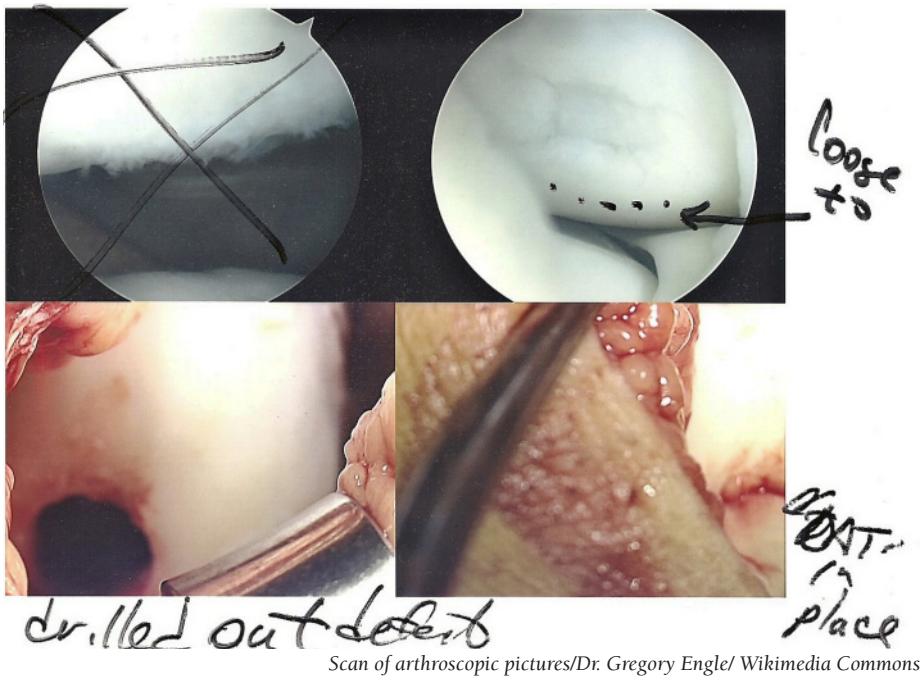
—EH (January 6, 2011) ◆

Age No Deterrent for ACI

There is good news for patients over 40 suffering from cartilage defects of their knees. A study published December 31 in *Orthopedic & Spine* reports that patients with an average age of 47.8 who underwent autologus chondrocyte implantation (ACI) for isolated cartilage defects did just as well as patients with an average age of 31 years undergoing the same treatment.

These results challenge the accepted wisdom that ACI is not a recommended surgical treatment for patients older than 40 to 50 years. In the study, conducted at the Department for Orthopedic Surgery and Traumatology, Freiburg University Hospital, Freiburg, Germany, 37 patients with an average age of 47.8 years were paired with 37 patients with an average age of 31 years. All underwent ACI for isolated cartilage defects of the knee.

While there was a slight tendency for better clinical outcomes in the younger patients, there were no statistically significant differences between patients in both groups at any point during the investigation. The statistical analysis revealed a significant increase in knee function after ACI in both groups as



Scan of arthroscopic pictures/Dr. Gregory Engle/ Wikimedia Commons

early as six months after surgery. The patients were followed for 24 months. The study also confirmed other recent studies that reported satisfying clinical results in middle-age patients.

—BY (January 4, 2011) ◆

Photo by Andrew Huth

Pull-String Opens Surgical Site

While arthroscopic procedures are playing an increasingly important role in the treatment of joint problems, the troubling fact remains that most surgeons, while operating on patients arthroscopically, struggle with problems of poor visualization and insufficient working space.

Keimyung University – One of the most prestigious universities in South Korea

Repeated obstruction of the visual field prolongs the surgery, increases fluid extravasations and results in making the surgery more complicated and difficult.

Now five doctors from the Department of Orthopedic Surgery, College of Medicine, Keimyung University, Daequ, Korea, led by Dr. Chul-Hyun Cho, have devised a simple process, called "The Pull-String Technique," using polydioxanone, to improve visualization and create and maintain an adequate working space in arthroscopic procedures.

Dr. Cho reports that the pull-string technique can be used in any arthroscopic procedure, such as shoulder, knee, elbow, wrist, or ankle surgery. His article, with photographs which demonstrate the technique, is published in the January issue of *Orthopedics*. Dr. Cho used the repair of a rotator cuff to demonstrate the pull-string technique.

As Dr. Cho explained," An 18-gauge spinal needle is used for passing of the polydioxanone. Through the spinal needle, a No. 1 polydioxanone is passed to the subacromial space and pulled out through the lateral portal using an arthroscopic grasper.

The hemostat holding the polydioxanone is pulled, which creates good visualization and enough working space through lateral traction of the deltoid muscle, allowing more room for the lateral reattachment anchor to enter the lateral distal portion of the greater tuberoses. Once good visualization has been secured, lateral reattachment screws are fixed at that exact point and the complete double-row suture-bridge."

"All patients," he reported, "had satisfactory results after rotator cuff repair using our technique. Also no intraoperative and postoperative complications existed. The pull-string technique is simple and may be applied in any desired anatomic location at any time to enlarge the working space to ensure good visualization."

Correspondence with Dr. Chul-Hyun Cho should be addressed to Department of Orthopedic Surgery, Dongsan Medical Center, College of Medicine, Keimyung University, 194 Dongsan-dong, Joong-Gu, Daegu, Korea 700-712.

—BY (December 30, 2010) ◆

people

John Kanis Wins Hamdan Award

He wasn't counting on an award… Professor John Kanis' calculations were focused on developing a state-of-the-art fracture risk assessment tool. It is for his outstanding contribution to the development and validation of the WHO Fracture Risk Assessment Tool—FRAX—that he has been honored with the 2010 Hamdan Award for Medical Research Excellence in the field of osteoporosis.

Professor Kanis, President of the International Osteoporosis Foundation, is the Emeritus Professor in Human Metabolism and Clinical Biochemistry and the Director of the WHO Collaborating Centre for Metabolic Bone Diseases, University in Sheffield, UK. His research interests are largely related to disorders of skeletal metabolism including osteoporosis, Paget's disease of bone, hyperparathyroidism, renal osteodystrophy and neoplasia affecting the skeleton.

He has also made a number of national and international contributions to guideline development, health technology assessment, epidemiology and health economics. Professor Kanis is a WHO Advisor on Osteoporosis, is Co Editor-in-Chief of Osteoporosis International, serves on the editorial board of several journals and is the author of more than 800 papers, chapters and books on bone disease and metabolism.

Photo manipulation by RRY Publications. Source: Wikimedia Commons

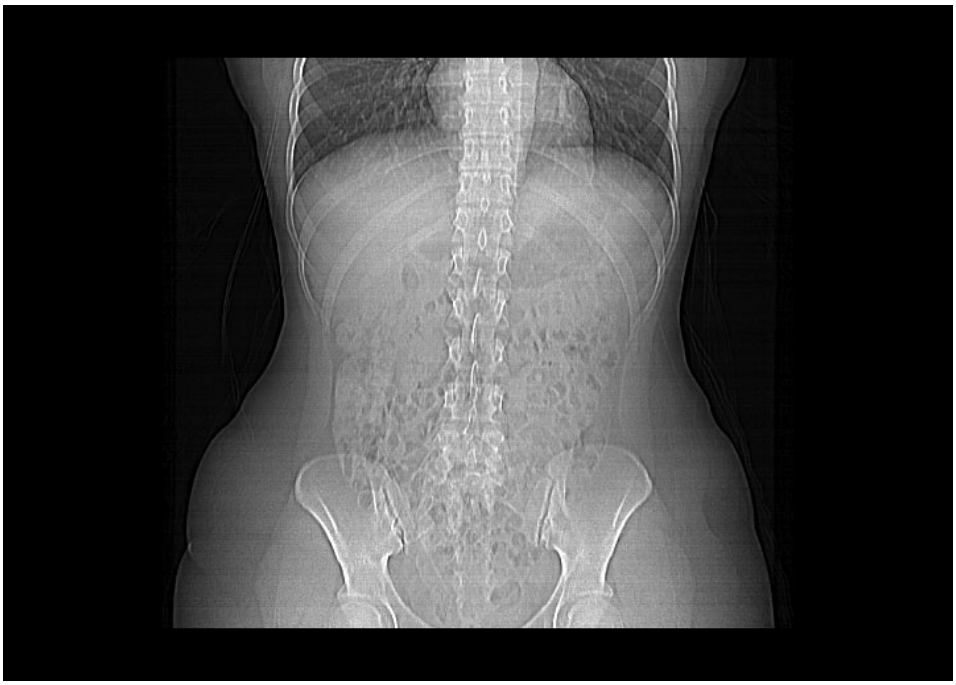
The Hamdan Awards for Medical Research Excellence were presented in Dubai on December 13, 2010, by His Highness Sheikh Hamdan Bin Rashid Al Maktoum, Deputy Ruler of Dubai, Minister of Finance and Industry, U.A.E., President of the Dubai Department of Health and Medical Services and Patron of the Award for Medical Sciences. The annual Awards pay tribute to three distinguished researchers who have made an enormous global impact through innovative research and novel advances in their respective fields.

—EH (January 3, 2011) ◆

spine

Website For Aging Spines

Alphatec Spine, Inc. one of the leading manufacturers of products for the treatment of spine disorders, has launched a major web-based initiative to provide information to healthcare providers and patients regarding the unique and difficult problems associated with the aging spine. Located at www.agingspinecenter.com, the site provides a wealth of information regarding disorders of the aging spine and the multitude of treatments that are available for the older patient.



Sébastien Barré/Wikimedia Commons

Through the use of videos and graphics in an easy-to-understand format the interactive web site prepares patients with the questions they should ask of their caregivers and enables them to review pertinent information about the problems associated with aging spines.

Alphatec Spine is working with the National Osteoporosis foundation and other clinical portals to provide peer-reviewed content for the site and with RRY Publications for pertinent medical abstracts.

"By 2015 the number of elderly spine patients will increase by 43%, representing the fastest growing sub-segment of patients suffering from back pain in the United States," said Robin Young, a 25-year industry analyst and founder of RRY Publications and PearlDiver Technologies Inc. "These elderly spine patients and their unique, complex issues have largely been ignored by traditional spinal implant manufacturers. Alphatec Spine's Aging Spine Center website is a welcome and far-sighted initiative to address this monumental unmet need."

Leo Schargorodski, Executive Director of the National Osteoporosis Foundation, said educational initiatives, like the Aging Spine Center website, are critical for consumer health and awareness. "Fractures related to osteoporosis have a serious medical, emotional and economic impact on individuals. Educating healthcare professionals and the general public on how to prevent, diagnose and treat osteoporosis is our first line of defense against the disease."

Aging spine patients (65 years and older) suffer from conditions such as osteoporosis (which results in 700,000 annual vertebral compression fractures), adult scoliosis (which is prevalent in this age group) and spondylolisthesis (which afflicts 12% of men and 30% of women in the aging population). According to the National Osteoporosis Foundation, one in two women and one in four men over age 50 will break a bone due to osteoporosis. The organization estimates that 10 million Americans currently suffer from osteoporosis and 34 million more are at risk of developing it.

Alphatec Spine, a division of Alphatec Holdings, Inc. is a leading medical technology company that designs, develops, manufactures and markets products for the surgical treatment of spine disorders with a focus on treating conditions affecting the aging spine.

—BY (January 3, 2011) ◆

THE PICTURE OF SUCCESS

Dr. John Cardea

By Elizabeth Hofheinz, M.P.H., M.Ed.

Dr. John Cardea

When the 17-year-old John Cardea emerged from a coal mine deep in the vast system of mountains in eastern North America known as the Appalachian Chain, he wiped his brow and said, "Mom, get me some more books."

The third generation son of miners of one of the oldest geologic structures on earth had just set himself a new goal. He was going to become a doctor.

John Cardea, now Chair Emeritus of the Department of Orthopaedic Surgery at Virginia Commonwealth University (VCU) looks back and recalls: "I was born in West Virginia, in the heart of Appalachia. My grandfather arrived at Ellis Island from Italy and he got a job in the coal mines…my dad followed him into that life. My mom had other ideas for me, however. She was a nurse who influenced me profoundly, especially when it came to obtaining an education."

Not only did young John Cardea become a doctor, he also became a leader in the training, education and nurturing of thousands of future surgeons. A founding member of the American Association of Hip and Knee Surgeons (AAHKS) and former president of the Orthopaedic Trauma Association (OTA), Dr. Cardea has pursued his passion for teaching and leadership with unusual gusto. And don't let him find anyone acting unethically. (Hint: they can't hide.)

Communication has always been of the utmost of importance to Dr. Cardea. He says, "If you come from Harvard, but you feel uncomfortable talking to your patient who is a farmer, what good are you?" One reason that Dr. Cardea has been a successful leader is his lifelong ability to talk to anyone…and listen. That doesn't mean he didn't hit some bumps along the way, however. "Growing up in Appalachia gave me an incredible ability to talk to people and to 'read' people. That being said, it took me awhile to get comfortable in the environment of higher education. I had endured years of snickering about my plans to become a doctor (most of my peers either took to the mines or joined the Marines). My family members, fortunately, were very supportive."

Occasionally, a hint of self-doubt would creep into Dr. Cardea's thinking. "While I had had dedicated and involved teachers in my youth, and I had received a broad education, my vocabulary skills and the way that I used words was limited because I was raised in Appalachia. I excelled at math and science, but sometimes felt self conscious in college. In those times my tendency was to withdraw. Whenever I wavered or felt any doubt, however, I held tighter to the goal of being a doctor and that commitment helped me to study even harder. For inspiration, I would ride my bike over to the West Virginia University Medical Center and give it a long, hard stare."

For that boy on the bike, the goal to be admitted into medical school must have seemed impossibly remote. John

"I finished my residency at VCU in June 1973 and one month later the powers that be appointed me to become a member of the faculty—the only full time faculty member. Why? Because the chair and all of the attendings had left!"

Cardea, however, would not only achieve that goal but eventually rise to the pinnacle of his profession and craft one of the leading international surgeon societies dedicated to furthering medical research.

"I finished my residency at VCU in June 1973 and one month later the powers that be appointed me to become a member of the faculty—the only full time faculty member. Why? Because the chair and all of the attendings had left! As the medical college struggled, I struggled along with it, learning about administration and trying to do my best without having any mentors. I did get a lot of guidance from the American Academy of Orthopaedic Surgeons (AAOS), as well as some leading surgeons who I met over time."

Dr. Cardea did find his way, and built a home for orthopedics at VCU. "I was the Chief of Orthopedics in the division of surgery, and also the Chair of the residency training program. It was especially difficult to interact with people who gave feedback that had no consequence for them. They would come in my office, give their opinions and leave—but I had to live with the entire situation. For example, some people said, 'You should go to the Accreditation Counsel for Graduate Medical Education (ACGME) and demand that orthopedics be given the status of department.' Mentors from other departments advised me to wait, which I did. When in 2000 we got a new chair in the department of surgery, someone who never listened to his subordinates, we moved forward. It took us four years to become a department."

Dr. Cardea's capacity for research, education and leadership would eventually extend far beyond the universities and research institutions in the Virginias. "In the mid to late 1980s hip and knee was exploding. There were two hip and knee organizations, but they were limited in activities and size by their charter (and were primarily engaged in research). I worked with my colleagues to form a new group that would bring together everyone in orthopedics with an interest in hip and knee; the AAHKS is now the largest such organization in the world."

Dr. Cardea also brought his leadership skills to the Orthopaedic Trauma Association in 1988 when he was elected president. "I was part of the organization as it grew from its original version as the 'Orthopaedic Trauma Hospital Organization' to become the OTA in the early 1980s. As founding members, we wanted to ensure that there would not be a small group of people controlling the organization. We had seen several examples of entities that were run by cliques and just rotated people through the leadership positions. The OTA grew steadily over the years; I always felt part of this great organization and was very proud to be elected president."

As an oral examiner for the American Board of Surgery (ABOS), Dr. Cardea has—for 30 years—had a hand in formulating the process to test physicians. "It's been fulfilling to contribute to this interesting process. As you might expect, it has changed over time. While the applicants used to be responsible for the body of knowledge in orthopedics, with the rise in sub-specialties the board had to change its examining patterns. Until 1992 doctors would go to different stations labeled, 'pediatrics' 'trauma' etc., and take a test. If at the end of the day a doctor made a passing grade then he was an orthopedic surgeon. But because of specialization and subspecialization we now ask surgeons to collect their operative cases from a certain period and send them to the board, which then chooses 12 of the cases to test prospective new surgeons on. We have worked hard to make the process nondiscriminatory and scientific, but there are still those who fail. I always tell people, 'You can't just know the case. You must know the body of knowledge involved."

When he was 17 years old, the young John Cardea emerged from the bowels of those ancient Appalachian Mountains and set out to scale an even taller peak. Dr. Cardea: "I am very goal oriented and will look for any legitimate way around, over, or under a brick wall. That is how I went about building the department of orthopedics at VCU."

Building a department and forging responsible orthopedists have been Dr. Cardea's two grandest accomplishments. Though he is a master at selecting successful orthopedists, Dr. Cardea is somewhat disheartened to see the generational shift in educa-

"If you catch yourself looking at the clock/calendar and saying, 'I need my Mercedes payment on the fifteenth so I'm going to do this surgery' then yes, catch yourself before you act. Irresponsible thoughts run through everyone's mind sometimes…the trick is to be guided by your highest principles and not give in to temptation."

tional expectations. "I adore education because I love seeing someone come in with an incredible desire to learn—but no idea how, when or why to operate—and see them turn the corner over time. But my bottom line has always been that if I didn't think they should be operating on me, then I won't let them out of my program."

"Now it is the MTV/USA Today generation where there tends to be more thinking along the lines of, 'What can you do for me?' Many students say, 'You didn't give me that information so how can you ask me about it?' If you say, 'It was in the book,' that doesn't hold water with them."

What is Dr. Cardea's advice for a new generation of surgeons 'coming up?' "Dedicate yourself to doing your best. You can't stumble through medicine because you're dealing with people's lives. If you catch yourself looking at the clock/calendar and saying, 'I need my Mercedes payment on the fifteenth so I'm going to do this surgery' then yes, catch yourself before you act. Irresponsible thoughts run through everyone's mind sometimes…the trick is to be guided by your highest principles and not give in to temptation."

And if you do give in, Dr. Cardea will find you. "I'm proud to say that in 27 years we only had two residents who didn't complete our program. One situation involved a young surgeon who lied on rounds, falsified notes, and basically allowed a patient's wound to get infected. Not only did I toss the guy out of the program, I followed him until I 'drummed' him out of medicine. I didn't want this person to become someone else's problem."

When dealing with this and other stressors, Dr. Cardea has a solid, loving shoulder to lean on. "My wife has been a real trooper through the years; between working as the chair, taking call, and handling university duties, I often came home at 10pm. She has created her own life and is someone I greatly respect. Each of our four children took a look at my life and said, 'no thanks' to medicine…they said I worked way too hard. As for my free time, my wife and I golf together, and I am starting to do a lot of traveling."

Dr. John Cardea…having journeyed from the coal mines to his personal summit he showed the way for others and in the process created a legacy of education, research and integrity. ◆

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