VOLUME 11, ISSUE 11 | APRIL 7, 2015

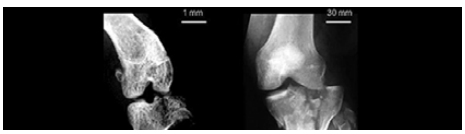
Orthopedics This Week

WEEK IN REVIEW

4 Lukianov >> Alex Lukianov, former CEO of NuVasive has left the building. The news is both sobering and surprising. We have great affection and admiration for Lukianov so we know these are very difficult times for all concerned. On another level, however, this prompts some reflection about the broader issue of leadership.

8 80%+ of Patients Undergoing ACI in the Patella Excellent Results // Study: AIS Patients Should Stick With High Volume Centers // Trauma: Hgb Levels CAN Safely Drop Below 7 >> New BWH research shows that autologous chondrocyte implantation in the patella can reduce pain and improve function. In another fascinating study, Tom Errico reveals there are fewer re-ops for adolescent idiopathic scoliosis at high volume centers. And now…further proof that blood transfusions bring a significant risk of complications.

12 AAOS Award Winning Paper Presented Stunning Conclusion >> This year's $20,000 Kappa Delta Sorority Award winning paper looked at the problem of post-traumatic arthritis of the knee in a new and novel way and may well have uncovered a remarkable new therapy or approach to preventing arthritis in knee trauma cases.



15 New King of the Ambulatory Surgical Jungle >> For 40 years, ambulatory surgical centers (ASC) have been an oasis for surgeons who want to own their own means of production, control their practices and realize the financial benefits of owning facilities. But on March 23, 2015, Tenet Healthcare became the King of a fragmented ASC jungle as "Big Health" begins the march towards consolidation.

BREAKING NEWS

19 Europe and Japan Approve **Zimmer/Biomet Deal**

Costs for **Surgical Readmissions** Calculated

Sex and Low Back Pain: Yes, It Matters

Delirium Found in 48% of **Hip Fracture** Patients…and It's Expensive!

"**Quasi-POD**" Charged with **False Claims**

David D. Teuscher, M.D. Assumes Presidency of **AAOS**

For all news that is ortho, read on.

Orthopedic Power Rankings

Robin Young's Entirely Subjective Ordering of Public Orthopedic Companies

THIS WEEK: The corridors of the exhibit hall at AAOS' annual meeting were more crowded than last year. Booth attendance for Stryker, Zimmer, Biomet, DePuy/Synthes, Smith & Nephew was also up smartly. Overall takeaway is that the Bigs are selling more units this year than last year. More patients with insurance. More surgeries. More treatments. Pricing, however, is moving in the opposite direction.

RANK	LAST WEEK	COMPANY	TTM OP MARGIN	30-DAY PRICE CHANGE	COMMENT
1	1	Integra LifeSciences	12.57%	3.70%	SeaSpine, Integra's spine and orthobiologics business, took one step closer to becoming a public company.
2	3	Exactech	10.44	13.67	Had a VERY active AAOS, highlighted by 4 papers for Equinoxe Shoulder and 2 papers for ExactechGPS guilded surgery.
3	6	MicroPort Scientific	16.53	12.81	Modest AAOS booth for such a global medical device powerhouse. But investors are liking MicroPort these days.
4	2	ConMed	10.51	0.22	It's all about the new management team and what they can do with ConMed's not insignificant assets.
5	7	Stryker	11.52	(1.35)	Up two spots on the basis of a strong AAOS. MAKOplasty was one of the strongest presentations on the floor.
6	8	Medtronic	28.84	(1.69)	In 1998 MDT bought Sofamor Danek for $3.6 billion. Today that asset is worth, conservatively, $9 billion. Spin off?
7	9	Zimmer	29.12	(1.55)	Also up two spots on the basis of a strong AAOS. Excellent overall presentation of products and training.
8	10	Orthofix	7.46	10.59	OFIX CEO Mason is pumping up the margins and running a tight ship. Investors are encouraged.
9	4	Alphatec	0.33	(6.00)	Good management. But ATEC needs a loyal institutional investor base to soak up excess shares during a sell off.
10	5	Johnson & Johnson	28.44	(1.98)	AAOS highlights were Expedium Osteomy, Viper Coritcal Fix, Synapse and Vivigen Cellular Bone Matrix. Investors, however, are focusing on JNJ, not DePuy/Synthes.

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Robin Young's Orthopedic Universe

TOP PERFORMERS LAST 30 DAYS

	COMPANY	SYMBOL	PRICE	MKT CAP	30-DAY CHG
1	Exactech	EXAC	$25.70	$358	13.67%
2	MicroPort Scientific	853	$0.52	$745	12.81%
3	K2M Group Holdings	KTWO	$22.48	$890	12.34%
4	Bacterin Intl Holdings	BONE	$4.09	$27	11.10%
5	Orthofix	OFIX	$36.87	$691	10.59%
6	Globus Medical	GMED	$25.39	$2,405	5.66%
7	Tornier N.V.	TRNX	$26.10	$1,279	5.11%
8	MiMedx Group	MDXG	$10.43	$1,127	4.09%
9	Integra LifeSciences	IART	$62.29	$2,042	3.70%
10	Wright Medical	WMGI	$25.81	$1,326	1.69%

WORST PERFORMERS LAST 30 DAYS

	COMPANY	SYMBOL	PRICE	MKT CAP	30-DAY CHG
1	TiGenix	TIG.BR	$0.71	$114	-15.02%
2	Aurora Spine	ASG	$0.99	$19	-14.86%
3	Alphatec Holdings	ATEC	$1.41	$141	-6.00%
4	NuVasive	NUVA	$42.37	$2,040	-5.87%
5	LDR Holding Corp.	LDRH	$35.76	$949	-5.32%
6	RTI Biologics Inc	RTIX	$5.14	$294	-3.20%
7	CryoLife	CRY	$10.34	$292	-2.45%
8	Johnson & Johnson	JNJ	$99.64	$277,055	-1.98%
9	Medtronic	MDT	$76.87	$109,545	-1.69%
10	Zimmer Holdings	ZMH	$116.92	$19,877	-1.55%

LOWEST PRICE / EARNINGS RATIO (TTM)

	COMPANY	SYMBOL	PRICE	MKT CAP	P/E
1	Johnson & Johnson	JNJ	$99.64	$277,055	16.69
2	Medtronic	MDT	$76.87	$109,545	19.22
3	Globus Medical	GMED	$25.39	$2,405	19.44
4	Zimmer Holdings	ZMH	$116.92	$19,877	20.03
5	Stryker	SYK	$91.12	$34,532	21.00

HIGHEST PRICE / EARNINGS RATIO (TTM)

	COMPANY	SYMBOL	PRICE	MKT CAP	P/E
1	MiMedx Group	MDXG	$10.43	$1,127	208.60
2	NuVasive	NUVA	$42.37	$2,040	101.61
3	RTI Biologics Inc	RTIX	$5.14	$294	97.38
4	Orthofix	OFIX	$36.87	$691	92.61
5	CryoLife	CRY	$10.34	$292	47.88

LOWEST P/E TO GROWTH RATIO (EARNINGS ESTIMATES)

	COMPANY	SYMBOL	PRICE	MKT CAP	PEG
1	Globus Medical	GMED	$25.39	$2,405	1.48
2	ConMed	CNMD	$51.12	$1,409	1.55
3	CryoLife	CRY	$10.34	$292	1.60
4	Medtronic	MDT	$76.87	$109,545	2.36
5	Integra LifeSciences	IART	$62.29	$2,042	2.44

HIGHEST P/E TO GROWTH RATIO (EARNINGS ESTIMATES)

	COMPANY	SYMBOL	PRICE	MKT CAP	PEG
1	MiMedx Group	MDXG	$10.43	$1,127	13.91
2	NuVasive	NUVA	$42.37	$2,040	8.89
3	RTI Biologics Inc	RTIX	$5.14	$294	6.49
4	Orthofix	OFIX	$36.87	$691	5.03
5	Smith & Nephew	SNN	$34.23	$15,329	4.50

LOWEST PRICE TO SALES RATIO (TTM)

	COMPANY	SYMBOL	PRICE	MKT CAP	PSR
1	Alphatec Holdings	ATEC	$1.41	$141	0.68
2	Bacterin Intl Holdings	BONE	$4.09	$27	0.77
3	RTI Biologics Inc	RTIX	$5.14	$294	1.12
4	Exactech	EXAC	$25.70	$358	1.44
5	Orthofix	OFIX	$36.87	$691	1.69

HIGHEST PRICE TO SALES RATIO (TTM)

	COMPANY	SYMBOL	PRICE	MKT CAP	PSR
1	TiGenix	TIG.BR	$0.71	$114	13.65
2	MiMedx Group	MDXG	$10.43	$1,127	9.54
3	LDR Holding Corp.	LDRH	$35.76	$949	7.10
4	Medtronic	MDT	$76.87	$109,545	6.25
5	K2M Group Holdings	KTWO	$22.48	$890	5.65

PSR: Aggregate current market capitalization divided by aggregate sales and the calculation excluded the companies for which sales figures are not available.

Lukianov

BY ROBIN YOUNG

Alex Lukianov, former CEO of NuVasive, Inc.—the $2 billion manufacturer of spinal implants—has left the building.

A few weeks before, Keith Valentine left the position of president of NuVasive although he is an advisor to the new CEO.

The two departures are unrelated but they may signal a turning point, we think, at NuVasive.

Importantly, many of the original managerial team that built NuVasive remain including Pat Miles, now NuVasive's president and chief operating officer.

Expense Reports and Personnel Issues

Alex Lukianov's departure from NuVasive was not by his choice, apparently.

Speaking for NuVasive's board, Jack R. Blair, lead independent director of the Board, said in a press release issued on April 1: "The results of an independent investigation overseen by the Board of Directors revealed that Alex had not complied with certain of the Company's expense reimbursement and personnel policies. Although the amounts involved appear to be immaterial to the Company's financial results, his actions in this regard were not representative of the high standards by which NuVasive operates. We believe this leadership transition is appropriate and in the best interests of the Company and all of our stakeholders. We appreciate the positive contributions Alex has made to the Company and wish him well in his future endeavors."

Alex Lukianov, courtesy of NuVasive

Corporate Leadership

When Alexis Lukianov joined NuVasive in 1999 (two years after it was founded) the company had no sales and was losing about $6 million a year. The next year NuVasive sold $52,000 of classic spine fusion products—and lost $14 million.

Today, 16 years later, NuVasive employs 1,500 people, is the third largest spinal implant supplier in the world with annual sales in excess of $760 million and has a market value of more than $2 billion.

Alex Lukianov was NuVasive's charismatic CEO during this entire period.

The news that Lukianov has been asked to relinquish his position at the firm is both sobering and surprising. We have great affection and admiration for Lukianov and the entire NuVasive family, so we know these are very difficult times for all concerned.

Hearing this news, however, did prompt some reflection about the broader issue of leadership.

NuVasive is a very different company from the struggling firm Lukianov joined in 1999. With 1,500 employees and a $2 billion market cap it's certainly a more stable firm but it is also a company with substantially more restrictions on managerial decision making.

In some ways, larger public companies like NuVasive feel more vulnerable and therefore act in more defensive ways than start-up firms. Boards of such companies think in terms of the tens of thousands of people who depend on these managers for at least some portion of their economic livelihood. And with all of these assets—people, intellectual property, sales, earnings and that large bank account—there is simply more to lose. So the rules of managerial behavior are not only well proscribed, but carry consequences when they are not followed.

Here is how Wells Fargo analyst Craig Bijou characterized Lukianov's departure in his research report to institutional investors:

"With Alex's resignation and COO Keith Valentine's recent departure, the two

primary drivers of NUVA's culture have now left the company. Although the departures are not related, we believe that there will be a change to the culture. While the cultural change could lead to some disruption, we believe that the remaining leadership such as Pat Miles and Matt Link has the confidence of surgeons and the industry. We view the perceived cultural change as positive because NUVA appears to be transitioning to a more mature culture as it has moved from a small spine player to the #3 spine company in the world."

It will be hard to imagine NuVasive without Valentine or Lukianov. Their personalities were stamped on NuVasive. Without them does NuVasive's culture mature in some way and, if so, is the Cheetah an endangered species?

Corporate Culture and CEO Leadership

Different leaders are needed at different stages of a company's development.

In their seminal meta-analysis of the impact of CEO personality and corporate culture (*The Promise and Problems of Organizational Culture: CEO Personality, Culture, and Firm Performance*) authors Charles O'Reilly, David Caldwell, Jennifer Chatman and Bernadette Doerr from Stanford, Santa Clara University and UC Berkeley, respectively, had fascinating insights.

Their conclusion? "Taken together a clear picture emerges showing that CEO personality is significantly related to organizational cultures: CEOs with a personality that is more open to experience have cultures that emphasize adaptability; CEOs who are more extraverted but less agreeable and more neurotic have more results-oriented cultures; and CEOs who are more conscientious have more detail-oriented cultures.

Here are four questions these top researchers asked as part of their research.

1. Are CEOs who are higher on extraversion (optimistic, energetic, prefer interactions with others) more likely to be associated with corporate cultures that are (a) more results oriented, and (b) more collaborative?
2. Are CEOs who are high on agreeableness more willing to compro-

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mise and avoid conflict and therefore have cultures that are more collaborative and less results orients?
3. Are CEOs who are high on conscientiousness (have a tendency to control impulses and tenaciously pursue goals) more likely to be associated with cultures that are detail-oriented, results-oriented and higher in integrity?
4. Are CEOs who are high on neuroticism (emotionally unstable and upset with minor threats or frustrations) more likely to be associated with cultures that are less results oriented and less collaborative?

The Answers From the Study

Here are some of the results the authors found from their research as they were attempting to answer these questions.

"After controlling for these differences and firm size, the results reveal a number of significant relationships between CEO personality and firm culture, providing support for the general hypothesis that variations in CEO personalities will be associated with differences in organizational culture."

Specifically, the researchers found that:

Question #1: CEOs who were more extraverted (gregarious, assertive, active) had cultures that were more results-oriented.

Question #2: More agreeable CEOs (trusting, compliant and compassionate) were associated with less results-oriented cultures.

Question #3: CEOs who were more conscientious (orderly, disciplined, achievement-oriented) had cultures that were more detail-oriented.

Question #4: CEOs who were higher on neuroticism and less emotionally stable were more likely to have cultures that were less results-oriented.

Discussion

In terms of NuVasive, the culture that the original team fostered and built was characterized both internally and externally by such catch phrases as "Speed of Innovation," "Performance Culture" and the image of the Cheetah. It resulted in a remarkable string of truly innovative products and a sales growth trajectory that placed NuVasive well on the way to $1 billion in sales.

Hopefully, the culture that created NuVasive will continue to deliver the kind of performance that made the company so successful.

However, NuVasive's duty as an organization is more than just to maximize profits. There's more—like appropri-

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ate corporate controls and corporate governance. In short, NuVasive's definition of performance may start to expand as a result of these changes. In the future, performance may come to encompass every stakeholder, the perhaps overly restrictive regulatory accountability requirements and more efficient use of SG&A.

O'Neill, et al.'s study of CEO personality and corporate culture had, we think, two important conclusions and implications.

First, CEO's personalities do affect organizational culture and performance. And no single, specific CEO personality is right every time or for every stage in a company's life. Perhaps, in certain circumstances, a board may prefer a more extraverted CEO who is otherwise low in agreeableness and neuroticism. Or, alternatively, a company may need someone who is more detail-oriented who is highly conscientious. Or, as a third possibility, a company may need a CEO who can build not only revenue growth but also employee attitudes.

Second, the perception of a CEO's personality is extremely powerful. This study really enforced the notion that top executives are intensely scrutinized by employees, board members, shareholders and Wall Street analysts. CEOs need to be aware of the impact they have on culture and the people around them.

NuVasive's Future

NuVasive's future is nominally in the hands of its Board and more specifically in the hands of Greg Lucier, a member of the company's Board of Directors since 2013. Lucier is now NuVasive's chairman and interim CEO. He was formerly chairman and CEO of Life Technologies. Lucier built Life Technologies into a $4 billion revenue company and eventually sold it to Thermo Fisher Scientific in 2013 for about $14 billion.

So far, Wall Street's reaction to Lukianov leaving is mixed. And NuVasive's market value is down about 5% since the announcement.

So we think there will be a period of settling down and sorting out. And it's hard to imagine that NuVasive's culture of speed and innovation will go away, but it may have new aspects to it and those will, no doubt, reflect the new CEO's personality. ♦

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80%+ of Patients Undergoing ACI in the Patella Excellent Results // Study: AIS Patients Should Stick With High Volume Centers // Trauma: Hgb Levels CAN Safely Drop Below 7

BY ELIZABETH HOFHEINZ, M.P.H., M.ED.

Excellent Outcomes in 80%+ of Patients Undergoing ACI in the Patella A multicenter study is shedding light on the dicey arena of autologous chondrocyte implantation (ACI) in the patella, an off-label indication for ACI. Andreas Gomoll, M.D., an orthopedic surgeon with Brigham and Women's Hospital, tells *OTW,* "ACI in the patella has always been seen as something that does not provide great results. My colleagues and I conducted a multicenter study in Boston, Chicago, Indianapolis and Atlanta, where we found that the outcomes of this procedure are very comparable to those in the femoral condyles. We were quite surprised to see how well it works, something we attribute to the careful assessment and correction of patellofemoral mechanics. In the past this was not done…surgeons would do the cartilage repair, but did not consider the whole joint, such as soft tissue imbalances or tuberosity position. That is clearly vital in order to ensure a good biomechanical environment for your repair."

"Our study, which included 110 patients, followed patients that were at least four years after ACI surgery for patellar defects. We employed several different patient reported outcome scales, and found that the vast majority of patients experienced clinically and statistically significant improvements in both pain and function. When asked, 93% patients said that they would undergo ACI again; 86% rated their knees as 'good' or 'excellent' at the last follow-up."

Michelangelo's David/Photo creation by RRY Publications, LLC and Wikimedia Commons

"Traditionally, many surgeons have thought, 'Let's do the easiest thing to fill this pothole—microfracture!' This works in small holes, but we know that it doesn't work in large defects. In order to do a full study you would have to randomize against microfracture, even though there is plenty of, albeit, non-randomized evidence against doing it for large defects, especially in the patella."

"This work is important because many insurance companies don't cover ACI in the patella, thus many patients are missing out on this surgery. One research paper that has been quoted for years (Widuchowski, *Knee* 2007) said that 60% of people who have arthroscopy have a cartilage defect in the knee, with the patella being the second most common location. So this is a very common problem that is difficult to manage—especially in young, active patients. I am pleased, however, that there is a growing recognition that cartilage repair in the patella works, provided one carefully evaluates why these defects develop…and then fixes those reasons along with the cartilage defect itself."

Study: Adolescents With Scoliosis Should Head to High Volume Centers Low-volume surgeons might want to rethink if and how they operate on adolescents with idiopathic scoliosis. According to a new study from NYU Langone Medical Center, patients who have surgery in high volume centers are less likely to undergo a reoperation. Thomas Errico, M.D., chief of Spine at that institution and lead author on the study, told *OTW*, "Despite adequate brace treatment teens can experience curve progression to a point where the family needs to make a decision about surgical treatment. The curve is getting more pronounced, and the family has do decide not only on the timing and but also the surgeon and the hospital. My colleagues and I wanted to obtain clarity on the best evidence to guide these patients so that their families can make the best decision possible."

"We utilized a New York State database, and found 3,928 individuals who underwent surgery for adolescent idiopathic scoliosis (AIS). We classified the treating surgeons as either low volume (less than 6 AIS surgeries per year), medium (less than 43 per year), or high volume (43-228 per year). We did the same with the hospitals involved."

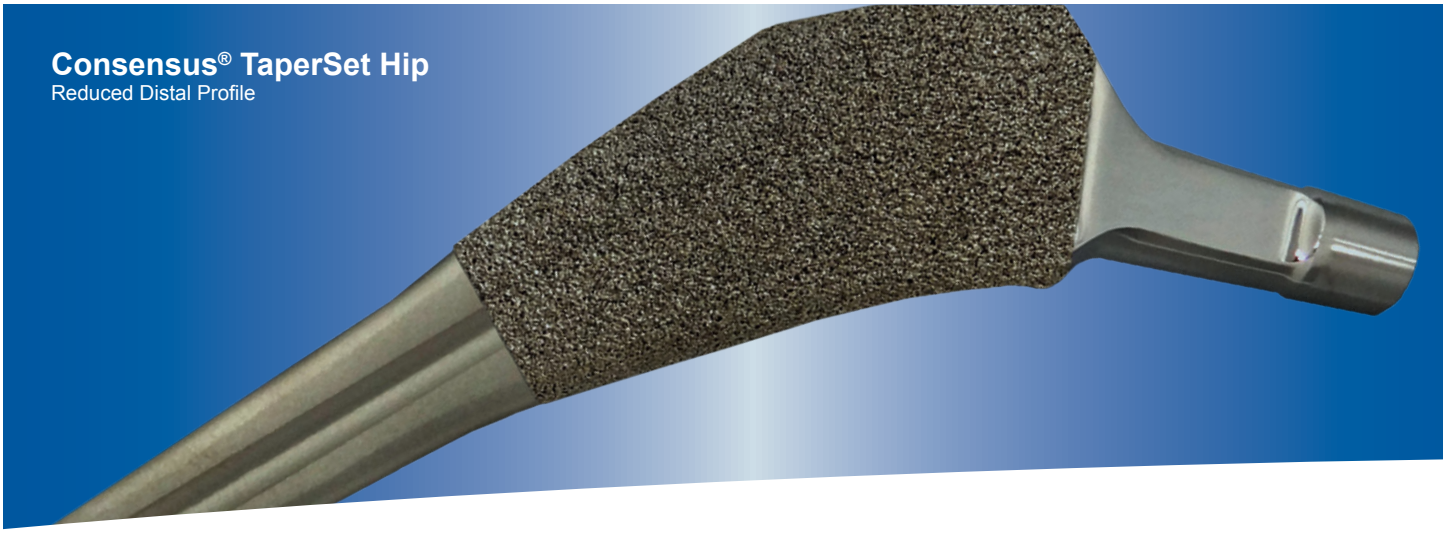
"We found that there were fewer repeat operations by a significant amount: 14% of those who were treated by a low volume surgeon had to undergo reoperation. In contrast, only 5% of patients who were treated by a high volume surgeon needed a reoperation. In addition, the infection rate in the low volume group was 4.1%. In the medium group it was 1.2%, and in the high volume group it was .6%."

"As for the hospitals themselves, the reoperation rate at low volume centers was 5.4%, at the medium volume centers it was 3.5% and 'only' 2.4% at the high volume centers."

"In the past, we've seen research indicating that high volume surgeons are less likely to perform surgeries resulting in complications. Prior to this study, however, it wasn't clear that going to a high volume surgeon would make it less likely that someone would have to undergo a reoperation."

"This work is important because as physicians we must advise parents and patients. My hope is that surgeons who don't perform many AIS surgeries will reconsider whether or not they should be doing these procedures. If they do want to undertake these operations, they should consider having a higher volume surgeons in the OR with them and at what hospital they perform the surgery. When I'm in the OR, and I turn around and ask for something, my staff is totally prepared. I don't have to waste time looking for anything or explaining anything because they know exactly how and when things need to unfold. The xray techs, for example, have been involved in the surgery 1,000 times and know the precise angle needed for proper imaging. Delays lengthen OR time and efficiency provides for the best results. If you put me in another hospital I wouldn't be as good…even though I have the appropriate skills. It is the entire team working in tandem…that's what gets it done right."

Transfusions…What Is the Right Hgb Level? Raise your hand if you are *sure* of when a blood transfusion is indicated in an anemic trauma patient… anyone? There is indeed a lack of clarity on what level of anemia is tolerable in these patients. Brian Mullis, M.D., an orthopedic surgeon with Eskenazi Health and an associate professor at Indiana University, told *OTW*, "While



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this issue has been studied in the total joint population, ours is the first prospective study to address the problem as related to orthopedic trauma patients. There is ample research indicating that allogenic transfusions significantly increase the risk of complications, including infection. It's unclear why, but basic science research shows that these transfusions can cause lifelong immunosuppression. The blood cells lose permeability as they age, and with this there is an increased risk of problems with the kidneys and heart. I tend to be conservative, running down to a hemoglobin of 5. This is based on research with Jehovah's Witnesses indicating that young, healthy patients can tolerate a level of 5 and that the related complication rate is low. There is a strong feeling amongst orthopedic surgeons that the hemoglobin should be kept at some magic number…but no one knows what that is."

"My colleagues and I undertook a retrospective, case control study of 104 of my patients who ranged in age from 18-50. Admittedly, it was underpowered because there are not many people in the low hemoglobin group who were not transfused. We divided patients into two groups: one with the lowest Hgb level before transfusion (under 7 g/dL) and one with 7 g/dL or higher. Not only did we find a significant risk of complications related to transfusion, but with each unit transfused there was an increased risk of complications."

"Most orthopedic surgeons get uncomfortable below 7 g/dL. Years ago the 'magic' number was 10 g/dL…then it was 9 g/dL. Now we know that given the right conditions, even 5 or 6 is acceptable. I will say that in patients who are experiencing dizziness or shortness of breath at rest, I would transfuse them because these may be early symptoms of hypoxia."

"At present we are moving forward with a prospective randomized pilot study to determine if a large multicenter study is feasible. If we find that we need 50,000 patients in order to do a multicenter study then that will be impossible. However, if we only need 300, then we can proceed. It's especially challenging because you have to coordinate a multitude of details with anesthesiologists, physical medicine doctors, etc. And the problem from an anesthesia perspective is that there is no way to measure symptoms while in surgery, so you have to establish objective criteria (a 30% increase in heart rate, for example). Our single center study plans to enroll 100 patients, with 10% enrolled and randomized so far. We hope this study will give us more accurate information for surgeons and patients, then it will have been worth it." ♦

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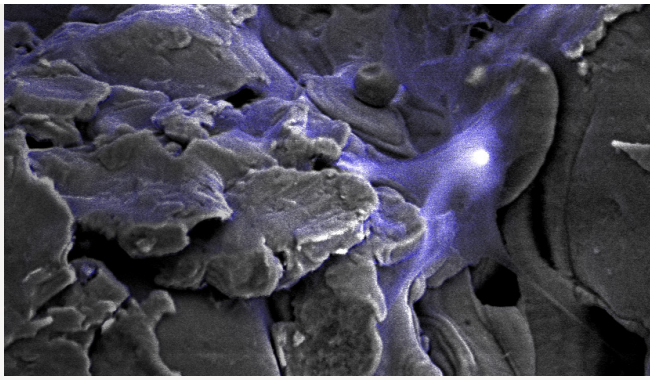
[1] Lebl DR. Mechanical performance of cervical TDRs in vivo. Spine (Phila, PA 1976) 2012 Dec 15; 37(26): 2151-60.
[2] References on File/Internal Reports; Centinel Spine, Inc. LBL 073 Rev 1.
[3] Centinel Spine Report VAL-2014-009.
[4] Centinel Spine Report CD12-03-07-038.



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Cell proliferation on Ti-ACTIVE™ coated device (above) as compared to a PEEK device (left).

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AAOS Award Winning Paper Presented Stunning Conclusion

BY BILOINE W. YOUNG

Winners of the $20,000 Kappa Delta Sorority Award, given at the annual meeting of the American Academy of Orthopaedic Surgeons, do not take on easy or simple problems. The medical foe this year's winning team challenged was arthritis—America's most common disability. One in three adults of working age has arthritis. And the number is growing.

Arthritis is a particularly difficult and recalcitrant foe. In the case of closed articular fractures, the incidence of arthritis doesn't fall into a neat hypothesis. Does a fracture injury cause chondrocytes to die thereby leading to arthritis? Not necessarily it turns out. This paper showed that a new model based on the inflammatory process of injury may well explain arthritis better.

When the award was announced for "*Joint degeneration following closed intraarticular fracture in the mouse knee: A model of posttraumatic arthritis* (*J Orthop Res* 2007;25:578–592)" a quartet of happy medical warriors took the stage—led by Steven A. Olson, M.D., a trauma surgeon and professor of orthopedic surgery at Duke University School of Medicine. Joining him were colleagues and honorees Virginia Byers Kraus, Ph.D., M.D., professor of medicine, Division of Rheumatology, Duke Molecular Physiology Institute; Janet Huebner, M.S., senior laboratory analyst; and Bridgette Furman, B.S, research analyst, Orthopaedic Research Laboratories—when this paper won the prestigious Kappa Delta Award.

Fig. 1 Radiographs of experimentally created mouse tibial plateau fracture (left) and clinically observed human tibial plateau fracture (right). Reprinted with permission from Furman BD, Strand J, Hembree WC, Ward BD, Guilak F, Olson SA: Joint degeneration following closed intraarticular fracture in the mouse knee: A model of posttraumatic arthritis. J Orthop Res 2007;25:578–592.

Also honored and recognized was Farshid Guilak, Ph.D., director of the Orthopaedic Research Laboratory.

Asking the Question in a New Way

Closed articular fracture (a break that crosses the surface of a joint) will almost certainly develop post-traumatic arthritis (PTA) within a year. (The U.S. military report that joint degradation following injury is the most common cause of a soldier's being judged unfit for duty.)

But, the researchers noted, arthritis developed in some accurately reduced joints while not in some mal-reduced fractures. Treating the injury—reducing the fracture—did not, in other words, predictably stop arthritis.

So the team decided to look at the problem in a new way. They decided to look at the metabolics of the knee following injury and, more specifically, at what was going on in the synovium, the lining tissue of the joint, following injury.

Asking the question in a new way, they hoped, would provide insights into the mechanisms that lead to PTA after an injury. With luck they might also find new therapeutic approaches that could improve treatments for joint injury.

But, fortunately, not everything went the way they expected. In the process of conducting their study the researchers made new, important discoveries that have long-term implications for the eventual successful treatment of arthritis.

The Experiment

The award winning scientists began with an experimental model of a closed intra articular fracture of a knee joint on the hind legs of individuals in the strain of mice labeled C57BL/6. The

opposite hind limb of the animals was designated the control.

Each mouse became its own control.

The team created fractures with a computer controlled testing system and sacrificed the mice at 4, 8 and 50 weeks following the fracture. Histologies revealed that the experimental joint developed PTA changes within 8 weeks post-surgery. The differences persisted at 50 weeks post-surgery.

Here Come Super Healers!

Then came the big surprise.

The researchers decided to test their results on a different strain of mice. They chose MRL/MpJ because other researchers had reported that these mice had spontaneously healed the ear punches researchers had made in their ears for identification purposes. Mouse ears consist of cartilage. How did these mice do it?

Olson and his team ran the MRL/MpJ mice through the same fracture tests that the C57BL/6 mice had experienced. When they compared results they found that the MRL/MpJ mice showed no signs of PTA.

The team then looked at a lot of comparisons between the two mice strains to see what could account for the differences. What they learned is that both mice strains had an initial inflammatory post injury response. But the MRL mouse calmed that inflammation quickly.

When the team conducted a cytokine analysis they found a lower systemic (serum) levels of the pro-inflammatory cytokine interleukin-1alpha (IL-1α) and higher levels of the anti-inflammatory cytokines IL-4 and IL-10 in the MRL/MpJ mice.

They wrote, "The study shows that the MRI/MpJ mouse is relatively protected from post-traumatic arthritis after an intra articular fracture."

They labeled these mice "super-healers."

Checking the Synovial Fluid

The next step, in collaboration with the Rheumatology faculty, was to analyze the synovial fluid and see what clues might exist there about intra articular knee environment for these super healers. In the synovial fluid of the super healers the team found a marker for arthritis. More mice, from both strains, were injured, sacrificed after 8 weeks and their synovial fluid examined.

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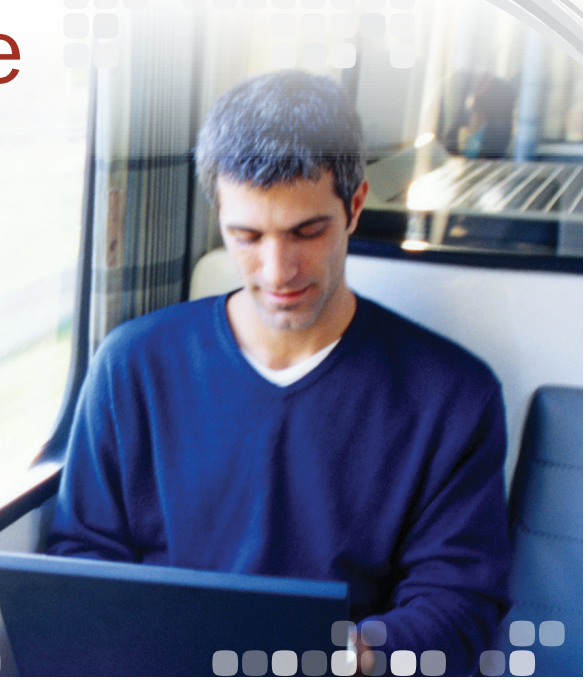

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They found that the C57BL/6 mice had all developed PTA and also had a gene expression of inflammatory cytokines and chemokines demonstrating 54 of the 84 inflammatory genes. In contrast the MRL/MpJ mice had only 33 of the inflammatory genes and 7 of the 84 genes were down-regulated.

Il-1Ra or Anakinra

The evolving theory from the two different mice models was that inflammation and its duration following injury was positively correlated with PTA. To test that hypothesis, the team decided to treat some injured mice with an IL-1 receptor antagonist. In plain English, that means that this compound could block the ability of the inflammatory compound from binding with the nerve receptors and, thereby, reducing inflammation.

When the team injected IL-1 in the joint the mice "demonstrated significantly reduced cartilage degeneration in the fractured knee compared to all other treatment groups." (Il-1Ra is Anakinra, a drug made for humans by Kineret of Stockholm, Sweden.)

But when IL-1 was delivered to the mice systemically, no change.

So What Does It All Mean?

This award-winning paper is the first report which showed not only that a pharmacologic intervention could lessen the severity of PTA after an intra-articular fracture but why that might occur.

The paper also presented an elegant argument that the healthy knee is more than a set of articulating bones. It is an entire eco-system which includes the synovium, a healthy nutrient rich synovial fluid, a proper Ph level and a healthy knee metabolism. When that system is traumatized, PTA can develop IF there is no intervention to attenuate synovial inflammation and, therefore, the disrupted eco-system of the knee.

It also means that because there is evidence of increased synovial inflammation after an intra-articular fracture in humans and that the time frame for treating patients is short—on the order of hours or days—there is a good argument for a biologic therapy as an adjunctive treatment for reducing inflammation and therefore the incidence of post-traumatic arthritis. ♦

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New King of the Ambulatory Surgical Jungle

BY WALTER EISNER

There is a new King in the ambulatory surgical center (ASC) jungle.

On March 23, 2015 Tenet Healthcare Corporation and United Surgical Partners International (USPI) announced they were creating the biggest ASC provider organization of ambulatory surgery in the U.S. The new partnership, which will maintain the USPI brand, has 244 short-stay surgery and imaging center assets, 16 short-stay surgical hospitals and 20 imaging centers in 29 states.

There is a lot at stake here with about 22 million surgical procedures performed at approximately 6,000 surgical centers in the U.S. every year.

For over 40 years, ASCs, which were first developed by a couple of physicians in Phoenix, have been an oasis for physicians who want to own their own means of production, control their practices and realize generous financial benefits of owning facilities.

But now the consolidation fever that has captured "Big Health" is hitting ASCs. Tenet's joint venture with USPI signals a move by hospitals to acquire the physician practice model that has moved millions of patients from hospitals to outpatient centers.

RRY Publications, LLC and Wikimedia Commons

Wayne Smith, chairman, president and CEO of Community Health Systems, says that the Affordable Care Act froze physician investment in hospitals and forbade new investment, such as physician syndication deals. "That leaves joint ventures with physicians in ambulatory surgery centers as about the only equity method of aligning with physicians," he said shortly after the law was passed.

With over 110,000 employees operating 80 hospitals, 214 outpatient centers, 6 health plans and Conifer Health Solutions, a leading provider of healthcare business process services, Tenet qualifies as a "Big Health" provider.

USPI was taken public in 2001, but returned to being private in 2007.

Trevor Fetter, Tenet's president and CEO said the partnership "accelerates" plans to expand the company's ambulatory services to meet "growing consumer demand for services that are provided in a lower cost, more convenient setting and that are aligned with the long-term transition to value-based care."

That's "Big Health Speak" for pay-for-performance.

Initially, Tenet will own a little over 50% of the deal and eventually all of

Logos courtesy of Tenet Healthcare Corporation and United Surgical Partners International (USPI)

it. The joint venture will have partnerships with 50 health systems and more than 4,000 physicians at the facility level. The partnership touts its relationship with non-profit providers.

AmSurg Corp. out of Nashville, Tennessee, is going to get kicked down to the number two spot with around 200 centers in its network, followed by Surgical Care Affiliates with 125 centers and HCA (Hospital Corporation of American) with 111. The top 10 ASC providers in the country, according to ASCA (Ambulatory Surgical Center Association), the industry trade group, own approximately 766 ASCs.

Tenet is also reaching into the United Kingdom's version of ASCs by agreeing to buy Aspen Healthcare Ltd.'s nine private hospitals and clinics from Welsh, Carson, Anderson & Stowe. Welsh Carson also owns USPI, which acquired Aspen in April of 2000.

Multi-Specialty Health Care

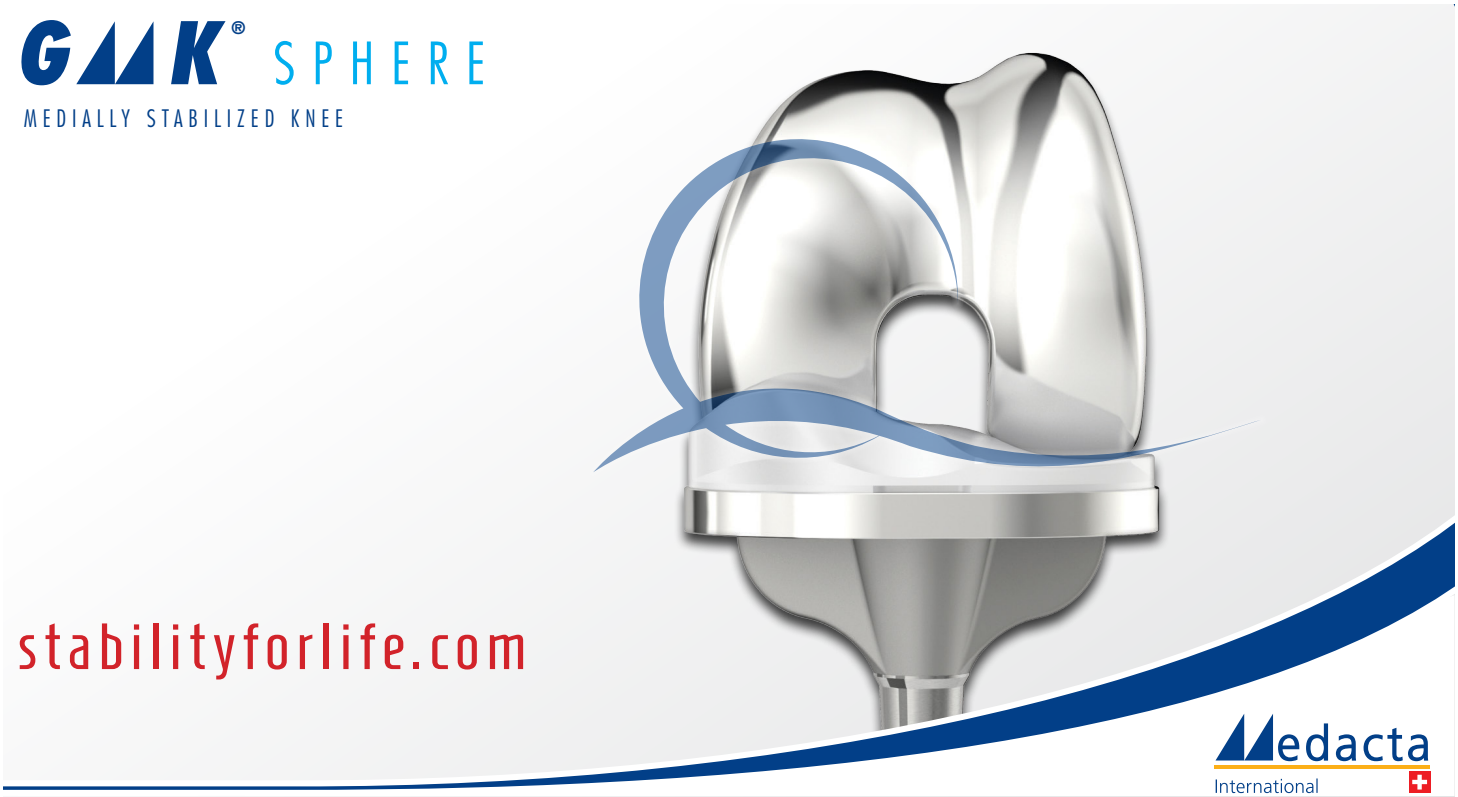
Regulatory approvals are expected by the end of September 2015.

ASCs

ASCs boast that they improve quality and customer service while reducing costs. ASCs also provide financial benefits to individual physician owners of ASCs to the extent that they are able to realize favorable passive income benefits from owning their facilities.

ASCs also save the government, third party payors and patients lots of money.

On average, Medicare saves more than $2.6 billion each year because of the significantly lower rates paid for



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the procedures performed at the ASC instead of a hospital. It's estimated that if just half of the eligible surgical procedures moved from hospital outpatient departments to ASCs, Medicare would save another $2.5 billion a year.

Physicians continue to have at least some ownership in virtually all (90%) ASCs. But many ASCs are now jointly owned with local hospitals that see a financial benefit. According to the most recent data available, hospitals have ownership interest in 23% of all ASCs and 2% are owned entirely by hospitals.

Show Me the Money

Currently, Medicare pays ASCs 58% of the amount paid to hospital outpatient departments for performing the same services. In 2003, Medicare paid hospitals only 16% more, on average, than it paid ASCs. Today, Medicare pays hospitals 81% more than ASCs for outpatient surgery.

Medicare payments to ASCs have increased $1 billion between 2004 and 2011. In 2004, Medicare paid ASCs $2.5 billion. By 2011 ASCs received $3.5 billion, according to MedPAC data.

However, commercial payers are reportedly the largest group within ASC payer mix at an average of 59% of gross charges. Medicare is second, with 24%.

Patients typically pay less coinsurance for procedures performed in the ASC than for comparable procedures in the hospital setting. For example, according to the ASCA, a Medicare beneficiary could pay as much as $496 in coinsurance for a cataract extraction procedure performed in a hospital outpatient department, whereas that same beneficiary's copayment in the ASC would be only $195.

Consolidation

The growing payment differential, the financial need for healthcare systems to generate billions in revenue and payer pressure are contributing to a market dynamic whereby ASCs are being purchased by hospitals and converted into hospital outpatient departments. Even if an ASC is not physically located next to a hospital, once it is part of a hospital, it can terminate its ASC license and become a unit of the hospital, entitling the hospital to bill for Medicare services provided in the former ASC at the 81% higher hospital outpatient rates.

Hospitals are reading the math tea leaves with 83% of ASC management companies reporting they are selling a controlling interest in a surgery center to a hospital, health system or other third party. However, according to Scott Becker of *Becker's ASCReview*, when a hospital invests in a center, there is no certainty that this will improve reimbursement rates.

The move to consolidate is not likely to slow anytime soon. In July 2013, Becker wrote that of 20 major ASC management and development companies, 53% said they intend to purchase 1 to 5 ASCs within the next year.

With 65% of hospital revenue now coming from outpatient services and providers seeing 10 outpatients for every inpatient, "It's not a question—they have to," said Blayne Rush, president of Ambulatory Alliances, an investment banking and mergers and acquisitions firm in a March 25, 2015 *Modern Healthcare* article. "We're going to see more and more of these types of deals."

"Everything I'm seeing is pointing to that direction," added Joan Dentler, CEO of Avanza Healthcare Strategies, a consulting firm on outpatient and population health strategies. "The hospitals taking aggressive stances and aggressive acquisition strategies are going to continue to do that."

AAOS and Device Makers

The American Academy of Orthopaedic Surgeons (AAOS) has taken note that orthopedic procedures are shifting to outpatient settings and offered a session at its recent annual meeting to inform surgeons about their opportunities.

Device makers, according to Needham & Company analyst, Mike Matson, are offering programs to enable their customers to perform outpatient reconstructive procedures.

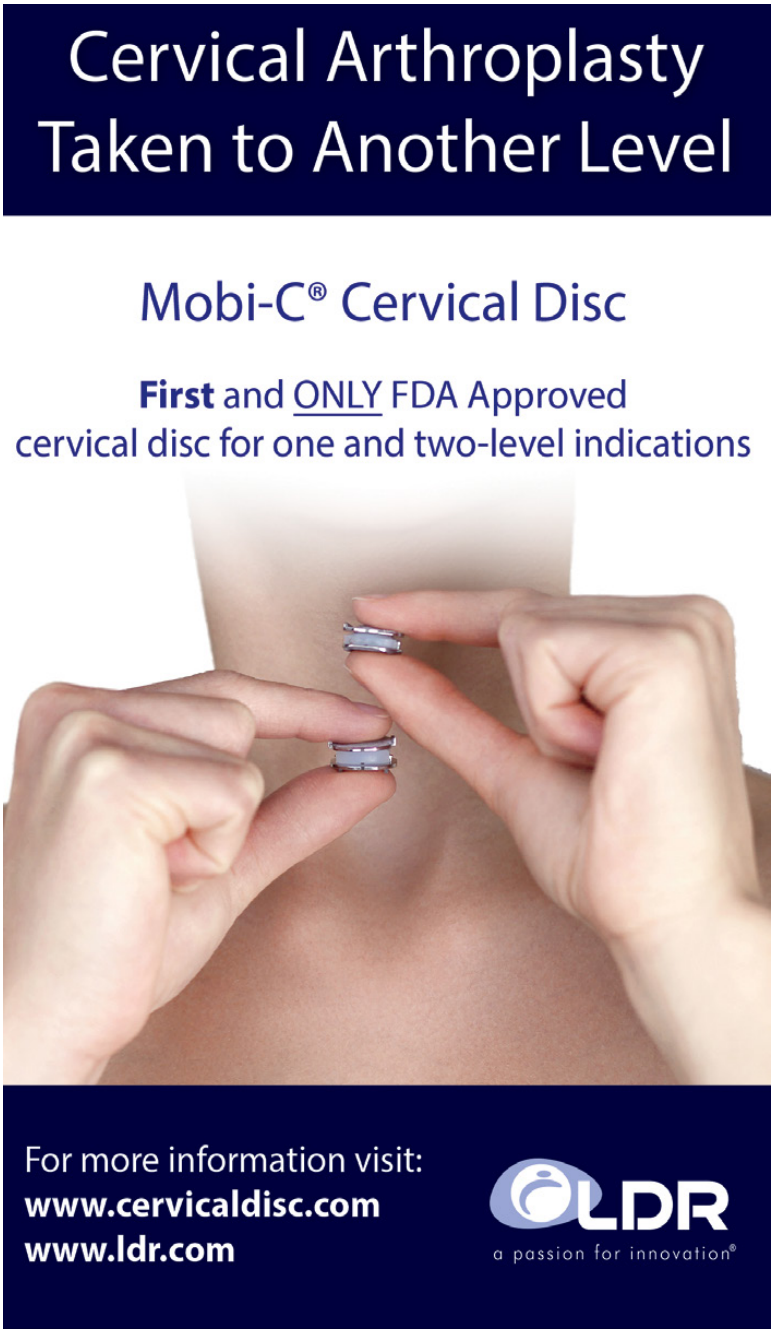
"Products used in the procedures are essentially the same as those used for inpatients. The programs, such as [Zimmer Holdings Inc.'s] Z23, instead focus on patient selection and pre- and post-operative care. While it seems all but inevitable that some of these procedures (especially in younger, healthier patients) will be shifted to the outpatient setting, we see risk that this increases implant pricing pressure since outpatient reimbursement tends to be lower and since many ambulatory surgery centers are owned (or partly owned) by surgeons," wrote Matson.

The Dark Side of ASCs

ASCs, while purportedly highly regulated and certified by Medicare, also come with some baggage. Safety questions arise in such highly publicized cases as the death of Joan Rivers who died while undergoing routine throat procedures at Yorkville Endoscopy, a year-old free-standing center located in Manhattan.

"Anytime there is a major or minor accident, people begin to question the safety record," said anesthesiologist David Shapiro, M.D., past president of the ASCA. Rivers' death, Shapiro said, is an aberration. "We have an exceptional, exceptional success rate," he said, adding that his industry is "very, very tightly regulated." Since 2006, he noted, an industry group called the ASC Quality Collaboration has been reporting aggregate data on complications including burns, falls and surgery on the wrong site or wrong patient.

But Lisa McGiffert, director of Consumer Union's Safe Patient Program, said in a 2014 *Kaiser News* article, "There's not much known about what happens within the walls of these places by regulators or by the public. Hospitals are more tightly regulated" than outpatient surgery centers. "They have to report on many more aspects of what they do, such as errors and certain infections."



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USPI 2.0

The new entity is going to keep USPI's brand name and the guys currently in charge of USPI, Bill Wilcox, the CEO will remain as CEO, and Brett Brodnax, will lead the company's strategy and growth efforts. Kyle Burnett, Tenet's senior vice president for outpatient services, will become president of ambulatory services and will take on the additional role of chief integration officer for the new venture.

Tenet's imaging facilities will also be included in the joint venture, and the companies anticipate adding other ambulatory services in the future as part of a strategy to offer a full range of ambulatory solutions and participate in value-based and other risk-based models with payers.

The venture expects to realize approximately $50 million of corporate and facility level synergies over the next three years.

Tenet executives say they intend to raise $2.2 billion of debt related to these transactions, to be used principally to refinance $1.5 billion in existing debt of USPI, make the $0.6 billion in cash payments to Welsh Carson for USPI and Aspen, and for related transaction expenses.

Still a Jungle Out There

With the top 10 ASC providers in the country only owning around 766 out of an estimated total of 6,000 facilities, the ASC jungle remains highly fragmented. But by becoming the lead player, Tenet is bulking up to become and stay the 800-pound silverback, King of the Jungle. ♦

COMPANY

Europe and Japan Approve Zimmer/ Biomet Deal

The rumors of impending European approval of Zimmer Holdings Inc.'s $13.3 billion takeover of Biomet, Inc. were true.

On March 30, 2015, the company announced that the European Union Commission cleared the deal conditional on the execution of divestiture of Zimmer's uni knee, ZUK and Biomet's Discovery Elbow throughout Europe. Zimmer must also divest Biomet's Vanguard Total Knee System for primary and revision implants in Denmark and Sweden. The company said it expects to enter into agreements to divest those assets in the near-term.

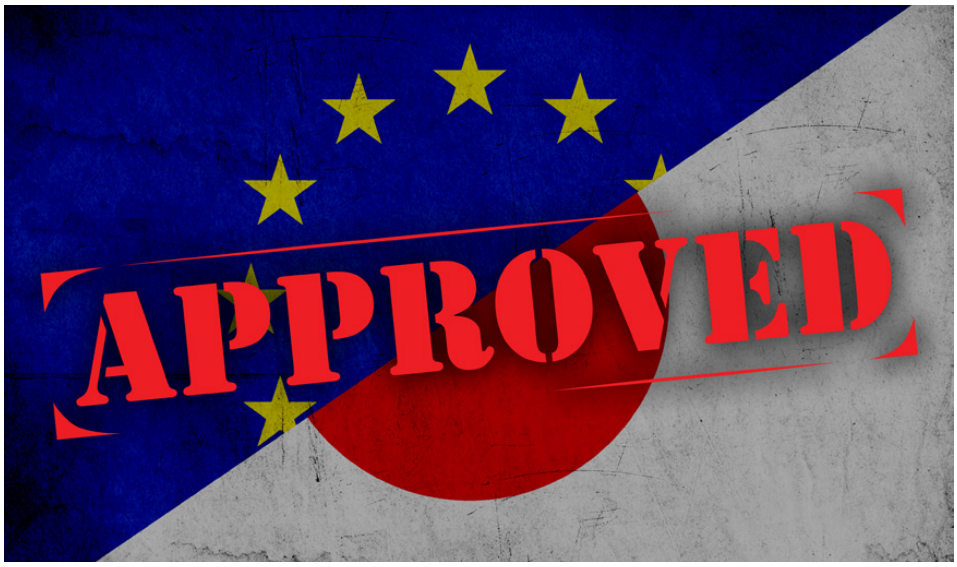

Image created by RRY Publications, LLC

The company still expects U.S. regulatory approval and closing of the deal in April.

On March 25, Zimmer also announced that the Japan Fair Trade Commission granted clearance of the acquisition.

When the deal closes, Zimmer will be the No. 2 player in the $45 billion global orthopedics market, trailing only Johnson & Johnson's DePuy Synthes. — *WE*

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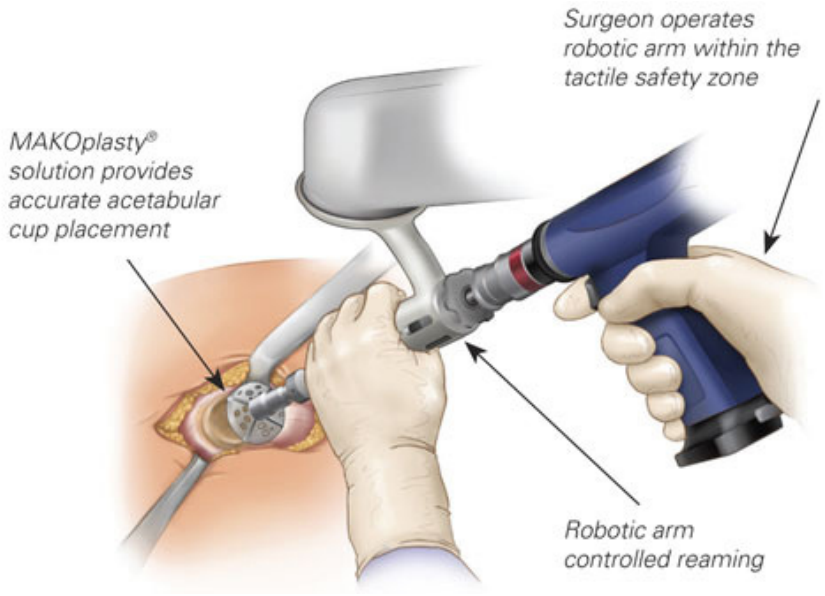
Advertisement

Mako's New Hip Application FDA Cleared

Stryker Corporation's Mako robotic system has a new clearance from the FDA for a total hip replacement application.

The company announced the clearance and launched the hip application on March 25, 2015 at the 2015 American Academy of Orthopaedic Surgeons (AAOS) Annual Meeting in Las Vegas.

The Mako system, according to the company, will be compatible with Stryker's Accolade II, Secur-Fit Advanced, Anato and Exeter femoral implants coupled with the Trident Acetabular system and engineered X3 polyethylene.



MAKOplasty/Stryker Orthopaedics

Accuracy and Precision

A recent study cited by the company found that manual acetabular cup placement, "fell within the acceptable safe range only 50% of the time. Robotic-arm assisted total hip arthroplasty has been shown to provide excellent accuracy and precision with regard to planned cup position,

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leg length, and offset. Additionally, robotic-arm assisted total hip arthroplasty has demonstrated acetabular cup placement four times more consistent to the pre-operative plan than manual cup placement and significantly higher modified Harris Hip Scores and UCLA Activity Level Ratings compared with manual total hip arthroplasty at one-year follow up.

"Transform" Joint Reconstruction Surgery

Bill Huffnagle, president of the company's reconstructive division, says combining the robotic-arm technology with the company's implants reflects the company's "conviction" that this technology will transform joint reconstruction surgery.

According to the company, over 50,000 Mako procedures have been performed since 2006, with the first total hip procedure performed in 2010. Since then, over 7,000 total hip procedures have been performed with the Mako system which facilitates various surgical approaches including direct anterior, postero-lateral, and antero-lateral.

Patient-Specific

The robotic-arm assisted total hip arthroplasty uses the patient's CT scan data to reconstruct the anatomy and create a patient-specific surgical plan for "optimal implant alignment and placement." During surgery, the company says the patient's hip joint is registered and matches with the surgical plan to provide dynamic information. Robotic-arm guidance, 3-D visual feedback, and real-time data assist the surgeon. — *WE*

LEGAL

"Quasi-POD" Charged With False Claims

The specter of PODs (Physician-Owned Distributors) was back in court recently as a federal district judge denied a motion to dismiss a False Claims Act case against a physician and his fiancée who owned a spinal implant distributorship.

In *U.S. ex rel. Cairns v D.S. Med, LLC*, (DS Medical), the government alleges that the joint venture ownership of the distributorship by a referring physician's fiancée and the physician resulted in Anti-Kickback violations. The physician allegedly instructed the hospital at which he practiced to purchase spinal implants from DS Medical for use on his patients, including Medicare and Medicaid beneficiaries.

Tom Bulleit of the law firm of Ropes & Gray, and a long-time device manufacture industry lawyer, wrote that while the government's complaint didn't allege that the physician was the legal owner of the distributorship, the complaint "relies on a less direct financial relationship that has only some of the indicia of ownership to show that profits from the physician's self-referral constituted kickbacks."

Bulleit says the evidence of kickbacks rests on the allegation that the physician and fiancée, identified in the complaint as the sole investor and owner of DS Medical, had been engaged to be married since at least 2008, implying that they should be treated, for remuneration purposes, as family members.

The physician, according to Bulleit, operated the distributorship as a joint venture with his fiancée, "although the term does not appear to be employed to indicate any legal ownership interest

Pixabay

by the physician. Rather, the character of the joint venture arose from facts such as the physician's participation in management of DS Medical, his sharing of employees and contractors with DS Medical, and the lease of space by DS Medical from the physician's practice."

Further, says Bulleit, funds from DS Medical were used to purchase items for the physician and his fiancée, including a home, multiple other properties, and cars.

To demonstrate that the government thinks of this as a POD case, Bulleit says the allegations of kickbacks "read as if taken from the OIG's 2013 Special Fraud Alert."

For instance:

- DS Medical was the physician's nearly exclusive source of spinal implants.
- The physician was the only "true" physician customer.
- DS Medical had little financial risk when it began operations, and few startup costs; it allegedly had profit margins of 95%.
- The physician allegedly began using more spinal implants after DS Medical began operations.
- DS Medical allegedly helped the physician profit from decisions about choice of implants.
- The physician maintained significant influence over his hospital regarding choice of implants.

Bulleit adds that this government action in a "quasi-ownership" situation indicates that the government won't be fooled by "form-over-substance" changes to the POD business model. He also notes that this case comes out of Missouri, whereas previous false claims cases were only reported out of California. — *WE*

England Considers Tougher Device Regulations

A paper published in the *British Medical Journal* calls for more regulation of medical devices. The purpose—to reduce the need for further traumatic and expensive surgery.

The University of Warwick in the United Kingdom looked at ten year revision rates for five of the most commonly used hip replacement devices. They wanted to learn how many devices had to be replaced within ten years of the original surgery.

The team found that the five devices studied had a revision rate of less than 5%. But other devices that were still in general use had higher revision rates than 5%.

As a result of the Warwick research the National Institute for Health and Care Excellence (NICE) is now recommending a reduction in the benchmark for hip replacement revision rates from 10% at ten years to 5% at ten years.

One of the authors of the study, Professor Aileen Clarke, said more regulation was needed and that revision surgery to replace a total hip replacement device was traumatic for the patient and expensive for the National Health Service.

She said: "When we undertook this research for NICE we found that the revision rates for five of the most commonly used hip replacement devices were less than 5%, which gave NICE the confidence to suggest this lower benchmark figure. This new guideline will help to make sure only the most effective devices are used."

She added, "Whether a total hip replacement device is assessed by the Orthopaedic Data Evaluation Panel (ODEP) or not depends on voluntary submission of evidence from the device manufacturers. The assumption is that these devices can be afforded a looser regulatory mechanism than drugs but we question whether this is wise because it has allowed a large number of different brands of device to slip into routine use although some have high rates of revision."

Fellow author Ngianga-Bakwin Kandala, M.D. said: "Past use of poor devices has been bad for patients, bad for the reputation of orthopaedics and of clinicians, and has contributed to a waste of NHS resources. The NICE guidelines are very necessary, but a poor second best to more effective and compulsory regulation." — *BY*

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LARGE JOINTS

Delirium Found in 48% of Hip Fracture Patients…and It's Expensive!

New research from the University of Toronto has found that 48% of hip fracture patients, age 65 and older, had delirium, or acute confusion, before, during and after surgery (perioperative), resulting in significantly longer hospital stays and higher costs for care. The study, recently presented at the 2015 Annual Meeting of the American Academy of Orthopaedic Surgeons (AAOS), found that perioperative delirium was associated with 7.4 additional hospital days.

According to the March 24, 2015 news release, "The patients with delirium had a mean age of 85, and were more likely to have a higher American Society of Anesthesiologists (ASA) score ("one" represents a "completely healthy fit patient," and "five," a patient not expected to live beyond 24 hours without surgery). After controlling for these differences, perioperative delirium was associated with $8,282 ($8,649 in U.S. dollars) in additional hospital costs (1.5 times the cost of patients who did not experience delirium). A significantly greater proportion of patients who experienced perioperative delirium required long-term and/or skilled care facility admission following their hospital stay (8% versus 0%)."

"Older patients are at high risk of developing delirium during hospitalization for a hip fracture, which is associated with worse outcomes," said orthopedic surgeon and lead study author Michael G. Zywiel, M.D. "Our work demonstrates that delirium also markedly increases the cost of elderly patient care while in the hospital. Given the high number of patients hospitalized every year with a hip fracture, there is a real need to develop and fund improved interventions to prevent in-hospital delirium in these patients."

Dr. Zywiel told *OTW*, "We were particularly surprised to learn that almost 50% of these patients experienced delirium while in hospital. This was higher than we expected, and reinforces how easy it is to miss delirium if patients aren't being routinely screened for it using validated methods."

Regarding solutions, Dr. Zywiel commented to *OTW*, "The first step is to recognize the problem. We believe that this requires incorporating delirium screening as a routine part of ward care. The second step involves close coordination among all providers involved in the episode of care to proactively address all known modifiable factors that predispose to and precipitate delirium, because we know that treating delirium is far less effective than preventing it in the first place. At minimum this includes coordination between ER, geriatrics, hospitalist medicine, orthopedics, anesthesia, nursing, and rehabilitation teams. The list of evidence-based interventions is long, but includes: early regional pain control, minimizing systemic narcotics, minimizing delay to surgery, blood management techniques to reduce risk of transfusion, minimizing depth of sedation intra-op, avoiding intra-operative hypotension, limited use of Foley catheters, addressing polypharmacy and avoiding medications known to increase risk of delirium, ensuring availability of patient orientation aids (eyeglasses, hearing aids; clock, information board, window within view; regular visitation by family), early and frequent post-operative mobilization." — *EH*

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Race, Socioeconomics Matter in Hip Fracture Care

Researchers at Hospital for Special Surgery (HSS) have found that people in certain racial and socioeconomic groups are at a disadvantage when it comes to care they receive after fracturing a hip. Investigators based their findings on information available for nearly 200,000 patients in a New York state database.

"The study found that black patients, Medicaid patients, and patients from impoverished communities are at increased risk for poor outcomes," said Michael Parks, M.D., a study author and orthopedic surgeon at Hospital for Special Surgery, in the March 26, 2015 news release.

Individuals who had surgery for a broken hip in New York State from 1998 to 2010 were identified. Factors assessed included the need for a subsequent procedure within one year; hospital readmissions within 90 days of surgery; complications within 90 days; and in-hospital mortality within one year of discharge following hip fracture surgery.

After adjusting for patient and community characteristics, investigators found that African American patients had a 55% increased risk for delayed surgery. They were 18% more likely to be readmitted to the hospital within 90 days and had a 12% higher risk of dying within one year compared to Caucasian patients.

Compared to Medicare patients, Medicaid patients had a 15% increased risk for delayed surgery. Patients who had private insurance were 21% less likely to experience delayed surgery, 23% less likely to be readmitted to the hospital and 20% less likely to experience complications, compared to Medicare patients. Those with private insurance were 19% less likely to die within one year.

Dr. Parks told *OTW*, "Future study of disparities in hip fracture care is needed. In order to better understand the reasons for this differential in care, further understanding of the relationship of patient and community characteristics and outcomes is needed."

"Our study shows that high levels of household poverty and lower levels of education were associated with poor outcomes and higher rates of reoperation. Future testing and evaluation of targeted interventions to address factors leading to delays in care and medical comorbidities in poor and minority populations may help us decrease or eliminate the surgical delays and poor outcomes we saw in our study. Specifically, we need to understand patient factors to help individuals with health literacy and to improve their ability to participate in their care."

"What interventions are effective in populations with low education and low health literacy to better empower patients to make decisions? Is there quality care available in census locations with increased poverty and lower education? We need to understand community characteristics that may limit access to quality care available." — *EH*

Andrew Huth and Wikimedia Commons

EXTREMITIES

Brain Commands Move Prosthetic Hand

Ottobock's prosthetic hand, with four movable fingers and a positionable thumb uses electrical signals originating in the brain to crate movement. The device has recently been cleared by the U.S. Food and Drug Administration for promotion in the U.S.

Called the Michelangelo Hand, users of the device say that it looks and feels like a real hand and has seven positions that enable it to manage a variety of tasks. "It's the closest thing to a second hand I've had since I became an amputee 30 years ago," said attorney and Michelangelo user Andrew Carter in a statement to *Fierce Medical Devices* writer Stacy Lawrence.

The hand's myoelectric controls work via an electrode that is placed on the surface of the wearer's residual limb. Motors and microprocessors within the prosthetic hand create the gripping and rotating movements.

Carter added, "It's designed to accommodate movements as fine as sorting money, transporting large objects or even performing delicate mechanical tasks. The prosthetic can help facilitate everyday tasks such as hanging clothes, holding a plate, cooking and riding a bicycle."

Ottobock is the American corporate division of the German company Ottobock HealthCare, a firm with 7,000 employees worldwide. The company offers 50,000 different kinds of orthotic and rehabilitation products. — *BY*

Courtesy of Ottobock

REIMBURSEMENT

Costs for Surgical Readmissions Calculated

A study by researchers at New York University's Langone's Hospital for Joint Diseases has identified common causes for hospital readmissions following total hip (THA) and knee arthroplasty(TKA).

The patients studied were part of the Bundled Payment for Care Initiative from the Centers for Medicare and Medicaid Services. This is a government pilot program where hospitals are paid for the quality of their procedures rather than for the quantity performed. The idea behind the program was that one way to measure quality would be by examining hospital readmission rates.

The researchers studied 721 patients who had been admitted to NYU's Langone's Hospital for Joint Diseases between January and December of 2013. They found that THA and TKA readmissions accounted for 54% and 44% of the readmissions. Surgical complications included infections, wound complications, bleeding, periprosthetic fractures, dislocations and post-surgical pain. The average cost of the readmissions for surgical complications was $36,038 for a THA and $61,049 for a TKA.

They also measured medical complications. These included gastrointestinal disease, pulmonary disease, gastro urinary, hematologic, cardiovascular, endocrine, syncope, rheumatologic and lumbago complications and an open ankle wound. The average cost of medical complications was $22,775 for THA and $10,283 for TKA patients.

Joseph Bosco, co-author of the study, is pleased that readmissions were as low as they were. "While some complications are unavoidable," he said, "we are proud of our low readmission rates at the Hospital for Joint Diseases and for identifying the causes of readmission. We hope to reduce our rates even further." — *BY*

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SPINE

Sex and Low Back Pain: Yes, It Matters

Ask patients with chronic low back pain and they will tell you…sex is affected by their condition. New research, recently presented at the 2015 annual meeting of the American Academy of Orthopaedic Surgeons (AAOS), has found that 70% of patients consider sexual activity "relevant" to their life quality. Patients who underwent surgery for spinal spondylolisthesis (DS) and spinal stenosis (SS) were twice as likely to report no pain during sex.

"Our current research sheds light on the effect that spinal surgery has on a patient's sex life and begins to describe the impact spinal disease has on this very important aspect of life," said senior study author Shane Burch, M.D., an orthopedic surgeon at the University of California, San Francisco, in the March 24, 2015 news release.

Utilizing data from the Spine Patients Outcomes Research Trial (SPORT), researchers reviewed 1,235 patients diagnosed with DS or SS who answered questions such as, "In the past week, how has pain affected your sex life?" Patients selecting the options, "unable to answer" or "does not apply to me," were placed in the sex-life non relevant (NR) group. Patients selecting other options were placed into the sex-life relevant (SLR) group. The mean age of patients in the NR and SLR groups were 68 and 63 years, respectively; 70% of patients were in the SLR group.

Patrick Horst, M.D., a study author and orthopedic surgery resident at University of California, San Francisco, told *OTW*, "The fact that sex-life is relevant to 70% of patients in our study with degenerative spine disease is interesting and has never been reported in this large of series. We also found it interesting that over 40% of patients report some level of pain related to their sex-life at baseline. We were also impressed by the dramatic difference in the percentage of patients reporting pain with sex-life between the operative and non-operative groups. Through four years of follow up, only 15-20% of patients that underwent surgery report pain with their sex life through four years of follow up while around 40% of patients treated non-operatively report having pain."

Asked how orthopedic surgeons can address the sexual issue with patients, Dr. Horst noted, "This study sheds light on the fact that sex life is an important consideration for patients with degenerative spine disease. It provides the surgeon with some evidence that low back pain is relevant to sexual function and that questions regarding improvement of sexual dysfunction can be addressed." — *EH*

Left: Spinal Stenosis / Sources: BruceBlaus, Wikimedia Commons and Kai Stachowiak

PEOPLE

David D. Teuscher, M.D. Assumes Presidency of AAOS

David D. Teuscher, M.D., an orthopedic surgeon and a military veteran, is now president of the American Academy of Orthopaedic Surgeons (AAOS) Board of Directors. Dr. Teuscher, a partner and past president of the Beaumont Bone & Joint Institute, served on the AAOS Board of Directors and as chair of the Board of Councilors from 2011 to 2012.

After earning his bachelor's degree from the University of Illinois at Urbana-Champaign and medical degree from the University of Texas Medical School in San Antonio, Texas, Dr. Teuscher completed an internship and residency at the Brooke Army Medical Center at Fort Sam Houston, in San Antonio, Texas. Dr. Teuscher is a U.S. Army veteran who served in operations Desert Shield and Desert Storm, and completed 13 years of military service as the chief of surgery at Fort Sill in Oklahoma.

"David is a skilled orthopaedic surgeon, a distinguished veteran of our armed forces, a hardworking Academy volunteer, and a passionate advocate for patients and the orthopaedic profession," said Frederick M. Azar, M.D., outgoing AAOS president, in the March 26, 2015 news release. "We are fortunate to have such an experienced and committed individual at the helm of this organization."

Dr. Teuscher noted, "Earlier this year, the Academy opened a new state-of-the-art Orthopaedic Learning Center near Chicago. In addition, the Academy hopes to utilize technology and alternative learning models to enhance global access to the organization's many educational courses, programs and tools, including those offered at the annual meeting."

David D. Teuscher, M.D., courtesy American Academy of Orthopaedic Surgeons

As indicated in the news release, improving surgical safety, ensuring value for musculoskeletal care, and expanding access to the Academy's educational programs are among Dr. Teuscher's priorities for the coming year.

Dr. Teuscher told *OTW*, "The Academy has outlined the specific value of five orthopaedic procedures—knee, ACL [anterior cruciate ligament], rotator cuff, disc repair and hip fracture—on the A Nation in Motion website. We are hoping to expand the number of procedures that we highlight, as well information on the great value that orthopaedics brings to the economy, and to individuals in helping them to get back in the game, back to work and back to life. Yes, what we do may seem expensive, but no, or suboptimal, orthopaedic care is even more expensive."

To improve patient safety, the Academy this year is planning a National Surgical Safety Summit, in conjunction with the American College of Surgeons and the entire perioperative community, to brainstorm and collaborate new ways to reduce surgical errors.

"We know there is no quality patient experience unless it is a safe experience," said Dr. Teuscher. "Any error is unacceptable." — *EH*

John Dahldorf Takes Helm as CFO at Benvenue Medical

John Dahldorf has just joined Benvenue Medical, Inc. as the company's chief financial officer (CFO). Dahldorf, who has more than 30 years of financial, operational and leadership experience in the healthcare industry, was most recently CFO at Volcano Corporation.

John Dahldorf courtesy of Benvenue Medical, Inc.

"I was looking for a great management team and a portfolio of medical technology that has strong growth potential, and I found it in Benvenue Medical," Dahldorf said in the March 23, 2015 news release. "Benvenue's products, Luna and Kiva, have entered a $3.2 billion U.S. market that's historically had very little innovation. I believe Benvenue has potential similar to what I experienced at Volcano, where we grew from virtually zero to $400 million in 11 years."

"John brings invaluable experience with private and public companies, including being chief financial officer at a publicly traded company," said Robert Weigle, CEO of Benvenue Medical, Inc.

"His strong reputation, experience in the investment community and expertise in public markets will be advantageous for achieving our future business plans."

Dahldorf told *OTW*, "As I move forward in this new role at Benvenue, my first steps will be to work closely with the senior management team to build both short- and long-term business strategies and to ensure our capital needs are met. I'll be participating in meetings internally and externally to assess where Benvenue is and where we want to go, and explore our options to get there."

Dahldorf's previous experience includes co-chief executive officer and chief financial officer at Digirad Corporation, finance director at Arrow Electronics, and a number of leadership positions at Baxter companies. He earned his master of business administration and bachelor of finance degrees at Western Illinois University. — *EH*

Advertisement

Macaulay to Head New York Ortho Departments

New York-Presbyterian Lawrence hospital in Bronxville, has named William Macaulay, M.D., director of orthopedic surgery and sports medicine to head orthopedics at two institutions. According to the release, The NewYork-Presbyterian Healthcare System, based in New York City, acquired Bronxville's Lawrence Hospital last year.

Macaulay will oversee care at the Joint Replacement Center at New York-Presbyterian/Lawrence, as well as other orthopedic surgery programs. He will perform surgery there as well as at Presbyterian/Columbia University Medical Center and will also see patients in Bronxville, Tarrytown and Manhattan.

Macaulay is the director of the Center for Hip & Knee Replacement and co-chief of the division of hip and knee reconstruction at NewYork-Presbyterian Hospital/Columbia University Medical Center. At Columbia University College of Physicians and Surgeons, he is a professor of clinical orthopedic surgery and director of the clinical hip and knee fellowship.

"Our goal will be to enhance the already amazing care provided by NewYork-Presbyterian/Lawrence orthopedic surgeons by blending world-class surgeons and state-of-the-art technology with the community feel of this Bronxville treasure," Macaulay said. "We want residents to have the best of both worlds close to their homes." — *BY*

William Macaulay, M.D., courtesy of NewYork-Presbyterian Healthcare System

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