VOLUME 8, ISSUE 12 | APRIL 10, 2012

Orthopedics This Week

week in review

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: This is the age of wisdom, it is the age of foolishness, this is the epoch of belief, it is the epoch of incredulity, we are in the spring of hope, we are in the winter of despair, we have everything before us, we have nothing before us. Orthopedics today is a tale of two futures. Which will we be?

RANK	LAST WEEK	COMPANY	TTM OP MARGIN	30-DAY PRICE CHANGE	COMMENT
1	3	Zimmer	24.95%	7.28%	Reading Biomet's SEC filings make us appreciate ZHM's profitability and cash flow even more. ZMH was an LBO too.
2	1	Integra LifeSciences	14.81	2.27	Integra launches an orthopedic line of implants for the veterinary market. Maybe going to the dogs is a good thing.
3	2	NuVasive	7.26	6.15	JMP securities upgraded NUVA citing an uptick in market share and the number of spine surgeries.
4	6	Stryker	23.73	5.73	For the record, SYK's cash cleared $3 billion last quarter and LTD was a fraction of equity.
5	4	Conmed	9.65	4.10	CNMD announces Q1 results in a couple weeks. Most analysts are predicting double-digit EPS growth.
6	5	Orthofix	14.72	(4.53)	Speaking of double -digit EPS growth, OFIX is expected to show 18% bottom line growth this quarter.
7	8	Smith & Nephew	22.80	(0.12)	Wall Street is thoroughly discounting SNN's ability to grow earnings. That's the disconnect. And the opportunity.
8	10	Johnson & Johnson	26.33	1.62	While JNJ has the 2nd lowest PE in orthopedics, the company is so huge that Wall Street basically doesn't even consider sales levels when valuing the firm.
9	7	ArthroCare	(0.95)	0.27	ARTC has sold off to the point that, as an equity, it is looking pretty cheap. A lot, however, will depend on the report for this and next quarter.
10	9	Medtronic	28.63	1.81	Rumors of more lay-offs in Memphis making the rounds. Eventually MDT's spine business will stabilize. The question is when?

Robin Young's Orthopedic Universe

TOP PERFORMERS LAST 30 DAYS

	COMPANY	SYMBOL	PRICE	MKT CAP	30-DAY CHG
1	Kensey Nash	KNSY	$29.02	$252	20.72%
2	Alphatec Holdings	ATEC	$2.25	$202	16.58%
3	MAKO Surgical	MAKO	$41.76	$1,771	14.66%
4	Wright Medical	WMGI	$19.01	$747	9.19%
5	Symmetry Medical	SMA	$7.10	$253	8.07%
6	Tornier N.V.	TRNX	$24.99	$982	7.99%
7	Zimmer Holdings	ZMH	$64.72	$11,528	7.28%
8	NuVasive	NUVA	$15.88	$677	6.15%
9	Stryker	SYK	$55.03	$20,981	5.73%
10	Conmed	CNMD	$30.21	$846	4.10%

WORST PERFORMERS LAST 30 DAYS

	COMPANY	SYMBOL	PRICE	MKT CAP	30-DAY CHG
1	Bacterin Intl Holdings	BONE	$2.48	$104	-20.51%
2	TranS1	TSON	$3.15	$86	-16.22%
3	TiGenix	TIG.BR	$0.84	$76	-6.46%
4	RTI Biologics Inc	RTIX	$3.52	$196	-5.38%
5	Orthofix	OFIX	$37.12	$694	-4.53%
6	Exactech	EXAC	$16.13	$212	-0.92%
7	CryoLife	CRY	$5.20	$144	-0.76%
8	Smith & Nephew	SNN	$48.75	$8,735	-0.12%
9	ArthroCare	ARTC	$25.69	$710	0.27%
10	Synthes	SYST.VX	$170.96	$20,306	0.83%

LOWEST PRICE / EARNINGS RATIO (TTM)

	COMPANY	SYMBOL	PRICE	MKT CAP	P/E
1	Medtronic	MDT	$38.20	$39,751	11.90
2	Johnson & Johnson	JNJ	$65.34	$179,363	13.07
3	Zimmer Holdings	ZMH	$64.72	$11,528	13.46
4	Orthofix	OFIX	$37.12	$694	13.75
5	ArthroCare	ARTC	$25.69	$710	14.76

HIGHEST PRICE / EARNINGS RATIO (TTM)

	COMPANY	SYMBOL	PRICE	MKT CAP	P/E
1	Wright Medical	WMGI	$19.01	$747	57.61
2	NuVasive	NUVA	$15.88	$677	31.76
3	Symmetry Medical	SMA	$7.10	$253	23.67
4	RTI Biologics Inc	RTIX	$3.52	$196	23.47
5	Exactech	EXAC	$16.13	$212	21.80

LOWEST P/E TO GROWTH RATIO (EARNINGS ESTIMATES)

	COMPANY	SYMBOL	PRICE	MKT CAP	PEG
1	Orthofix	OFIX	$37.12	$694	0.83
2	Kensey Nash	KNSY	$29.02	$252	1.27
3	Stryker	SYK	$55.03	$20,981	1.37
4	ArthroCare	ARTC	$25.69	$710	1.38
5	Integra LifeSciences	IART	$33.83	$909	1.39

HIGHEST P/E TO GROWTH RATIO (EARNINGS ESTIMATES)

	COMPANY	SYMBOL	PRICE	MKT CAP	PEG
1	Wright Medical	WMGI	$19.01	$747	6.04
2	NuVasive	NUVA	$15.88	$677	3.54
3	CryoLife	CRY	$5.20	$144	2.25
4	Smith & Nephew	SNN	$48.75	$8,735	2.16
5	Johnson & Johnson	JNJ	$65.34	$179,363	2.14

LOWEST PRICE TO SALES RATIO (TTM)

	COMPANY	SYMBOL	PRICE	MKT CAP	PSR
1	Symmetry Medical	SMA	$7.10	$253	0.70
2	Alphatec Holdings	ATEC	$2.25	$202	1.02
3	Exactech	EXAC	$16.13	$212	1.03
4	RTI Biologics Inc	RTIX	$3.52	$196	1.16
5	Integra LifeSciences	IART	$33.83	$909	1.17

HIGHEST PRICE TO SALES RATIO (TTM)

	COMPANY	SYMBOL	PRICE	MKT CAP	PSR
1	TiGenix	TIG.BR	$0.84	$76	66.48
2	MAKO Surgical	MAKO	$41.76	$1,771	20.96
3	Synthes	SYST.VX	$170.96	$20,306	5.11
4	TranS1	TSON	$3.15	$86	4.48
5	Tornier N.V.	TRNX	$24.99	$982	3.76

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

What Globus' IPO Means

By Robin Young

Globus Medical, Inc./Photo Creation by RRY Publications LLC

On what is essentially Globus Medical, Inc.'s ninth birthday, this company of 672 employees, 39 major product lines and $331 million in annual sales will "go public." For some companies this process of opening up for public scrutiny and valuation is a natural and expected rite of passage as they grow to a particular size or complexity. For other companies going "public" can be a profoundly disruptive event particularly if its corporate culture and DNA is more inner-directed and, well, private.

Globus Medical, as a company, has a particularly well defined corporate culture and, if we were to put words to it we would say that it is engineering-based, thoughtful, focused but with a bias to taking on tasks internally. Globus is a company that listens more than it speaks. Going public will be interesting.

How is Founder and CEO David Paul handling all this? No doubt with solid determination. Our advice? Stay true to your instincts and don't let yourself be pulled into the circus of analyst calls and investor meetings. Hold one meeting per year. The Annual meeting. Anyone who wants to know about the company can attend. Seriously.

Pulling Back the Curtain

One of the requirements for selling shares of any company to the general public is that it must provide a full and complete picture of its business to the general public. The first such look is in a filing with the Securities and Exchange Commission (SEC) called an S-1 filing. There are six basic areas of disclosure in that filing:

1. Sales and earnings performance
2. The company's strategic plan for growth
3. The history of litigation and regulatory problems, if any
4. All risk factors, real or imagined

5. Management's conflicts of interest
6. Pay rates and ownership stakes

These are not trivial disclosures. Which is why "going public" is really not for everyone.

Here, then, is a tour of Globus' S-1.

Sales, as we mentioned earlier, were $331 million last year and what is most interesting in these numbers is how fast Globus' "disruptive technology" product category is growing. Standard fusion products grew pretty much in line with the industry at 4% last year. But "disruptive technologies" jumped 47% and pulled overall sales growth to 15%—that's very good in today's tough spinal implant market, particularly for new technologies.

and a welcome bright spot for innovation in spine.

Globus is also more profitable than, we suppose, observers might have thought given management's reputation for pinching pennies. Gross profit margins last year were 79% of sales. By comparison gross profit margins at other spine companies are, as follows: NuVasive, Inc.: 79%; Alphatec Holdings, Inc.:59%; Zimmer Holdings, Inc.:75%; and Stryker Corporation: 66%. Gross profits, however, have been declining as a percent of sales at Globus—falling from 84% of sales in 2009 to 79% last year. All spinal implant companies have been experiencing pricing pressures so this is not surprising.

Last year, Globus reported $76 million in operating cash flows and $143 million in cash.

Maybe pinching pennies is a good thing.

What Kind of Investment Will Globus Be?

Spine and growth are two words that institutional investors do not typically use in the same sentence these days. But 15% sales growth and an underlying "disruptive technology" growth rate that is 2 or 3x higher makes Globus look like a growth stock. Will Wall Street make an exception to its "spine is yesterday's news" attitude? It could be tough—but—the financial report in this S-1 is impressive.

$ in 000s	Year Ended December 31		Change 2010 / 2011	
	2010	2011	Globus Medical Annual Revenues	% Change
Innovative Fusion	$215,565	$224,356	$8,791	4%
Disruptive Technology	72,630	107,122	34,492	47%
TOTAL Sales	**$288,195**	**$331,478**	**$43,283**	**15%**
United States	$277,974	$311,024	$33,050	12%
International	10,221	20,454	10,233	100%
TOTAL Sales	**$288,195**	**$331,478**	**$43,283**	**15%**

Source: Globus Medical, Inc. S-1

Disruptive technologies at Globus refers to MIS techniques and instruments, motion preserving implants like dynamic stabilization products, total disc replacement and interspinous process spacer products, and advanced biomaterials technologies. The fact that Globus is booking that kind of growth from these technologies is both notable

The acid test for profitability is operating profit margin and here Globus really excels. Last year Globus made 29 cents in profit for every sales dollar. That's excellent and puts Globus in the upper ranks of all orthopedic companies. Again, here is how that compares. NuVasive: 7%; Alphatec: (7%); Zimmer: 25%; and Stryker: 24%.

Globus, we think, joins NuVasive as a high profile spinal implant company with both better than average growth rates and, in terms of Globus, stellar profit margins. Having two strong spinal implant firms in the public eye will go a long way to rehabilitate the reputation of spinal implant industry. A Globus IPO raises the value and vis-

ibility of several private spinal implant companies.

What's not to like about a 15% sales growth rate and nearly 30% operating margins?

Globus's Strategic Plan

How does Globus plan to maintain, if not increase, its growth rate? Courtesy of the S-1 filing, here's the answer:

1. Keep doing what got them to $331 million in sales in the first place. "We plan to continue to develop innovative fusion products and disruptive technology products."
2. Add more sales people. "We intend to add a total of 30 direct and distributor sales representatives in the United States by the end of 2012. We will continue to provide our sales representatives with specialized development programs to improve their productivity.
3. Expand internationally. "As of December 31, 2011 we had an existing direct or distributor sales presence in 17 countries outside of the United States and aim to have a sales presence in eight additional countries by the end of 2012."
4. Make acquisitions. "We are currently evaluating a number of possible acquisitions or strategic relationships and believe that our resources and experience make us an attractive acquirer or partner."

Litigation and Related Party Transactions

Yes, Virginia, Globus has engaged in litigation. All current and past significant cases are summarized in the S-1. None were surprising. Interestingly, perhaps, the companies with whom Globus is litigating are also among the largest firms in the spine industry—Synthes (soon to be combined with DePuy Spine), Medtronic and NuVasive.

One interesting related party transaction was disclosed in the filing and it is one of those items that, as a private company, is not unusual and often is one of the perks of having founded and successfully built a private company. In the public domain, however, this is disclosed and effectively folded into the overall company.

Since 2004, Globus has bought products from an outside manufacturer which was owned by a group comprised of Globus' CEO, President and VP of Operations. Between 2009 and 2011, Globus purchased, in the aggregate, $43.3 million of products from this supplier.

Control Stays With David Paul, CEO and founder, and His Team

Once the IPO is effective and Globus' stock is trading, CEO and Founder David Paul plus other members of management, some directors and stockholders will have most of the voting power of the outstanding common stock. Assuming Globus lands on the New York Stock Exchange, which is most likely where it will be, it will be considered to be a "controlled company." That means that it will not be bound by certain corporate governance requirements, including the requirement that a majority of the directors to be independent and that the compensation and nominating and corporate governance committees consist entirely of independent directors.

Management

David Paul is CEO and founder and he will remain in those positions following the IPO. David Demski is Globus' President and Chief Operating Officer and David Davidar is VP of Operations. All three have been with Globus since 2003. The other senior managers, however, are comparative newbies. Richard Baron, CFO, joined the firm three months ago in January 2012. Brett Murphy, VP of Sales joined the firm in February 2011. Ole Stocklund, VP of International joined in 2010.

What Will Globus Be Worth?

With underwriters like Goldman Sachs, Piper Jaffray and Bank of America, this underwriting will, no doubt, happen on time and at a very decent price.

Having said that, however, what is the market currently paying for the typical high performing spinal implant sales dollar or earnings dollar? Since there is really only one comparable (NuVasive) the answer to that question is pretty straight forward. As of last week, investors were paying about $1.33 per $1.00 of sales and $33.68 per $1.00 of after tax earnings for NuVasive. Now, investors were also forecasting that NuVasive's sales would rise 14% this year to $616 million and that earnings would *decline* this year by 13%.

If we applied the NuVasive multiples to Globus, the value of the firm would be about $440 million if you use trailing sales, probably $510 million if you use future sales. On an earnings basis, the NuVasive multiple would push Globus' value to $2 billion—which doesn't make sense, really. The average orthopedic company is currently getting $17.67 per $1 in earnings from the market so applying that ratio to Globus gets a valuation number of $1.1 billion—which is probably must closer to the mark.

We would also note that Globus is a really exceptionally profitable company and buyers, in today's nervous market, are looking for companies like this. So, our back of the envelope valuation numbers may be light.

To read the S-1 filing yourself, **click here.**

Conclusion

Will Globus thrive in the fishbowl? It should. While there are lots of good reasons to sell stock to public and institutional investors, at the end of the day the reason to go public is about what's best for the business, not the "public" demands and requirements. If we had a vote, and we don't, we'd suggest that Globus take the money and keep managing exactly as they have—quietly and outside the glare of Wall Street. ♦

Biomet's Surprising Trauma Move

By Walter Eisner

Wikimedia Commons and U.S. National Archives and Records Administration/Photo Creation by RRY Pub

The $280 million binding offer by Biomet, Inc. for DePuy Orthopaedics Inc.'s trauma business was greeted by most analysts in orthopedics without comment. We know, because we asked.

But our publisher, a former Wall Street analyst, commenting in Ft. Wayne, Indiana's *The Journal Gazette*, expressed surprise at Biomet's decision.

Our publisher, Robin Young, also co-founder (with his brother Benjamin Young) of the orthopedic-data firm PearlDiver Technologies, Inc. is a frequent commentator in the national and regional business press regarding medical companies and technologies.

"Deal Doesn't Add Up"

In last week's *Journal Gazette* story about the Biomet bid, reporter Sherry Slater quoted Young on the Biomet offer as saying, "I'm looking at this thing, and it doesn't add up...I wouldn't have done it." Slater wrote that Young said the company hasn't made money in years and that Biomet, which has $2.8 billion in annual sales, should strive to turn a profit on existing operations.

Young concluded in the story, "But that's not to say DePuy's trauma business isn't a smart investment for a company that could easily afford it, such as competitors Zimmer Holdings Inc. or Stryker Corp."

Biomet Defends Bid

Biomet spokesperson Bill Kolter rebutted Young's assessment in the story by saying that the company had more than adequate financial wherewithal to purchase DePuy's trauma business and disagreed with Young's assessment noting that Young was not a financial expert.

Slater quotes Kolter: "Your source may be an 'industry expert' but he is not a financial expert. There is a significant difference between reported and adjusted earnings. Biomet is thriving financially."

Kolter, in a written response to Slater's questions, said Biomet generated free cash flow of more than $200 million in fiscal 2011 with adjusted earnings before interest, taxes, depreciation and

JournalGazette.com

amortization of more than $1 billion, or 37% of sales. Adjusted financial numbers "remove any one-time or unusual amounts to arrive at a better picture of the performance of the underlying business."

As of the end of last quarter, said Kolter, Biomet had more $380 million in cash and cash equivalents on hand, more than enough to cover the $280 million cash offer.

Addressing Biomet's financial condition, *Journal Gazette* reporter Slater noted that Biomet's most recent Securities and Exchange Commission filing dated January 13; show about $3 billion in equity and about $8 billion in debt. She also pointed out that Biomet reported an $843.5 million loss for fiscal 2011, which ended May 31. That followed a $47.6 million loss reported for fiscal 2010 and a net loss of $749.2 million for fiscal 2009.

Special items for fiscal 2011 included a $941.4 million charge for goodwill and intangible assets impairment related to a continued slowdown in the European market.

Biomet Clarifies Public Remarks

On April 5, the *Gazette* published the following news brief with the caption: "Biomet rep clarifies bid remarks."

> *"Biomet Inc. spokesman Bill Kolter on Wednesday toned down a statement he made Tuesday about Robin Young, founder of the Warsaw-based orthopedic-data firm PearlDiver Technologies, Inc. and publisher of Orthopedics This Week, an online industry journal.*
>
> *Kolter recanted the statement on Wednesday and said Biomet officials respect Young's credentials. "Our comment was meant to highlight our disagreement with his perspective, not to demean his credentials," Kolter said in a statement.*

So back to the question Young raised about the deal not adding up.

"To put this in the most basic terms, among the potential buyers of DePuy's trauma business, Biomet was, to me, the least likely buyer," said Young. "Other firms, like Zimmer or Stryker or even Smith & Nephew, have stronger balance sheets and have been reporting the kinds of operating earnings that would lead me to think they would not only buy the business, but invest in it over the long haul. Had any other major orthopedic company been the bidder, I would have understood."

"But Biomet? It raised a series of questions. To be perfectly clear, Binder and

his team may have excellent answers to the questions. But they are not immediately apparent."

From There to Here

The future of Biomet has been a source of speculation ever since company Founder Dane Miller, Ph.D., stepped down unexpectedly in 2006 after acknowledging "friction" with his board of directors which included former Vice President Dan Quayle's wife, Marilyn Quayle.

After Miller's departure, the company hired Morgan Stanley to help it explore its strategic options and by the end of 2006 the company announced that a group of private equity owners, including The Blackstone Group, Goldman Sachs, Kohlberg Kravis Roberts & Co. and TPG Capital, would take the company private for $10.9 billion. Dane Miller would serve on the new board.

The company was now out of the hands of the local founders and public shareholders and in the hands of some of Wall Street's largest dealmakers.

Are there plans to take the company public again? In an October 2008 story in the *Gazette*, Binder reportedly said that when the time comes he thinks Biomet's most likely move is going public, but he couldn't say when that might happen. Miller, agreed, and a representative for the private-equity consortium declined to comment.

Young said he's assuming that this bid to purchase DePuy's trauma business is consistent with the financial goals of Biomet's owners.

"Highly Leveraged"

In February 2007, the company announced that Jeff Binder would take over the role of president and CEO. In an *OTW* interview in May 2007, Binder told us that the private equity sponsors had to, by contract, approve his appointment.

Wikimedia Commons and Fletcher6

According to a 2011 Biomet 10-K filing, the company "incurred significant indebtedness and became highly leveraged." The purchase was financed through notes bearing interest rates between 10 and 11%.

Over a three year period from 2008 to 2011, the filings show the company's shareholder's equity dropped from $4.836 billion to $3.175 billion and over $1.56 billion in interest payments were reported by the company.

What does the acquisition of DePuy's trauma division mean given this balance sheet?

Biomet has the most levered balance sheet among major orthopedic companies, said Young. "And that means that as a percent of operating cash flows, Biomet has fewer dollars to reinvest in its business than its competitors. It means that Biomet's management has less room for error and must, in effect, outsmart the competition in order to match industry growth rates. Biomet must be more efficient than Stryker, Zimmer, et al."

Biomet Trauma

In his May 2007 *OTW* interview, Binder noted challenges at Biomet Trauma and Biomet Spine.

Said Binder: "Our Parsippany-based business, Biomet Trauma and Biomet Spine, which used to be called EBI, is a business that has been struggling quite a bit...I think that business has a lot of potential. It's a business that's in a great

high growth space. It's a business that has not executed up to our expectations over the course of the past few years and I think it's a business that you will see get back to being a growth driver for us over the course of the next couple of years."

Biomet's Trauma business, according to Wells Fargo Analyst Larry Biegelsen, reported quarterly declines over previous years' sales of -3%, -9%, -5% -20%, -6% and -1% sequentially between the company's first quarter of fiscal 2011 to the second quarter of fiscal 2012.

In the fourth quarter of 2011, Biegelsen reported that DePuy's trauma sales were $50 million and a slight increase over the previous year.

In announcing the offer for DePuy's trauma division, Binder said the DePuy trauma team has, "done a great job of building a successful business." He added, "This transaction will provide Biomet with a much stronger presence in the global trauma market and greatly expands our Sports, Extremities and Trauma business, which is a meaningful growth driver for Biomet."

Young said he agrees with Binder's comment. "No reason not to. I'm sure that is why Biomet made the bid."

Does acquiring DePuy's trauma business make Biomet stronger?

This acquisition shores up Biomet's Trauma business, said Young. "On its face, it would appear that Biomet thinks that filling out the trauma product line and picking up additional distribution could stabilize its trauma unit."

"I don't know if Biomet will successfully acquire DePuy's trauma division," concluded Young, "If they do, I would certainly expect that it WOULD increase operating cash flows. Having said that, however, I am surprised that Biomet is making such a large purchase given its record of operating losses and its very high debt load. I would have expected the firm to start reporting profits before it went shopping." ♦

Cuckler Debates Schmalzried Over the Optimal Metal-Metal Arthroplasty (Hint: Not Surface Replacement?)

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

"We are really still experimenting with surface replacement," says John Cuckler, "It should be limited to centers with sufficient volume." "Contrary to what John showed you, there is actually higher survivorship [with surface replacement] than total hip in the at-risk patients," argues Tom Schmalzried. "We reported this in 2004…we hid it in the *Journal of Bone and Joint Surgery (JBJS)* so John must not have been able to find it."

This week's Orthopaedic Crossfire® debate is, "The Optimal Metal-Metal Arthroplasty is Not a Surface Replacement." For the proposition was John M. Cuckler, M.D. from the Alabama Spine and Joint Center. Against the proposition was Thomas P. Schmalzried, M.D. of the Joint Replacement Institute in Los Angeles; moderating was Cecil H. Rorabeck, M.D., F.R.C.S.(C) of the University of Western Ontario.

Wikimedia - KaihsuTai and Current Concepts in Joint Replacement/RRY Photo Creation

Dr. Cuckler: "I like resurfacing. However, I'm doing them in a setting with a 56-year-old male who had a malunion of a subtrochanteric fracture with a question of infection. I didn't think I could get any type of conventional stemmed implant into him…he is now four years out and continues to function well. The problem is that we don't have enough long-term data."

"The pros of resurfacing: they conserve femoral bone stock; cons are larger: issues of femoral fracture, increased acetabular bone stock removal, anatomic limits to the indication of this type of device, the biomechanics may be inferior, and the results—early on—and the learning curve consequences are significant."

"Short term results: This data is somewhat aged now (from 1996, 1999), but the revision rate early on (12%, 71%, and some 0%) indicates that there is something going on that is improving and may become as good as the conventional total hip. If you look at newer reports [2004, 2005], the survivorship at two year follow-up is good, but not as good as conventional hip replacement."

"If you look at Amstutz's experience—and he has devoted his life to this concept…his survivorship at 2-6 year follow-up is 97% for the group as a whole. Good—but not as good as modern cementless conventional total hip arthroplasty."

"The Australian Joint Registry: they found that the surface replacement arthroplasty revision rate compared with conventional total hips—short to intermediate term results are not nearly as good as with conventional total hip arthroplasty. In experienced hands, the results are approaching as good, but the learning curve is steep, as shown by Michael Mont's experience. He had a 26% failure rate in his first 50 and 1% in his next 150."

"Paul Beaulé and Amstutz's selection criteria…their 'Surface Arthroplasty Risk Index.' (previous surgery=1; weight=2 if <82kg/180lbs; femoral cyst>1cm=2; activity level=1) This is going to knock

out the majority of my young patients. If you have a score greater than 3 your risk of failure goes up 12 times."

"Age is a relative contraindication to this device if you're over 65. Under age 55 you can do reasonably well in the hands of an experienced surgeon…but after that it's debatable. And women do not do as well with this device; older women do even worse than older men."

"So the limitations to surface replacement include: leg length discrepancy>1cm, osteoporosis, heavy weight or light weight, female, acetabular dysplasia, varus and maybe valgus necks, femoral head cysts, large infarcts, you can't restore offset well with these devices…and high activity level may be a relative contraindication."

"We probably remove more acetabular bone stock with these devices…that may come back to haunt us. Ion release I don't think is a factor. But there are unanswered questions: we need better intermediate and long term results; we need to know how the revision, especially on the socket side, is turning out…the acetabulum is the real question."

"For now we should limit this to centers with sufficient volume and experience to teach us all what this device will really do. Thank you."

Dr. Schmalzried: "These are not directly competing technologies. There are narrower indications for resurfacing, and you will see amazing outcomes and patients. Contrary to what John showed you, there is actually higher survivorship than total hip in the at-risk patients for which resurfacing is indicated."

"We reported this in 2004…but we hid it in the *JBJS* so John must not have been able to find it. There's no difference in the socket size that I use for surface replacement versus total hip in equivalent sized patients."

"The selection criteria include the shape of the proximal femur. For example, a patient had bad mechanics in his right hip—a big slip. He is very short and quite varus, so I'm going to do a nice total on him and fix up his offset and limb length. His other hip had nice mechanics, so I'll do a resurfacing on that side. No difference in the socket parameters or position."

"Indications: those patients with an increased risk for failure of a total hip, that have a good proximal femur, or some femoral deformity or device that would complicate putting in a total hip. My poster child is a patient with bilateral surface replacements, and is active duty Navy Seal. In his free time he barefoot water-skis backwards."

"Very important: Dr. Amstutz's series really taught us who's it best in and who should we avoid. Who's at higher risk for failure? Females, smaller component sizes, those with large femoral defects, smaller patients, and relative varus position. Best results? Big osteoarthritic males because there's dense bone, large fixation area. Also, the series showed that there was durable acetabular component fixation, just like we see with cementless acetabular components in total hips."

"Patients are living longer and harder. They are unaccepting of disability, and want no restrictions. They don't want a stem; they're worried about the limitations of a total hip (no running/hard skiing/singles tennis). And large males can break a stem."

"Three DEXA studies show that resurfacing maintains bone. You'll never see proximal bone maintenance—Gruen zones 1 and 7—with a total hip. You just can't do it with inside out…I don't care how short the stem is. You only get it with outside-in physiologic loading."

"These are the fill in the blanks for John. If you look at all comers—all total hips versus all resurfacings in Australia—he's right. But that's a patient selection issue. If you look at the at-risk demographic, males more than females, age under 65 and larger sized components…those patients actually have a better six year survivorship (that's the length of time the Aussie registry's been around) than the equivalent demographic with a total hip."

"Conversion to total hip: one of our fellows looked at that, mostly for femoral side failure. The outcomes are similar to those of a primary total hip; the operative variables in terms of blood loss and operating time are similar to a total hip,

and there have been no revisions in that group…no re-revisions out to 46 months."

"Why resurfacing? The indications have been refined, and it's not a directly competing technology with total hip. We do see higher activity, and I don't place any restrictions on these patients…and it doesn't in any way appear to be associated with early failure. Most importantly, there is higher survivorship in the at-risk demographic when compared to the same demographic with total hips. Thank you."

Moderator Rorabeck: "John, one of the issues that patients who have had a resurfacing will tell you is that their hip 'feels normal.' The biomechanics are not normal. Why is that?"

Dr. Cuckler: "I think that happens because of what David Blaha said earlier…we hit that 'sweet spot' in terms of restoring the biomechanics and function of the musculature of the hip. I think you can achieve that with either of these implants. What we agree on is that it takes careful patient selection, preoperative planning…and if you're not doing a fair number of these regularly you're probably not going to get the kind of results that Tom gets. You may need to send it to someone else."

Moderator Rorabeck: "Women don't do as well…is it about head size or osteopenia, or what?"

Dr. Cuckler: "We don't know. The ones I've revised have been revised for femoral neck fracture, which related to a technical error on the part of the surgeon. (We've met the enemy and he is us.) If you notch that femoral neck at the time of surgery you should probably go ahead and convert to a conventional total then and there."

Dr. Schmalzried: "The Aussie registry—this year's registry—is helpful. In big registries you have surrogates, such as gender, age, and component size. What they find is that the survivorship is better in males, in younger patients, and in larger components. If you take all those together the surrogate is cross sectional bone mass across the femoral neck. Resurfacing failures are all front loaded…they tend to occur in the first year and are mostly due to fracture. So those that don't have much cross sectional bone mass are the ones at higher risk for short-term failure."

Moderator Rorabeck: "So, John, should we being doing DEXA scans on resurfacing patients?"

Dr. Cuckler: "Clearly, osteopenia disposes to failure, but I think in the hands of an expert you can probably still get a good result. Patient selection is key, and you need to discipline yourself…at the end of the day I find very few that are truly appropriate.

Moderator Rorabeck: "You used the word 'expert' too, John. Is this an operation that somebody who's doing five hips a year should think about taking up?"

Dr. Cuckler: "Probably not. But if you're doing 30 or more I think you can begin…there is a different skill set than conventional hip arthroplasty."

Moderator Rorabeck: "If I were a 50 year old again and needed a hip replacement—and I'm obviously a male (or I think I am)—I would think seriously about having a resurfacing arthroplasty. John, where is 'the place' for this surgery?"

Dr. Cuckler: "We will ultimately be using this procedure in cases with proximal femoral deformity, and in young active males…and it will be done in a select number of centers where people can do enough to have the skills to do it consistently well."

Moderator Rorabeck: "Thank you both." ♦

Please visit www.CCJR.com to register for the 2012 CCJR Spring Meeting, May 20-23 in Las Vegas, Nevada.

"You may now view content from the CCJR Meetings on the CCJR Mobile™ App. Please scan the QR code to download the CCJR Mobile App to your Android or iOS mobile device, or visit www.ccjrmobile.com."

Photo on Top: Dr. Rodeo/Photo on bottom: Laura Robbins.

On (and Off) the Record

By Elizabeth Hofheinz

Stunning Surgical Technique Salvages Limbs….HSS Moves to Brazil?…Prestigious *and Lucrative* Delmas Prize Awarded!...Accreditation Game Change in the Works…Put Trauma BACK into OR Education!…Allan E. Inglis, M.D. joins HSS…and more.

Accreditation Game Change in the Works An educator active in the orthopedic realm tells *OTW*, "On everyone's lips now is the Accreditation Council for Graduate Medical Education's (ACGME) announcement of the Next Accreditations System, or NAS, which will significantly change how we educate and train future surgeons. For the longest time while the goal was to train doctors, the reality was that programs often focused on administrative tasks and things they needed to do to get accredited…they got away from what is essential to teaching orthopedic surgery.

"The laser focus going forward will be on educational excellence—and holding programs accountable for that. Programs are going to have to step back and say, 'What exactly do we need to teach residents?' Then they will have to measure what has been taught. I think that this measuring component will be the most difficult thing to tackle…orthopedic surgeons are very talented, but are not necessarily great evaluators. One huge area is an enhanced focus on observation. How exactly do you observe someone in the OR to ensure that he or she is learning? How programs are visited, how they are accredited…all that and more will be changing."

Stunning Surgical Technique Salvages Extremities Two surgeries and the patient can keep his limb. Benjamin Taylor, M.D. of Orthopaedic Trauma

& Reconstructive Surgery in Ohio has recently published his work, "Induced Membrane Technique for Reconstruction to Manage Bone Loss, in the *Journal of the American Academy of Orthopaedic Surgeons*. Dr. Taylor tells *OTW*, "Managing segmental bone loss often involves multiple surgeries, and can lead to prolonged recovery times, poor patient outcomes, and even amputation. A two-stage technique—which could save limbs—uses induced biologic membranes with delayed placement of bone graft.

"The first stage involves putting a polymethyl methacrylate spacer into the defect to produce a bioactive membrane. After the cement is removed the membrane remains and protects the bone grafts. Patients go home four days later and return in about six weeks for the second surgery, which involves removing the bone cement. During this process the membrane stays in place and it will end up being filled with its own bone graft. We are getting terrific results thus far, and are seeing that this membrane stimulates the bone graft to fully consolidate and heal. This is a very simple yet effective way of salvaging extremities with bone loss."

Allan E. Inglis, M.D. Joins HSS This New York institution is welcoming home one of its own. Dr. Allan Inglis, a native New Yorker who trained at HSS, is its new assistant attending orthopedic surgeon. Dr. Inglis, also a clinical assistant professor of orthopedic surgery at Weill Cornell Medical College, focuses his practice on the surgical treatment of arthritic conditions in adults and is involved in the custom design of joint replacements in the most difficult cases. Dr. Inglis graduated from Cornell Medical School and interned at the Virginia Mason Hospital in Seattle. He also trained at the Royal National Orthopaedic Hospital in London, the EndoKlinik in Hamburg, Germany, and the Kerlan-Jobe Orthopaedic Clinic in Los Angeles.

Put Trauma BACK into OR Education The Orthopaedic Trauma Association (OTA) is redefining what it is to provide an OTA sanctioned trauma fellowship. Dr. Robert Probe, president of the aforementioned organization, tells *OTW*, "Recent years have seen an explosion in the number of graduating orthopedic residents that choose to extend their education with fellowship training in trauma. As the number of fellowships expanded to meet this demand, it became increasingly difficult for interviewing applicants to be assured that all of the fellowships they were considering were of the highest quality."

Just in the last few days we have revamped the criteria for programs that want to be part of the OTA match program… criteria that expand and strengthen the fellowship experience. First of all, each fellow's trauma log should reflect that he or she has performed 400 CPT procedures per year. On the program side, institutions must demonstrate that they have a base volume of certain procedures so that we know the fellows are in a satisfactory learning environment. As for specifying the number of XYZ cases that a fellow should do annually, we are getting there. We must first examine the data from the log books in more depth before we mandate anything specific. The Board also came to the decision that programs should have on staff—for the first fellow—two *active* members of the OTA. For each additional fellow one active OTA member should be present.

In the deliberation of these changes, the OTA was respectful of the need to preserve educational innovation and unique program identities but did feel as though the ultimate beneficiary

of this process would be those future patients being cared for by our graduating fellows."

Prestigious and Lucrative Delmas Prize Awarded! Professor René Rizzoli, professor of medicine at University Hospitals of Geneva and head of the service of bone diseases at the Department of Rehabilitation and Geriatrics, has been awarded the Pierre Delmas Prize.

The award is given by the European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO) and the International Osteoporosis Foundation (IOF)—with the support of Servier. The prize, valued at 40.000 EUR, is awarded to an individual investigator for outstanding and major scientific contributions to the study of bone and mineral diseases.

The award is named after the late Pierre Delmas, professor of Medicine and Rheumatology at the University of Lyon, France, who made major contributions to basic and clinical research in the field, and, was the founding President of IOF. René Rizzoli is Vice Chair of IOF Committee of Scientific Advisors (having chaired the Committee for its first eight years) and is former president of the Swiss Association Against Osteoporosis. He is presently member of the IOF Executive Committee, and also chairs the Scientific Advisory Board of the European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis.

HSS's Rodeo Hits Rio! The Brazilians rang and the luminaries at HSS answered the call. Scott Rodeo, M.D., co-chief of the Sports Medicine and Shoulder Service at Hospital for Special Surgery (HSS), tells *OTW*, "A Brazilian managed healthcare provider, Amil Par, reached out to us over a year ago and asked that we advise them on how to manage a world class private orthopedic hospital. Since then, Brazilian administrators and orthopedic surgeons have made several trips here to learn how we handle everything from nursing to material management. And along with my colleague, Laura Robbins, Ph.D., senior vice president for education and academic affairs, I just returned from Rio de Janeiro where they are preparing for the grand opening of their institution, known as Hospitalys.

"The Brazilians leading this effort are top orthopedic surgeons, and will have little trouble learning how to organize a great institution. What will be challenging for them, however, is if they wish to replicate the culture of HSS. HSS is unique…a relatively small, specialty hospital where everyone from the division chief to the nurse's aid is on the same page—and enthused about being a part of the HSS family. They are going in the right direction, however. We visited with physical therapists, neurologists, and physiatrists who will be part of Hospitalys and I was very impressed with how they work together.

"To further their efforts, we are looking at creating a web-based learning environment whereby we could share our meetings and lectures in real time. Additionally, their doctors will likely come to HSS for several weeks or months to further their clinical or research training. And the timing of all of this couldn't be better. Brazil is hosting the 2014 World Cup and the 2016 Olympics, and Hospitalys is aiming to make sports medicine a focus of their efforts." ♦

company

Take-Apart Instrument Gets FDA OK

The Food and Drug Administration has granted 510k clearance to Integra LifeSciences Holding Corporation's Jarit Take-Apart Laparoscopic Instrument. The device, which looks like a cross between a pair of scissors and a target pistol, was developed to address the growing concerns of hospitals and regulatory bodies for instruments that can be more easily cleaned and sterilized.

"These new laparoscopic patterns are an important addition to our instrument portfolio," said Dan Reuvers, president of Integra Surgical in the March 26 news release. "Long, narrow cannulas and intricately fitting components are a challenge to clean, yet are necessary for minimally invasive surgery. Our new take-apart design balances ease of cleaning with surgeon preference, both of which are important goals in achieving optimal patient care."

A Cross Between Scissors and a Pistol?

Source: Courtesy of Integra LifeSciences Holding, Inc.

Integra officials say the company has recently introduced numerous products that increase the certainty that hospitals are using clean instruments on every patient. Integra featured the Jarit Take-Apart Laparoscopic instruments at the 59th Congress of the Association of periOperative Registered Nurses (AORN), March 24-29, 2012, in New Orleans, Louisiana.

—BY (April 6, 2012)

Disintermediation Hits Federal Court

We reported in late March that Emerge Medical Inc. had signed a deal to distribute the company's generic medical devices through Premier, Inc., the nation's second largest healthcare group purchasing organization (GPO). The deal makes Emerge's orthopedic devices available to the GPO's 2,500 hospital members at specially negotiated pricing and terms.

We also reported that Emerge and one of its founders, John Marotta, a former Synthes Inc. sales rep and manager were currently involved in litigation. Synthes sued Marotta and other former Synthes employees who joined Marotta

Wikimedia Commons and Legal Education.org.uk

at Emerge. The company said Marotta and the former employees violated their non-compete agreements, attempted to steal business, and illegally used proprietary information.

On Tuesday, April 3, Marotta's attorney filed a counterclaim in federal court in Philadelphia. According to an April 5 story in the *Philadelphia Inquirer*, the counterclaim accuses Synthes of anti-trust violations, making misleading statements to Emerge customers, and trying to crush Emerge through litigation.

This case may have important implications for an industry where certain orthopedic devices and instruments are becoming commoditized and existing manufacturing and distribution chains are being disintermediated as hospitals seek lower cost items.

Inquirer reporter David Sell writes that Synthes has filed numerous lawsuits against employees leaving for competitors. Patent law is another field of legal battle, but Marotta and Emerge say that Synthes doesn't have patents for the screws, nails, and wires that Emerge is trying to sell.

Beyond that, writes Sell, the legal filing in answer to the Synthes complaint says the sales approaches of the companies differ, with Synthes directing sales toward surgeons and Emerge selling its "Generic Device Fixation Hardware," to hospital administrators because "surgeons don't really care" what brand of screw or nail or wire is used to affix a rod or plate or replacement joint.

We'll dissect the anti-trust counterclaim and lawsuit for you next week.

—WE (April 6, 2012)

Biomet's $280 Million Trauma Bet

The regulatory requirements of the planned merger of Synthes, Inc. and Johnson & Johnson's (J&J) DePuy Orthopaedics, Inc., are adding fuel to the shake-up of the world's orthopedics market.

On April 3, 2012, Biomet, Inc. announced the company was making a $280 million bet to crash into the top tier of trauma companies in the world.

The company said it was making a $280 million binding offer to acquire the worldwide trauma business of DePuy Orthopaedics. Divesting of trauma will, reportedly, allow DePuy to ease regulatory concerns over Johnson & Johnson's planned $21.3 billion acquisition of Synthes. Synthes leads the worldwide trauma market with an almost 50% market share, followed by Stryker Corporation, Smith & Nephew, and Zimmer Holdings, Inc.

J&J said in a statement that the binding offer includes the purchase of DePuy's internal and external fixation products used in the treatment of bone fractures, as well as the organization supporting the business. The sale is subject to regulatory approvals and is expected to close in the second quarter.

J&J also said it expects the deal with Biomet will satisfy any remaining concerns regulators might have over its dominance in the trauma field.

"We believe this divestiture will satisfy all regulatory concerns relating to the pending purchase of Synthes by Johnson & Johnson, but we will not know with certainty until the regulatory processes in the EU and U.S. are completed," J&J said in a statement. "We continue to make progress in our work with antitrust authorities on the Synthes transaction."

Biomet CEO and President Jeff Binder said the DePuy trauma team has, "done a great job of building a successful business." He added, "This transaction will provide Biomet with a much stronger presence in the global trauma market and greatly expands our Sports, Extremities and Trauma business, which is a meaningful growth driver for Biomet."

The binding offer expires on June 1, 2012 but can be extended under certain circumstances. The transaction is subject to receipt of regulatory approvals, completion of required employee consultation procedures and other customary closing conditions.

—WE (April 3, 2012)

Image Credit: Wikimedia Commons and SJBrown

legal

Medtronic Pays $85 Million to Settle Infuse Suit

Infuse continues to cost Medtronic, Inc., pain and treasure. The company announced on March 30 that it was paying $85 million to make a lawsuit by a group of retired firefighters, teachers and county employees go away.

Infuse Source: Medtronic, Inc.

In December 2008, the Minneapolis Firefighters Relief Association filed a federal securities class action suit against Medtronic seeking damages for alleged misrepresentations and omissions by the company prior to November 2008.

The firefighters claimed Medtronic misled investors about the profitability of its Infuse device. They claimed that sales of the product were more dependent on off-label uses than Medtronic disclosed and that the omissions inflated the company's stock price.

In reaching a settlement, Medtronic explicitly denies that it made any misrepresentations or omissions or that it otherwise engaged in any wrongdoing. Looks like the company's new CEO, Omar Ishrak, is continuing to clear the decks of Infuse controversies.

Other plaintiffs in the class included the Oklahoma Teachers' Retirement System, the Oklahoma Firefighters Pension Fund and the Westmoreland County Employee Retirement System.

—WE (April 2, 2012)

Tyler, Texas Rebel Docs Roar Back

Texas Spine & Joint Hospital Photo

Those Tyler, Texas rebel physicians from the Texas Spine & Joint Hospital who want to expand their physician-owned hospital (POH), have landed smack in the middle of the national debate over the constitutionality of the Affordable Care Act.

The physicians and their association, Physician Hospitals of America (PHA), convinced Federal Judge Jerry Edwin Smith of the U.S. Court of Appeals for the Fifth Circuit in Houston to hear their challenge to Section 6001 of the Affordable Care Act. The Act restricts physician-owned hospitals from expanding or constructing new hospitals. They argue that physicians who invested in hospital expansions before the enactment of the new law should be able to recoup their money as an unlawful "taking." They also say the Act should be declared unconstitutional.

Judicial Ultimatum

During a hearing on April 2, Judge Smith issued an ultimatum to the government

lawyers that U.S. Attorney General Eric Holder deliver to Judge Smith's court by noon April 5, a "3-page singled-spaced" letter addressing whether the executive branch's recent public statements indicate a belief that the judiciary cannot overturn a federal statute on constitutional grounds.

The Judge was referring to comments made by President Obama during a press conference with the leaders of Mexico and Canada. The President said that it would be "unprecedented" for nine unelected judges to overturn a law passed by a democratically elected Congress and would constitute an act of "judicial activism."

The president's press secretary had to walk back his boss' comments the next day, saying the president was referring to cases involving commerce.

Constitutional Challenge

An email from the PHA, tells *OTW* that many physician-owned hospital projects were stifled or completely shut down when Section 6001 became law on March 23, 2010. Yet, say the physicians, according the U.S. Supreme Court, laws are unconstitutionally retroactive when they immediately interfere with completed and settled transactions. Therefore, PHA will argue that the prohibition on physician-owned facility expansion was unfairly retroactive and impacted hundreds of physician-owned hospital expansion projects.

"This deadline was extremely unrealistic for the physician-owned hospitals. When healthcare reform passed, all new hospitals were banned and POH's were given eight months to finish ongoing projects and receive Medicare certification," said Michael Russell, M.D. president of PHA. "This is something that takes years to complete. This deadline robbed our communities of good care and good jobs."

PHA will also argue that the appellate court should consider the provisions targeting physician-owned hospitals a "regulatory taking." PHA also bases this argument on clear authority from the Supreme Court that claims of regulatory takings are fact-intensive and need to be considered in the context of an extensive record. In PHA's case, however, the lower court did not give PHA's regulatory takings claim due scrutiny.

—WE (April 5, 2012)

biologics

Athletes Opt For Cells, Ignore FDA

Elite basketball players, engulfed in either the frenzy of March Madness or the grind of a regular NBA season, have turned to injections of stem cells to help them recover from injuries more quickly. Among the players who sought out treatment in the U.S. or overseas, are Jason Kidd, Tracy McGrady, Amar Stoudemire, Allan Houston and Kenyon Martin, according to a *Sports Illustrated* article.

Each of the athletes had microfracture surgery to extract mesenchymal stem cells from their bone marrow. Dr. Jason Dragoo, a Stanford University School of Medicine orthopedic surgery and sports medicine professor, told Stephanie Baum of *MedCity News* that publicity on these treatments does not help further the cause of stem cell therapy and, instead, has a negative impact on the development of clinically proven stem cell treatments for orthopedic medicine.

"Because of this market pressure, private clinics have been offering stem cells treatments both here in the USA as well as around the world. Often, these treatments have not been studied and are not regulated in any way," Dragoo said in the March 29 release. He added that FDA regulations have also severely

Wikimedia Commons and Keith Allison

limited new clinical trials in stem cell therapy in the U.S.

The FDA permits cells to be extracted from individuals, transformed into stem cells, and re-inserted back into the same person. It requires that the conversion involve no more than water, preservatives and storage products. Anything more than that, the FDA maintains, would have to be classified as a drug therapy and would therefore have to go through the application protocol. Because of the FDA's reservations there have been no clinical trials for stem cell treatments in sports medicine in the United States.

A decision, expected in May by the U.S. District Court in Washington, D.C., may bring about some changes. The FDA and Regenerative Science of Colorado have been engaged in a four-year struggle over how autologous adult stem cell treatments are to be regulated. The company wants to provide autologous adult stem cell treatments to patients for musculoskeletal and spinal injuries and the FDA is seeking to prevent it.

If Regenerative Science should win its case, any doctor could develop autologous stem cells and inject them back into basketball players, or any other patients, without FDA oversight, according to a *Cell Press* article.

In the meantime Stanford University is preparing a clinical trial, to begin next year, to look at inducible stem cells. As Dragoo explained, "This technique takes adult cells and makes them young again by inserting four genes, which makes the cells immature and allows them to be directed into different types of tissues."

—BY (April 6, 2012)

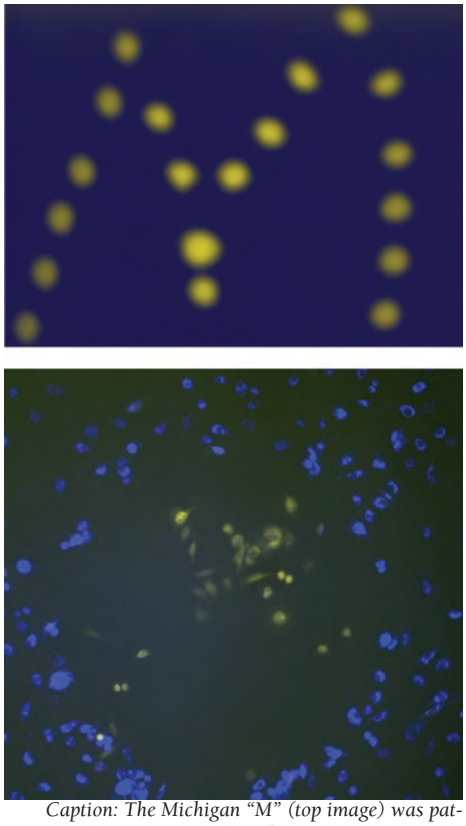
Patterning Cells on Implants: The Future?

Sound waves and droplets…such is the process of a new method for printing human cells onto surfaces in defined patterns. The authors, researchers from Michigan, hope that this work will advance research on tissue engineering and regeneration.

"Cell printing is one of the breakthrough technologies that will make the application of stem cells for tissue engineering feasible," says John Jansen, D.D.S., Ph.D., Methods Co-Editor-in-Chief and Professor and Chairman, Department of Biomaterials, Radboud University Nijmegen Medical Center, The Netherlands, in the March 28, 2012 news release.

Yu Fang and colleagues at the University of Michigan, Ann Arbor, combined two microscale techniques to dispense and position cells in a variety of patterns. They then demonstrated the ability to use these 3-dimensional cell systems to monitor cell signaling events known to have a role in the growth, proliferation, and metastasis of cancer cells. The authors describe the use of sound waves to deliver microdroplets of cells and polymer-based phase separation to control cell placement in the article "Rapid Generation of Multiplexed Cell Co-Cultures Using Acoustic Droplet Ejection Followed by Aqueous Two-phase Exclusion Patterning."

John Frampton, Ph.D., co-first author, told *OTW*, "We had two main goals, or milestones, for this project. The first milestone was demonstrating that we could use the forces from ultrasound waves to eject droplets of a viscous liquid (dextran) from a standing pool. The second milestone was to demonstrate that cells incorporated into these droplets remained alive and were able to be patterned in the desired configurations with other cells."



Caption: The Michigan "M" (top image) was patterned by ejecting droplets of a water-based dextran solution (yellow) and then covering the droplets with another water-based polyethylene glycol solution (blue), essentially allowing us to separate water from water. A boundary, or interface, exists between the dextran and polyethylene glycol, allowing us to pattern cells within these liquids (shown in bottom image)./University of Michigan

Dr. Frampton also commented to *OTW*, "Orthopedists may find this technology of interest because it allows patterning of more than one type of cell on surfaces that may assume many different shapes or sizes. We think that this technology, or other technologies like it, could one day be used to pattern cells on implantable materials, which could potentially improve functional integration in patients."

—EH (April 3, 2012)

large joints

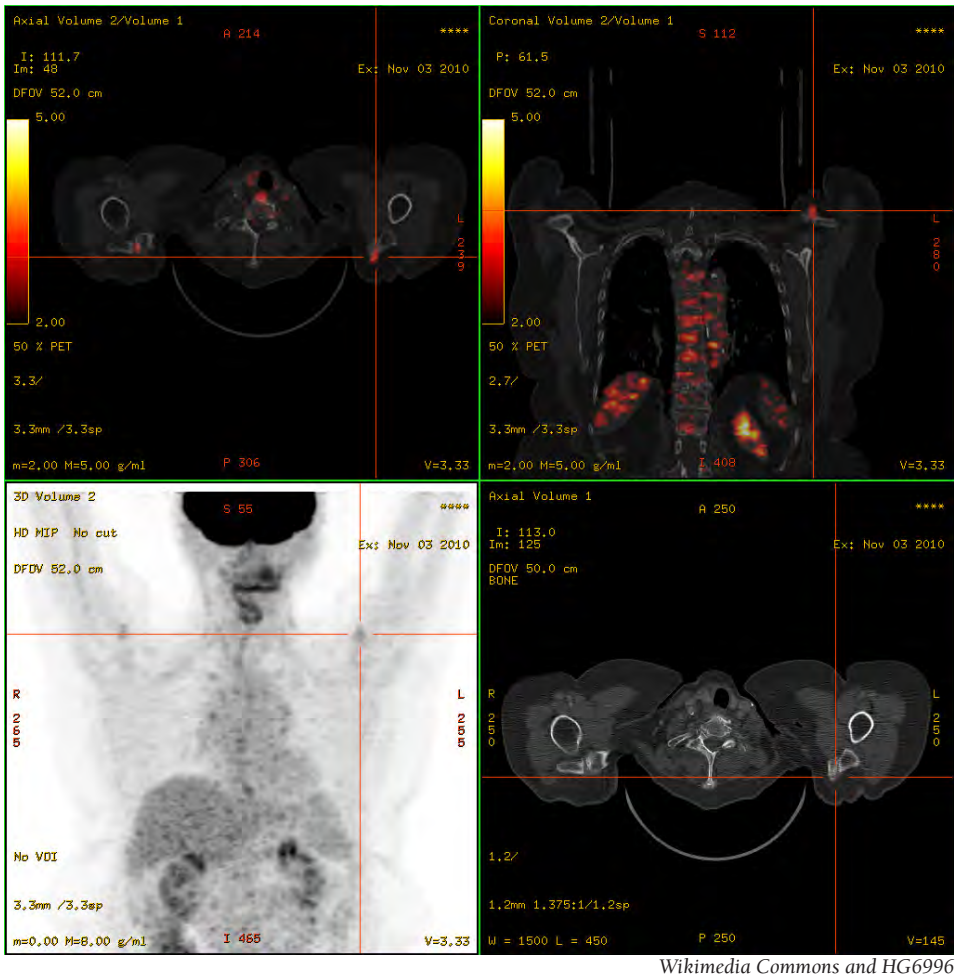
Astonishing Osteoarthritis Drug Breakthrough!

A clinical trial being conducted in Great Britain on a drug for the brittle bone disease osteoporosis turned up a major surprise! It appears that the drug, called Protelos, may be a potent treatment for osteoarthritis. The drug's ability to stem cartilage loss was unexpected because osteoarthritis and osteoporosis are believed to be completely different diseases.

The lead investigator on the trial, Professor Cyrus Cooper, said in the March 23 news release: "This is a major breakthrough. For over 20 years we have been searching for a treatment that would allow us to alter the course of the disease rather than just manage the symptoms. The results today could totally change the way we treat osteoarthritis. For the first time we have a treatment that can slow the development of this debilitating disease and could reduce or even eliminate the need for expensive and painful joint replacement surgery."

England's National Health Service performs more than 140,000 hip and knee replacements each year at a cost of more than one billion pounds annually. Data on Protelos, or strontium renelate, presented at the European Congress on Osteoporosis and Osteoarthritis in Bordeaux, shows that the drug reduces the deterioration of knee cartilage by a third.

Protelos is inexpensive and easy to take. Patients dissolve the lemon-flavored powder in a glass of water and drink it once a day at bedtime. Investigators say that Protelos is the first treatment shown to slow the progress of osteoarthritis. Current methods can only relieve the symptoms of the disease, which is presently held to be incurable and often leads to knee replacements. Many sufferers rely on anti-inflammatory painkillers, although these can damage the stomach when used long term.



Wikimedia Commons and HG6996

The study of 1,683 mostly women patients with an average age of 63 found that for every three years of treatment, Protelos slowed progression of the disease by a year. It was also shown to significantly reduce pain, allowing patients to move around more freely.

Judith Brodie, chief executive of charity Arthritis Care, said: "Many people with osteoarthritis live for years in great pain before eventually needing joint replacements. "If there is a treatment which can hold back the disease, then it will be good news for millions of people."

Medical director of Arthritis Research UK Professor Alan Silman said the result of the phase III trial was an "exciting development" and showed that strontium ranelate could be valuable in treating osteoarthritis. "This the first time that a drug has been shown to slow progression of osteoarthritis, as existing treatments focus on symptoms," he said.

—BY (April 6, 2012)

Runners Less Prone to Osteoarthritis

Spring is here, the runners are out, and some individuals who should know better are warning runners that running will "ruin their knees." Is it true that serious running will result in runners eventually getting osteoarthritis (OA) in their knees? Or is that just another "old wives" tale?

The National Institutes of Health followed 45 long-distance runners and 53 control individuals from 1984 to 2002 to determine if OA is more common in runners than in non-runners. The investigators compared knee X-rays of both groups over time and did not find OA to be more common in runners than in the non-runners. At the beginning of the study, 6.7% of the runners had some form of OA while the control group had no incidence of OA. By the end of the study, 20% of the runners had some evidence of OA compared to 32% of the non-runners.

No definite connection has been found between running and OA of knees, with one possible exception—marathon running. A study conducted in 2010 on 10 marathon runners compared to 10 non-runners found signs of early knee cartilage breakdown in the marathon runners—even months following their marathon. The study took a number of MRIs on runners, who had no known knee injuries before they ran the race. More MRI's were taken 48 hours following the race and additional ones 10 to 12 weeks after they had completed the race. Though the study was very small, it does suggest that marathon runners may be at a higher risk for developing knee OA. The study was published in the *American Journal of Sports Medicine*.

—BY (April 6, 2012)

Wikimedia Commons and Rico Shen

"Buddy" Grows a Knee – the Whole Knee

Thanks to a dog named "Buddy" and veterinary surgeon James Cook at the University of Missouri, doctors are one step closer to replacing artificial joints with human donor knees. "Total joint replacement with metal and plastic is the best of what we have. But it's not normal. It's not perfect. We really wanted to find a solution to that," said Cook.

Wikimedia Commons and Kalumet

Cook and his biologist colleague Aaron Stoker, in their research for joint replacement solutions, developed their "total biologic joint replacement theory." They noted that it has been possible, in the past, for humans to received portions of a donor knee, but it has not been possible to implant an entire donor knee because, they said, the cells do not survive long enough for doctors to get the knee in and have it grow into the patient's leg.

The two have now come up with a way to double the length of time in which tissue will remain viable. They have succeeded in implanting donor joints in both mice and rabbits. Then they met Buddy, a dog who needed a new joint. Cook was willing to try his breakthrough surgery on a larger animal. And it was a success.

James Stannard, M.D., of the University of Missouri Orthopaedic Institute, has now teamed up with Cook and Stoker to research how to perform similar surgery on humans.

"We are in the process right now of translating those from the animal to the human—and that transition is really more research proof than how to do it. We know how to do it," he said. Stannard says that he already has a list of people waiting to have this surgery.

—BY (April 4, 2012)

extremities

Incredible Carpal Tunnel Myth Debunked

It is time to stop blaming the keyboard—for carpel tunnel syndrome—that is. Long considered a probable cause, typing now may have the opposite effect and serve as a preventative. A study in Sweden found that people who spend a lot of time on the computer are less likely to get carpal tunnel syndrome (CTS). The study suggests that, rather than hurting the wrist, typing could actually protect typists from CTS. The hitting of keys is an exercise that works out the muscles and, in that way, could lower the risk of swelling.

In the study, researchers surveyed nearly 2,500 adults. Of those who spent four hours a day or more on the computer, 2.6% developed CTS. For those who spent from one to four hours a day the figure was 2.9%. And 5.2% of those who didn't use the computer at all had CTS. As noted by Jeff Jurmain on March 29 in The *Doctors Health Press*, CTS has been around since the 1900s, long before much of the world spent hours hunched over a keyboard.

The more likely causes of CTS are repetitive motion tasks that require a degree of force greater than that involved in typing. Potential causes include an injury, having diabetes or arthritis, thyroid problems, job stress, alcohol abuse, or a previous injury to the wrist. The "tunnel" of CTS is located at the bend of the wrist and has eight small carpal bones in it. The median nerve passes through that tunnel and when it becomes compressed CTS is the painful result.

—BY (April 6, 2012)


Wikimedia Commons and Matthew Bowden

spine

Spinal Cord Injury: Progress From Kansas State

Researchers from a Kansas State University have paved the way to make it easier to recover after spinal cord injury or to study neurological disorders. Mark Weiss, Ph.D., professor of anatomy and physiology, is researching genetic models for spinal cord injury or diseases such as Parkinson's disease. He is developing technology that can advance cellular therapy and regenerative medicine.

"We're trying to build tools, trying to build models that will have broad applications," Dr. Weiss said in the March 19, 2012 news release. "So if you're interested in neural differentiation or if you're interested in response after an injury, we're trying to come up with cell lines that will teach us, help us to solve a medical mystery."

According to the news release, Dr. Weiss' research team has perfected a technique to use stem cells to study targeted genetic modifications. They are among a handful of laboratories in the world using these types of models for disease. The researchers are creating several tools to study functional genomics, one of which involves developing new ways to use fluorescent transporters, which make it easier to study proteins and their functions. These fluorescent transporters can be especially helpful when studying neurological disorders such as Parkinson's disease, stroke and spinal cord injury.

Dr. Weiss told *OTW*, "Our notion is that rats will be superior models for translational and regenerative medicine compared to mice. We made rat embryonic stem cells (ESCs) from inbred transgenic rats as a model for patient-specific pluripotent stem cells, which we believe will be used for regenerative medicine in the future. We are modeling how we might apply patient-specific pluripotent stem cells, and use the laboratory rat and rat ESC as a model system for translational medicine and drug discovery work."

Wikimedia Commons and Simon Kågedal

Dr. Weiss also commented to *OTW*, "We made a reporter of differentiation (cells report their differentiation state by fluorescing when the expression of a particular gene promoter is active). These reporters have many applications. For example, they can be used as a tool for optimizing in vitro differentiation to a particular cell lineage. Alternatively, we can use this technology to develop tools for in vitro screening of compounds that may assist with regeneration following particular injury."

"Currently, the technology exists to derive pluripotent stem cells from virtually any individual for research purposes. This leads to the questions of how we might employ these cells in vitro and how might they be utilized clinically? In vitro, these cells have been used to model diseases and teach us about the etiology and pathology of disease (and leveraged for drug discovery). Clinically, the hope is that pluripotent cells might be differentiated into biomaterials, i.e., replacement cells."

—EH (April 6, 2012)

+

PearlDiver reports:

- Available in spreadsheet and written report form
- Bottom up analysis starting with diagnostic and procedure codes
- 1.7 Billion patient records in database (HIPPA compliant)
- Every zip code and virtually every hospital covered

PearlDiver co-founder Robin Young has been at the forefront of virtually every major technology trend in orthopedics. He organized PearlDiver's research to give senior marketing executives the most actionable market data possible.

Detailed market analysis (in spreadsheets) from $1,950.

Specific indication analysis (in pdf) from $950.

PearlDiver

unfathomably deep data retrieval

For unfathomablty deep and useful tmedical market research, call the Data Guys at PearlDiver-Scott or Heather at 260-468-3635 or dataguys@pearldverinc.com.

Orthopedics This Week | RRY Publications LLC

Main Contact Information:
RRY Publications LLC
116 Ivywood Lane • Wayne, PA 19087
TOLL FREE: 1-888-749-2153
Fax: 610-260-6451

Robin R. Young, CFA
Editor and Publisher
robin@ryortho.com

Elizabeth Hofheinz, M.P.H., M.Ed.
Senior Writer
elizabeth@ryortho.com

Walter Eisner
Senior Writer
walter@ryortho.com

Tom Bishow
Vice President of Sales
tom@ryortho.com

Biloine W. Young
Writer
bgwy@msn.com

Suzanne Kirchner
Production Manager
suzanne@ryortho.com

Jayme Johnson
Production Coordinator
jayme@ryortho.com

Dana Bader
Graphic Designer
dana@ryortho.com