

## INSIDE this issue

Welcome to the first issue of **MAKO View**, a publication dedicated to providing information, data, perspective and opinions on healthcare and economics related to the new orthopedic solution, MAKOplasty®. In this issue we focus on MAKOplasty® health economics.



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Board Chairman, CEO  
Foundation Surgery Affiliates  
CEO Point of View

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**Martin W. Roche, M.D.**  
Chief of Orthopedics  
Holy Cross Hospital  
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### Physician and Hospital Coding Guide

The Coding Guide is intended to assist providers in accurately obtaining reimbursement for healthcare services.

Back cover

# Tapping into the 15 Million Adults that Suffer with Knee OA

- Editorial

Of the 15 million people who suffer from knee osteoarthritis (OA), 600,000 patients may be candidates for MAKOplasty®. OA is the most common form of arthritis with pain being its primary effect and it is the leading cause of disability worldwide according to the American Academy of Orthopaedic Surgeons. Market facts unveil a treatment gap that MAKOplasty®, a surgeon-interactive robotic arm solution, has the potential to dominate.

Consider that approximately 45,000 partial knee arthroplasties (PKA) were performed in 2007, while in the same period approximately 633,000 primary knee arthroplasties were performed. Relative to knee arthroplasty are findings from a Duke University study survey reporting that of those men and women whose physicians recommended a total hip or knee replacement, a staggering 92% and 88%, respectively, did not take advantage of these surgical procedures when offered. Using this data, the derived primary knee arthroplasty market potential is 6 million. The carve out market potential for PKA is 600,000, assuming a 10% incidence of disease confined to the medial compartment. A review of literature demonstrates a broad range of findings with the incidence of medial OA at 4% to 50%.

Regardless of the historical positive outcomes for total knee arthroplasty (TKA), patient thinking and perception is a force to be reckoned with. The Duke University study investigators surmise that, "fear of pain or worsened mobility, misperception of advances in the rehabilitation process, and lack of awareness of the full range of benefits afforded by

such interventions is behind the high patient refusal rates."

What does this mean for hospitals and surgeons? Conservatively, 600,000 patients may be candidates for PKA and this is an untapped market (Figure 1). Additionally, the overall market is expected to grow with the active, aging baby boomer and obesity populations (Figures 2 and 3). Of note, Riddle, et. al. report that PKA grew at an average rate of

32.5% from 1998 to 2005. During this same period TKA grew only 9.4%.

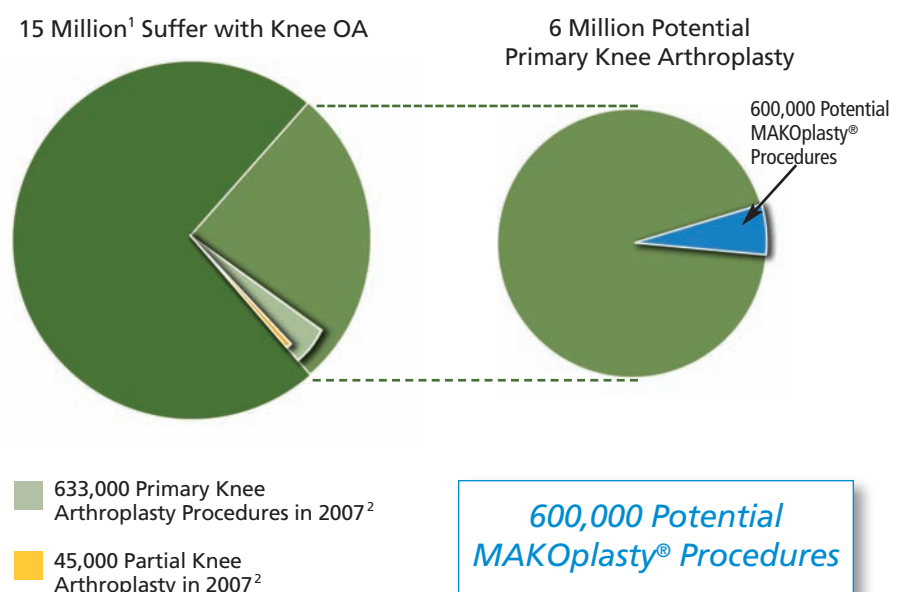
Manual PKA, estimated at less than 8% in 2007, has minimally penetrated the PKA market opportunity. Inconsistent results with the manual approach are considered the leading cause.

How does MAKOplasty® reach the large and untapped market

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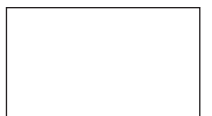
Figure 1.

## Reaching the Untapped Market The MAKOplasty® Potential



1. AAOS.org, 2008  
2. Datamonitor, 2004

MAKO Surgical Corp.  
2555 Davie Road  
Fort Lauderdale, FL 33317



## Editor's Comment:

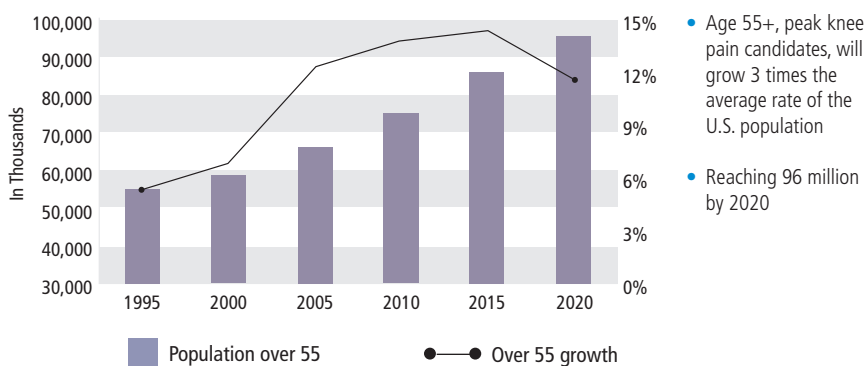
Just one and a half years into the commercialization of the surgeon-interactive robotic arm used to perform MAKOplasty® partial knee resurfacing, initial economic data demonstrates the positive return on investment early adopters are seeking. This is remarkable in an ever tightening hospital economic environment where careful budget management and competition for patients who desire latest technology and best of care can conflict. Supporting evidence and early experience offer the perspective that MAKOplasty® has the potential to build an Orthopedic Center of Excellence by attracting new patients and growing case loads while recovering the capital expenditure in a relatively short period. **MV**

### Tapping into the 15 Million Adults that Suffer with Knee OA

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Figure 2.

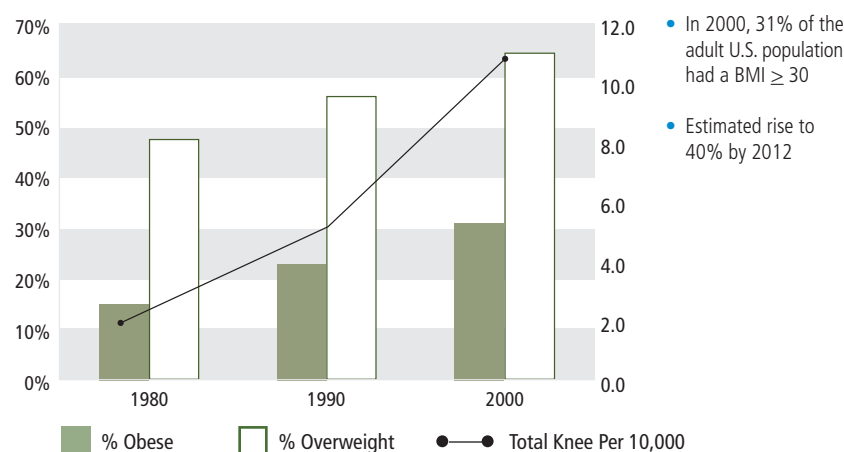
#### The Population is Aging



Source: U.S. Census Bureau

Figure 3.

#### Obesity Rates are Rising



Source: CDC, Orthopedic Network News, RBC Capital Market estimates

opportunity for PKA? MAKOplasty® specifically offers consistently reproducible precision which is enabled by the surgeon-interactive robotic arm and precise pre and intra-operative planning enabling more reliable and reproducible implant placement. Plus, its less invasive approach and ability to restore natural knee function has the potential to address patient

desires for faster recovery, less pain and return to active lifestyles.

Finally, with robots in surgery capturing health media interest, MAKOplasty®, enabled by the robotic arm, offers not only keen medical and economic considerations, its strong marketability may be what captures the attention of the 15 million adults that suffer with knee OA.

## CEO Point of View

An interview with **Thomas Michaud**

Board Chairman, CEO  
Foundation Surgery Affiliates  
Oklahoma City, OK

Foundation Surgery Affiliates (FSA) specializes in ambulatory surgery center and surgical hospital development, design, partner recruitment, and operations. FSA operates numerous surgical facilities throughout the United States that cater to their patients' needs and expectations of quality healthcare. Tom Michaud is the Foundation Surgery Affiliates Chief Executive Officer and Chairman of the Board.

### What are the tough economic pressures facing hospitals in the United States today?

The hospital industry is subject to the same cost increases being experienced by most other industries. The increases in fuel costs are having an impact on many of our costs; directly in our energy costs of operating our facilities and indirectly as these fuel cost increases are being passed on to us with increased prices by our suppliers. Gas at the pump is now starting to impact our employees' cost of living, adding pressure to our overall payroll costs. At the same time, payors are putting additional downward pressure on most of our reimbursements, further aggravating our bottom lines.



Thomas A. Michaud

### How are patient desires/demands for new technology changing as compared to five years ago?

As the "boomers" start reaching retirement age, they want to prolong their "active life" phase and explore everything from joint replacement to cosmetic surgery. The Internet, along with other media, has provided "boomers" with easy access to detailed information on new healthcare and medical technologies. Many of the "boomers" are very well informed as to the latest and greatest technologies, procedures, etc. and come armed with very probing questions. Many truly do believe that today's 60 is yesterday's 45. They are currently living that way and plan to continue.

### How is the growing population of aging baby boomers impacting your case and care loads?

We are seeing more and more patients that (a) know what they want and (b) are ready, willing and able to undergo these "active lifestyle maintenance" procedures. We believe that the "boomers" and their "lifestyle maintenance" philosophy will have a significant impact on our average patient profile.

### You recently invested in the MAKO TGS to perform MAKOplasty, what was your approach to decision making? What key factors led to the decision to acquire the MAKO TGS?

After reading about and seeing first-hand the MAKO technology, both our orthopedic surgeons and our administrative personnel thought that this would be a "special" technology. Some of our orthopedic partners that have been performing other unilateral knee procedures for years were, at first, skeptical and felt there would not be a significant outcome difference between what they were currently performing and MAKOplasty. All of our surgeons that have embraced the technology and been trained to perform the MAKOplasty procedure are extremely impressed with the outcomes, expedited recovery times, and patient satisfaction. We were also looking for technology that would help differentiate us from other orthopedic surgical hospitals. MAKO has delivered on all counts.

### What positive effects have been realized as a result of purchasing this new technology for your Houston hospital?

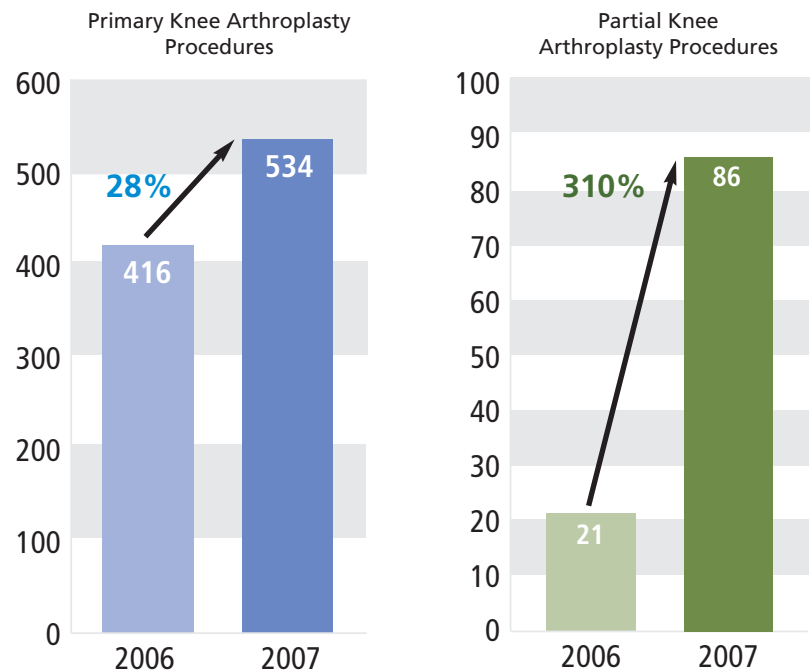
We have performed twice the number of MAKOplasty procedures than we had originally estimated in our investment justification analysis and have actually performed total knees on patients that came to us for the MAKO technology, but were not appropriate candidates for the MAKO procedure. We would not have been exposed to many of these total knee cases had those patients not come to us based on their interest in the MAKO technology. We have been impressed enough with the technology, patient outcomes and financial results that we are in the process of adding MAKOplasty in two of our other specialty hospitals.

# MAKOplasty® Center of Excellence: First Year Performance

The MAKOplasty® Center of Excellence (COE) is devoted to providing innovation and best practices. It aims to educate new patients on the MAKOplasty® solution while supporting growth across arthroplasty programs, as well as, attracting and retaining high volume, top surgical talent. Early performance is encouraging as demonstrated by this COE first year data.

- 28% growth across all primary knee arthroplasty
- 310% growth in PKA
  - 67 MAKOplasty® procedures
- 13% growth in primary TKA
  - 53 incremental primary TKA cases (395 to 448)

Single MAKOplasty® Surgeon in Group of 3



**Martin W. Roche, M.D.**  
 Chief of Orthopedics  
 Holy Cross Hospital  
 Fort Lauderdale, FL

## Surgeon Experience:

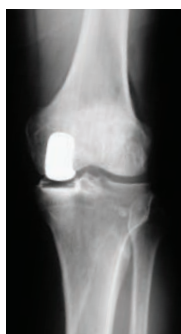
Dr. Roche conducted a MAKOplasty® Surgical Procedure webcast with live Q&A session on April 29, 2008. Below are some highlights that have been extracted from the Q&A session. The webcast was hosted by Medcompare.com.

**Q: What is the purpose of the robotic arm during the procedure?**

A: The robotic arm, to me, brings two extensions. One, it integrates the pre-operative plan that I have confirmed on my CAT scan, and number two, it acts as a smart instrument. What I mean by that is when I'm holding the robotic arm it gives me tactile feedback - auditory and visual as well - that allows me to continue operating with no pins or jigs in 3-D virtual visualization that allows a precise way of preparing the bone for the implant to fit perfectly.

**Q: What are the most significant advantages you have found using the robotic arm system versus standardized instrument-based PKA?**

A: For me, standard templates and standard cutting jigs have been somewhat fallible. I can never specifically say that I have achieved my perfect varus/valgus cut or my posterior slope for that patient. I also have concerns about using any pins for standard templates on the cutting jigs for fear of peri-prosthetic fracture. I can say to date that [while using the robotic arm system] my x-ray pre-operatively with my CAT scan plan have matched my post-operative x-ray perfectly. Also with the soft tissue alignment balance that we're able to achieve as well, [it] has really made my patients' knees move better and faster. So I would say that it gives me the comfort that I'm doing the best surgical procedure I can with a precision that I can't get just by using standard instruments and my own eyes.



**Q: In your experience with reimbursement for the procedure, what have you observed?**

A: We have been able to go to some of our private payors and negotiate a higher rate – even though in Florida it's a very tough market. Three payors have come back and after showing the benefits of the surgery as well as the ability to minimize physical therapy post-operatively, and we're now showing early return to function (such as work), in our younger patients, they have actually bought into some of the benefits of this technology. So it's an uphill battle. I think it's a lot of education (with private payors) and I think you have to have your hospital supporting you to obtain that.

**Q: Why have you overall adopted MAKOplasty?**

A: I think it has done a couple things. One thing is that you are always trying to achieve a perfect surgery, and that's one thing you can control. Certain knees are tougher than other knees and you can't always predict that. Having this smart extension of my surgical skill has been very beneficial. I now know going into a surgery that my plan, with confirmation intra-operatively, is what I get. Using components that have a true, tried longevity I expect my patients to continue on with the benefits [for] hopefully over a decade. So in my hands I can achieve what most surgeons want to achieve – the ability to adjust their implant based on what they like, what they feel comfortable with and what the patient's body presents. MAKOplasty has driven a lot of patients to our center. Patients are coming in asking for MAKOplasty because patients search out new technology just as they search out new knee implants and different types of minimally invasive techniques. Patients are looking for new technology that minimize the surgery and some patients just do not want a total knee and do not know where to turn.



**MAKOplasty® Patient Demographics**  
Across Three Markets: South, South Central, West



**n = 112**

**Age**

Overall average age	68 years
Average age < 65	57 years
% patients ≥ 65	65%
% patients < 65	35%

**Gender**

Female	52%
Male	48%

factoid

**Incidence of UKA Growing at Triple the Rate of TKA - 32.5% vs. 9.4%**

Riddle, Jiranek and McGlynn reported in The Journal of Arthroplasty this year that the incidence of unicompartmental knee arthroplasty (UKA) in the United States is growing at a brisk rate of 32.5% as compared to 9.4% for total knee arthroplasty (TKA). The study used data from three major implant manufacturers over an 8-year period from 1998 to 2005. National estimates for all other implants were captured through a database from 44 hospitals.

This estimate compared with worldwide estimates of 8% to 15.1% during a similar time. The authors note that UKA is reported to have a number of advantages over TKA, "including less surgical trauma with the sparing of more of the patient's anatomy and kinematics and a more rapid rehabilitation." These advantages along with patients' requests for less invasive procedures and faster recovery appear to have led to the 32.5% growth in UKA the authors report.

The study found that in 2004, UKA represented 7.7% of TKA.

Daniel L. Riddle, William A. Jiranek, Fred J. McGlynn. Yearly Incidence of Unicompartmental Knee Arthroplasty in the United States. *The Journal of Arthroplasty*, Vol. 23 No. 3 2008.

**Physician and Hospital Coding Guide**

**Hospital In-Patient**

MS-DRG <sup>1</sup>	MS-DRG Description	2008 Medicare National Payment Average
470	Major joint replacement or reattachment of lower extremity without MCC	\$9,722.88
485**	Knee procedures with principal diagnosis of infection with MCC	\$14,366.83
486**	Knee procedures with principal diagnosis of infection with CC	\$11,440.91
487**	Knee procedures with principal diagnosis of infection with CC	\$11,440.91

--- Subject to CMS rule of 10/1/08 code 81.47

**Scenario: Ambulatory Surgery Center**

Code	Description
27446	Arthroplasty, knee, condyle and plateau, ASC
27446	Arthroplasty, knee, condyle and plateau, ASC

**Scenario: Out-Patient**

Code	Description
27446	Arthroplasty, knee, condyle and plateau, Hospital
27446	Arthroplasty, knee, condyle and plateau, Hospital

**Scenario: In-Patient**

Code	Description
27446	Arthroplasty, knee, condyle and plateau, Hospital
81.5A/MS-DRG 470	Total knee replacement (bi-compartmental, uni-compartmental/unicompartmental)

1. CPT 2008 Professional Edition 2007 American Medical Association  
2. ICD-9-CM-PCS Manual 2008-2009 and ICD-9-CM-PCS Manual 2008-2009, Physician Hospital Fee Schedule  
3. Medicare Reimbursement Manual, Part 418, Subpart D, Section 418.2, 2007 American Medical Association  
4. 2008 Medicare Outpatient Prospective Payment System (OPPS) Manual, Part 418, Subpart D, Section 418.2, 2007 American Medical Association  
5. 2008 HCPCS, American Medical Association 2007  
6. 2008 DRG Update, 2007 American Medical Association. Medicare average payment will vary by hospital.

**MAKO SURGICAL CORP.**  
Restoring Quality of Life Through Innovation  
MAKO Surgical Corp.  
2555 Davie Road | Fort Lauderdale, FL 33317 | 866.647.6256 | www.makosurgical.com

**Physician and Hospital Coding Guide**

The codes denoted in this document are recommendations only, which reflect MAKO's understanding from the identified sources, as prepared by our reimbursement consultants. This information should not be construed as authoritative. Codes and values are subject to frequent change without notice. The entity billing Medicare and/or third party payors is solely responsible for the accuracy of the codes assigned to the services and items in the medical record. Therefore, healthcare providers must use great care and validate coding requirements ascribed by payors with whom they work. MAKO assumes no responsibility for coding and cannot recommend codes for specific cases. When making coding decisions, we encourage you to seek input from the AMA, relevant medical societies, CMS, your local Medicare Administrative Contractor and other health plans to which you submit claims. MAKO does not promote the off-label use of its devices.

**Physician Coding Options**

CPT Code <sup>1</sup>	CPT Description	2008 Medicare National Payment Average <sup>2</sup>
27496	Arthroplasty, knee, condyle and plateau, medial OR lateral compartment	\$1,043.95

**Hospital Out-Patient and Free-Standing ASC**

CPT Code	CPT Description	Status Indicator	APC Group	2008 Hospital Payment Rate <sup>3</sup>	2008 ASC Payment Rate <sup>4</sup>
27446	Arthroplasty, medial or lateral	T	0681	\$17,404.99	\$11,271.67
73700	CT lower extremity; without contrast	S	0332	\$191.78	\$124.65

1. CPT 2008 Professional Edition 2007 American Medical Association  
2. Medicare Reimbursement Manual, Part 418, Subpart D, Section 418.2, 2007 American Medical Association  
3. 2008 Medicare Outpatient Prospective Payment System (OPPS) Manual, Part 418, Subpart D, Section 418.2, 2007 American Medical Association  
4. 2008 HCPCS, American Medical Association 2007

**Hospital Procedure Codes**

ICD9 Code <sup>5</sup>	ICD9 Description
81.47**	Other knee repair
81.54	Total knee replacement

\*\* Off will be removing code for this code, pending for September 2008 extension

**HCPCS Codes**

HCPCS Code <sup>6</sup>	HCPCS Description
S2900	Surgical techniques requiring use of robotic surgical system

5. ICD-9-CM-PCS Manual 2008-2009 and ICD-9-CM-PCS Manual 2008-2009, Physician Hospital Fee Schedule  
6. HCPCS Manual, Part 418, Subpart D, Section 418.2, 2007 American Medical Association

**MAKO SURGICAL CORP.**

The information contained in this guide is provided to assist you in understanding the reimbursement process. It is intended to assist providers in accurately obtaining reimbursement for healthcare services. It is not intended to increase or maximize reimbursement by any payor.

- Physician Coding Options
- Hospital Out-Patient and Free-Standing ASC
- Hospital Procedure Codes
- HCPCS Codes
- Hospital In-Patient
- Scenario: Ambulatory Surgery Center
- Scenario: Out-Patient
- Scenario: In-Patient

**Robotic Assisted Procedures Code May Be On the Horizon With CMS.**

A new subcategory code, 17.4 Robotic Assisted Procedures, is under consideration for the ICD-9-CM October 1, 2008 effective period.

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**Please contact your MAKO Representative for the complete guide, call 866.647.6256 or visit www.makosurgical.com.**

