

Informed Consent for HRA

In my opinion, Hip Resurfacing Arthroplasty (HRA) is the best way to reconstruct a severely arthritic hip. It is more complicated to perform than a standard Total Hip replacement (THR); therefore, few surgeons are willing to offer this procedure. In the major joint registry reports, THR has better implant survivorship in most groups of patients (except in men with osteoarthritis who are under 60 years old). However, registries measure outcomes for average surgeons. The average surgeon performs less than 2.5 HRA cases/year. This is not adequate to be an expert. In reports by high volume hip resurfacing surgeons, results are much better than the registries suggest. Dr. Gross has now performed over 6100 Hip Resurfacing Arthroplasty (HRA) procedures over the last 18 years and currently performs nearly 500 cases/year.

The proven advantages of HRA are better function, longer implant survivorship, fewer dislocations, no thigh pain (from a THR stem), bone preservation, and longer life expectancy than THR patients.

HRA does not result in a normal hip. But, when done by an expert, it more nearly approaches a normal hip in biomechanics and function and patients are more likely to resume heavy work and impact sports than they could with a THR. Long-distance running is even possible for many (**but not all**) patients. Also, activities that require extreme range of motion such as full squats, yoga, gymnastics and ballet are possible because HRA has near normal stability. There are several other HRA surgeons in the world who have reported similar long-term implant survivorship data. There is no large single-surgeon report of THR that can match the results reported here.

Most failures occur during the first two years after surgery, which is why it is critical to severely limit activities in the first 6 months to allow adequate healing. After that, a patient can gradually return to completely unrestricted activity. There remains a slow rate of failure that occurs over time. But this does not seem to be affected by activity. Therefore, the overall failure rate increases for a group of patients as the length of follow-up increases. Herein, we report implant survivorship, for all three of our HRA implant groups (we no longer use Corin or Biomet hybrid implants; we exclusively use Biomet uncemented implants). Not all complications lead to failure. Below is a complete list of ALL major complications (not just failures/causes for revision) in the 5000 HRA cases using the Biomet uncemented system since 2007:

A. FAILURES REQUIRING REVISION (up to 13 YEAR FOLLOW-UP)

1. Femoral neck fracture	13
2. Failure of acetabular ingrowth	8
3. Adverse-wear related failure	3
4. Femoral head collapse (osteonecrosis)	3
5. Late acetabular loosening	2
6. Cup Shift	2
7. Unknown cause (revised elsewhere)	2
8. Intertrochanteric femoral fracture	2
9. Subluxation	2
10. Unexplained pain	1
11. Femoral head fracture	1
12. Subtrochanteric femoral fracture	1
13. Impingement	1
14. Recurrent dislocation	1
15. Deep infection	0

TOTAL: 42 / 5010 (0.8% of total cases)

B. COMPLICATIONS REQUIRING REOPERATION*

1. Traumatic intertrochanteric fracture (5-11 months postop)	11
2. Deep infection (cured)	3
3. Hematoma	3
4. Superficial infection (cured)	2
5. Fascia failure	2
6. Frostbite from ice machine	2
7. Suture reaction	2
8. Dislocation	1
9. Abductor Tear	1

***Implants are not removed during reoperation.**

TOTAL: 27/5010 (0.5% of total cases)

C. OTHER COMPLICATIONS*

1. Acetabular component shift (nonsymptomatic)	28
2. Cardiovascular complication	14
3. Dislocation	13
4. Spinal headache	7
5. Urinary complication	7
6. Fracture	7
7. Hematoma	6
8. Other	4
9. Peroneal nerve palsy	4
10. Femoral component shift	3
11. GI Bleed	2
12. Loose femoral component	2
13. Infection	1
14. Femoral notching	0
15. Death due to surgery	0

***No reoperation or revision required.**

TOTAL: 98/5010 (2.0% of total cases)

D. RESURFACING SURVIVORSHIP

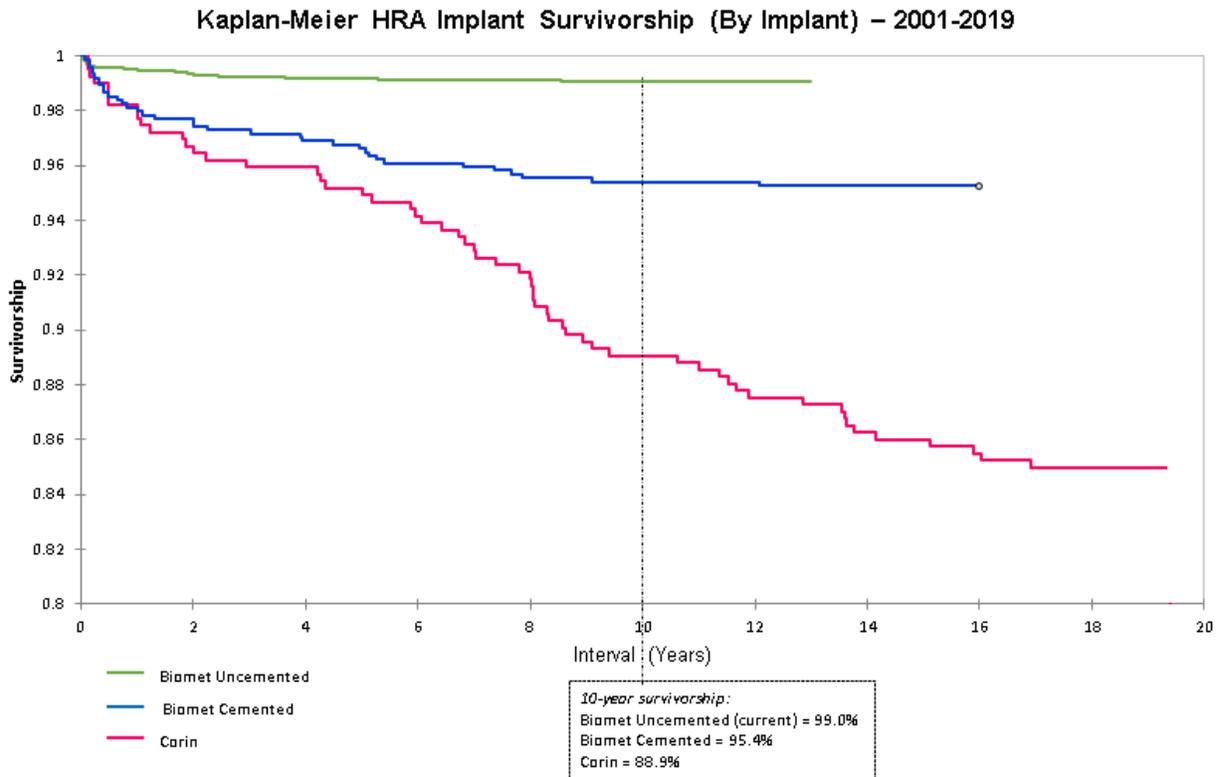
Includes ALL implant types*: 6100 cases over 18 years

**unless noted otherwise in each graph*

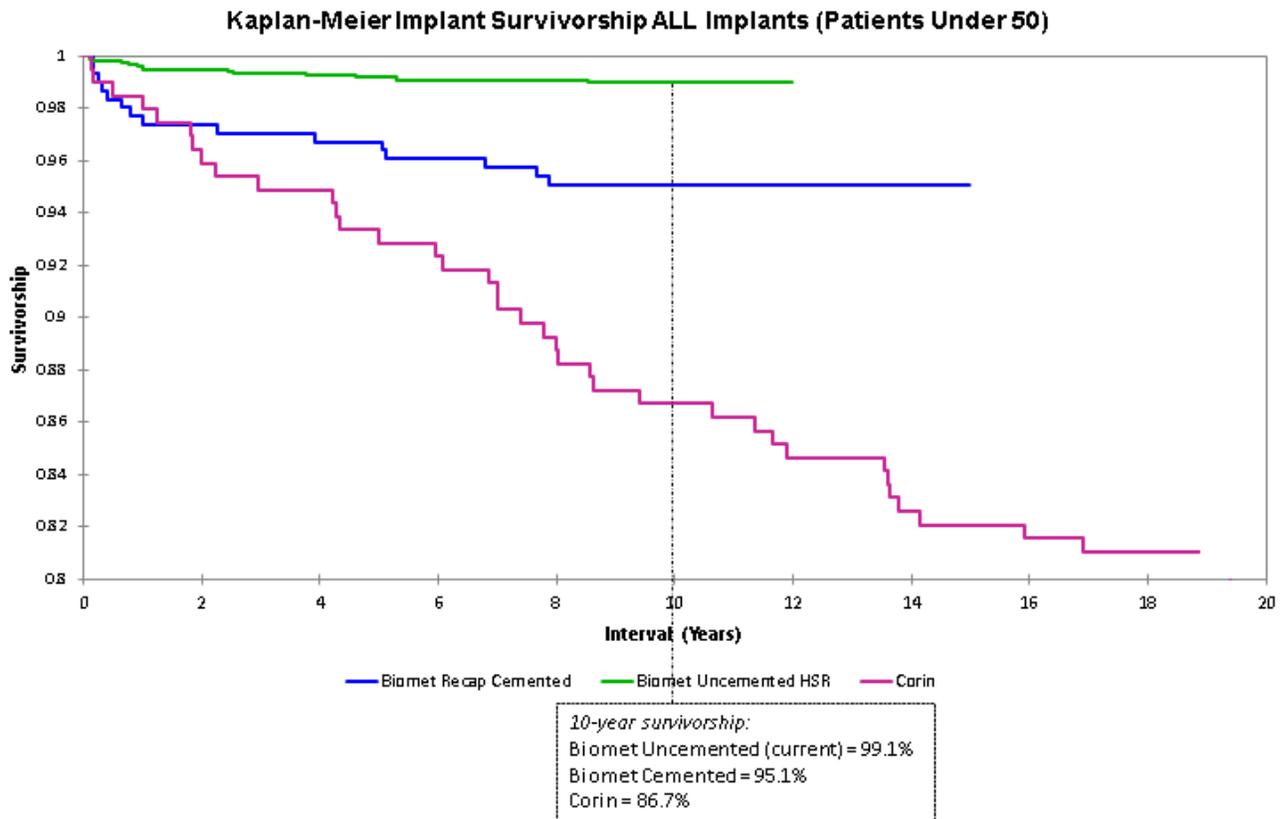
Survivorship of hip resurfacing continues to improve as we gain more experience and find measures to prevent failures. These survivorship curves give the reader an opportunity to see what the odds are that their implant will still be functioning at some time point after implantation. We have used three implant systems in the last 18 years. Unless specified, the results include unselected consecutive patients (includes both genders, all ages and all diagnoses). We present three Kaplan-Meier survivorship curves: all implant groups, all implants for patients under 50 at time of surgery, and Biomet implants grouped by sex.

Unlike for THR, implant survivorship does not vary by age (overall 99.1% 13-year implant survivorship in patients over 50 as well as those under 50 years) Men have slightly better implant survivorship (99.3%), but women are now only one percentage point worse off (98.3%). Most failures occur in the first 1-2 years. If you make it to one year your implant survivorship at 13 years is 99.6%, If you make it to 2 years it is 99.8%. My uncemented resurfacing implant survivorship beats all registry benchmarks for THR regardless of age or sex.

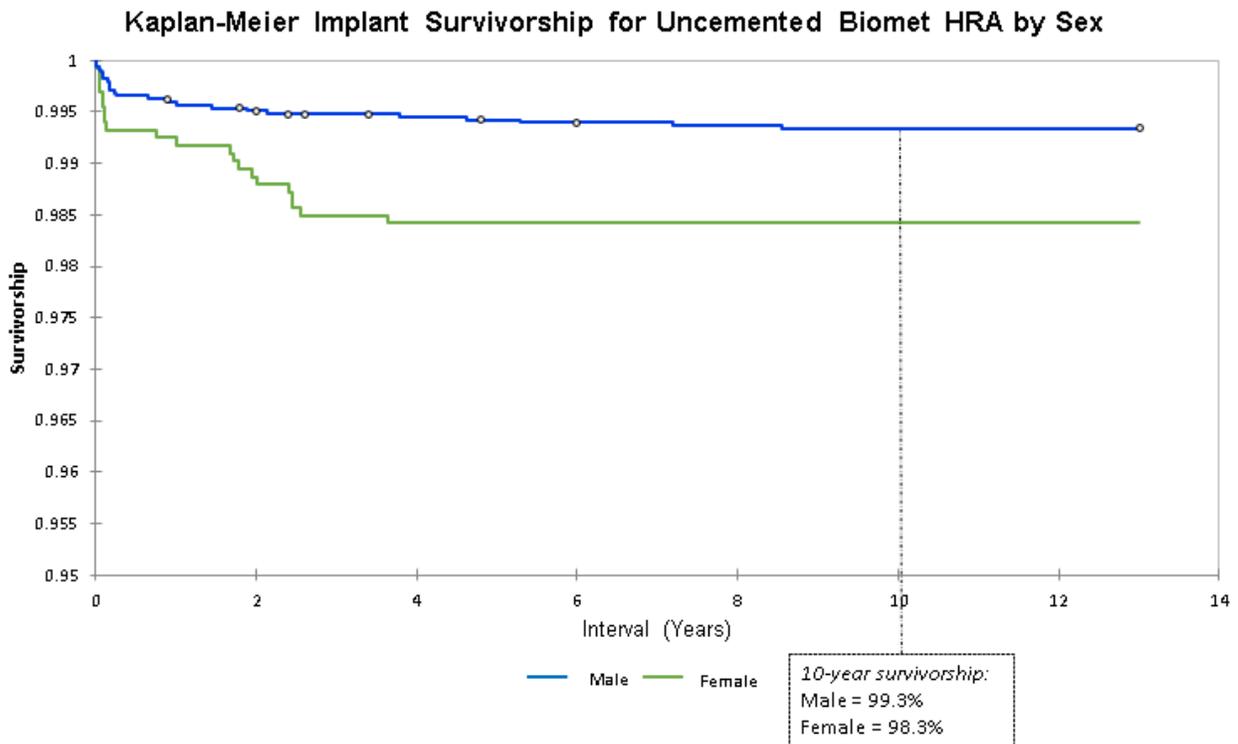
A multicenter international study in which I participated recently was accepted for publication in the journal Hip International. In 27 resurfacing centers in 13 countries over 11,000 cases in patients **under age 50** with multiple different metal on metal resurfacing implant brands showed a 90% 20-year implant survivorship (93% in men and 81% in women). For comparison, for total hip replacement registries show approximately 80% implant survivorship at 10 years and 50% at 20 years **in this age group**.



The Corin (pink) and Biomet hybrid (blue) are implants that I used in the past. Notice that patient follow-up is longer for the Hybrid (cemented femoral) Biomet and the Corin groups. All Biomet hybrid implants (n=739) are now a minimum of 13 years old, all Corin Hybrid implants (n=373) are at least 16 years old. Results are steadily improving with improvements in implants, knowledge about resurfacing and surgeon experience. Current 13-year implant survivorship with the Biomet uncemented implants (n= 5010) is 99.1%.



Survivorship continues to improve with experience. The standard for “excellent survivorship” in Total Hip Replacement (THR) is >95% 10-year implant survivorship for patients of mean age 70. However, reported registry results for THR in patients under 50 is only 80% 10-year implant survivorship. It can be seen here that 10-year survivorship for our current implant, the uncemented (UC) Biomet ReCap, is at 99.1%. Implant survivorship does not drop off in our younger patients with HRA as it does for THR. THR lasts reasonably well in older folks for whom golf and walking are considered an “active” lifestyle, but they are not adequate for younger patients with a sporting lifestyle.



Women have historically had higher implant failure rate with HRA than men. This is primarily due to two factors: Dysplasia is more common in women, which carries higher failure rate with any type of hip replacement. Also, women usually require smaller bearing sizes, which have been more prone to wear failure in HRA from edge loading resulting in metallosis. **Both problems have been solved at our practice and are reflected in our improved results in women.** The last wear failure was from a procedure performed in August 2009; the last acetabular failure due to dysplasia was from a procedure performed in December 2007. Currently, 10-year implant survivorship in men is 99.3% and women is 98.3%, which is far better than the reported registry value of 80% 10-year survivorship for young men and women with THR.

The implant survivorship data reported here far surpasses joint implant registry data from Britain, Sweden and Australia (for both THR and HRA) where these types of data are kept. These are publicly available and you can get access them online for free. Registry data can be thought of as average surgeon implant survivorship for purposes of a benchmark. **But the most important factor in the outcome of any operation is individual surgeon skill.** It is hard to know at which level a surgeon you are considering can perform. Anecdotal reports from a few patients or reputation are a poor substitute for data. Few surgeons provide written data such as I do.

Remember, implant survivorship is not the only factor that needs to be considered in deciding between THR and HRA. Other proven advantages of HRA are better functional outcome, less residual thigh pain, fewer dislocations, bone preservation, and longer life expectancy.

After all revisions, reoperations, and complications are accounted for there are still approximately 2% of patients who experience moderate unexplained residual pain after HRA. The risk of moderate residual unexplained pain in THR is 20%. This means we cannot determine a specific reason why they are not satisfied. Some may have referred pain from their back or soft tissue problems we are unable to diagnose. In a THR thigh pain from the stem is a common cause of residual pain. Residual pain may just represent the fact that HRA does not result in a normal hip. Because we can't diagnose a cause, we don't recommend revision

surgery. If a revision is still performed, sometimes a patient improves, but most often they subject themselves to the risk of revision surgery and do not improve.

There is no measurable difference in the speed of recovery between THR and HRA.

I have reviewed the above and understand the risks involved with this operation. I would like Dr. Thomas Gross to perform hip resurfacing on me.

I also understand that all data from my case will be collected and used for research purposes mainly to continue to improve the quality of Dr. Gross' work and to inform future patients and the world about hip resurfacing. My privacy will be protected by anonymizing the data before any publication.

_____	_____
Patient Signature	Date
_____	_____
Witness Signature	Date