

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 6700 Hip Resurfacing Arthroplasty (HRA) procedures over the last 20 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 >5400 HRA cases performed using the Biomet uncemented system since 2007:

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

1. Femoral neck fracture	17
2. Failure of acetabular ingrowth	9
3. Adverse-wear related failure	4
4. Femoral head collapse (osteonecrosis)	3
5. Late acetabular loosening	3
6. Component Shift	3
7. Late Fracture	3
8. Unknown cause (revised elsewhere)	2
9. Intertrochanteric femoral fracture	2
10. Subluxation	2
11. Unexplained pain	1
12. Subtrochanteric femoral fracture	1
13. Impingement	1
14. Deep infection	1
15. Psoas Tendonitis	1

B. COMPLICATIONS REQUIRING REOPERATION*

1. Traumatic intertrochanteric fracture (5-11 mo postop)	11
2. Deep infection (cured)	4
3. Hematoma	4
4. Fascia failure	4
5. Superficial infection (cured)	2
6. Frostbite from ice machine	1
7. Suture reaction	1
8. Dislocation	1
9. Abductor Tear	1
10. Excessive scar tissue	1
11. Peroneal nerve palsy	1
12. Psoas tendonitis	1

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

TOTAL: 32/5431 (0.6% of total cases)

c. OTHER COMPLICATIONS*

1. Acetabular component shift (nonsymptomatic)	28
2. Dislocation	17
3. Cardiovascular complication	16
4. Fracture	8
5. Spinal headache	7
6. Urinary complication	7
7. Peroneal Nerve Palsy	5
8. Hematoma	4
9. Other	4
10. Femoral component shift	4
11. GI Bleed	2
12. Loose femoral component	2
13. Anesthesia complication	2
14. Infection	1
15. Fascia failure	1
16. Pneumonia	1
17. Constipation	1

***No reoperation or revision required.**

TOTAL: 106/5431 (2.0% of total cases)

D. RESURFACING SURVIVORSHIP

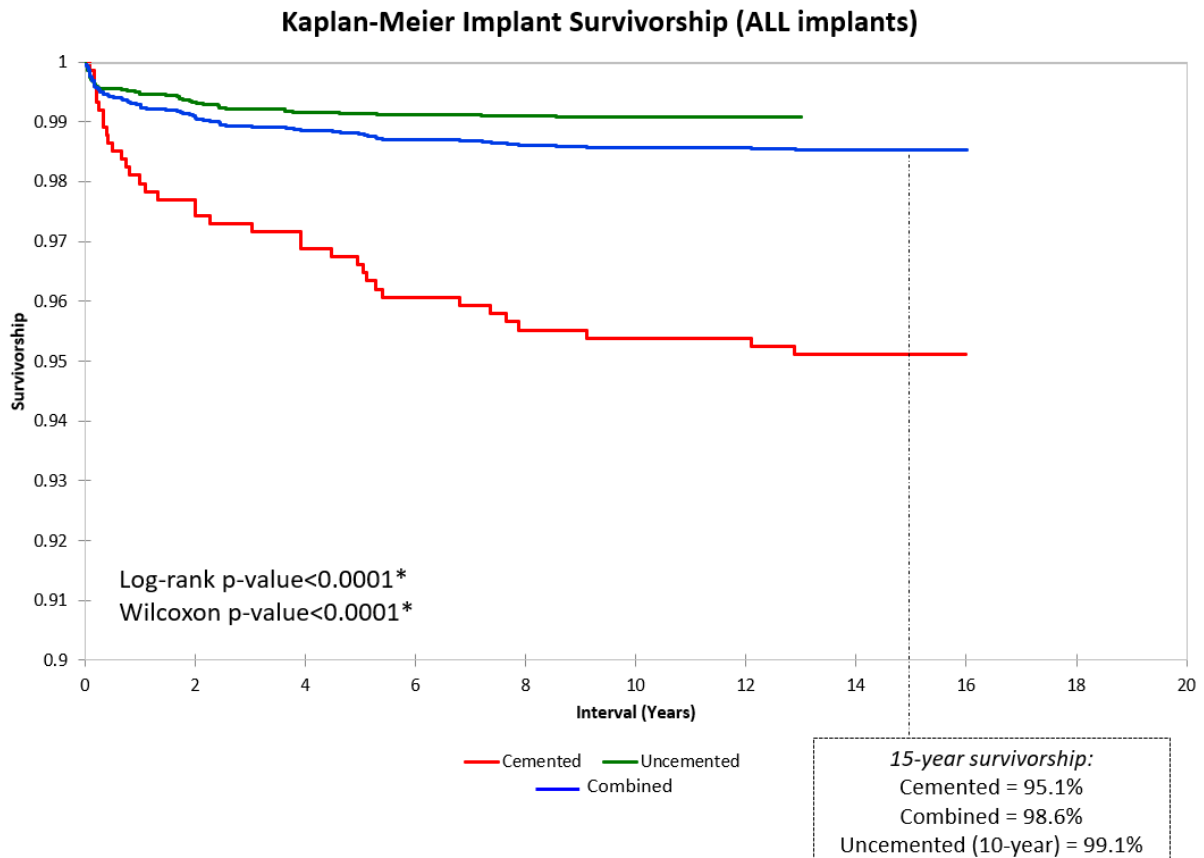
Includes ALL implant types*: 6700 cases over 20 years

**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.

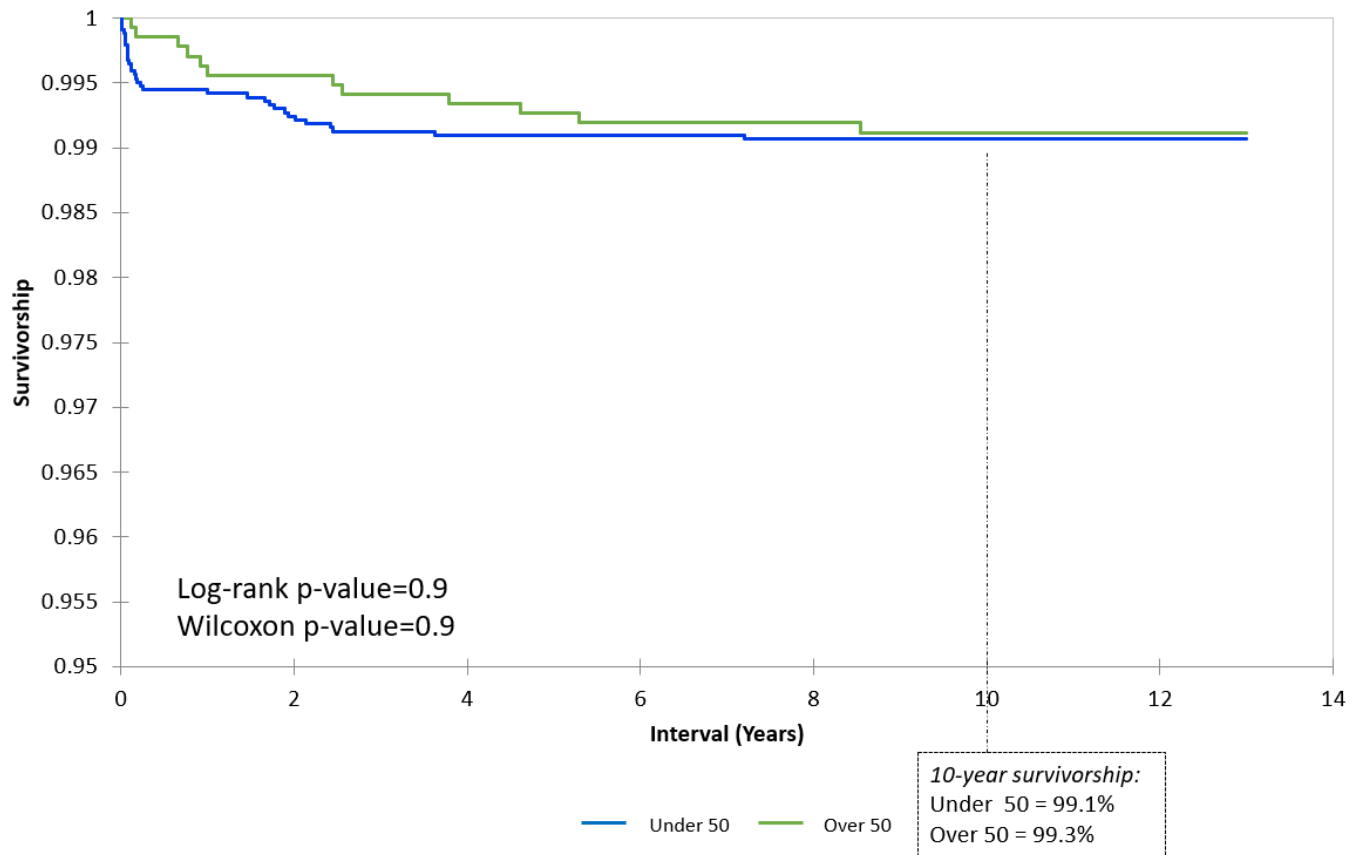
Unlike for THR, implant survivorship does not vary by age (overall 99.1% 13-year implant survivorship in patients over 50 as well as those under 50 years) Men have slightly better implant survivorship (99.3%), but women are now only one percentage point worse off (98.3%). Most failures occur in the first 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%. Dr. Gross' 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**.



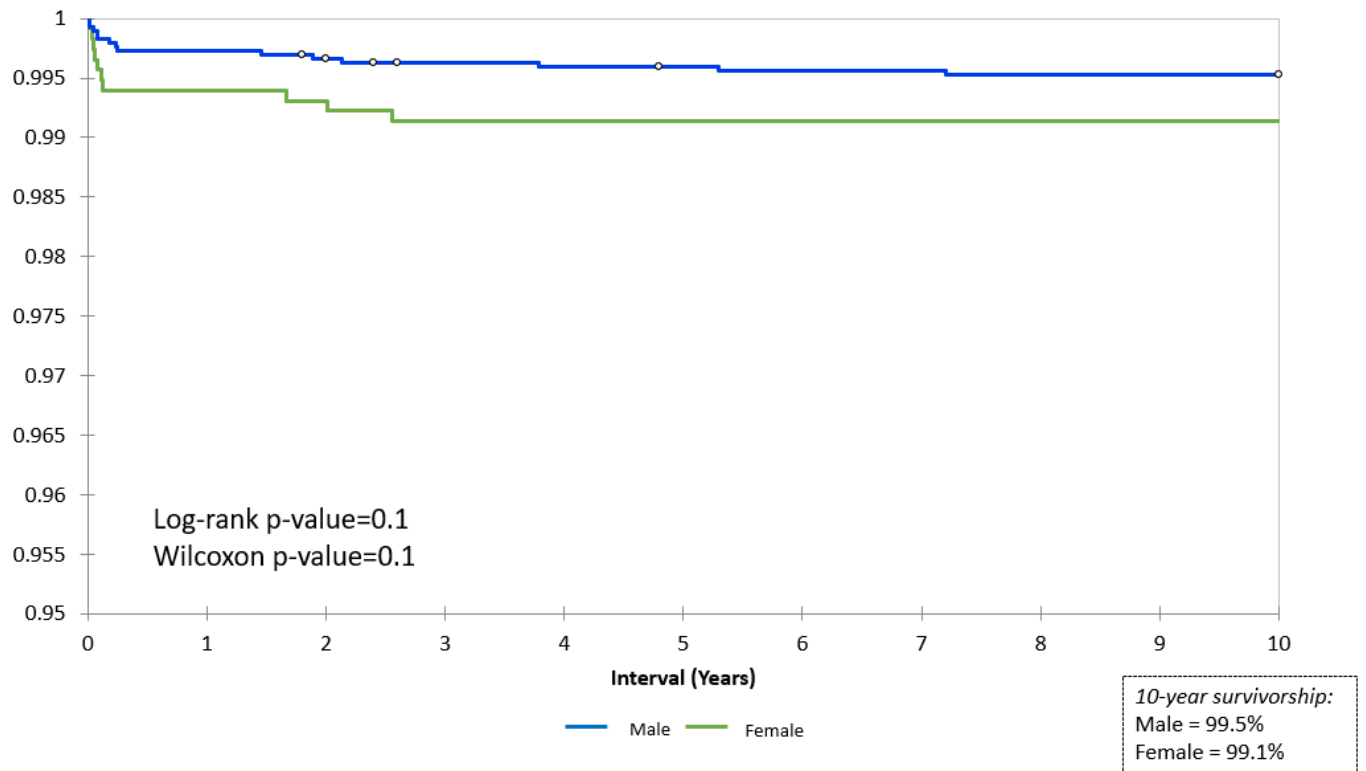
Survivorship curve for all implants, as of 2022. All included cases have a minimum of 2 years of follow-up (surgeries performed in 2020 or earlier). Note that the survivorship y-axis begins at 80%. There have been no instances of adverse metal wear in cases after 2009.

Kaplan-Meier Implant Survivorship by Age (Uncemented ReCap)



Above is the survivorship curve separate by age group for our uncemented ReCap group. **Note the y-axis start at 95%.** There is no difference in survivorship or raw failure rate based on age. While many centers report greater rates of failure in younger patients, that is not the case at our practice. We pride ourselves on provide a durable arthroplasty option for young patients who wish to maintain their high levels of activity.

Kaplan-Meier Implant Survivorship by Sex (Uncemented ReCap Post-2010)



Many hip replacement surgeons exclude women from receiving surgery because of poor published results. We, however, elected to find out WHY implants in women were underperforming and to CORRECT implant design and surgical technique instead of excluding women from surgery. After implementation of new protocols from 2007-2009, outcomes in women at our center have improved drastically

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