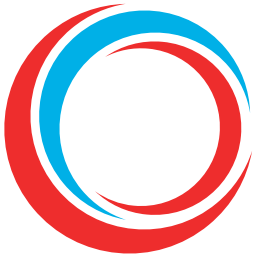


Regenexx®

Why Knee and Hip Replacement May Not Be All It's Cracked Up to Be

10 Rarely Discussed Facts About Joint Replacement Surgery

Christopher J. Centeno, MD

Knee and hip replacement surgeries come with many risks and complications. Several years ago we queried the National Sampling System for Medicare and found that in the year 2008 alone, there were 17,500 serious complications related to knee replacement surgery resulting in 5,000 patient deaths.

If joint replacement is an option for you, please take the time to read this report. These 10 facts come from the Regenexx website. Our goal is to provide information that will help you make the right choice for you.

1. Heart Attack Risk Dramatically Increases Following Knee or Hip Replacement

There is an increased incidence of heart attacks seen with knee and hip replacement surgeries. This study shows that among patients 60 and up, those with a hip replacement were 25.5 times more likely to experience a heart attack in the two weeks following surgery. Those with knee replacements were 31 times more likely to have a heart attack.

Why do these heart attacks happen? In our office we call these surgeries "amputation with insertion of prosthesis." When you completely excise a joint, there is severe trauma to the blood vessels and bone marrow space. This trauma likely leads to a higher risk of blood clots that can travel to the heart and obstruct the arteries. In addition, for some patients the stress of undergoing the joint amputation may be enough to induce a heart attack.

Conclusion: Avoiding a knee or hip replacement lessens your risk of a heart attack.

2. Smoking Can Be a Deadly Decision Following Knee or Hip Replacement

One study shows smokers were at a substantially increased risk of a variety complications after a knee or hip replacement. Researchers from the University of Alabama at Birmingham assessed the effects of cigarette smoking on 33,336 patients 30 days after elective total knee or total hip replacement surgery. Smokers who have total knee or hip replacement surgeries are at a significant risk of 30-day-postoperative complications and/or death at one year. These statistics were even more surprising: there was a 53% greater chance of infection, 161% greater chance of stroke, 63% greater chance of one-year mortality, and 34% greater chance of pneumonia.

Conclusion: If you are a smoker, consider quitting before pulling the trigger on knee or hip replacement surgery.

3. Bleeding Stomach Ulcers Significantly Increase Following Knee or Hip Replacement

One study shows that bleeding stomach ulcers are a significant problem following knee or hip replacement. A Danish knee and hip replacement surgery registry was reviewed, and then matched subjects without surgery were used as controls. There was a staggering sixfold increase in stomach bleeding following a hip replacement and a two- to three-times increase following a knee replacement. The elevated risk lasted 12 weeks in hip patients and 6 weeks in knee patients. Using an acid-reducing drug did decrease the risk for hip patients but not for knee patients.

Conclusion: To eliminate your risk of bleeding stomach ulcers due to knee or hip replacement, consider other treatment options besides surgery.

4. Metal Ions in the Blood Caused by Knee or Hip Replacement

Our website shares known knee replacement complications surrounding wear particles. Wear particles are microscopic pieces of metal, ceramic, or plastic that break off of the knee or hip prosthesis and irritate the local tissues and/or enter the bloodstream. These issues are more significant now that new partial or resurfacing knee and hip replacements are becoming popular, as these new devices need to be metal to withstand the additional stresses placed on smaller parts.

The research concerning what happens to your body when it's implanted with metal seems to point in the same direction: patients who receive knee replacements have higher levels of various metals in their bloodstream. For example, researchers from Austria demonstrated that the size of the prosthesis was directly correlated with the blood concentration of metal ions (the larger the knee replacement device, the more metal ions that were found in the bloodstream). One group in Italy found more of these metal ions in knee replacement patients who had a loose prosthesis. Why? In some patients the knee replacement device may not be seated tightly or may not have bound to the surrounding bone. This would cause more wear between the bone and the metal prosthesis thus leading to more metal particles. A group in Germany found that metal ions in the blood increased precipitously after a knee prosthesis was implanted. A different German group also found higher serum levels of chromium and cobalt in knee replacement patients than patients without knee replacements.

In 2012 , Stryker, the major manufacturer of the Titanium Modular Neck system devices was forced to put out a major recall, not only for increased blood metal ions, but because shards of metal had also been found in patients with these devices. Styker is facing many lawsuits from patients who have experienced everything from ongoing tissue inflammation at the site of the device, to early device failure, to bone death. Importantly, Stryker is only

one of several hip replacement device manufacturers who have faced major device recalls in the last several years.

While the trend toward computer-assisted minimally invasive hip and knee replacements or knee and hip resurfacing may represent smaller surgeries, the increased use of metal in these devices likely means more of these metal ions. There seems to be no getting around the fact that metal knee and hip replacement devices produce wear particles that lead to metal ions in the blood.

A new study set out to evaluate the blood serum levels of chromium, cobalt, and titanium within the first 2 years following hip replacement with the titanium modular neck system total hip replacement device. To do this, 25 patients randomly received a metal on metal device (MoM), which is the type with the known metal wear issue, and 25 patients received a titanium modular neck system, which is a metal on polyethylene (MoP) device with a titanium shell, the new type intended to reduce wear particles. The results were concerning. The MoM and MoP devices caused similar increases in titanium, cobalt, and chromium by the end of the first year. However, the MoM device had slightly lower levels of titanium by the end of the second year. So the device designed to replace the original metal on metal hip replacement implant raised metal blood levels more than the device it was supposed to replace!

Polyethylene wears more quickly, so cross-linked polyethylene is also being used because it wears more slowly, allowing a longer survival of the prosthesis. However, when it does wear and produce particles, what happens? In a new study authors injected both polyethylene and its longer lasting cross linked cousin into the knees of an animal model. They then measured markers of inflammation and cartilage breakdown. The cross-linked polyethylene caused the knee tissues to produce a much nastier stew of cartilage inflammation and breakdown chemicals.

Conclusion: While we don't know the long-term implications of these higher serum metal concentrations in knee and hip replacement patients, obviously, high levels of metal in the blood is not a good thing. And the alternatives being used to attempt to eliminate the wear creating these hazardous metal ions are creating their own toxic mix of wear particles. The bottom line is there is no safe hip replacement option right now, which should concern anyone considering having this invasive surgery.

5. Allergy Testing Now Advised for Patients Considering Knee or Hip Replacement

The past few years we have seen numerous studies discuss that the components of knee replacement prostheses can cause allergies. In fact, one study concluded that being allergic to certain types of jewelry was a good indicator of whether a surgeon should be con-

cerned about a metal allergy. Now a new study says that simply being an "allergic person" is tied to having more pain after a knee replacement, presumably because of an allergy to the replacement device.

The idea that patients could be allergic to the metal or other components in a knee or hip replacement began a few years back. These patients are more likely to have loosening of the prosthesis because the bone is unable to bond and integrate into the device. In addition, they're also more likely to have chronic pain after the procedure, due to the chronic inflammation caused by the device, which is perceived as a "foreign" by the body.

Another study demonstrated that two-thirds of knee and hip replacement patients had allergies to some component of their prosthesis. The study focused on common patient allergies to metals. Our website explains the issue of wear particles in knee and hip replacement prostheses and how this is leading to toxicity from heavy metals and to local tissue reactions that can cause medical problems. This makes sense as the biggest issue with wear particles are in metal-on-metal (MoM) hip and knee devices. These devices are most commonly used in "hip resurfacing" procedures; since less of the joint is removed, the prosthesis must be stronger. A limitation of this study is that the allergy testing was performed in only a small group of patients.

What's very surprising is that two in three knee or hip replacement patients tested positive for one or more allergies to the components used to make the knee or hip device. Are you allergic to the metals used to make your knee or hip replacement prosthesis?

Conclusion: Metal allergies have been a known issue and cause of poor results from a total knee replacement surgery. However, it seems that just being an "allergic person" is also a risk factor. What do you do if you have allergies and knee arthritis? Allergy testing, at the very least, would be a good idea if you're considering knee or hip replacement; however, consider some of the newer autologous biologic options to treat your knee arthritis if you want to forego the surgery!

6. Patients with Mild Pain Should Seek Knee Replacement Alternatives

You might think we must know that the knee replacements performed every day work very well; after all we perform 600,000 of these procedures annually, they're FDA approved, and knee replacement devices are paid for by every insurance company. While there is some data from various studies, a large study that looked at long-term data was very disappointing. In fact, it argues that we should be looking at knee replacement alternatives.

A Lancet article raised some concerns about the wide range of patients who were receiving total knee replacements. Their concern was that there were not only patients who were disabled by knee pain but also patients with only mild symptoms. Our website discusses the

issue of joint replacement device manufacturers aiming their advertisements at a younger and more active population with knee pain. You can't watch TV without seeing commercials with young and active people advertising the latest knee and hip replacement device. In fact, with knee and hip arthritis rates soaring in younger people, the manufacturers of these devices have found a new and bigger market than in the elderly.

The study author noted that the growing number of younger people undergoing knee replacement surgery is something of a mystery. In fact, they noted that an international panel found that surgeons' recommendations for knee replacement were not correlated with pain, disability, or radiographic severity. The study author commented that only patients with long-standing pain at night or pain with weight bearing (just walking) should undergo the invasive surgery. Finally, the authors noted that knee replacement alternatives that are nonsurgical should receive major research attention.

Conclusion: If you are a younger patient experiencing only mild knee pain, seek nonsurgical alternatives to relieve your symptoms, such as the Regenexx-SD procedure. At three months following the Regenexx procedure, greater than 50% of knee patients who responded reported greater than 50% relief, and the percentage of patients reporting greater than 50% relief increases over time, up to 90% of patients at 48 months following the Regenexx-SD procedure.

7. Levels of Activity Lower Than Expected Following Knee or Hip Replacement

Many patients are quite optimistic that once they get a hip or knee replaced, they will return to high levels of physical activity. Ads placed by knee and hip replacement manufacturers show people climbing mountains and generally being extremely active with their new joints. There's been a lot of criticism of this advertising approach as most patients don't return to this level of activity.

One study shows that knee replacement patients don't return to the amount of activity expected by the patient. The study reviewed the expectations of more than 80 knee replacement patients before their surgery and found that the average expectation of returning to high levels of physical activity never materialized after the knee replacement.

Additional research concerning activity after these surgeries looked at patients who were waiting for hip or knee replacement versus those who had the surgery. The study authors actually measured how active the patients were using accelerometer devices (rather than relying on how active the patients thought they were). Based on the objective measurements, patients were no more active after these joints were replaced than they were before the surgery. Why? Based on the studies linked above, this finding fits a bigger picture. For example, if you weren't running before the knee replacement don't expect to do so after the surgery. In addition, many patients after these surgeries still have pain, so perhaps this

is a barrier? Finally, many patients have gotten quite weak, so without a lot of work to turn that trend around, they likely just continue to be unable to move easily.

Conclusion: If you believe you will return to high levels of physical activity after a knee or hip replacement, know that it isn't supported by medical research the same way it's supported by TV advertising.

8. Severe Persistent Pain Despite Total Knee or Hip Replacement

Most patients believe that the vast majority of their pain will go away after a knee replacement. So what's the reality? There are a number of new research studies that show that only a minority of patients after a knee replacement are pain free.

Knee arthritis is a problem whereby the cartilage inside the joint gets worn out and degraded. The bone then reacts (or as a new study shows the bone actually reacts first in arthritis) and begins to deform with bone spurs. In some patients the knee becomes very painful, however in others it doesn't. This is the conundrum of knee arthritis—you generally can't tell who hurts by looking at the severity of their x-ray or MRI.

Knee replacement is one option to treat arthritis. However, despite massive increased risks for heart attack and stroke, many patients surprisingly have pain after a knee replacement. For example, the most common pain score after knee replacement in one study was a staggering 5 out of 10! Why would you take this huge risk if you're not virtually guaranteed that your knee will be without pain?

There is an interesting study on the percentage of patients who continue to experience severe persistent pain despite having their knees replaced. What was really surprising was that 44 percent of total knee replacement and 27 percent of total hip replacement patients continued to experience postsurgical pain of any severity three to four years after surgery. More surprising was that 15 percent of total knee replacement patients reported severe to extreme persistent pain despite invasive knee surgery. The persistent pain was most commonly described as aching, tender, and tiring. In addition, major depression was more common for patients experiencing pain after knee replacement. This is likely a confounder, as who wouldn't be depressed if there was still severe knee pain after going through an invasive surgery to get rid of knee pain?

More importantly, the study authors stated that pain elsewhere was associated with persistent pain after joint replacement. However, rather than concluding that this may mean the knee or hip may not be the cause of the knee or hip pain in the first place, the authors went in a different direction. They stated, "The association between the number of pain problems elsewhere and the severity of persistent postsurgical pain suggests that

patients…may have an underlying vulnerability to pain." This is an erudite way of saying patients who still have pain after our joint replacement surgeries must be wimps!

This data can be interpreted much differently. We've seen many patients with knee or hip pain—their x-rays showing what appears to be arthritis—who have been told they need joint replacement. Many of these patients have pain coming from elsewhere that is referred to the knee or hip as we've been able to solve their pain problems without surgery. In these patients, replacing their joints won't do much good. These concepts of referred pain are discussed in our book, Orthopedics 2.0.

Another study looked at more than seventeen hundred patients who had knee replacement. The focus was to determine how many would still have pain coming from the front of the knee joint. The researchers found that more than 5 years later, 20% had pain in the front of the knee. However, a whopping 54% of patients still had knee pain with only 46% being pain free. Also interesting was that 87% of patients had their knee pain develop after the surgery and within the first 5 years. In addition, knee pain in the front was more common among younger and more active patients.

Another study looked at 100 patients paying strict attention to patients' pain complaints right around the time most surgeons claim you should be getting your maximum improvement from the surgery—four to six months after the procedure. Regrettably, this study showed that 67 percent of hip replacement patients and a whopping 89 percent of knee replacement patients were still in pain. How much pain? Look at the graph above, taken from the article and annotated. The bars numbered 0 to 10 represent postoperative pain scores that the patients reported, and the y-axis (height of the bar) represents how many patients have that pain score. For the hip replacement patients, while many patients still have significant pain, at least the bar is highest on the 0/10 pain (no pain) side. However, for the knee replacement patients, the bar is actually highest at 5/10, which is still moderate pain (not that much different from what most patients would describe before the surgery). The annotations show where the bars should be if the pain data actually matched what most patients believe (a very tall 0/10 bar with maybe a smaller 1/10 bar—blue line) versus what's actually reported (red line). This data is also consistent with other studies showing continued pain after knee replacement.

Why would so many patients still be in significant pain after the knee joint was removed? There's a clue in the data. For 77 percent of the knee replacement patients, their pain was described as numbness. This means that their knee pain was likely coming from a pinched nerve and not the knee joint itself. This is consistent with data showing that nerve issues lead to pain and arthritis and not the other way around (structural changes don't cause pain—pain is caused by bad nerves). Where could this pinched nerve be? Given the average age range for knee replacement patients, it's most likely to be in their low back.

The fact that most of the residual pain is described as numbness means that our medical care system is missing patients with knee pain primarily caused by nerve, not joint, issues. Having seen patients in this boat, this seems to happen when the decision to operate and replace the knee joint is based on a cursory exam and the results of a knee x-ray without ever investigating if the source of the knee pain is really the knee.

Yet another study shows that only about half of the patients who get a knee or hip replaced have significant improvement in pain and mobility after the surgery.

The authors of the study looked at 2,400 patients with both common and inflammatory arthritis. Nearly 480 of these patients had a knee or hip replacement, and of the 202 patients included in the study, only half reported a meaningful improvement in their overall hip and knee pain and disability one to two years after surgery. What's more, researchers found that the patients who had worse knee or hip pain to begin with but fewer general health problems and no arthritis outside of the replaced joint were more likely to report benefits. However, nearly 83% of study participants had at least two troublesome knees and/or hips. In general, an estimated 25% percent of patients who undergo a single joint replacement will have another joint replacement within two years. This fits with what we see in the clinic as most of our patients have pain in multiple areas.

Severe pain despite joint replacement is more common than we would have guessed, and based on our experience, it is often caused by an inaccurate diagnosis of the pain generator before surgery.

Conclusion: Most patients who opt for a knee replacement would peg the likelihood that they would be pain free after the surgery at 90% or more. However, this isn't reality. If you're considering a knee or hip replacement, it likely makes sense to insist that someone take the simple step of numbing the joint under imaging guidance to ensure that the joint is really the culprit. If this doesn't take away over 75% of the pain, this isn't the surgery for you. In that case keep searching for a cause (which in our experience is often nerve issues in the low back).

9. Arthritis Study Shows X-rays Predict Need for Knee Replacement—Maybe

By 2015 1.4 million knee replacements will be performed annually due to a 45% lifetime risk of knee arthritis. As a result early detection is important, which is what one study sought to better understand. The authors took knee x-rays of more than 500 patients every five years. Women in their 50s with mild to moderate arthritis on x-rays (KL grade 1 or 2) had about a fifty-fifty chance of needing a knee replacement 15 years later. Women in their 50s with no arthritis on x-rays only had about a 1 in 100 chance of needing a knee replacement 15 years later. Heavier patients were more likely to progress. Other studies have shown that

heavier patients also have worse outcomes after knee replacement surgery and experience more complications.

While all of this seems to make sense, what was really interesting is that the majority of the women who actually got a knee replacement by year 15 didn't actually have mild or moderate arthritis at the time the study began—indicating, yet again, that images like x-rays are a poor surrogate for pain. This last point is very important, as we often see patients who are transfixed by their MRI images. This study, and many others like it, show that the pain you experience and what's seen on images are often two different things, so take any x-ray or MRI result with a grain of salt. In addition, don't forget about the 44% percent of patients who have their knees replaced and still have pain, 15% reporting severe to extreme pain, despite the surgery.

Conclusion: The pain you are experiencing doesn't always relate to what you see on x-ray images. Follow up with additional tests to find the true source of your pain.

10. Knee Replacement Prices Soar as Outcomes Drop and Complications Mount

How much does a knee replacement cost? This article does a great job of putting the outrageous costs of knee or hip replacement in perspective. With the average cost of $50,105 (in 2014) for a hip or knee replacement in the United States, this exceeds the average annual income in many states. Cost many be one reason to look for a knee replacement alternative.

The writer of the article compared that whopper $50,105 cost to the average income in all 50 states. She also adjusted that mean cost of the surgery by state. Eighteen US states had knee or hip replacement costs that exceeded their average annual income. Perhaps more disturbing is that 7 in 10 Americans don't have enough saved to cover the cost in retirement. Even if the surgery is covered by a solvent Medicare program, the 20% out-of-pocket costs would completely or substantially drain the life savings of 60% of Americans. Is it time for a less invasive knee replacement alternative?

The states in which the cost of the procedure exceeds income are listed below. Is yours on the list?

Alabama	Indiana	New Mexico
Arizona	Louisiana	Oklahoma
California	Mississippi	Pennsylvania
Colorado	Missouri	South Carolina
Florida	Nevada	Tennessee
Georgia	New Jersey	Texas

As we've discussed, these surgeries are associated with wear particles that can spike metal

levels in the blood, huge increases in heart attack and stroke risk, and wearing out at fast rates in active people, and the outcomes aren't as good as usually advertised.

US healthcare is very expensive. As a country we have missed a huge opportunity to fix our cost problem by not turning the healthcare market into a consumer-driven model.

Conclusion: Why pay huge amounts in copays, deductibles, or cash for invasive and risky surgeries that have huge side effects and so-so outcomes? Instead, consider treating your arthritis through a simple stem cell injection.

Conclusion

Complications due to knee and hip replacement are numerous, as these are big surgeries. Some of the possible complications you must consider include increased risk of heart attacks, local irritation of the tissues and higher concentrations of toxic metal ions in the blood due to metal-on-metal hip resurfacing implants, and severe knee pain despite knee replacement. We also know age impacts knee and hip replacement complications, and the odds of perishing from a hip replacement are 13 times higher for patients age 80 and over. In addition, heavier patients also do poorly after hip or knee replacement when compared to their lighter counterparts.

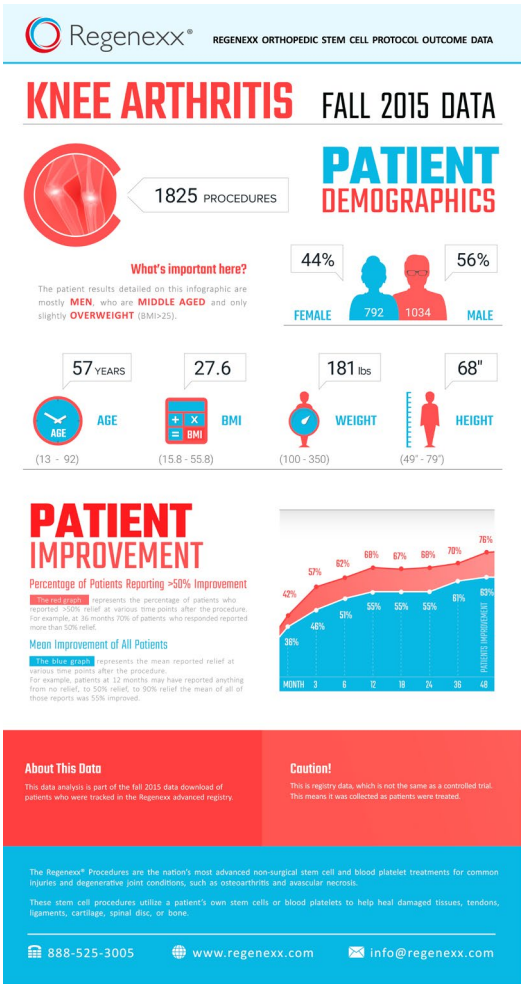
With so many possibilities for complications due to joint replacement, consider the safer alternative—Regenexx stem cell injections. Review how the Regenexx-SD stem cell procedure compares to knee and hip replacements. For knees, the same-day stem cell procedure held its own based on the same standardized orthopedic measures used in both groups. For hips, the stem cell procedure, considering it was an injection versus a joint amputation, also did well.

As a knee surgery or knee replacement alternative, the Regenexx-SD procedure may help alleviate knee pain and the conditions that cause it with a simple office injection procedure. Patients are encouraged to walk the same day, and most experience little to no downtime from the procedure.

Regenexx *is considered a world leader with the nation's most advanced, non-surgical, stem cell procedures for orthopedic conditions. With over 10 years of experience and tens of thousands of procedures performed, we take our work seriously so we can provide you with the most experienced, well researched, and personalized stem cell procedures available today.*

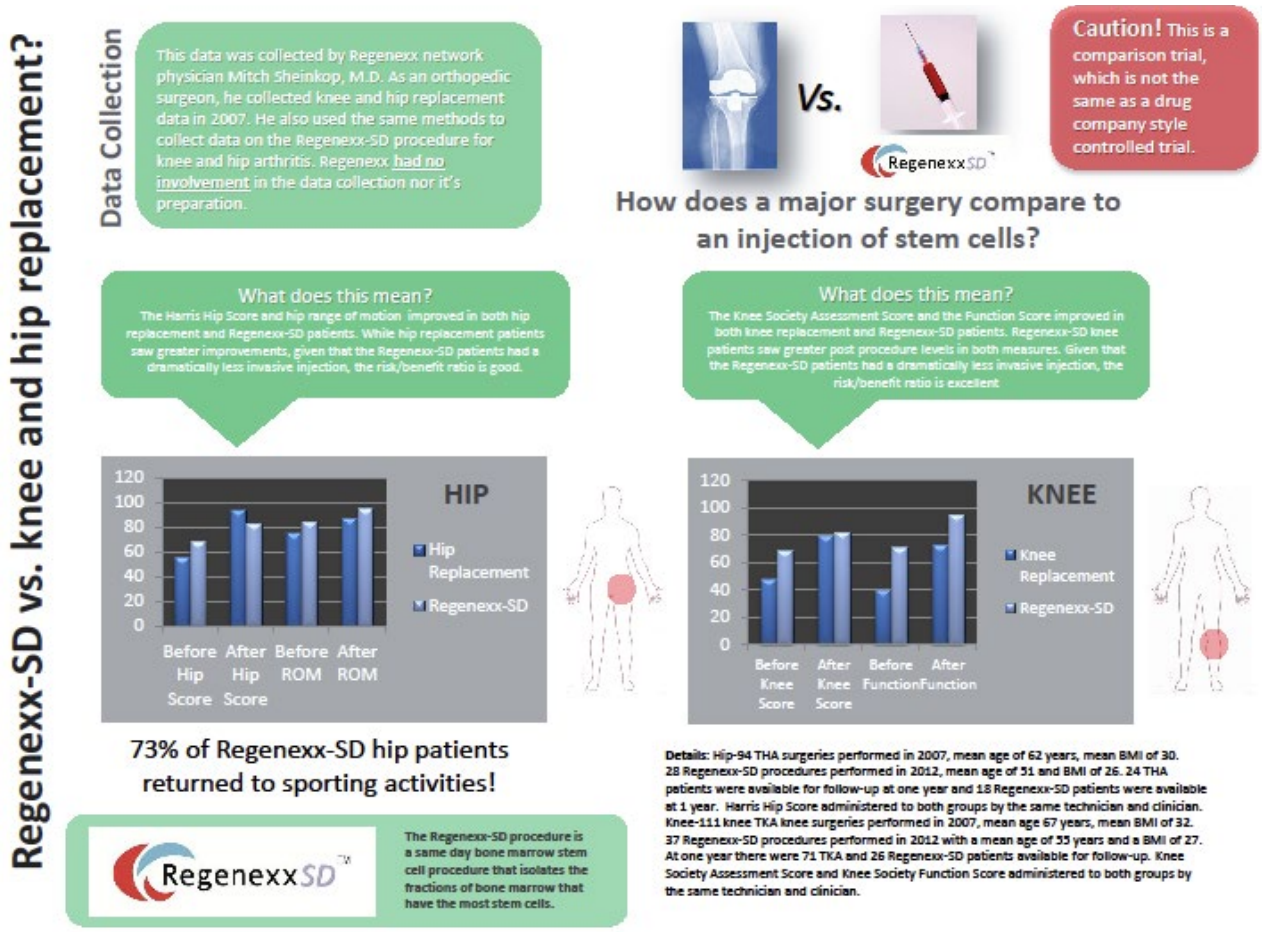
Regenexx Knee Replacement Video vs Stem Cells

Knee Patient Outcome Data - Click to enlarge



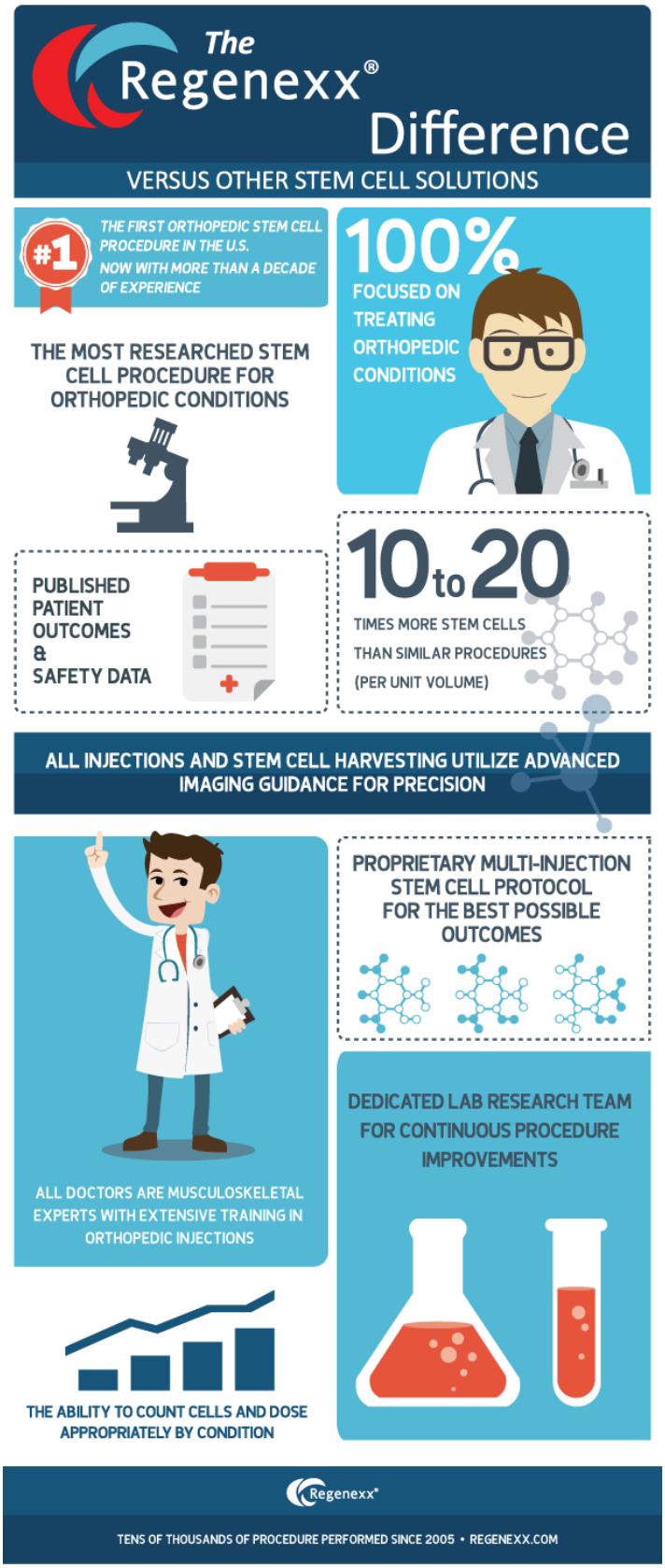
How does Regenexx-SD compare to joint replacement surgery?

This comparison data was compiled by Dr. Mitch Sheinkop, orthopedic surgeon, who has done hundreds of total joint replacements and is now a part of the Regenexx Network. Dr. Sheinkop used the same data-collection methods to compare these two groups.

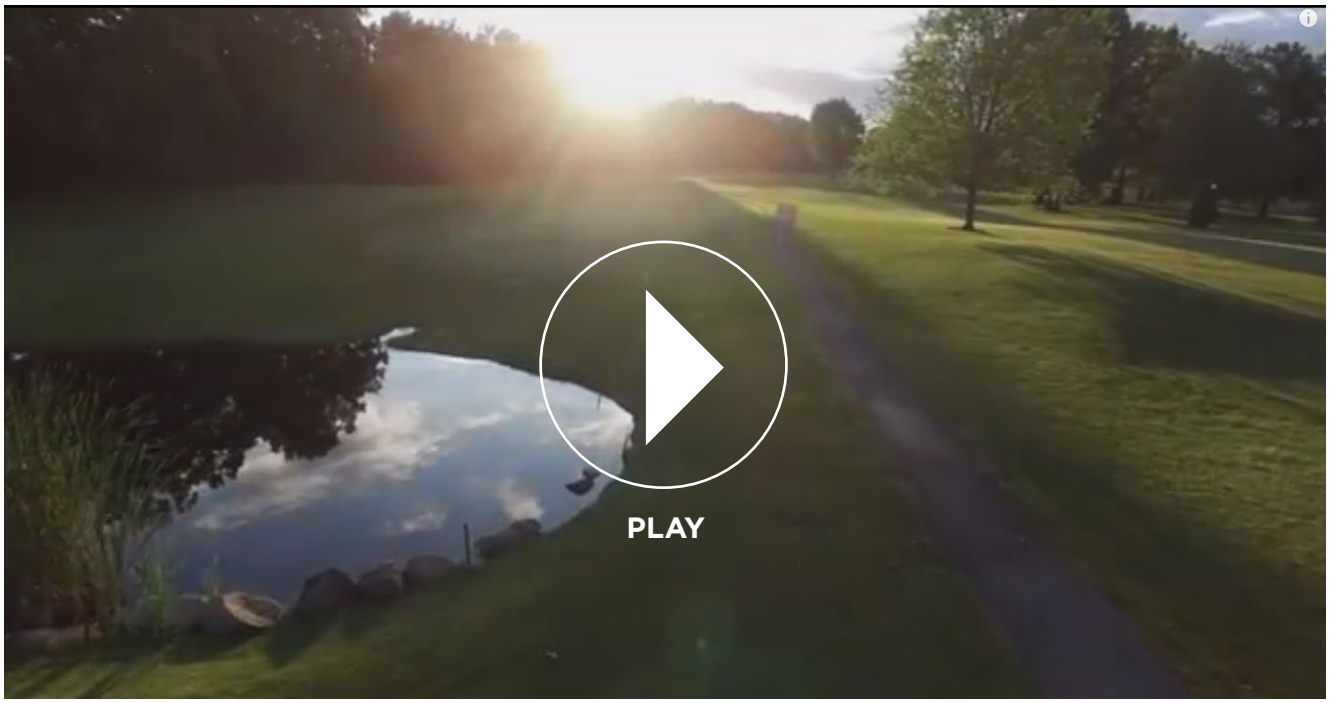


Regenexx vs. Other Stem Cell Treatments

Regenexx Differences

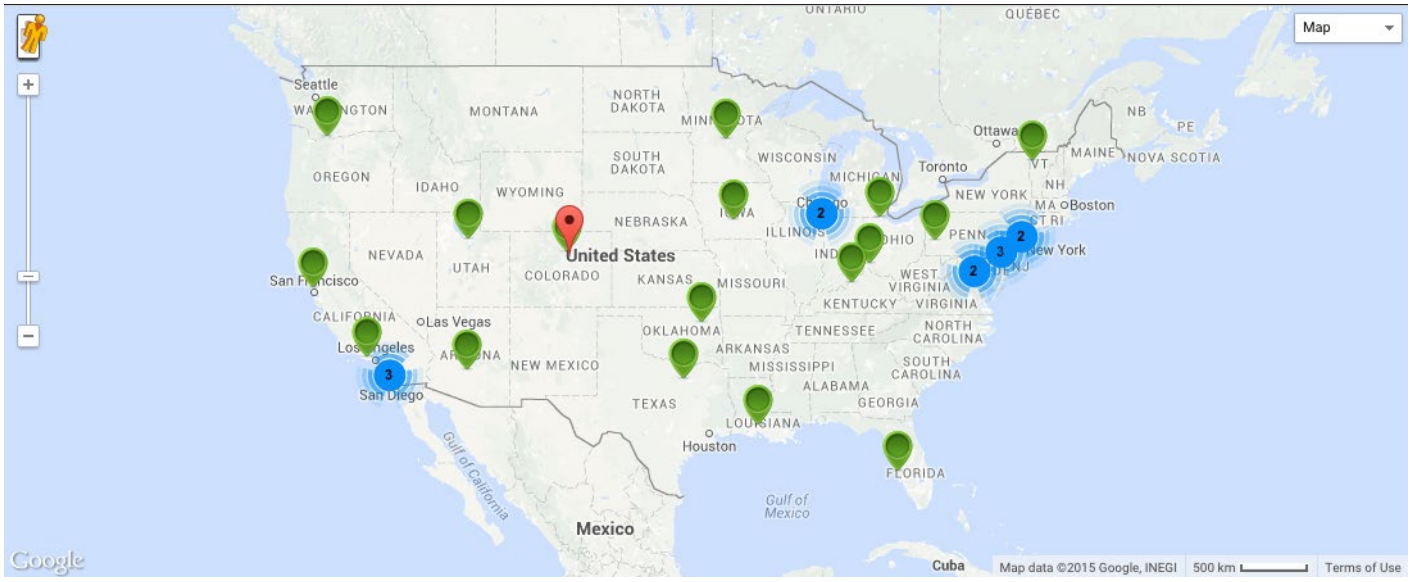


What Patients Are Saying About Regenexx

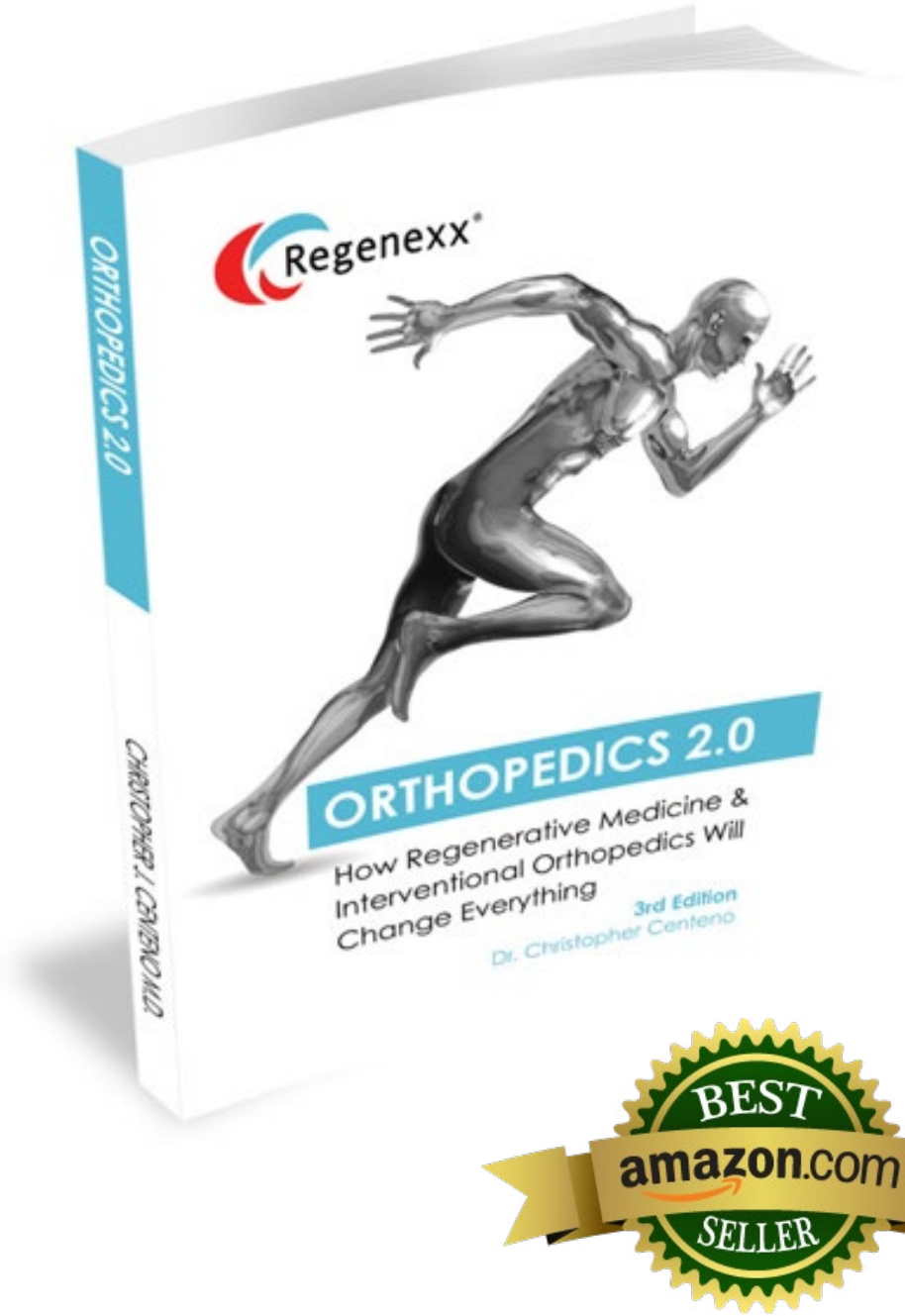


Disclaimer: Like all medical procedures, Regenexx Procedures have a success & failure rate.
Not all patients will experience the same results.

Regenexx Procedure Network
Find a Physician



Free Orthopedics 2.0- an Amazon Best Seller



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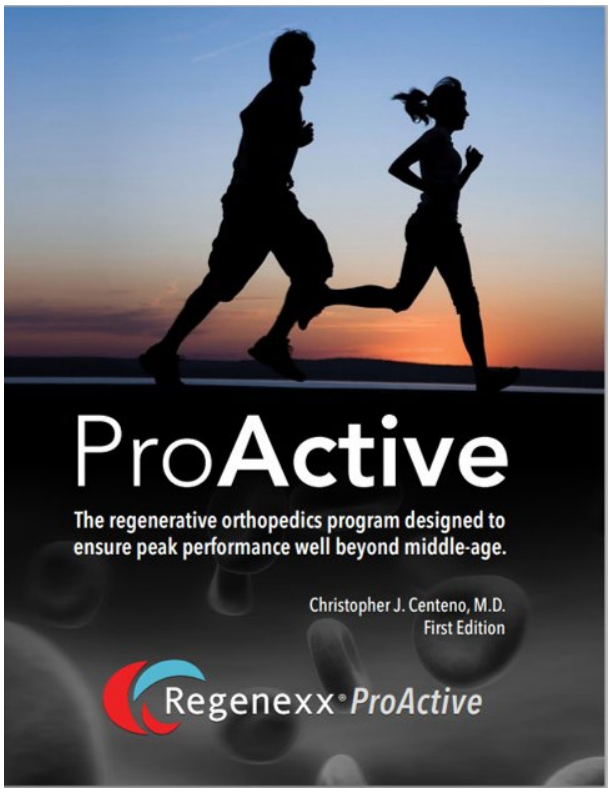

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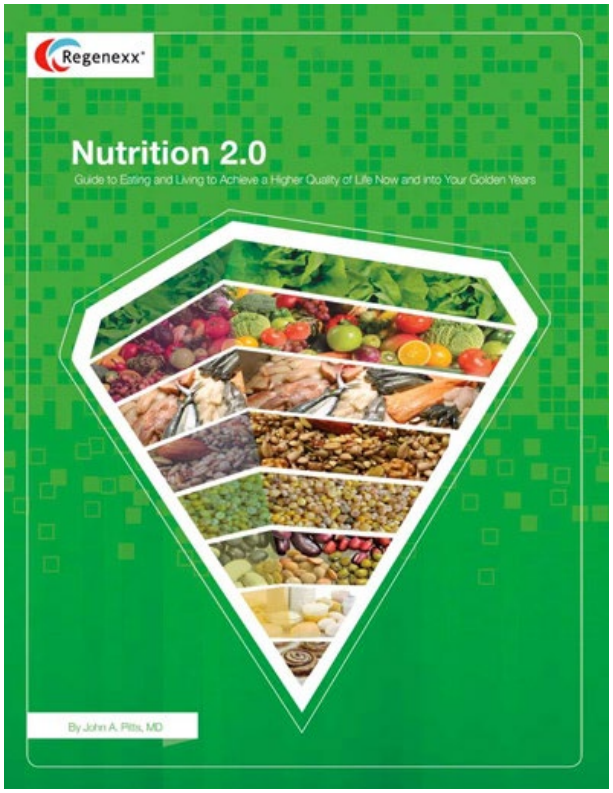

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