

# Primer on Total Knee Replacements

## An Introduction and Informed Consent

### **Information and Discussion on Total Knee Replacements:**

This is a discussion covering the preoperative phase, immediate postoperative phase in the hospital long-term rehabilitation and follow-up. You don't have to wade through this stack of paper every time you have a concern. There is also a Frequently Asked Questions (**FAQ**) section at the end. If you still have questions, call my office! My staff knows 95% of the answers. The ones they don't know they will find out.

### **Making a decision to have a total knee replacement:**

Before you have a total knee replacement, you must be certain to understand:

- 1) The risks and benefits of total a knee replacement.
- 2) What will happen during surgery?
- 3) What to expect of your knee.
- 4) Your restrictions in the immediate postoperative phase and your long-term restrictions.
- 5) That you and only you are responsible for making your knee work!

Once you understand the risks and benefits, you can then decide whether a total knee is right for you. No one can tell you when it is the right time to have a total knee. You will know when it is time. My job is to provide you with the information you need to make a decision.

### **Warning!**

**A Total Knee Replacement is a huge commitment on your behalf. If you are not motivated to work hard everyday doing your own exercises for a month before and several months after surgery, don't have it done. You could end up in worse shape that you are now. If you work hard you can expect years of good service from your knee replacement**

### **Timeline for total knee replacement**

- 1) During the first 6 weeks after surgery
    - You will hate me for the first 4 weeks.
    - I will not be such a bad guy at 6 weeks.
    - You will use a walker or crutches until your physical therapist feels you are safe without it.
    - You will have to use a knee immobilizer at night until your knee is straight.
    - You cannot drive until the end of six weeks, and you feel you are safe to drive. Were you to have an accident, I cannot defend you in court until the end of six weeks.
    - You will need pain medications for 2-6 weeks
    - You will have out patient physical therapy three times a week.
    - You will independently do your exercises 2-3 times a day.
    - You will return to water walking as soon as the staples are out of your wound. This is not with the physical therapists. You need to return to the pool on alternate days to your physical therapy. You will work up to 3-4 hours of water walking a week.
    - Your knee is swollen, red, and warm. You have fluid in your knee and increased blood flow. This is normal. It is part of the healing process.
- The average knee replacement is warmer than a normal knee for 6-12 months Because of

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- surgical scar; your knee will always be larger than the other.
- You will wear thigh high compression stocking for 2 weeks.
  - You will always have some numbness on the outside corner of the knee (I had to cut a small skin nerve to get into your knee).
- 2) At 8 weeks, I am a nice guy.
- You are usually done with physical therapy and should continue a water exercise program for two more months.
  - You will continue an independent exercise program 2-3 times a day for two more months.
  - Your knee is still warm, swollen and still has fluid in it. It is not uncommon, to go several weeks with minimal swelling, then have an episode of increased swelling because of change in activity or increased exercise.
  - If your knee suddenly becomes red, hot and painful, this could be a sign of infection. Call me immediately
  - You will always have some numbness on the outside corner of the knee (I had to cut a small skin nerve to get into your knee).
- 3) At 3 months this was easy (If you do what I ask!).
- You will be returning to most normal activities.
  - You will have stiffness and “start up” pain, especially in the morning. The swelling and heat in your knee is getting less.
- 4) Around 6 months to a year, it feels like your own knee.
- You should be relatively pain free (85-90% pain relief).
  - You should have returned to all your pre-surgery activities. You should be embarking on activities you were unable to do before surgery.
  - Your knee is still bigger than your other knee and always will be. Your knee is mildly warm.

### **Risks of total knee replacement:**

#### **Death, Stroke, Heart Attacks and other major events**

The most serious risk of total knee replacement is death. It is a very rare occurrence, but in even healthy individuals, there is approximately 1 in 675,000 chance of dying from anesthesia or other causes. While this doesn't happen often, you must realize it could happen to you! Stroke, heart attacks, pneumonia and multiple other medical complications can occur. I will work with your medical doctor to determine what your risks of surgery are. Once you know what your risks are, you must decide if the risks outweigh the benefits of having a good knee. This is elective surgery and you must understand that just about anything can happen.

#### **Infection**

The most horrible consequence of a total knee replacement is infection. Nationwide on a first-time knee replacement, the rate of infection is approximately 1 in 80 to 150 knee replacements.

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We have recently reviewed approximately our last 500 total joints in Grants Pass, and found that we have a significantly lower rate of infection than the national average. Our infection rate is approximately 1 in 500 making our rate of infection approximately one-third that of the national average. Three Rivers Community Hospital received a national award in 2007 for our low rates of post surgical infection. Patients undergoing redo knee replacements, patients who have had multiple knee surgeries, and patients with diabetes, rheumatoid arthritis, and poor circulation, skin problems, on steroids or other immunosuppressive problems have a higher risk of infection.

I take every precaution to prevent infections. The operating room staff and myself wear space suits and have special air sterile rooms that filter the air 30 times every hour. I give you antibiotics before surgery and after surgery, I use bone cement with antibiotic in it, and I promise not to spit in the wound! Even with all these precautions there are still a small percentage of people who will get an infection. There are some bacteria that my antibiotics won't kill, and they may be living on your skin! Our community has a high rate of people "colonized" with these resistant bacteria. Unless you have surgery or a skin problem, you and these resistant bacteria live together without problems. You might never know that these bacteria are on your skin

Getting rid of the infection can be a difficult and long, drawn out procedure. It may involve placement of an intravenous line in your arm or shoulder for long-term antibiotics (approximately 8 weeks) and surgery to wash out your knee. In worst cases it requires the removal of your infected total knee replacement and one, or more, surgeries to remove the infection from your knee, followed by another knee replacement two or three months later. There are some bacteria that no antibiotic can kill. We do not have those in town (yet!), but we will in the future. There is the possibility that I could not cure such an infection. You could be left with no knee, a fused/stiff knee, or an amputation.

### **Blood Clots**

Deep vein thrombosis/ phlebitis/ blood clots and pulmonary embolism (where a clot breaks loose from your legs and lodges in your lungs) are a risk involved in any surgery. For total knee replacements, it is a major concern. It can be life-threatening. Blood clots can go from your legs to your lungs and, in the worst case, cause death. With our present precautions, the risk of a "bad" blood clot is about 1 in 2000.

The American Academy of Orthopaedic Surgeons recommends 10-17 days of anticoagulation (blood thinning) after total knee replacement. The recommendations include injectable blood thinners such as Lovenox or Arixtra, Warfarin (Coumadin aka rat poison), or aspirin. Injectable blood thinners are the most effective and the easiest. Warfarin is the next most effective but requires blood draws multiple times a week and adjustments to dose. With Warfarin, there can be a risk of confusion on the dose and risk of overshooting the right level. Aspirin alone does not feel like enough coverage to me. Studies are on going and recommendations are constantly changing.

I have used injectable blood thinners for over 10 years with very low rates of blood clots. Injectable blood thinners such as Arixtra and Lovenox are much more convenient than Coumadin/ Warfarin (you or someone else injects you once a day instead of having to go and get your blood drawn at the hospital or coumadin clinic), but they are expensive for even 10-17 days of treatment. Often you may have a co-payment with your insurance.

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At this time I feel the best option for you is preventive treatment with an injectable blood thinner in the hospital and for 10-14 days after you go home. Several days before you complete the injectable blood thinner you start one aspirin a day for a month. I feel it provides a maximum of safety, cost savings, and convenience.

If you are already on Warfarin/Coumadin before surgery, I will stop your Warfarin/Coumadin seven days before surgery. Should you be at high risk for blood clots, I may start you on “Bridging Therapy” with injectable blood thinners when your INR drops below 2.0. We will ask your PCP or heart doctor for the best plan. After surgery you will receive injections of a blood thinner (Arixtra or Lovenox) once or twice a day, while in the hospital. I will also start you back on your blood thinner Warfarin /Coumadin the day of surgery. When your INR gets back over 2.0, I will stop the injectable blood thinner and continue you on your regular dose of Warfarin/Coumadin. If your INR is not up to acceptable levels when you go home, I will send you home with several doses of injectable blood thinner until your INR is good. Generally I have you check your INR twice a week for several weeks after you go home because frequently your INR will fluctuate after surgery.

If you are on Plavix (because of strokes or you have had stents placed in your heart), we will discuss with your PCP or heart doctor the safest plan to take you off Plavix around surgery. Generally, I will stop your Plavix one week before surgery, continue your daily aspirin, and three days after you stop your Plavix I will start an injectable blood thinner. You will take your last dose of injectable blood thinner 24 hrs before surgery but continue to take your aspirin. I will restart your Plavix and injectable blood thinner the day of surgery. Even on Plavix you need to be on injectable blood thinners and aspirin. Often I will put you on a stomach protective medicine to help prevent ulcers while you are on Plavix, aspirin, and injectable blood thinners.

Some patients cannot tolerate injectable blood thinners and have to be placed on Warfarin/Coumadin or aspirin. If placed on Warfarin/Coumadin, you will take Warfarin/Coumadin for 3-6 weeks after surgery depending on your risk of blood clots. Patients with normal risk of blood clots are treated with Warfarin/Coumadin for 3 weeks. Patients who have a history of blood clots, a family history of blood clots, or a known “high risk” state need Warfarin/Coumadin for 6 weeks. While on Warfarin/Coumadin you will need to have your INR, a measure of blood thinning, checked once to three times a week. Generally, this is done through your PCP or a Coumadin Clinic in your area. We want to keep your INR between 1.5 and 2.0. Your PCP or Coumadin Clinic will advise you daily to weekly as to your daily dose of Warfarin/Coumadin.

Whatever form of blood thinning we end up using, if you can tolerate the aspirin, you should take a baby aspirin, 81 mg, a day for 4 weeks after you finish your blood thinning protocol. As far as I can tell, no one knows if a full strength aspirin is any better than a baby aspirin. I suggest a baby aspirin, but I have no problems with you choosing a full aspirin if your stomach tolerates it.

In the hospital, I have foot squeezers placed on your feet to assist in your circulation and place compression stockings on your legs to help with circulation. You will wear the compression stockings for two weeks after surgery. You don't have to wear the stockings all the time. They can be taken off to wash and give your legs a rest!

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For those patients on other blood thinners, I may hold those medicines until after you have completed the Warfarin/Coumadin blood thinner.

If you are on Warfarin/Coumadin, Plavix, or other blood thinners, you will not generally go on a baby aspirin a day after surgery unless so directed by your heart doctor or PCP.

Once again, the risk of “bad” blood clots is low, but if you do get a blood clot after surgery, you may require treatment with a blood thinner for anywhere from three to six months after surgery. Watch closely for new pain in your calves, new and different swelling in your legs, chest pain and shortness of breath.

### **Knee Stiffness and Motion Less Than You Want**

The PFC Sigma Total Knee Replacement has four different styles. The standard knee is designed to give a maximum of 0-120 degrees of motion. Some styles can obtain up to 0-150 degrees. The average patient gets 0-100 degrees of motion with their leg hanging to gravity without a physical therapist “wailing” on their leg. **What motion you expect from your knee replacement and what motion you can reasonably expect are important factors in how happy you will be with your knee replacement surgery.**

*A good rule of thumb is whatever motion you have before surgery is what you can expect after surgery. I encourage you to aggressively work on getting you knee as straight as you can **BEFORE** surgery, and get as much bend as you can **BEFORE** surgery.* I will send you to a physical therapist, when we decide to do surgery for you to learn how to work on your knee range of motion. The therapist can only show you the way. You must make it straighten and bend!

In the operating room, I will get your knee out straight and bending as much as you leg will allow (generally 0 to 120-150 degrees), but if you had poor motion before surgery, your muscles, ligaments, tendons, and other tissues will have shortened. They have “memory” and will want to stay in their shortened state. They will take time and work to stretch them out. If you haven’t been able to fully straighten or bend you knee before surgery, don’t expect your muscles, ligaments, tendons and other soft tissues to lengthen without a struggle. The more you work on motion and strength before surgery, the easier it will be to get the motion after surgery.

For those who will work hard and do their own exercises multiple times a day, you can expect much more motion and less stiffness. Tomorrow is never easier when it comes to knee range of motion. You must work on it today! The longer you wait to get motion the harder it will be to get it. Patients who do not push themselves at home and at therapy have universally poorer results and range of motion. Good pain control is important I encourage you to take narcotic pain medicines and NSAIDs (anti-inflammatories) as you need to be able to do you therapy and exercises. I promise not to allow you to become a “Drug Addict” and will modify you narcotic pain medicines every week or so to try to prevent your body from becoming “habituated” to them.

**Your therapist cannot get the range of motion for you.** Very aggressive therapy that leaves you hurting more than an hour or so after therapy or which leaves you more painful the next day actually will slow down your progress. Very aggressive therapy can tear not stretch muscles, ligaments, tendons and other soft tissues, causing pain, swelling and fear. This will slow down your therapy by making you afraid and unable to relax your muscles with your therapist. Obviously, your must work hard getting your own

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motion and not depend on the therapist to “force” your knee and “overpower” your muscles. You will go backwards not forwards.

Other factors that determine knee motion include how small or big your leg is and how muscular your leg is. Clearly, a person with thin legs and small muscles can usually get more range of motion than those with very large muscular legs

If for whatever reason your knee stiffens up and we don't get adequate range of motion, sometimes I have to take you back to the operating room to break up scar by manipulating your knee while you are under anesthesia. The average person needs 80 degrees of motion to go up and down stairs, 90 degrees of motion to get in and out of a car, and 100 degrees of motion to tie your shoe. If you haven't gotten at least 80 degrees by 4 to 12 weeks after surgery we need to consider the manipulation. I can break up the scar but only you can make the muscles, ligaments, tendons, and other soft tissues stretch. If you don't work it hard after the manipulation don't expect to get better motion. On average, patients who need manipulation only get 20 degrees more of motion. **Manipulation has risks. I can break your leg or tear ligaments while breaking up the scar. Work hard so we don' have to take those risks.**

Rare people are severe scar formers (1%), and we may never get as much bend, as we would like no matter what we do.

### **Numbness of the Skin in the Front of the Knee, Pain in the Front of the Knee, Grating or Crepitus of the Knee, and Knee Cap “Clunk”**

Virtually everyone will have some numbness at the front and outer side of the knee. Unfortunately, the incision must go across the Infrapatellar Branch of the Saphenous Nerve for me to get into your knee. The branch of this nerve provides feeling to some of the skin at the front of your knee. With time you will notice it less, but it will always be there.

Some pain or discomfort in the front of the knee without correctable cause will occur in 6% of people with about 10-20% of people experiencing discomfort when kneeling.

A “grating” or “grinding” sensation called crepitus occurs in 12% of knee replacements. It is caused by some scar formation in the front of the knee. It is not a sign of a problem or malfunctioning of your knee. Often strengthening of specific muscles and cortisone shot relieves the problem. Remember crepitus is not a problem. Nothing is loose or wrong with your knee replacement.

The most severe form of crepitus is scar formation that gets trapped between the top edge of the knee cap and the thigh bone cap when you get up from a seated position or up and down stairs. It is called “patellar clunk”. Again, we can normally correct this with cortisone injections and exercise. Occasionally, the symptoms of “patellar clunk” are bad enough that we need to remove the scar. I do it with the arthroscope (TV camera). Removing the scar will almost always resolve the “clunk”. While a knee arthroscopy to remove the scar is a small surgery, there is up to a 6% infection rate in some studies! In other words we don't jump into surgery unless it really bothers you. Occasionally the scar will come back, and we must do a small surgery to redo your knee cap replacement to a different style.

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### **Wound Problems, Skin Loss**

### **Other Risks - Nerve and Blood Vessel injury, Fracture or Muscle Avulsion, Neuromas, Neuropathy, Reflex Sympathetic Dystrophy**

There is a very small risk of injury to nerves and blood vessels of your leg during surgery (1 in 100). I take every care to protect these, and the risks of nerve or blood vessel injury are extremely low. You must understand that it can happen and, in some cases, the function of the nerve or blood vessel may never return. People with diabetes and hardening of the arteries or poor circulation are at greater risk. If you have a valgus knee (one that is worn out on the outside corner of the knee - dog leg) or have a knee that doesn't come out straight (a flexion contracture), you have a higher risk of stretching the Peroneal nerve when we straighten out the leg with the total knee replacement. Even though I am nowhere near the nerve, just the act of doing the knee replacement can stretch the small blood vessels that feed a nerve stunning the nerve. Sometimes the knee has been at an angle so long that scar has formed around the nerve, so when we straighten out the leg the nerve is trapped and squeezed by the scar. The result is a "Foot Drop". This is where the top of the foot is numb and you cannot lift your toes towards your face. Most of the time the function of the nerve will come back in 18-24 months, but sometimes the nerve may never come back. You might need to wear a foot and ankle brace for the rest of your life.

The risk of damaging blood vessels is also small. They are in the back of the knee and I stay away from them. People with arteriosclerosis (hardening of the arteries) and Diabetes has a higher risk of injury because their blood vessels are so stiff. In the worse case you could loose you leg.

If you have soft or abnormally shaped bones there is a risk of a bone fracture during surgery. Most of these are seen during surgery and fixed. You may have limited Weight bearing and range of motion while the bone heals. This can delay your rehabilitation.

The muscles and ligaments can tear off of the bones during surgery. Generally, it is because the bones are very soft or there is a lot of scaring from previous surgeries or injury. Surgery to repair these kinds of complications can be extensive

Remember the little nerve that I have to cut to get into your knee (the infrapatellar branch of the saphenous nerve)? Rarely the cut nerve end can bunch up and become a painful, electric, stabbing neuroma in the area below the knee cap on the inside aspect of your leg. Often a cortisone shot and some therapy can relieve it. Occasionally, I need to go back and cut out the remnant of the nerve.

### **Failure or Wearing Out**

In the past the major ways a knee replacement eventually failed was that the pieces got loose, the plastic wore out, or you had bone loss (called osteolysis caused by plastic wear). Present knee replacements don't seem to get loose, plastic wear has been reduced or eliminated, and bone loss seems to be something that only happens after many many years.

The major mode of knee replacement failure now appears to be the stretching out of your own ligaments with time and activity. If your ligaments stretch out, the PFC Sigma Knee Replacement is designed for a relatively small surgery to replace the plastic liner and "snug" up your knee, hopefully getting you many more years of activity.

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### **Benefits of Total Knee Replacement:**

Total knee replacements are successful in approximately 98% of patients. Patient satisfaction is 95%. Of the kind of total knee replacement I use 98% are functioning well at 10 years for patients over 65 years of age. Patients younger than 55 years of age

### **Pain**

Most patients note that they have less pain approximately ten days after surgery than they did before surgery. Knee replacement will eliminate 85-90% of your pain. Will I get rid of 100% of your pain? Generally, I will not. Expecting more of metal and plastic is just unrealistic.

### **Activity**

A total knee replacement will allow you to return to most of your daily functions of life without difficulty or restrictions. Higher levels of activity such as aggressive sports can make you loosen your knee, stretch out your ligaments or make your knee wear out sooner.

Most patients are able to return to doing the activities they love in life—hunting, fishing, hiking, camping, and low-level sports. You just won't be doing as much as you used to do. If you used to walk ten miles elk hunting, you will need to be happy with 1 or 2 miles. If you get an elk, you will need help to get it back. If you stress your knee, it will be swollen and ache that night, but the next day you will be ready to go again. The knee replacement is metal and plastic not flesh and blood. Remember that it has limits.

Golf, swimming, cross-country skiing, and other such low-impact sports are encouraged. Many patients do play doubles tennis and other more aggressive sports, but they must realize that they may be increasing their risk of wearing their knee out at a more rapid rate. Running, jogging, and contact sports are not recommended. Many patients do participate in these activities, but they must be aware that they will stretch out their knee sooner and require plastic switches and redo surgery sooner.

### **Motion (see Risks: Knee Stiffness and Less Motion than You Want)**

The PFC Sigma total knee replacement standard fixed tibia and rotating platform knee replacements are designed to provide 0-120 degrees of motion. As noted before, most people get 0-100 degrees in many studies. Work hard and prove them wrong.....get more motion..... don't be average! Again your motion will depend on your size, what motion you had before surgery, how hard you work at getting your motion and the design. The PFC Sigma RPF high flex rotating platform total knee replacement is designed to provide up to 0-150 degrees of motion. While it is a modification of the existing very successful design and while it is a very exciting advance, it has only been available to us for a short period of time. I do not know the long term results. If you have a need for serious "bend" we will have to talk about the pros and cons before we choose it.

### **The Surgery**

I recap your thigh bone. I put a plate with a stem on your shin bone. I shave off the under surface of your knee cap and put a new brake pad on it. Many people think I cut out the entire knee and replace the whole thing. In reality, I save everything I can and just "resurface" your knee. I take as little bone as possible and only remove diseased or worn out ligaments, cartilage, bone, and meniscus.

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I use a “minimally invasive” short incision and muscle sparing surgical approach to your knee. “Minimally Invasive” or “Muscle/Quad Sparing” are probably bad terms to describe the approaches to your knee. After all as small an incision as I will use, you will still have a big guy in your knee with a “chainsaw”. There are at least 4 different approaches or ways to get into the knee. The most common are the Medial Para-Patellar, the Modified Medial Para-Patellar, Mid-Vastus, and Sub-Vastus approaches. I use the Medial Para-Patella (which splits the Quadriceps Tendon above the patella) for redo knee surgeries. It is the “old standard” because it gives the best “exposure” of the knee with the fewest risks, but it has the longest incision. The Modified Medial Para-Patellar, the Mid Vastus, and the Sub-Vastus are all called “Minimally Invasive” or “Quad/Muscle Sparing” approaches. They all preserve the Quadriceps Tendon and use much smaller skin incisions. I have been using the Mid- and Sub-Vastus approaches for greater than 10 years. The press has overblown “Minimally Invasive” as some new approach (as have some companies who have tried to copyright them). In reality, we are just making much smaller incisions and being much kinder to the muscles, tendons, ligaments and other soft tissues.

The major benefits of “Minimally Invasive” appear not to be the incision so much as a philosophy of less tissue injury, better pre-surgery physical preparation, and better pain control. Minimally Invasive knee surgery patients bounce back quicker and feel better sooner; however, after six months there is no difference in function, knee range of motion, strength, pain or long term outcomes for a “Minimally Invasive” knee replacement and a “Standard” knee replacement. What does all this mean? “Minimally Invasive” knee replacement is not something “MAGIC”. If you do the pre and post surgery therapy, the pre and post surgery exercise program, and the pre and post surgery water walking programs, you will do great and be very happy with me. If you don’t, it will take a long time to get better.

### **Parts/ Equipment Used**

The Total knee replacement I use is a cemented prosthesis made by Johnson & Johnson/ DePuy Orthopedics (the largest manufacturer of total joints in the world). The PFC Sigma Total Knee replacement was designed at Harvard, and I have been using it since 1990. The PFC knee has been constantly refined and improved. I believe it is the best total knee replacement available. It has a large number of options, which make it possible to deal with about any inter-operative situation. It has the options for a fixed platform (the Modular and One Piece Tibia), the rotating platform (the MBT), the high flex rotating platform (the Sigma RPF), and multiple posterior cruciate ligament sparing/substituting/stabilizing designs. You can view them at [depu.com](http://depu.com).

There are four pieces to a total knee replacement, the femoral component (the thigh bone cap), the tibial component (the shin bone cap), the polyethylene spacer (the liner between the thigh bone piece and the shin bone piece) and the patella (the knee cap piece). The femoral and tibial components are made from chrome cobalt. The polyethylene spacer and the patella are made from polyethylene, a super plastic. The pieces are cemented in place with acrylic cement, methyl methacrylate.

Chrome cobalt can be polished to an extremely smooth surface. This helps reduce wear and debris. Chrome cobalt has very low levels of nickel reducing any risk of allergic reactions. In the past many parts of total knee replacements were made of titanium. While titanium is very flexible and very strong it is also very “rough” and caused rapid wear and failures of many early knee replacements in the 1980’s and 1990’s.

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The plastic spacer is made out of high-density polyethylene, the same material that is used to make coalscuttles. If you have ever seen trains unloading coal onto a white shining platform, that is high-density polyethylene. You can pour millions and millions of tons across it every year and not leave a scratch. However, you are much harder on your knee than the coal is on the platforms. An average person takes somewhere in the area of two to ten million steps a year. Eventually, the plastic can wear out, but the design of the knee we use allows us to replace the plastic, should this happen. Plastic wear makes small particles that some people's body will attack. This can lead to loosening of your knee or need for revision. The PFC Sigma Knee replacement is designed to reduce wear. The major problem is that some day you will stretch out around your knee replacement.

I use bone cement to fix your knee in place rather than try to get your bone to grow into the metal. Why? Because no one has designed and tested a knee replacement where bone grows into the metal that works as well as a "cemented" one. I use only hip replacements where the bone grows into the bone. Why? Because it works better than "cement" in hips.

I have to look to your future. Many years from now, you may need a revision or re-do of your knee. If it wears out, if you stretch out your ligaments, if you suffer an injury or damage your knee, I need a flexible system to fix your leg with a minimum of Surgery. Most knee systems do not address these concerns. The PFC Sigma Knee is designed with all these possibilities in mind. It gives me the most options to take care of you long term.

### **Pre-surgery Events:**

#### **Preparing for a Total Knee Replacement**

I will generally set you up with a short course of physical therapy to learn an exercise program and introduce you to your therapists. You will need to do your own exercise program twice a day until surgery. Water walking 4-6 hours per week for a month before surgery makes a world of difference. Doing it can cut your rehabilitation time in half. The minimally invasive surgery certainly helps with rapid recovery, but being prepared before surgery is the most important factor in your recovery! If you cannot get into water walking, Nordic Track, Elliptical Stryders, or Stair Climbers are alternatives. Many patients ask "Why not just walking?" Generally you can do much more and be better prepared if you do one of the above. You can exercise more and hurt less than walking. After all, why do you want a knee replacement?

The more active you are and the more you exercise before surgery the faster you will bounce back from your knee replacement. Work hard at getting your knee bending and straightening now. The better it bends before surgery the easier it will go after surgery.

#### **Pre-operative Counseling**

I like to have a 20-30 minute counseling appointment for you and your family to discuss surgery and total knee replacement options. Generally you should have read this before we talk.

#### **Scheduling of Appointments and Surgery**

Our surgery scheduler will schedule most of your appointments and provide you with a calendar of events leading up to your knee replacement. She runs my life and now she gets a chance to run yours! She will arrange for blood donations and assist with such events as medical clearance, obtaining blood thinners,

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and insurance pre-authorizations. **It takes about 4 hours or more of my surgical scheduler's time to just set up your surgery!**

You will be notified by the hospital when and where to come the day of surgery. There is a great deal of preparation involved before your surgery, including, in many cases, nerve blocks performed by anesthesia, new laboratories, and a great deal of paperwork. **You need to be at the Hospital the day of surgery on time or early to allow your surgery to go smoothly.**

### History and Physical

My physician assistant or nurse practitioner will perform a history and physical exam one or two weeks before surgery. **You will need to bring all your medications to this appointment not just a list!** You will receive prescriptions for pain medications and medical equipment. This is another time for counseling and questions. Don't be afraid to ask "ANY" question.

### Medical Clearance

For medical clearance, I will ask your primary care physician to see you before surgery. Many times the major delay for your surgery or the number one reason for canceling your hip replacement is that we couldn't get your clearance scheduled with your primary care soon enough to get you cleared for surgery. Often when they see you they need to do tests and get consults with other doctors which could cause me to cancel your surgery because consults with other doctors and multiple tests may not get done by your surgery date. Help me avoid a delay in your surgery. Call your primary care doctor immediately and get the soonest appointment you can. Tell their office staff that you will come in sooner if they have a cancellation. To avoid delays, ask them what tests your doctor might want in advance. We do this also, but remember the squeaky joint gets the total knee replacement! If you are from out of town, I will also have you see a local physician for a consult. If you have a medical emergency, I need someone to back me up.

### Blood Donation/Autologous (your own) Blood

I previously asked all patients (who could) to donate 2 pints of their own blood for surgery; however, the Red Cross (the people who take and store the blood) now suggest against self donation of blood. Why? Because the risk of a clerical error where your blood is mislabeled and you get someone else's blood is far greater than if you get Blood Bank blood donated by someone who has donated gallons of blood and been tested for AIDS and hepatitis many many times. People who donate their own blood may have illnesses that can be transferred to someone else if their blood is mislabeled. This is a clerical error which could happen 1 in 16,000 times. The risk of AIDS is now approximately 1 in 875,000 (maybe as little as 1 in 4,000,000) from blood bank blood, but the risk of hepatitis is somewhere in the region of 1 in 120,000. No one has gotten AIDS or hepatitis from a blood transfusion in southern Oregon in the last 10 years. A marvelous record! So, I recommend against self blood donation.

That said, if you really want to donate your own blood and understand the risks, we will help arrange it. If your Hemoglobin level is greater than 13, you can donate blood. If your hemoglobin level is less than 13, donating blood would knock down your blood levels and you would not recover to normal levels by the time of surgery. We would actually be increasing your risk of needing a transfusion by having you donate blood. Some patients are unable to donate blood because they are anemic or have medical problems. Other patients may need more blood than they can donate.

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If I have to give a patient blood which is not their own, I don't do it unless there is a life-threatening event or significant risk of heart attack/stroke. While we obtain your consent to give you blood before surgery, if possible I will discuss it with you before giving you a transfusion.

I am very familiar with patients who for personal or religious reasons request no transfusions. I understand your desires and beliefs and will comply with your wishes. We have Cell Savers, blood saving drains and staff aware of your needs. I stay up on new techniques and regularly review the literature on "No Blood" surgery. Red blood cell stimulating drugs such as erythropoietin work very well, however Medicare and most insurance won't pay for it (cost \$1800). New artificial blood replacements are coming tutorials. I have been asked to participate in these studies, but at this point no trials are active.

Family can donate blood for you, but insurance will not pay for it. Blood banks charge about \$400 dollars a pint. Statistics show that it is safer to take blood bank blood than blood from your own family and friends. Go figure that one out! The Red Cross says it is because family members many have medical problem they don't know about or are afraid to disclose to others.

### **Hospital Course:**

#### **Length of Surgery**

Once you have been admitted to the hospital, your surgery will take somewhere between two and four hours. My actual operating time is only 1-1 1/2 hours. Every patient is different and every case is different. Much of the time involved is taken up with the anesthesiologists, preparation for your surgery in the operating room, and then immediate post-care in the recovery room. Family should expect me to call them or come and find them 1 1/2 to 2 hours after you go to the OR. Because of HIPPA (privacy act) your family will not be able to see you in the Recovery Room. They will have to wait until you are in your room on the 3<sup>rd</sup> floor. Generally you are in the recovery room for 1 1/2 hours and then the nurses need about an hour to get you settled into your room. I suggest family goes and does something else for about 2 1/2 hours after I talk to them before they go to your room. If they don't want to "hang" around in the hospital for the 4 hours from the time surgery starts to the time they get to see you in your room, I will be happy to call them when surgery is done.

#### **Anesthesia**

I prefer a continuous femoral nerve block, a continuous sciatic nerve block and a light general anesthesia/spinal. Pre surgery, we will give you a low dose of long acting narcotic and a long acting NSAID. The nerve block will control most of your pain for 3 days. It does a great job with about 85% of the pain on the top of your knee, but pain in the back of your knee will be less well controlled. You need fewer narcotics with the nerve block, so your chances of nausea, vomiting, pneumonia, over sedation and falling are greatly reduced. Staff will be asking you regularly "what is your pain level (scale of 1-10)". It is the best way we have of assessing what pain medicines you need. If you are hurting tell the nurses, I order a variety of different medicines for each patient.

#### **Minimally Invasive Surgical Approach (see The Surgery for more)**

Minimally Invasive Total Knee Replacement is doing a knee replacement thru the smallest incision and doing the least amount of tissue damage. I use a one incision technique at the side of the knee cap. I slide under the large muscle (the Vastus Medialis) or split the muscle and along the knee cap and its ligament.

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It really depends on how big you are as to how big an incision we need. I can do a knee thru a 3 inch incision in thin people with small muscles. People with more padding or very large muscles require larger incisions. People with large knees need bigger incisions just to get the parts into place. Generally even in large well muscled people, I can do a knee with a 4-5 inch incision. This is far smaller than our old 10 inch incisions. What I do inside the knee is the real “minimally invasive” part. By not cutting the muscle the knee cap tracks better and you bounce back quicker. Since we have to undermine the skin to free up the muscle the may be more bruising on the inside corner of your knee.

If you have had surgery in the past, have a very valgus (dog leg) knee or are very fluffy/muscular, I may have to do a standard incision to get inside you knee. With the above situations, we make take a much greater risk of tearing the knee cap ligament off of the shin bone that is worth the risk of a minimally invasive approach.

### **Governmental “Privacy” Rules and Family Visits**

Because of governmental “privacy” rules (HIPPA), your family will not be able to see you until you have gone to your room, approximately a two and a half hours after surgery has been completed or about 4 hour after we take you to surgery. That day you will probably be quite sleepy and, in fact, may not remember most of the day. Family should limit their stays to one or two short visits of a half an hour or slightly longer unless you feel up to having them there. Don’t feel you are being rude if you want to tell people to go away and get some rest. You just had major surgery.

### **Seeing Dr Van Horne in the Hospital**

After surgery I do my very best to speak to family and friends immediately after surgery. Generally I write orders first. The nurses get cranky if I don’t give them something to do. Because your family will not get to see you for approximately four hours after the start of surgery, many families will go home and leave a cell phone number or home number for me to call. Rarely, I am unable to find family or am called away to an emergency. In such cases, I leave messages with the operating room staff and try to find them later. If you have an extended family or people in far places, it helps me if you appoint a specific person for me to communicate with. That way no one feels I am ignoring him or her.

I will see you each morning and many times in the afternoon or evening. Family is welcome. Occasionally, I am away at a conference or giving an out of town talk. On Those occasions my partner will see you. On the weekends, the orthopedists in town share call. Unless there are complications I may ask them to see you so I can be with my wife and kids. I write all the orders and make all preparations for your care in advance. I almost always have my pager on unless I am out of town.

### **Length of Hospital Stay**

Most patients are in the hospital for a primary total knee one to two days. Depending on how you progress, the physical therapists and I will determine when you are able to go home. My requirements for you to go home are that you are able to:

- 1) Walk 250-350 feet with a walker or crutches.
- 2) Get in and out of bed by yourself.
- 3) Get in and out of your bathroom by yourself.
- 4) Get in and out of your house by yourself.

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- 5) Up and down any stairs by yourself, and generally a full flight of stairs
- 6) Get in and out of a car by yourself.
- 7) You can perform your exercises independently
- 8) Your pain is well controlled on medicines by mouth
- 9) The physical therapists say you are safe for home.

If you are unable to meet these requirements, you do not have help at home, or if the physical therapists feel you are unsafe for your home environment, you will need to go to a rehabilitation hospital. I see no reason for you to go home until you are “safe”. The average stay at the rehabilitation hospital is approximately week although some patients need 2 or 3 weeks to be safe at home. Most insurances will pay for a rehabilitation hospital or Skilled Nursing facility (SNF) only if you are not physically safe for your home or if you do not have adequate help at home.

### **Physical Therapy in the Hospital**

Your physical therapy will start in the hospital the day after surgery. Therapists will be getting you out of bed and starting you walking on the day of surgery. I find the sooner we get you out of bed and get you walking, the less chance you have of pneumonia, blood clots, and bed sores. Perhaps even more important, are the longer you

Lie in bed, the weaker you get, so the longer it takes you to recover your strength and return to full activities after surgery.

Most patients’ major complaint the first day after surgery is back pain. It comes from being in bed all day (not your bed but a hospital bed and the operating room table). If you have a history of back pain, it will be all that much worse. The cure? Get you out of bed as much as we can as soon as we can. Don’t get mad at the nurses and physical therapists when they get you out of bed and make you stay out of bed in a chair. They are doing it because I told them to do it. Blame me!

The first ten steps are the hardest. After those first ten steps, each one is easier. You will be surprised. If you push yourself, you will make great gains with our excellent physical therapy and nursing staff.

Part of your therapy is getting out of bed to chair for all your meals and starting to take care of yourself and do your simple activities of daily living such as combing your hair, brushing your teeth, and even giving yourself a bath. All these activities are necessary for you to return to home.

Your physical therapist will instruct you in a self-exercise program, as well as your restrictions after surgery. You need to start your exercise program immediately. This includes exercises to strengthen your leg and to decrease your chance of blood clots. Your exercises will include training in appropriate walking, getting in and out of bed, strengthening exercises and range of motion of your knee. The strengthening exercises include straight leg raises, strengthening of your buttock muscles, heel slides, pumping your ankles and lifting your leg to the side.

Knee range of motion is a major focus of you rehabilitation. In the past, I used a knee continuous passive motion (CPM) machine the first night after surgery. It helped squeeze out any extra blood that has collected in your knee; however, the CPM machine has not been shown to help you get better range of motion. Most of the time it actually seems to slow people down because they think the machine is going

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to do all the work for them. With the nerve blocks we take the risk of rubbing you raw with a CPM machine, so we have stopped using the all together. We find with the nerve blocks that we get much better motion sooner than with the CPMs. Your therapist will start working with you day #1 on range of motion of your knee. They will teach you the exercises. They are your guides. They will not make your knee bend. Only you can do that! .

### **Restrictions and Limitations in the Hospital and Home**

Physical therapists will go over your restrictions.

**You should not drive for a total of six weeks.** This is not my rule or the physical therapist's rule; it is because of the risk of accidents. The auto insurances many years ago did a study which demonstrated that patients having hip or knee surgery, had reduced reflexes for a total of six to eight weeks after surgery, so, if you drive and have an accident, I cannot defend you in a court of law. New studies show that your reaction times are reduced for six week (no matter which knee you have done. Right or Left). If you wait six weeks to drive and believe you are safe to drive, I can get up in court and defend you! If you don't wait six weeks to drive, call my exchange so I can keep my kids inside when you are driving. Some time after this six-week point, you will know when you are safe to drive. We suggest that you try driving in a parking lot before you actually go out on the road. Remember if you get in an auto accident and kill yourself, I will never forgive you. If you kill someone else, you will never forgive yourself.

Your physical therapist will also demonstrate the use of a knee immobilizer which will help you get your knee straight during the first 6 weeks after surgery. You will wear the knee immobilizer only at night until you get your knee straight. Most people flex their knees at night. This makes it harder for you to get it straight. Holding it straight at night will make things go faster. You will wear the knee immobilizer at night, until you can straight leg raise without difficulty 10 times and you get your knee straight. Your physical therapist will tell you when to get rid of it.

**Sitting in a Lazy Boy or similar reclining chair is the best way to make sure you never get your leg straight after surgery.** When you sit in these types of chairs they flex your knee. It is the number #1 reason people don't get their knee straight. If you want to sit in your Lazy Boy, put a chair in front of you and prop your leg up on a pillow. Make sure you turn your toes in to get the kneecap straight up and down, so that the axis of motion is to get the knee straight. Putting a cat, dog or 10lbs bag of rice on your knee will help force it straight.

Your physical therapist will train you in using either your crutches or walker. You will need these for the first 6 weeks after surgery to, once again, protect your knee during its healing phase. When your therapist feels you are safe they will advance you to a cane.

### **Home and Rehabilitation Hospital:**

#### **Discharge Planning**

The discharge planner at the hospital will be assisting you and your family in making arrangements for home care. I have standard discharge protocols, which the discharge planner will be using.

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### **Outpatient Physical Therapy**

If you are able to go home directly from the hospital, the discharge planner will arrange your outpatient physical therapy to start the day after you leave the hospital. Many times my surgical scheduler will do this in advance. It is easier to cancel an appointment than to get you “squeezed” into one.

Your physical therapist will be reviewing your self-exercise program, progressing new exercises and evaluating your wound. It will be your responsibility for the first 8 weeks after your surgery to do your exercise program twice a day, to walk as much as possible, to get back into water walking 3-4 hours per week and to do your leg straightening exercises. The 3-4 hours a week of water walking is in addition to any water exercise you physical therapist is having you do in their office. I want you to get back to the water walking as soon as your staples are out and the wound is clean and dry. Some patients ignore me or just don't get back into water walking for months. On the whole patients who do not return to water walking do much more poorly and take much longer to get better than patients who get right back in to water walking. The more active you are the better your outcome will be at the soonest possible time.

Water walking/exercise is a great way to get back to a high level of activity. I encourage all patients to return to a water walking and exercise program at the 2 week point after surgery. For those afraid or uncertain about water walking/exercise, I can generally get you to a physical therapist with a pool in their office. Medicare and most insurance will only pay for a few visits of water therapy and then you have to get into your own regular water walking program. At 2 months, those patients who go to water exercise 3-4 times a week look like patients 4-6 months out from surgery.

### **Rehabilitation Hospitals/Skilled Nursing Facilities**

If you go to a rehabilitation hospital, you will be there for approximately 7-10 days to continue your exercise strengthening program, or until you are safe for home. Some patients need two to three weeks to be ready for home. Medicare and most insurance will pay for a stay at a rehabilitation hospital if you are not safe to go home or do not have adequate help at home. Patients are often confused by their insurance saying it will pay for a stay in the rehabilitation hospital. They will only pay for it if you are not physically safe to go home according to the hospital physical therapists or if you do not have adequate assistance at home. **(SEE BELOW Home Preparation and Needs)**. Going to a rehabilitation hospital or SNF to get “Better” therapy is not beneficial to you if you already meet my criteria to go home. In fact, you may increase your risk of flu, pneumonia or other illnesses by contact with other patients. Trust me and my therapists to make the right choice for you. I have known many of the therapists for as long as 14 years and have known them to be wrong only once or twice in all those years. More frequently, I have patients who felt they wanted to go to the SNF

### **Home Preparations and Needs**

I do not let you go home until you can walk 350 ft, get in and out of bed, get in and out of your house, get in and out of your bathroom, get in and out of your shower, get on and off of your toilet, get in and out of a chair, climb up and down a full flight of stairs and get in and out of your car. I see no reason for you to go home unless you are safe for home. I do not want to see you or your family gets hurt because you are not safe. I long ago decided to let the hospital physical therapists decide when you are safe to go home. Neither you nor I are the best judge. Trust the therapists! It is what they do every day. They have no reason to send you home unless you are safe.

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Once you are safe to go home, you don't have to have someone at home with you 24 hours a day. When you first go home, you will need someone around to make sure you are O.K.. They should be able to help with such things as putting on your socks and watching you get in/out of the shower. I suggest that you have someone available to check on you several times a day, as well as someone to help with the activities around the house such as washing clothes, cooking meals, cleaning house, and, most importantly, purchasing your food and helping you on errands. You will need someone to drive you to shopping, physical therapy and to doctor's appointments.

It will be your responsibility for the first 8 weeks after your surgery to do your exercise program twice a day, to do your knee straightening exercises and to get back into a water walking program. The more active you are with your total knee replacement, the better your outcome will be at the soonest possible time.

At the end of the 8 weeks, we re-evaluate you to see what your muscle strength, knee range of motion and gait is like. At that point, if necessary, we will reorder physical therapy for specific training and exercise programs. I recommend you stay with your home exercise program and water walking until 4 months after surgery. Long term being in a regular exercise program with 4 hours a week of upright exercise such as water walking, walking, aerobics Tai Chi, elliptical striding, Nordic tracking and others will reduce your chances of falling and fracturing a major bone by over 54%. It will also keep your gait more steady and reduce your chances of falling by over 50%.

### **Post Operative Office Appointments, Therapy and Exercise**

You will have a four-week follow-up with my physician assistant or nurse practitioner for a wound check, review of exercises, and renewal of physical therapy orders. Medicare and most insurance now require us to see you every 4 weeks just to renew your therapy. At eight weeks, you will have a follow-up appointment with me. We will review your progress and make decisions about activities, and if needed more, physical therapy. At 8 weeks, I definitely want you to continue your water walking program. Three or four sessions of water exercise a week for two months will get you back to the activities you love. Water walking/exercise with a partner or in a formal class seems to work best (people tend to stay with these more); however, if you cannot or will not participate in water exercise you need to find another form of regular exercise. Frankly, there isn't much for me to do the first 8 weeks after surgery. I did 5% of the work now you have to do the other 95% of the work. The therapists have shown you the way, but you have to do the job.

### **Travel**

You will probably set off the metal detectors at the airports. We will give you an identification card about your knee surgery, but they will still search you. You have Small increased risk of blood clots for six months. The best things to do when traveling to prevent blood clots are:

- 1) Stand up or get out of your car every one to two hours and walk for a few minutes.
- 2) Pump your feet up and down while sitting.
- 3) Unless you are on Coumadin, Plavix or have problems with aspirin, take one aspirin a day starting three days before your trip, and one aspirin a day during your trip, and one aspirin a day for three days after your trip is completed.

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### Dental Work, Operations and Infections

I prefer you have your teeth cleaned several weeks before surgery and then not again until at least 3 months after surgery.

For two years you should take an antibiotic before and after any dental work and before and after some surgeries. Your dentist, surgeon, or I will write a prescription for you. **Always tell your physician or surgeon that you have a knee replacement before any procedure for the rest of your life!** Again, your doctor or I will provide you with a prescription. You may or may not need antibiotics for many surgeries, but let your doctor decide. If they have questions they will call me.

Infections such as bladder infections and festering wounds should also be treated immediately with antibiotics. If you think you have a bladder infection call your primary care physician and get it checked out. Viral colds and flu's do not require antibiotic treatment to protect your hip.

### Post Operative Pain Medicines.

We will give you a prescription for your home pain medicines at the time of your history and physical. I will try some long acting pain medicines while you are in the hospital. Depending on your response to them, I may or may not send you home on them. *When you need refills of your pain medicine call your pharmacy or my office Monday-Thursday between 9am-3pm. If you call Friday, we won't be able to get it filled. Because of many addicts seeking drugs, the doctor on call will not refill your pain medications at night or on the weekends.*

You will need pain medication for about 2-6 weeks. Everyone is different. I change your pain medicines because your body becomes rapidly accustomed to narcotics. It is better to switch them every few weeks.

Many Patients start hoarding or saving their pain medications and only taking their pain medications at night to help them "sleep". This is a trap not to fall into. We frequently hear the complaint that "I have pain at night and cannot get to sleep unless I take a pain pill". Their body has come to need the pain medication and this is the sign of their "addiction". We just need to get rid of that pain medication, start a new one and add a NSAID. Sleep may be bad for a few nights, but it will resolve.

**I have read and understand the previous 18 pages of information including the risks and dangers of total knee replacement. I understand that every possible risk, complication or danger cannot be included, but that Dr. Van Horne has made the best effort to inform me fully. I have been given adequate opportunity to ask questions and have had them answered to my satisfaction.**

Signed \_\_\_\_\_ Date \_\_\_\_/\_\_\_\_/\_\_\_\_