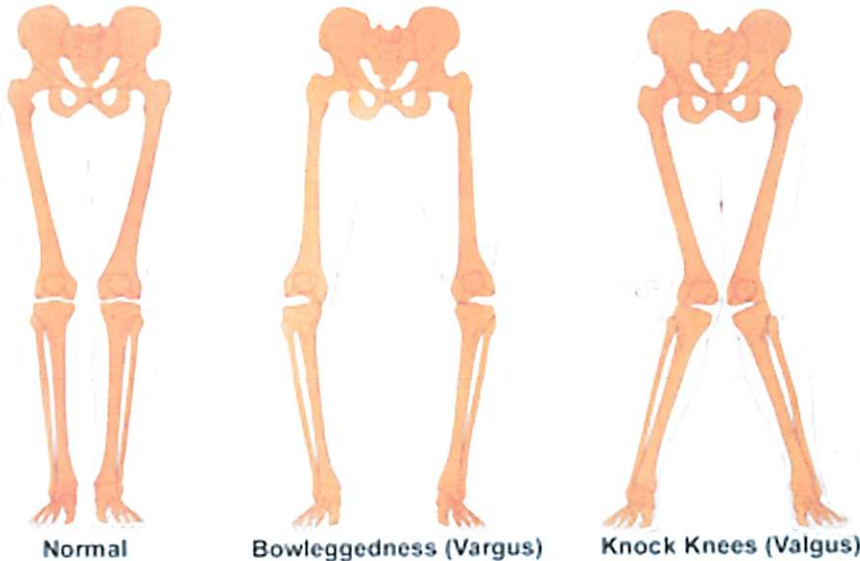


ARTHRITIS UPDATE



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ORTHOPAEDIC SPECIALISTS
of Northwest Indiana

ORTHOPAEDIC SPECIALISTS OF NW INDIANA Advanced Joint Replacement Techniques

New Techniques in Joint Replacement: “Visionaire” Instrumentation Custom Alignment for Knee Replacement

Dr. Joseph Hecht, M.D.

The modern era for Knee Replacements has provided widespread help for patients with arthritis since the early 1980's. As technology has advanced, researchers have looked toward techniques that make the operation easier and more reliably reproducible for patients.

The story is very much like that of a carpenter figuring out ways to make the parts of his craftsmanship fit with precise alignment time after time. Before the 1980's, the earliest design of knee replacements were placed without instruments, simply “eyeballing” the bone cuts for alignment. The surgeon had to have the eye of an artist to straighten out

bowed or knocked knee deformities and hope the alignment of the replacement parts worked out.

In the early 1980's, techniques were developed to make the alignment bone cuts reproducible. Jigs that fit over or inside the bone were designed that could measure the angles that bone was to be cut for the parts to fit more precisely. **This was a major breakthrough** and made the operation have a high degree of reliability. Those early instruments were large enough that it took quite long incisions and more extensive cutting to fit the jigs in place, secure them to bone and finally make the cuts for the parts to fit.

The instruments used in most of today's knee replacements still use rods placed

inside or over the thigh and leg bones as long “guides” for alignment.

“Before the 1980's... the surgeon had to have the eye of an artist to straighten out knee deformities and hope the placement of the parts worked out.”

By the early 2000's, “minimally invasive” techniques were developed. This meant less bulky jigs so that the approach to the knee joint and the incision could be smaller in the range of 4 inches..

New Techniques in Joint Replacement “Visionaire Instrumentation” Custom Alignment for Knee Replacement

Also in the 2000’s, techniques were developed that could use computer navigation to place the implants. The concept was to have the computer system in the operating room and have it “see” what the alignment of the limb was so that the angle of the bone cut could be precisely made. These systems were very expensive and only caught on to a limited extent.

To get around this problem, several knee replacement systems have been designed to do the precision alignment before the actual surgery, using pre-operative imaging and then make custom cutting blocks that fit directly onto the patients bone during surgery. These techniques require either computerized imaging such as a CT or MRI. The imaging study is not used in the usual way, which is to look for any damage to anatomy of bone, cartilage or ligaments of the knee. Here the imaging is used to precisely measure how much bone and cartilage is removed so that the knee replacement components have the ideal fit for each individual patient.

One orthopedic manufacturer, Smith-Nephew, uses a preoperative MRI, which is used for the measurements. That data is reviewed by the company engineers and the patients surgeon and when all that information appears correct, custom-made cutting blocks are created for component placement during surgery. Branded “Visionaire” technique, the cutting blocks are made of a hard nylon material, come sterilized for use in the operating room and fit exactly over the bone. Once secured to the bone, they have a cutting slot where the bone cuts are completed.

Computer modeled cutting blocks, custom designed for each patient and based on their own X-Ray and MRI imaging helps the surgery become even less invasive, faster and with less blood loss.

There are several advantages to this. One, as already mentioned, is precision and customized component placement. Additionally these blocks are smaller than even the minimally

invasive instruments, so the surgery can be less invasive. Since they come “pre-aligned,” there are no larger alignment instruments needed, so the surgery is often done in significantly less time. Finally, there is no rod placement down the central bone canal as in traditional techniques, which can lead to extra post-op blood loss.

For more detailed information covered in this “Arthritis Update,” I can be contacted at:

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Pre-operative design sheet for Visionaire Instrumentation

Visionaire blocks/X-Ray and Final Components

