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THE LIBRA[™] DYNAMIC KNEE BALANCER, BY SYNVASIVE TECHNOLOGY, INC.

An operative solution to assure TKR stability is realized in the OR

Synvasive Technology, Inc. (El Dorado Hills, CA) introduced the LIBRA[™] Dynamic Knee Balancer in 2005. Since then, a growing number of orthopaedic surgeons have continued to validate the benefits this innovative instrument system offers total knee surgeons in developing flexion gap symmetry by establishing femoral implant rotation and joint stability prior to resecting the posterior femoral condyles. How does it accomplish this? The LIBRA device uses pre-resection kinematics to develop the correct femoral implant rotation to assure the supporting ligaments are toned properly to stabilize the knee through the functional range of motion with the patella positioned. This balanced femoral implant position is used to locate the 4-in-1 femoral resection guide provided with the implant system to complete the reconstruction. The result is a dynamically balanced knee reconstruction that minimizes indifferent results and improves patient satisfaction (1).

As the demographics and demands of today's total knee replacement patients change, orthopaedic surgeons are transforming the procedures and technology they use to improve and prolong outcomes. Brett R. Smith, MD, MS, Co-Director for Adult Reconstruction Fellowships at the Institute for Bone and Joint Disorders (Phoenix, AZ), is a young surgeon using the LIBRA device in all of his primary total knee replacements. Dr. Smith finds that this instrument technology not only

offers him an advantage during surgery, but leads to more successful outcomes in his patients. "The Libra device is the only true dynamic balancer available. It is easy to use and I find that it actually speeds up the procedure. No matter which knee system a surgeon might choose to use, including navigation, the Libra device will be compatible. The end result with the Libra will be a balanced knee."

Traditionally, anatomic landmarks such as the transepicondylar axis, the A/P axis or Whiteside's line, and the posterior condylar axis are used in total knee surgery to establish rotational alignment of the femoral implant to develop flexion gap symmetry. These empirical landmarks provide reference points, but are known to produce inconsistencies among patients with anatomic variations, hypoplastic deformities or laxity of the collateral ligaments (2). Anthony Hedley, MD, Chairman



of Orthopedic Surgery, St. Luke's Hospital (Phoenix, AZ), says that when using the LIBRA device, "the guesswork in accurate, and more importantly consistent flexion balance, has been eliminated." Dr. Hedley finds that this is particularly so with valgus deformities, which are "the most difficult to handle. There are more structures on the lateral side of the knee that need to be appropriately balanced to get the knee functioning well." Dr. Hedley goes on to say, "traditionally, the amount of rotation that is put onto the femoral component is done empirically. The Libra takes the

guesswork out of it because tensioning of the ligaments is done on an individual basis. With the Libra, I can tense the lateral side of the knee to get an equal balance between the medial and lateral compartments through the functional range of motion. I am able to do this accurately and specifically to each deformity. The Libra has contributed greatly to my reproducibility in reconstructing valgus knees*”.

Dr. Smith agrees with Dr. Hedley's comment regarding reproducibility, and says that “ninety percent of varus or valgus knees come out with an 'ok' knee. It's the other ten percent of knees that don't do well because they are not balanced properly in flexion. The LIBRA device balances the flexion space—every time. I find that the number one reason for a knee revision, given today's advanced arthroplasty standards, is because the flexion space is misbalanced. The LIBRA device would prevent a whole host of revision knees if utilized in every patient.”

Another advancing frontier in total knee reconstruction is the growing interest in mobile bearing or rotating platform knee implants. This interest is likely to grow as the large orthopaedic companies introduce these components into their knee brands in an effort to improve function and longevity for patients suffering from activity limiting arthritis. “With use of these mobile

bearing knees, however, there is a trade-off because there is less freedom for error during the surgical procedure,” explains Martin W. Roche, MD, Chief of Orthopedics, Holy Cross Hospital (Ft. Lauderdale, FL). “If the knee is not balanced appropriately, not only will the knee not function correctly, but you run the risk of the tibial insert dislocating or impinging on the surrounding soft tissue. The LIBRA device allows me to intraoperatively balance the flexion and extension gap and at the same time visualize appropriate patellar tracking prior to finalizing my femoral cuts.” Dr. Roche goes on to say that he feels more confident balancing rotating platform knees with the LIBRA device. “From a surgical standpoint, the LIBRA can be used through large as well as small incisions and gives me reliable, consistent results.”

With all of this said, does the LIBRA device bring incremental benefit to the total knee patient? The rate of a patient's recovery following TKR is determined by so many variables that it would be difficult to pinpoint a specific element of surgery which brings about an earlier recovery or better recovery, but Dr. Roche feels confident that by using the LIBRA and having properly balanced flexion and extension gaps, “a patient's recovery will be more consistent and the patient will have an earlier functioning knee.” Dr. Roche closes by saying, “The LIBRA device allows the surgeon who does hundreds of

TKR's a year or a surgeon who does only forty a year to be able to achieve a consistent flexion gap—and that's very critical. The LIBRA device gives you true feedback intraoperatively and takes a lot of the variables out of the procedure so you can achieve a consistently successful knee replacement and more satisfied total knee patients.”

** The LIBRA device should not be used if a complete soft tissue release has been performed to align a severely deformed knee. The ability to “tone” soft tissue structures in flexion will be adversely affected. In these procedures excessive opening will occur on the released side which could lead to excessive rotation of the femoral component by the LIBRA device. In these cases, the transepicondylar axis is the best reference for determining rotation of the femoral implant.*



The LIBRA™ Dynamic Knee Balancer can enhance your primary TKR technique. For more information concerning Synvasive, call 1-916-939-3913; or visit the company's Web site at www.synvasive.com.

References:

1. In a study of 407 patients, researchers found that knees, which remain unbalanced post-operatively, showed the least change in outcome scores, while those that were balanced showed the most improvement. “Better TKA Outcomes Recorded After Tissue Balancing,” Linda Unitt, MCSP, SRP, 7th ERORT Congress.
2. Christopher W. Olcott, MD and Richard D. Scott, MD “A Comparison of 4 Intraoperative Methods to Determine Femoral Component Rotation During Total Knee Arthroplasty,” *Journal of Arthroplasty*, Vol. 15 [1], 2000: 22-26.