



why bicompartamental?

A REVOLUTIONARY ALTERNATIVE TO TOTAL KNEE REPLACEMENTS

TKR **is not** **always** the answer

Today, many patients with medial or lateral disease and patellofemoral involvement receive a Total Knee Replacement (TKR) without consideration of other options.

TKR is not always needed

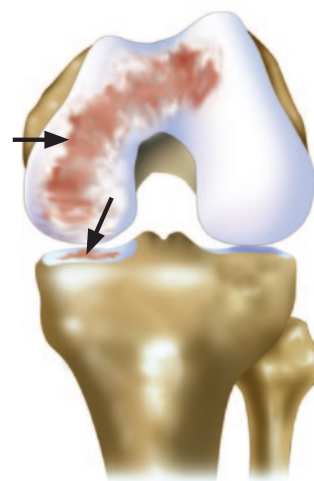
Osteoarthritis (OA) disease pattern studies have shown that bicompartamental disease is the most common disease pattern found amongst knee OA patients.

- *Ledingham J., et al.*, demonstrated through radiographic examination of 252 patients (470 knees) with OA of the knee that **58% of the knees were affected with bicompartamental OA**; 50% in the medial compartment/PF joint and 8% in the lateral compartment/PF joint¹
- *Rolston L., et al.*, tracked 100 patients older than 40 years of age, and identified through radiographic interpretation that **73% had involvement of both medial and patellofemoral compartments, but no lateral involvement**²



Not all of the patients in these study populations are candidates for knee arthroplasty and some may never go on to have a knee replacement. But initial data studying the disease pattern seen amongst actual knee arthroplasty patients indicate a third of procedures are performed on patients with bicompartamental disease and intact cruciate ligaments.

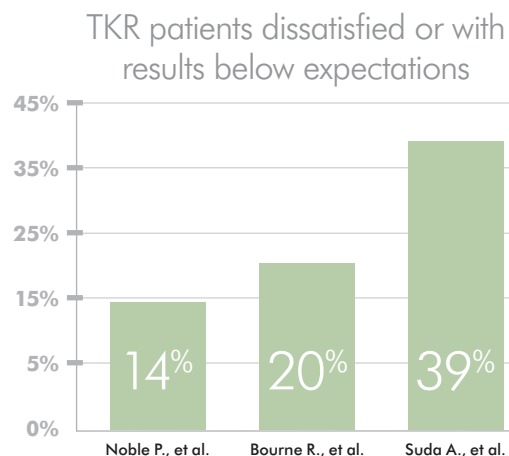
- A study investigating incidence of OA intra-operatively in a series of 237 consecutive knee replacement patients showed **28% of patients had bicompartamental disease and intact ligaments**³



Surgeon satisfaction vs. patient satisfaction

Advances in Total Knee Arthroplasty (TKA) and durability of results have made it the gold standard for many surgeons treating knee OA. However, in studies of patient satisfaction, a significant minority of patients was less satisfied with their outcome than surgeons typically think.

- *Noble P., et al.*, surveyed 253 TKR patients with minimum 1 year follow-up and identified that **14% of TKR patients were either dissatisfied or very dissatisfied**⁴
- *Bourne R., et al.*, reviewed results of over 1,700 procedures and reported **1 in 5 patients were either dissatisfied or very dissatisfied with their TKR**⁵
- *Suda A., et al.*, in a 46 patient survey completed 3 years before and after TKA surgery, that **39% reported the result of their TKR to be below their expectations**⁶



the **PKR** advantage

As patients become more demanding and more active, the interest in bone and tissue sparing Partial Knee Replacement (PKR) approaches has increased dramatically.

More surgeons recommending PKR

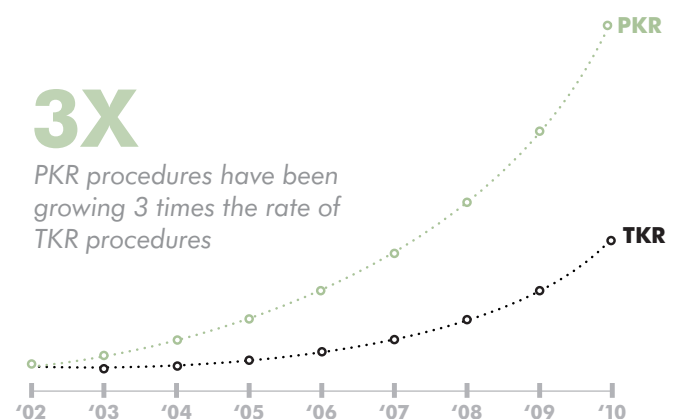
Recent data indicates surgeons are recommending PKR to their patients more and more frequently.

- *Riddle, et al.*, in a 2008 study measuring the incidence of PKR in the United States over an 8 year period, reported that **PKR procedures grew at 3 times the rate of TKR procedures**⁷

A less invasive option

In studies measuring the role the ACL plays in proprioception, or joint sense, preserving the ACL appears to provide patients with a much better sense of the function of their knee.

- *Pap G, et al.*, in a comparative study of 20 patients with a torn ACL and 15 patients with an intact ACL, assessed proprioception using threshold levels for the perception of knee movement and found that **failure to appreciate movement was significantly greater in knees with ACL loss** compared with the undamaged knees⁸
- *Carter, N., et al.*, studied the impact of losing the ACL on Joint Position Sense (JPS) in 50 patients and found that **JPS was impaired in ACL deficient knees and did not improve with exercise therapy**⁹



“...failure to appreciate movement was significantly greater in knees with ACL loss...”

Higher patient satisfaction and better outcomes

In comparative studies of patients with both PKR and TKR implants, patients have reported better early flexion, higher range of motion and a more natural feel of the PKR implant.

- *Dalury DF, et al.*, in a 2009 study of 23 bilateral patients receiving PKR implants in one knee and a TKR implant in the other knee, identified that more than **50% of patients preferred their PKR implant to their TKR implant** while none preferred their TKR to their PKR implant¹⁰
- *Laurencin, CT*, in a comparative study of 23 patients with PKR implants in one knee and TKR implants in the other knee, noted those patients reported **better early flexion, higher range of motion and a more natural feel** in the knee with the PKR implant¹¹

Other studies comparing PKR and TKR indicate that PKR solutions have demonstrated a benefit in function and natural kinematics.

- *Rougraff, B., et al.*, reported in a comparison of patients with UKR and TKR, **reported that UKR patients had better range of motion and function**¹²
- *Patil S, et al*, in a biomechanical study, identified that **tibial axial rotation in a native knee appears comparable to tibial axial rotation in a PKR knee**, while TKR knees show a significant difference¹³
- *Lastad-Lygre S., et al.*, collected postoperative, patient-reported data from over 1,344 patients, TKR (972 patients) and PKR (372 patients), and found that patients with **PKR implants had fewer problems with activities that involved bending the knee**¹⁴

Positive initial long-term data

While aggregate data suggests that TKR remains the gold standard on durability, partial knee procedures, when performed well in appropriately selected patients, have been shown to do as well as traditional TKR.

- *Newman JH, et al.*, showed that **PKR patients had better early function and maintained those advantages at 15 years vs. TKR**, with no disadvantage on durability¹⁵
- *Berger RA, et al.*, identified in a prospective study of 62 consecutive fixed bearing UKR procedures, that **unicompartmental survivorship was at 98% after 10 years**¹⁶

TKR vs. PKR



TKR results in significant bone loss



PKR preserves more of your bone



Tibial axial rotation

comparable with native knee

“Survivorship was at **98%** after 10 years.”

offering the **PKR** **advantage** to bicompartamental patients

A revolutionary alternative

The iDuo® G2 bicompartamental knee resurfacing system offers a revolutionary alternative to traditional TKR by combining proven TKA principles for patellofemoral treatment with the advantages of the ConforMIS partial knee system.

With the iDuo G2, a surgeon can treat just the affected compartments with a precise, patient specific implant that delivers unparalleled fit, preserves all ligaments and conserves far more bone than traditional TKA. Not only does this provide patients with a more natural knee motion, it also preserves future treatment options—a benefit to both patients and surgeons alike.

True patient-specific design makes a difference

Patient satisfaction is a result of multiple factors: setting realistic expectations, proper implant design, intuitive/reproducible surgical technique, and post-op patient compliance. A true patient specific implant and instrument system ensures the implants will provide optimal fit for the patient while delivering a simplified surgical technique that makes the OR experience smooth and reproducible.

- The iDuo G2 delivers a solution with a patella femoral treatment that is based on proven principles from TKR, with the ACL and PCL preserving advantages of a partial knee solution
- The design allows for a patient-specific fit that avoids overhang and under-coverage
- Its integrated single piece, monoblock design also avoids the complexity of matching two implants and managing the transition zone in a dual implant procedure
- This iDuo G2 bicompartamental solution is delivered with the unique advantages of the ConforMIS G2 system, including a wear-optimized design approach on the femur and tibia, and the disposable instrumentation available with all ConforMIS products



iDuo G2

**See the ConforMIS advantage for yourself.
Contact us for an in office demo.**

Call 781.345.9001 or visit www.conformis.com



references

- ¹ Ledingham J., et al.; Radiographic Patterns and Associations of Osteoarthritis of the Knee in Patients Referred to Hospital; *Ann Rheum Dis*; Jul 1993; Vol. 52(7): pp. 520-526; PMID: 8346979
- ² Rolston L, et al.; Bicompartmental knee arthroplasty: a bone-sparing, ligament-sparing and minimally invasive alternative for active patients; *Orthopedics*; Aug 2007; Vol. 30(8):pp. 70-73; PMID: 17824339
- ³ Data on file, ConforMIS
- ⁴ Noble P., et al.; The John Insall Award: Patient expectations affect satisfaction with total knee arthroplasty; *Clin Orthop Relat Res*; Nov 2006; Vol. 452: pp. 35-43; PMID: 16967035
- ⁵ Bourne R., et al.; Patient satisfaction after total knee arthroplasty: Who is satisfied and who is not; *Clin Orthop Relat Res*; Jan 2010; Vol. 468(1): pp. 57-63; PMID: 19844772
- ⁶ Suda A.; Are patients' expectations of hip and knee arthroplasty fulfilled? A prospective study of 130 patients; *Orthopedics*; Feb 2010; Vol. 33(2): pp. 76-60; PMID: 20192137
- ⁷ Riddle D, et al.; Yearly Incidence of Unicompartmental Knee Arthroplasty in the United States, *Journal of Arthroplasty*; Apr 2008; Vol. 23(3): pp. 408-412; PMID: 18358380
- ⁸ Pap G, et al.; Detailed analysis of proprioception in normal and ACL-deficient knees; *J Bone Joint Surg Br*; Sep 1999; Vol. 81(5): pp. 764-768; PMID: 10530833
- ⁹ Carter N, et al.; Joint position sense and rehabilitation in the anterior cruciate ligament deficient knee; *Br J Sports Med*; Sep 1997; Vol. 31(3): pp. 209-212; PMID: 9298555
- ¹⁰ Dalury D., et al.; Unicompartmental knee arthroplasty compares favorably to total knee arthroplasty in the same patient; *Orthopedics*; Apr 2009; Vol. 32(4): pp. 253; PMID: 19388619
- ¹¹ Laurencin C; Unicompartmental versus total knee arthroplasty in the same patient: A comparative study; *Clin Orthop Relat Res*; Dec 1991; Vol. 273: pp. 151-156; PMID: 1959264
- ¹² Rougraff B, et al.; A comparison of tricompartmental and unicompartmental arthroplasty for the treatment of gonarthrosis; *Clin Orthop Relat Res*; Dec 1991; Vol. 273: pp. 157-164; PMID: 1959265
- ¹³ Patil S, et al.; Can normal knee kinematics be restored with unicompartmental knee replacement?; *J Bone Joint Surg Am*; Feb 2005; Vol. 87(2): pp. 332-338; PMID: 15687156
- ¹⁴ Lastad-Lygre S.; Pain and function in patients after primary unicompartmental and total knee arthroplasty; *J Bone Joint Surg Am*; Dec 2010; Vol. 92(18): pp. 2890-2897; PMID: 21159989
- ¹⁵ Newman JH, et al.; Unicompartmental or total knee replacement? 15 year results of a prospective, randomized controlled trial; *J Bone Joint Surg Br*; Jan 2009; Vol. 91-B(1): pp. 52-57; DOI:10.1302/0301-620X.91B1.20899
- ¹⁶ Berger RA, et al.; Results of Unicompartmental Knee Arthroplasty at a Minimum of Ten Years of Follow-up; *J Bone Joint Surg Am*; May 2005; Vol. 87(5): pp. 999-1006; PMID: 15866962



ConforMIS, Inc.

11 North Avenue • Burlington, MA 01803 • Phone: 781.345.9001 • Fax: 781.345.0147