The INDUS knee prosthesis: Prospective multicentric trial of posteriorly stabilized high-flex design: Two years follow-up

Sir,

We read the article “The INDUS knee prosthesis: prospective multicentric trial of a posteriorly stabilized high-flex design: Two years follow-up” by Sancheti KH et al.1 with interest. We compliment the authors for a well written prospective study. We have a few concerns regarding the prosthesis design and the clinical outcome described by them for Indian patients.

It is not uncommon to see patients with very advanced osteoarthritis with gross, neglected deformities, with very limited pre-operative range of motion, confined to wheelchair or bed for many years in this part of the world. The patients presenting even in late stages anticipate sitting crosslegged and squatting, in the postoperative period. The authors’ series does not describe such severe deformities. The authors have discussed the preoperative deformity as ranging from 32 degrees of varus to 18 degrees of valgus (the femorotibial angle). It is not clear whether the authors have excluded severe deformities and patients with restricted pre operative range of motion and obese patients. This leaves the reader with the dilemma of choosing such a high flex design, which theoretically promises the benefits of squatting and sitting cross legged.

Authors in their study have described the design modifications of the prosthesis to achieve a mean flexion of 135 degrees without compromising the stability, which allows the patients activities such as squatting and sitting cross legged. However the authors in their two years follow-up have described 24 knees in their series, having a flexion of less than 100 degrees. The cause of such a flexion loss at early follow-up has not been discussed in their work.2 Did these patients have restricted movements in the pre operative period? This leaves the reader wondering why there was flexion loss in these patients despite the use of a highflex design. The significance lies in the fact that if there is restricted range of motion preoperatively, is there any advantage of such a high-flex design? Many studies have shown the clinical and functional outcome of a fixed and mobile bearing total knee arthroplasty to be similar.2,4 Studies also indicate that the preoperative functional status is an important indicator in the post operative outcome and function in patients undergoing total knee arthroplasty.5,6 It is not clear in the manuscript whether the design of the prosthesis per se, can increase the postoperative function and range of motion in a knee that had restricted range of motion and function in the pre operative period?

The INDUS knee prosthesis described does not have an option of using extenders with the femoral component. The study includes 44 patients with rheumatoid arthritis (RA) and the authors have not described any of these patients as having poor bone quality, a common finding in such patients. The stem extenders are an integral part of the preoperative planning for total knee arthroplasty in patients with RA. It is also interesting to note that the authors have not used any such extenders in these patients.

The design of the prosthesis with less removal of the bone from the intercondylar notch (which is also our experience), appears promising and authors describe that this would make the revision easier. With 75.7% of patients in their follow-up being able to squat and sit cross legged, we foresee many patients would require revision due to polywear due to increased contact stresses with the polyethylene. But having said that, are the authors planning to alter the design to include options of stem extenders to make revision possible with Indus knee or they recommend the readers, prosthesis? The authors have not described the type of prosthesis used for the revision case in their series.

Can patients with high BMI, where fat thigh and the calf restrict the high flexion in the post operative periods, can get the benefits of this design? Can the preoperative deformity, range of motion, quadriceps strength, mobility status and obesity be confounding factors in post operative outcome in this population?

Ashish Anand, A Ravi Raj

Joint Replacement and Sports Medicine Unit, Fortis Hospitals, Delhi, India

Address for correspondence: Dr. Ashish Anand, Consultant Orthopedic Surgeon, Fortis Escorts Hospitals, Delhi-NCR, India. E-mail: anandash@gmail.com

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Letters to Editor

Sir,

We appreciate the thoughtful comments by the readers' in referencing our paper and the INDUS knee prosthesis. About readers' inquiry regarding selection of patients with severe deformity, we can emphatically say that we have not excluded any joint that is fit for conventional total knee replacement. Only the knees that were grossly unstable and required a constrained implant were not implanted with INDUS knee prosthesis.

Preoperative factors like the preoperative range of motion, flexion deformity, body mass index, diagnosis etc are among the most important factors that define the postoperative outcome and these were the factors that lead to less than 100 degrees range in 24 patients in our study. The rationale of having a high flex design is not only achieving high flexion but to make achievement of this high flexion safe. For example, even with the conventional knee replacements many of our patients ignored the surgeon's advice and continued sitting cross-legged which lead to early failure of these implants. The high flex features in INDUS knee makes this high flexion activity much safer than the conventional implant. The INDUS knee is able to achieve the mean range of motion comparable to the other high flexion knee joint which indicates the ability of the implant to achieve better range of motion within the given limitation of the pre-operative factor, although a detailed study with respect to these factors and comparison of the INDUS implant with the conventional design implants will be presented soon along with the midterm results.

We thoroughly agree that outcomes of fixed and mobile bearing are proven to be similar and so we designed INDUS to be a fixed bearing so as to make it more economical and suitable for the economic conditions of our country. Regarding stem extenders, the INDUS knee has an option of stem extenders in the tibial side but not on the femoral side. We personally do not think that requirement of stem extenders is a function of osteoporosis or inflammatory joint disease. We use stem extenders only in cases with bone defects that occupy more than 50% area of tibial condyle. We had none of the cases with such big defect in presented sample however we have performed more than forty cases with tibial stem extenders over the last two years.

We had no case of revision of INDUS knee so far in our early follow-up of two years study. Also tibial stem extenders are available for INDUS implant. Here we require making it very clear that we do not promote sitting cross-legged or squatting in our patients, but have merely reported their ability to do so at final follow up. We adequately warn our patients against this, however the High Flex features of the INDUS knee make noncompliant deep knee flexion in these patients much more safe thus preventing wear and providing longevity to the implant. In conclusion we say that, we have presented early results of INDUS knee prosthesis with mean range and associated complications in the present study which in our view is very satisfactory in terms of clinical, functional and financial benefit to our patients.

We acknowledge your comments that, an important factor that may affect preoperative range of motion is the preoperative knee flexion range. Hence, in our study the patients with severe deformity, who have very poor preoperative range of motion, have very poor range of motion postoperatively also.

A complete detailed analysis of the pre-operative and intraoperative factors and their effect on outcome of INDUS implant is an ongoing study the results of which will be published soon.

Kantilal H Sancheti, Parag K Sancheti, Ashok K Shyam, Surendra Patil, Rajiv Joshi
Sancheti Institute for Orthopaedics and Rehabilitation, Pune, India

Address for correspondence:
Dr. Kantilal H Sancheti,
Sancheti Institute for Orthopaedics and Rehabilitation,
16, Shivajinagar, Pune - 411 005, India.
E-mail: parag@sanchetihospital.org

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