

A Novel Osteotomy for Medial Osteoarthritis of the Knee Joint – Distal Tibial Tuberosity Focal Dome Osteotomy combined with Intra–Articular Condylar Osteotomy (Focal Dome Condylar Osteotomy): Technique and Preliminary Result

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What was the question?

Focal Dome Condylar Osteotomy (FDCO) is a novel surgical technique for medial compartment osteoarthritis of the knee joint with varus deformity. We combined distal tibial tuberosity focal dome osteotomy centered on the center of rotation and angulation (CORA) with the longitudinal condylar intra–articular osteotomy. The present study provides surgical technique, early clinical and radiological outcomes of FDCO for osteoarthritis of the knee joint.

How did you answer the question?

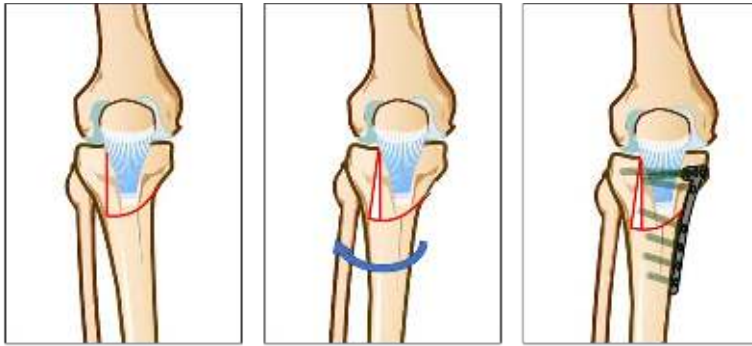
The clinical data of 19 patients (20 knees) with medial compartment osteoarthritis who were treated with FDCO between November 2018 and April 2021 was retrospectively analyzed. There were 3 males (3 knees) and 16 females (17 knees) with a mean age of 64.9 ± 10.0 years at the time of surgery. Mean body mass index was 26.2 ± 3.4 kg/m². We compared the pre and postoperative radiographic and clinical variables including % mechanical axis deviation (%MA), femorotibial angles (FTA), hip–knee–ankle (HKA) angles, medial proximal tibial angles (MPTA), modified Insall–Salvati Index (mISI), modified Caton–Deschamps Index (mCDI), and modified Blackburne–Peel Index (mBPI), and mechanical axis–lateral tibia plafond angle (MA–LTP) on radiographs, knee range of motion (ROM), Osteoarthritis Outcome Score (KOOS) and the time to union. Mean follow–up of the patients was 15.1 months.

What are the results?

The %MA, FTA, HKA, and MPTA significantly changed from $16.0 \pm 11.5\%$ to $62.7 \pm 7.7\%$, from $180.5 \pm 3.4^\circ$ to $171.7 \pm 3.9^\circ$, from $-7.1 \pm 2.9^\circ$ to $3.5 \pm 2.6^\circ$ from $84.4 \pm 1.3^\circ$ to $92.4 \pm 2.3^\circ$ respectively. For the patella high index, mISI, mCDI, and mBPI showed no statistically significant postoperative changes. MA–LTP significantly changed from $97.2 \pm 2.8^\circ$ to $90.3 \pm 1.9^\circ$. ROM showed no statistically significant postoperative change from $-3.3 \pm 4.1^\circ$ to $-2.3 \pm 3.0^\circ$ for extension, from $127.2 \pm 9.5^\circ$ to $128.0 \pm 8.8^\circ$ for flexion. All subscales of KOOS improved significantly after surgery. The KOOS symptoms improved from 64.4 ± 18.1 to 80.9 ± 9.5 ($P < .0005$), pain from 62.4 ± 8.8 to 85.8 ± 7.1 ($P < .0001$), activities of daily living from 69.5 ± 7.7 to 89.6 ± 6.7 ($P < .0001$), sport from 39.0 ± 13.0 to 60.5 ± 22.9 ($P < .0001$), and quality of life from 39.3 ± 10.9 to 69.1 ± 14.9 ($P < .0001$) at final follow–up.

What are your conclusions?

In the present study, we combined the distal tibial tuberosity focal dome osteotomy centered on the CORA with the longitudinal condylar osteotomy (Focal Dome Condylar Osteotomy: FDCO) for knee OA. The advantages of this procedure are as follows: physiological orientation of adjacent joint is achieved; limb length is maintained; joint stabilization in the coronal plane is achieved; patella infra is prevented; sufficient bone contact between the medial and posterior cortex is achieved; early weight–bearing walking is possible; fibular osteotomy is not required. This study shows FDCO leads to significant improvement of patient reported outcomes and function after intervention and demonstrates reliable mechanical axis correction with subsequent shift of weight–bearing without patella infra.



Distal tibial tuberosity focal dome osteotomy combined with intra-articular condylar osteotomy

Focal Dome Condylar Osteotomy: FDCO

