Surgical approach for a new knee prosthesis concept (TSTP) retaining both cruciate ligaments

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The transversal support tibial plateau (TSTP) concept was developed to retain both cruciate ligaments during total knee arthroplasty. TSTP design consists of two individual joint surfaces, reinforced beneath the joint line by two joint surface supports and buttressed by a single transversal support (TS). This configuration is devised to provide good bony anchoring especially for the TS, and to ensure long-term alignment of the individual joint surfaces. TS insertion requires a small extra incision. This study assessed techniques to implant the TS into the tibia. Using a specially designed aiming device, TS insertion from each side was evaluated in 13 human cadaveric knees (10 formalin-fixed, two Thiel embalmed, one fresh) at defined intervals of 15, 25, and 35 mm beneath the joint line. Particular attention was paid to potentially endangered structures, e.g., the medial collateral ligament (MCL), pes anserinus, and common peroneal nerve, as well as impediments to insertion, e.g., the fibula. TS implantation was successfully performed using both medial and lateral approaches. From medial, the TS was inserted safely at the 15 mm interval with the knee in maximum flexion and external rotation. With increasing intervals, however, the MCL and pes anserinus became progressively more susceptible to injury. In contrast, with the lateral approach, the operative field was quite close to the fibular head for the 25 mm interval. However, with the knee in extension, no other important structures were at risk.

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