Appendix 1 (as submitted by the authors): Medial opening wedge high tibial osteotomy procedures

Prior to surgery, full-limb standing anteroposterior radiographs (i.e. hip-to-ankle X-rays) were used to template the planned angle of correction. The aim was to shift the weight-bearing line (i.e., the line from the centre of the hip to the centre of the ankle) laterally up to 62.5% of the medial-to-lateral tibial width. This new position of the weight-bearing line typically crosses the knee lateral tibial spine and creates very slight valgus alignment[1,2]. To determine the wedge size, lines were drawn from a point just lateral relative to the lateral tibial spine superiorly to the center of the hip femoral head, and inferiorly to the center of the ankle talocrural joint. The angle created by these two lines indicated the amount of correction. Then, the osteotomy line was drawn at about 4 cm below the knee medial joint line toward the fibular head. This line was measured in millimeters and transferred to the apex of triangle created. The width of the triangle's base was measured in millimeters, which corresponded to the amount of correction required. The final angle was decided intraoperatively at the surgeon's discretion through visual inspection of fluoroscopic imaging and the appearance of the lower extremity.

Surgeries were performed under general anesthesia and patients received prophylactic antibiotics. An oblique medial-to-lateral cut was made through the proximal tibia to the lateral cortex using a guide pin and osteotomes (rigid and flexible). The osteotomy was opened to create the desired correction. Strategies to minimize possible increases in posterior tibial slope included making the osteotomy cut parallel to the posterior tibial slope, ensuring the anterior and posterior cortical cuts both reach the lateral hinge point of correction, and ensuring the anterior osteotomy gap was approximately half of the posteromedial gap at the time of plate fixation. Planned alteration of the tibial slope was not performed unless there was a specific ligamentous issue. The osteotomy was secured using an internal fixation plate with cancellous and cortical screws placed both proximally and distally. Cancellous allograft bone was used to fill the osteotomies.

Postoperatively, patients followed a standardized rehabilitation protocol. Patients used a hinged knee brace and crutches, gradually increasing weight-bearing and rehabilitation exercises over approximately 2-to-10 weeks, depending on the fixation plate used and clinical signs of osteotomy healing. Neuromuscular exercises for knee OA[3] were progressed with the aim to return to high-demand physical activities by approximately 6 months after surgery.

References

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