Editorial

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Some Considerations in High Tibial Osteotomy

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High tibial osteotomy (HTO) has long been considered a successful and effective treatment option for patients with medial compartment osteoarthritis (OA) of the knee[1-4]. Two basic HTO techniques are commonly performed. In the past, lateral closed-wedge HTO (CWHTO)[5] was more common; however, medial open-wedge HTO (OWHTO) with the TomoFix system[6] made the procedure easier and popular. Despite several advantages of OWHTO, it can cause the unintended effects: changes in the posterior tibial slope[7], patellar height[8], and leg length[9]. This issue of the *Knee Surgery & Related Research* contains three articles related to HTO, including two original articles and one case report. Saito et al. reported on a hybrid CWHTO method based on the conventional CWHTO approach, which was developed by Takeuchi et al.[10]. Briefly, hybrid CWHTO is a combined method with lateral closed-wedge and medial open-wedge styles. Therefore, lower bone loss in the lateral cortex and less medial opening can lead to more extensive correction in patients with severe deformities compared with OWHTO. It could be beneficial in terms of reduced leg shortening and less lowering of the patella and lower pressure increases at the patellofemoral joint compared with OWHTO[8,11]. Large correction in OWHTO results in joint-line obliquity and excessive shear stress on the articular cartilage[12]. In this situation, hybrid CWHTO can be used as an option for treatment. However, it needs to keep in mind that this technique is a technically demanding procedure. Though this is a retrospective case series including 29 knees (level 4 study), it is the first article on the outcomes of hybrid CWHTO other than by the original authors.

The 2nd original article (Lee et al.) evaluated the learning curve for OWHTO in 100 consecutive cases. Surgical competency of orthopedic surgeons has been commonly evaluated using clinical scores, operation times, errors in radiological parameters, and incidence of complications. Lee et al. evaluated the learning curve for OWHTO, using the cumulative summation test for learning curve (LC-CUSUM) analysis[13]. In this study, the parameters of surgical errors were defined by three separate factors: correction error (under- and overcorrection), excessive posterior slope change, and the presence of a lateral hinge fracture. The informative summary might be as follows: undercorrection, excessive posterior slope change, and lateral hinge fracture could be improved by surgical experience. However, it did not reduce the incidence of overcorrection in medial open wedge HTO (MOWHTO) until 100 cases conducted over 6 years.

Overcorrection in MOWHTO is commonly associated with soft tissue laxity[14]; even in an experienced surgeon in OWHTO should pay careful attention to prevent overcorrection.

The 3rd case report is popliteal artery injury during MOWHTO. Chun et al. first reported an injury to the popliteal artery due to drilling during screw fixation of the locking plate after the osteotomy. Other reports were due to the use of an osteotome or oscillating saw. The best policy for vascular injury in medial OWHTO is prevention. The most important thing for prevention of vascular injury is metal plate position, which should be positioned posteromedially.

The goals of HTO are to reduce knee pain and delay the need for a knee replacement. To achieve these goals, appropriate patient selection, precise surgical planning, precise surgical techniques, and prevention of complications are essential. The above information might be helpful to avoid complications.

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