

Editorial Commentary: High Tibial Osteotomy Is Effective, Even in Patients With Severe Osteoarthritis: Contradiction of Another Dogma From the Past



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Abstract: High tibial osteotomy is a widespread treatment option and has been performed in the treatment of osteoarthritis long before joint replacements started their triumphant era in the last third of the last century. However, osteotomies have again gained interest and popularity within the last 2 decades. Historically, osteotomies have mainly been recommended for early osteoarthritis and contraindicated for advanced osteoarthritis. However, over time, some historic but widespread dogmas have already been contradicted regarding high tibial osteotomy. Osteotomies are very well possible and can yield excellent outcomes, even in patients with severe osteoarthritis. Thus, another dogma from the past is contradicted.

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Long before joint replacements dominated the surgical treatment strategy for osteoarthritic knees, osteotomies had already been performed for decades with good results.¹ However, consequently to the success of joint-replacement surgery, joint preservation and osteotomies became somehow unpopular. But within the last 2 decades osteotomies have again gained increased popularity.² Nevertheless, some relics from the past persisted: One of them is the recommendation to perform osteotomies only in early-to-moderate osteoarthritic and not in severe osteoarthritic knees.

In the article “Clinicoradiologic Outcomes of Medial Open-Wedge High-Tibial Osteotomy Are Equivalent in Bone-on-Bone Medial Osteoarthritis and Non–Bone-on-Bone Medial Osteoarthritis,” Lee, Kim, Bin, Kim, and Kim present a retrospective comparison of 134 knees from a single center with either moderate or severe osteoarthritis.³ No difference in clinical results was apparent in a mid-term follow-up. The conclusion further challenges the long-standing dogma of not performing osteotomies in severe osteoarthritis.

The current study adds good evidence to what we know from other studies that have presented excellent results in subgroups of high-degree osteoarthritis treated with high tibial osteotomy (HTO) in the last years: In 2013, Floerkemeier et al.⁴ published mid-term results of more than 500 cases from a multicenter study. About one third of the included cases either had Grade IV cartilage defects according to the Outerbridge classification or Grade III to V osteoarthritis according to the Ahlbäck classification. Crucially, those patients had even more severe osteoarthritis as the cases included in the present study by Lee et al., where Ahlbäck Grade III to V were excluded. Although patients with more severe cartilage damage had slightly inferior results in absolute score, the overall results of the HTO procedure in these cases were also excellent. It might be that these results have been misinterpreted in the past: Although no preoperative scores are presented it might well be that absolute increase is comparable or even greater than in cases with lower cartilage damage, as it has also been observed in the present study.

Further, we have published excellent mid- and long-term results of 80 cases with quite severe osteoarthritis (Kellgren–Lawrence Grade III and IV and large area full-thickness cartilage defects) treated with HTO and cartilage repair from our sports orthopaedic center: The 10-year survival rate was 82% in this series, and International Knee Documentation Committee score increased from around 40 to 70, remaining constant over time.^{5,6}

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We found an extraordinary high satisfaction rate in this series, implying that patients experienced a significant benefit from the procedure, and they were especially happy to avoid or postpone arthroplasty, which would have been the alternative treatment. We have also seen that in combination with a cartilage repair procedure (abrasion and microfracture) excellent cartilage restoration can be achieved in the majority of cases. Further, it has been shown by Kim et al.⁷ that cartilage can improve or even regenerate after HTO without cartilage treatment even in full-thickness osteoarthritic defects.

Therefore, it is not new that osteotomies can very well be performed in more severe osteoarthritis, but the current study strongly contributes to contradict this dogma from the past by direct comparison of 2 groups. In clinical conclusion, obviously, the degree of osteoarthritis itself should not be a limiting factor or even a contraindication. Generally and in our experience, patients with more severe osteoarthritis are more challenging to treat with osteotomies: With more severe osteoarthritis, the joint space width decreases, and the joint line convergence angle increases. To achieve appropriate correction, a slight overcorrection of the tibia is necessary in the majority of these cases. In the current study, this can be seen in the resulting post-operative medial proximal tibial angle, which was 91° in group I and 93° in group II (more severe osteoarthritis), respectively. In cases of more severe osteoarthritis, this might lead to overcorrections that can hardly be accepted (medial proximal tibial angle >93). These resulting iatrogenic deformities are detrimental with regard to clinical results and possible further joint replacement, independently of either unicompartmental or total knee replacement. The joint line convergence angle has been reported to decrease after HTO and is one of the key factors for the accuracy of the correction. Some guidelines for evaluation and planning of this have recently been published.⁸ Acceptance of a neutral axis or slight undercorrection as well as performing double-level osteotomies are ways to preserve anatomical bony angles and a neutral joint line to overcome this problem.

In the past, age and the degree of osteoarthritis have often been the generally accepted crucial—and often only—factors for the decision of whether joint-preserving or -replacing treatment is recommended. But obviously basic principles change here.^{2,9} Nowadays, with increasing knowledge and data from high-quality

studies over the last 2 decades, a more individual approach and treatment strategy is necessary in the treatment of osteoarthritis, in particular based on anatomical and functional factors such as type, location, extent and etiology of deformity, knowledge of kinematics and instabilities, respect and knowledge of the importance of the joint line, and consequently avoidance of iatrogenic deformities and overcorrection. Together with patient specific factors, this approach will result in an optimized individual treatment strategy for osteoarthritic knees.

In conclusion, do not hesitate to perform osteotomies even in severe osteoarthritis—but respect what we have learned over the last few years.

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