Editorial
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HIGH TIBIAL OSTEOTOMY FOR KNEE JOINT PRESERVATION: "OLD BUT GOLD"!

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INTRODUCTION

It is known that one of the most common chronic diseases affecting the elderlyis knee osteoarthritis (OA). Knee OA significantly impairs the activity of daily living of the patients. In knee OA there is the destruction of the articular cartilage of the knee joint, leading to progressive impairment. The change in mechanical axis of the knee causes impairment on the three compartments of knee. In the knee joint, if the medial compartment of the knee is affected, it will cause a varus knee deformity, whereas lateral the knee (1,2). The techniques of surgery to address the mal-aligned axis of the joint is knee osteotomy.

This correcting the frontal and/or sagittal plane malalignment, including the instability of the knee with the healthy side of the compartment. In simpler terms, deformities of angular and/or rotational nature can be corrected using the knee osteotomy technique, consequently realigning the bone axis (3,4). Historically, the osteotomy technique has been developed for centuries. The first modern osteotomy was performed by Williams Adams in 1879 and was reported in the British Medical Journal under the name 'On Subcutaneous Osteotomy.' Another historically significant osteotomy of the knee, which preserves joint function, was high tibial osteotomy (HTO) to treat varus deformity, performed by Wardle in 1941 (5). It was further popularized by Jackson and Waugh in 1961 (6) and Conventry MB in 1965 (7). Now, in 2023, this editorial article transformation most recent transformed the landscape of knee joint preservation.

There is a growing interest in developing minimally invasive techniques for HTO, such as using smaller incisions, arthroscopy-assisted osteotomy, Patients Specific Instrumentation (PSI) and computer- guided navigation systems. These techniques aim to reduce surgical trauma, minimize scarring, and facilitate faster recovery. One of the most significant recent advancements in knee osteotomy is

3D printing of the knee. Surgeons now can create patient-specific cutting guides and instruments, enabling precise and accurate bone resection. Reports have shown that HTO has lower accuracy post- operative compared to pre-operative planning.8 A systematic review conducted by Zaffagnini, et al. (9), stated that 3D printed patient-specific bone guides showed higher accuracy in HTO procedures, demonstrated by the pre-operative and post-operative correction of HKA (hip-knee-ankle angle) being less than or equal to 3 degrees and yielding better clinical outcomes.

The 3D printed cutting guide is based on the double limb weight bearing anteroposterior full leg radiograph (to assess HKA) and 3D CT (computed tomography) scan data of the tibia. These data are then used as guidance for designing the surgical plan and the PSI (patient-specific using medical grade materials, such as nylon, which can be sterilized using an autoclave (8). The use of navigation systems enables precise measurement of the alignment parameters, such as the mechanical axis, that need to be corrected during the procedure of HTO. During the surgery, navigation systems provide real-time guidance to ensure accurate bone cuts and alignment correction. The system provides visual feedback, such as virtual overlays on the surgical field or monitor screens, to guide the surgeon in achieving precise bone cuts and alignment. Navigation systems help improve the accuracy and precision of HTO. The surgeon can ensure that the planned correction is executed accurately, leading to better alignment and overall outcomes (10,11).

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