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Original Article

Conventional plate and screws in medial opening-wedge high tibial osteotomy: are they sufficiently stable? A retrospective study☆

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ABSTRACT

Objective: Opening-wedge osteotomy of the proximal tibia is a widely performed procedure for treating medial gonarthrosis in active patients and in the presence of varus malalignment of the lower limb. The fixation method is controversial, and the use of conventional implants has been abandoned in favor of implants with more modern locking screws. The aim of the present clinical study was to assess the maintenance of the correction achieved in cases wherein fixation was performed using conventional implants.

Methods: This retrospective study included 51 patients who underwent opening-wedge high tibial osteotomy wherein fixation was performed using conventional implants (4.5-mm DCP plate and non-locking screws). Radiological findings regarding patellar height, tibial slope, and varus correction postoperatively and after consolidation were analyzed to assess the maintenance of the correction achieved by osteotomy.

Results: The mean loss of correction angle, calculated by the difference between the correction angle in the immediate postoperative period and that after consolidation, was $0.92^{\circ} \pm 0.9^{\circ}$. In addition, changes in patellar height determined by the Blackburne–Peel method and in the sagittal slope of the tibial plateau were not significant or clinically relevant.

Conclusions: The use of conventional plates and screws is viable in the fixation of opening-wedge high tibial osteotomy because they provide enough stability to maintain the achieved correction until consolidation, without significant changes.

☆ Work performed in the Universidade de São Paulo, Faculdade de Medicina, Hospital das Clínicas, Departamento de Biomecânica, Medicina e Reabilitação do Aparelho Locomotor, Ribeirão Preto, SP, Brazil.

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O sistema convencional de placa e parafusos na osteotomia tibial alta em cunha de abertura medial é suficientemente estável? Um estudo retrospectivo

Palavras-chave:
Estudo retrospectivo
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RESUMO

Objetivo: A osteotomia em cunha de abertura da tíbia proximal é um procedimento amplamente realizado para o tratamento da gonartrose medial em pacientes ativos e na presença de mau alinhamento em varo do membro inferior. O método de fixação é controverso e o uso de implantes convencionais foi substituído pelo uso de implantes com parafusos de bloqueio mais modernos. O objetivo do presente estudo clínico foi avaliar a manutenção da correção realizada nos casos em que a fixação foi realizada com implantes convencionais.
Métodos: Este estudo retrospectivo incluiu 51 pacientes submetidos a osteotomia tibial alta em cunha de abertura em que a fixação foi realizada utilizando implantes convencionais (placa de DCP de 4,5 mm e parafusos não bloqueados). Os achados radiológicos referentes à altura da patela, à inclinação tibial e à correção do varo no pós-operatório imediato e após consolidação foram analisados para avaliar a manutenção da correção obtida pela osteotomia.
Resultados: A perda de ângulo de correção média, calculada pela diferença entre o ângulo de correção no pós-operatório imediato e após a consolidação, foi de $0{,}92^{\circ} \pm 0{,}9^{\circ}$. Além disso, alterações na altura patelar, avaliadas pelo método de Blackburne-Peel, e na inclinação sagital do platô tibial não foram significativas ou clinicamente relevantes.
Conclusão: O uso de placas e parafusos convencionais é uma alternativa viável na fixação da osteotomia tibial alta em cunha de abertura, pois proporcionam estabilidade suficiente para manter a correção obtida até a consolidação, sem alterações significativas.

Introduction

Proximal tibial osteotomy is a widely performed surgical procedure for the treatment of unicompartimental knee arthrosis associated with the malalignment of the mechanical axis of the limb (varus), particularly in relatively young and active patients. The procedure allows arthroplasty to be delayed for more than 10 years in approximately 80% of patients.[1,2] Medial opening wedge high tibial osteotomy has become increasingly popular in recent years because it is an easy technique that allows fine adjustments to the desired correction during the surgical procedure[3] and does not require a surgical approach to the fibula or superior tibiofibular articulation. However, this type of procedure results in a small bone contact surface at the osteotomy site that is often limited to the apex of osteotomy, which increases the chance of fixation failure and loss of correction.[4] For this reason, several authors have stressed the importance of preserving the integrity of the cortex opposite the base of the osteotomy wedge as a means of preventing secondary deformities, and there are descriptions of surgical strategies for this purpose.[5] Biomechanical and clinical studies have emphasized the importance of the implant used in the fixation of opening wedge osteotomies, in addition to the geometry of the osteotomy, and novel implants have been developed with the aim of increasing stability.[6,7] Some implants have wedges or blocks of varying sizes that are placed so as to support the cortex of the opening wedge, and others use locking screws that create angular stability relative to the plates.[8] In developing countries, it is sometimes difficult to obtain the most modern and expensive implants for the fixation of osteotomies, and conventional implants that theoretically would not be the first choice are used as an alternative. This retrospective study reports a series of cases of high tibial osteotomy performed using the medial opening wedge technique, wherein the fixations were performed using conventional DCP (Synthes, Paoli, USA) plates and investigates the efficacy of these implants in the maintenance of the achieved correction until union of the osteotomy site.

Methods

The present study was retrospectively conducted by assessing radiological findings and medical records of patients who underwent medial opening wedge high tibial osteotomy, wherein the fixation was performed with a 4.5-mm DCP plate, between 2000 and 2013 in a teaching hospital of Ribeirão Preto Medical School of the University of São Paulo. The included patients were older than 18 years of age and exhibited localized pain and functional limitations as a result of arthrosis in the medial compartment of the knee associated with the malalignment of the mechanical axis of the lower limb (varus). Patients with less than two years of clinical follow-up, those who were younger than 18 years old, and those who had rheumatologic conditions and flexion contracture of more than 15° were excluded. Of the total of 51 patients (51 knees), 31 were men and 20 were women. The mean age of the

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