



## Original article

# Range of motion predictability after total knee arthroplasty with medial pivot prosthesis<sup>☆</sup>



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## ABSTRACT

**Objective:** To assess whether there the final range of motion (ROM) results achieved by patients undergoing total knee arthroplasty (TKA) with prosthesis using Medial Pivot design are predictable.

**Methods:** Between January and August of 2014, 155 patients with primary osteoarthritis of knee who underwent TKA using the prosthesis ADVANCE<sup>®</sup> Medial Pivot were prospectively assessed. All ROM measures were made and recorded before, during, and after surgery. All patients were clinically assessed preoperatively and postoperatively (15, 45 days, three months, six months, one year, and annually thereafter after surgery); their functional status was assessed using the WOMAC questionnaire.

**Results:** Significant differences ( $p < 0.001$ ) were observed between the means and medians of ROM in the preoperative when compared with those during the perioperative; the perioperative values, when compared with those after six months postoperative, were also different ( $p < 0.001$ ). No significant differences were found between the means and medians ROM between the intraoperative period and at the 45-day assessment (ns) and between the means and medians ROM between the preoperative period and at the six-month evaluation (ns).

**Conclusion:** The final ROM achieved by patients that underwent TKA with medial pivot prosthesis can be predicted. The perioperative ROM correlates with that at 45 days after surgery. The final ROM is correlated with that of the pre-operative period.

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## Previsibilidade da amplitude de movimento após artroplastia total do joelho com prótese medial pivot

### R E S U M O

#### Palavras-chave:

Amplitude de movimento articular  
Artroplastia do joelho  
Desenho de prótese

**Objetivo:** Avaliar se há previsibilidade da amplitude de movimentos alcançada por pacientes submetidos a artroplastia total do joelho com prótese que usa desenho medial pivot.

**Métodos:** Entre janeiro e agosto de 2014 foi feita avaliação prospectiva de 155 pacientes com osteoartrose primária do joelho submetidos a artroplastia total do joelho com o uso da prótese Advance® Medial Pivot. Todas as medidas da amplitude de movimentos foram feitas antes, durante e após a cirurgia. Todos os pacientes foram avaliados clinicamente no pré- e pós-operatório (15, 45 dias, três meses, seis meses, um ano e depois anualmente após a cirurgia) para a análise de seu estado funcional. O questionário Western Ontario and McMaster Universities Osteoarthritis Index (Womac) foi usado.

**Resultados:** Diferenças significativas ( $p < 0,001$ ) foram relatadas entre as médias e medianas da amplitude de movimentos no pré-operatório em comparação com as medidas obtidas no período intraoperatório. As medidas do pré-operatório também se mostraram diferentes quando comparadas com aquelas após seis meses de pós-operatório ( $p < 0,001$ ). Não foram encontradas diferenças significativas entre as médias e medianas da amplitude de movimento na comparação do intraoperatório e as medidas feitas aos 45 dias (*ns*) e entre as médias e medianas das medidas pré-operatórias e aquelas observadas aos seis meses (*ns*).

**Conclusão:** Há previsibilidade da amplitude de movimentos obtida por pacientes submetidos a artroplastia total do joelho com prótese medial pivot. A amplitude aos 45 dias é semelhante àquela observada nas medidas intraoperatórias. A amplitude final está relacionada à amplitude pré-operatória.

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## Introduction

Osteoarthrosis of the knee is a common cause of pain, disability, and decreasing quality of life, affecting 41.1% of certain population groups, especially women over 70 years.<sup>1-3</sup> Total knee arthroplasty (TKA) is a well-established procedure associated with good clinical outcomes, particularly regarding functional improvement.<sup>4-6</sup>

Although different results may be related to TKA, range of motion (ROM) recovery is essential for functional outcome.<sup>7,8</sup> Several factors may influence the post-TKA ROM, including pre- and perioperative ROM, surgical technique, posterior cruciate ligament (PCL) resection, prosthesis design, and post-operative rehabilitation.<sup>8-11</sup> In some groups and in certain situations, even ROM loss has been described after TKA.<sup>9,11-14</sup> Some studies also discuss the importance of the perioperative ROM as an indicator of the final movement; to the best of the authors' knowledge, there are no studies using medial pivot prostheses.<sup>12,13,15</sup>

Medial pivot prostheses were introduced in 1998 as a revolutionary concept in relation to the other prostheses then available.<sup>16</sup> By sacrificing both cruciate ligaments, stability was based on the conformation of the condyle and medial plateau, making this region a spherically stable center of rotation, and allowing greater movement in the lateral compartment.<sup>5,17,18</sup> This asymmetry attempts to ensure the reproduction of the combined movement of rotation/translation normally observed in human knees.<sup>16,18-20</sup>

It is assumed that a higher perioperative ROM can positively influence the ROM observed after TKA using the ADVANCE® Medial-Pivot prosthesis, which could result in better functional results. This study aimed to assess whether it is possible to predict final ROM achieved by patients submitted to TKA with a medial-pivot design prosthesis.

## Material and methods

Between January and August 2014, 210 TKAs were performed; in 162 of these, the ADVANCE® Medial-Pivot prosthesis (Micro-Port Orthopaedics Inc., Arlington, TN, United States) was used. A prospective assessment of 155 patients (95.7%) with primary knee osteoarthrosis submitted to TKA using this prosthesis was made. All patients with TKA indication were considered for inclusion. Patients who had previously undergone surgical procedures in the knee, those with active infection, those who had difficulty in understanding and completing the questionnaires, and those who had undergone TKA on the opposite side within less than six months were excluded from the study due to the possible functional influence. A total of 119 patients (76.77%) were female and 36 (23.23%) were male. The patients' age ranged from 51 to 88 years, with a mean of 70.71. The right knee was operated on in 94 patients. Body mass ranged from 54 to 113 kg, with a mean of 78 kg. Height ranged from 1.40 m to 1.88 m, with a mean of 1.62 m. BMI ranged from 27.55 to 31.97, with a mean of 27.64.

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