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Total ankle replacement in patients under the age of 50. Should the indications be revised?

Ricardo Rodrigues-Pinto MD[a,*], José Muras MD[a], Xavier Martín Oliva MD, PhD[b,c], Paulo Amado MD[d,e]

[a] Department of Orthopaedics, Centro Hospitalar do Porto, Hospital de Santo António, Largo Prof. Abel Salazar, 4099-001 Porto, Portugal
[b] Department of Orthopaedics, Clinica del Remei, Calle Escorial, 148, 08024 Barcelona, Spain
[c] Department of Anatomy and Human Embriology, Faculty of Medicine, University of Barcelona, Calle Casanova, 143, 08038 Barcelona, Spain
[d] Department of Orthopaedics, Instituto CUF, Porto, Rua Fonte das Sete Bicas, 170, 4460-188 Senhora da Hora, Portugal
[e] Faculty of Health Sciences, Universidade Fernando Pessoa, Rua Carlos da Maia, 296, 4200-150 Porto, Portugal

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ABSTRACT

Background: High physical demand and young age are currently considered contraindications for total ankle replacement. This study aimed to compare its results between patients under the age of 50 and those aged 50 or older.
Methods: 103 patients derived from an ongoing prospective multicentric study with a mean follow-up of 41 (range, 24–72) months were included in this study. Clinical status (AOFAS score), range of motion (ROM), complication and survivorship rates were compared between <50 and ≥50 patients.
Results: ROM and AOFAS score were significantly higher, as were their increases relatively to pre-operative values in patients <50. Complication and survivorship rates were comparable between both groups.
Conclusions: At medium-term, ankle replacement is at least as effective in patients under the age of 50 as in those with aged 50 or older. Long-term results will allow to assess whether surgical indications for should be revised.

1. Introduction

End-stage ankle osteoarthritis is a debilitating condition that, despite being relatively uncommon when compared with the more prevalent hip and knee osteoarthritis, is associated with significantly more severe mental and physical disability [1]. With population ageing, the absolute number of patients affected by ankle osteoarthritis is likely to increase. Unlike the hip and knee, in which the primary causes of degeneration are primary osteoarthritis and inflammatory diseases, 80% of ankle osteoarthritis is post-traumatic [2,3]. For this reason, patients are usually younger and have higher physical demands, placing the damaged joint under increased stresses [4].

During the last decade, total ankle arthroplasty has resurged as an alternative to ankle arthrodesis in the treatment of painful ankle osteoarthritis [5]. A recent prospective controlled trial has shown that, when compared with ankle arthrodesis, ankle arthroplasty provides similar pain relief and better functional results [6].

As younger patients generally have higher physical demands, this procedure has mostly been used to treat those above the age of 50, with arthrodesis being preferentially offered to younger patients [7,8]. This is due to reports of low clinical scores and early failure rates obtained in this subgroup of patients when using the previous generations of implants [9]. This rational, however, has not been applied to patients with osteoarthritis affecting other lower limb joints. In fact, young patients with total hip and knee arthroplasties perform better in terms of pain, disability and quality of life, and have survirvorship and revision rates at least comparable to older patients [10–14].

The fact that an implant can last several years, providing optimal quality of life has possibly been responsible for a recent change in this paradigm. Nowadays, a joint replacement is not necessarily a surgery for the old and inactive patient. In fact, some of the more recently published results on ankle replacements include patients under the age of 50 [15–19]. However, there is still controversy as to whether it should be used in this subgroup of patients and, to date, no study has directly compared the results

* Corresponding author. Tel.: +351 222 077 500.
E-mail address: ric_pinto@hotmail.com (R. Rodrigues-Pinto).

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of this procedure in young and old patients using the most recent ankle implants.

Since January 2005, a multicentric study has been conducted in Portugal and Spain to analyse the results of total ankle arthroplasty in the treatment of painful end-stage ankle osteoarthritis. This procedure has been performed independently of patient's age. *The aim of this separate study was to analyse the clinical results, and survivorship between young and older patients submitted to total ankle replacements.*

2. Methods

2.1. Study and prosthesis description

In January 2005 a prospective multicentric study was initiated in Portugal and Spain with the objective of analysing total ankle replacement results and its early to medium-term results, together with a detailed analysis of complications of the initial 119 cases were subjected to a separate publication in this issue [20].

The Salto® prosthesis (Tornier, Saint Ismier, France) was used in all cases. This prosthesis has been used in Europe since 1997; it is a third generation, non-cemented anatomically designed prosthesis with a mobile bearing polyethylene. The polyethylene is superiorly flat, where it contacts with the tibial component; inferiorly it is designed to replicate the anatomy of the talar surface. The talar component extends to the lateral side of the talus, where it contacts the lateral malleolus. The polyethylene moves between the tibial and talar component in flexion and extension, allowing for 4° of varus/valgus movement coronally [15].

One hundred and three patients (103 ankle replacements) were reviewed for the current study (nine patients were lost to follow-up and 47 had a follow-up shorter than 24 months).

Patients were divided in two groups: group <50 consisted of patients under 50 years of age ($n = 31$) and group ≥50 consisted of patients with 50 years or older ($n = 72$). Mean age was 43 years (range, 24–49) in the <50 and 61 years (50–81) in the ≥50 group. Mean follow-up was 40 months (range, 24–72) in the <50 and 42 months (25–72) in the ≥50 group. The main primary diagnosis was post-traumatic arthritis in both groups (74% of the patients in group <50 and 64% in group ≥50). Table 1 details and compares patient demographics between groups.

2.2. Outcome variables

The outcomes analysed for this study were clinical and functional results, complications and survivorship. Results were compared within each group (pre-operative results versus results at last follow-up) and between groups (pre-operative, last follow-up and differences between last follow-up and pre-operative results).

Clinical and functional results were assessed using the American Orthopaedic Foot & Ankle Society (AOFAS) ankle-hindfoot score [21], which analyses pain, function and alignment and by measuring the ROM (forced dorsiflexion plus forced plantar flexion, measured with a goniometer with the patient in prone position and the knee flexed to 90°).

Complications were subdivided into minor and major, as previously described [22]. Minor complications were those that were manageable without further surgery, whereas major complications were those that required additional surgery.

For survivorship analysis, failure was defined as any reoperation or revision surgery on the ankle.

2.3. Statistical analysis

Normal distribution between groups was analysed using the Smirnov–Kolmogorov test. Since the distribution between groups was non-Gaussian, non-parametric tests were used to compare differences between groups and equality of variances was analysed with the Levene test. Survivorship analysis was performed with the Kaplan–Meyer method. p-Values less than 0.05 were considered to represent a significant difference.

3. Results

3.1. Clinical and functional results

Patients in both age groups had equivalent mean pre-operative AOFAS scores (26.7 points (range, 15–51) in the <50 group versus 27.0 points (range, 10–55) in the ≥50 group, $p = 0.848$). A significant increase in the AOFAS score was seen in both groups from their pre-operative value to their values at follow-up ($p < 0.001$). This increase, however, was significantly higher in the <50 group (mean 66.8 points (range, 46–85) versus 62.8 (range, 20–80) points in the ≥50 group, $p = 0.048$), as was the mean AOFAS score at follow-up (93.5 points (range, 83–100) in the <50 group versus 89.8 points (range, 51–100) in the ≥50 group, $p = 0.001$) (Table 2).

There were no significant differences between the pre-operative ROM values in both groups (mean 15.4° (range, 10–20) in the <50 and 16.2° (range, 10–40) in the ≥50 group, $p = 0.329$). Patients in both groups had their ROM significantly increased at follow-up ($p < 0.001$). However, this increase was significantly higher in the <50 group (mean 21.8° (range, 10–36) versus 17.7 (range, 0–30) in the ≥50 group, $p = 0.012$), as was the mean ROM at follow-up (37.2° (range, 25–50) in the <50 group versus 33.9° (range, 15–45) in the ≥50 group, $p = 0.020$) (Table 2).

Table 1
Patient demographics.

	Age groups		
	<50 ($n = 31$)	≥50 ($n = 72$)	Difference between groups (p-value)
Age[b]	43 (24–49)	61 (50–81)	
Female/Male[a]	12/19 (38.7%/61.3%)	33/39 (45.8%/54.2%)	0.51
Diagnosis			
Post-traumatic[a]	23 (74.2%)	46 (63.9%)	0.93
Inflammatory arthritis[a]	8 (25.8%)	18 (25.0%)	0.30
Idiopathic[a]	0	8 (11.1%)	<0.01
Follow-up[b]	39.7 (24–72)	42.2 (25–72)	0.35

[a] The values are given as absolute numbers and percentage (in parenthesis).
[b] The values are given as the mean and range (in parenthesis).