



# Clinical and functional results of revision arthroplasty. A 2-year single-center observational study.

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## Abstract

**Introduction:** Hip and knee arthroplasty revision surgery are rescue procedures in patients with infections or mechanical loosening of the prosthesis. The objective of this study was to evaluate the functional results after revision surgery over two years, applying the respective functionality scales.

**Methods:** The present observational study was conducted at Hospital Alcívar in Guayaquil, Ecuador, from January 2021 to December 2022 with patients undergoing shoulder and knee arthroplasty revision surgery. The variables were age, sex, time of onset of symptoms, presence of joint instability, and pain rating scale (VAS) before and after surgery. Joint mobility and postoperative functional scale.

**Results:** The study included 23 patients. In 17 cases (73.9%), knee prostheses were revised; in 6 cases (25.1%), hip prostheses were revised. There were 15 men (65.21%) and eight women (34.79%), with an average age of 67 years. The cause of prosthesis change was mechanical in 15 cases (65.21%) and infections in 8 patients (34.78%). Joint instability occurred in 17 cases (73.91%) and without instability in 6 cases (23.08%). Pain decreased from severe perception in 18 patients (78.3%) in the preoperative period to mild in 18 cases (78.3%). Knee functionality at three months was good in 7 cases (41.2%); at six months, it was good and excellent in 9 patients (52.9%). Hip functionality was regular at three months in 5 cases (83.3%) and good at six months in 5 cases (83.3%).

**Conclusions:** Overall, the results of this study suggest that revision arthroplasties are an effective procedure to improve the functionality of patients with aseptic loosening and septic failure of knee and hip replacements.

## Keywords:

**MeSH:** Knee; Arthroplasty, Replacement, Knee; Reoperation; Hip, Arthroplasty, Replacement, Hip.

## Abbreviations

VAS: Visual analog scale.  
KSS: Knee Society Score.  
HHS: Harris Hip Score.

## Supplementary information

No supplementary materials are declared.

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## Author contributions

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## Availability of data and materials

Not declared

Surgery

## Introduction

Hip and knee arthroplasty revision surgery are salvage procedures in patients with infections or mechanical loosening of a previously operated prosthesis. The incidence of this surgery is 20 cases per 100,000 inhabitants/year. Its incidence increases as the incidence of primary arthroplasty rises in the general population, from 99 to 105 cases per 100,000 inhabitants/year [1, 2]. It can correspond to the change in the prosthesis with a useful life of 10 years. Hence, the population subjected to this intervention generally has higher risk factors and morbidity and mortality.

The same thing that happens with primary arthroplasty can be seen with revision surgery but in a more accentuated way. It is a procedure extended to a population older than in primary surgery with more significant comorbidity. To all this, we added surgical time, bleeding, and, consequently, higher risks than immediate surgery [3, 4].

Due to the multiple reasons that may lead us to the need to reoperate an implanted hip prosthesis, in our series, we intend to evaluate the incidence of each of the causes regarding the total number of rescue surgeries performed in our center in 2 years.

The objective of this study was to evaluate the functional results after revision surgery over the course of 2 years, applying the respective functionality scales.

## Materials and methods

### Study design

The present study is observational. The source is prospective.

### Scenery

The study was carried out in the Orthopedics and Traumatology service of the Alcívar Hospital in Guayaquil, Ecuador. The study period was from January 1, 2021, to December 30, 2022.

### Participants

Patients of legal age with a previous arthroplasty revision surgery requirement were included. Cases in which the information could not be completed were excluded.

### Study groups

According to the type of previous arthroplasty, two groups were formed:

Group 1: knee revision arthroplasty.

Group 2: hip revision arthroplasty.

### Variables

The variables were age, sex, time of onset of symptoms, presence of joint instability, and pain rating scale (VAS) before and after surgery. Joint mobility and postoperative functional scale.

### Data sources/measurements

The source was direct; an electronic form was filled out from the data collected during the study period. The information was treated confidentially; personal data that would allow the identification of the study subjects were not included.

### Biases

To avoid interviewer, information, and memory biases, the principal investigator kept the data with a guide and records approved in the research protocol. Observation and selection bias was avoided by applying the participant selection criteria. Two researchers independently analyzed each record in duplicate, and the variables were recorded in the database once their concordance was verified.

### Study size

The sample was nonprobabilistic, of the census type, where all possible cases of the study period were included.

### Quantitative variables

Descriptive statistics were used. The results are expressed as frequencies (categorical variables) and medians (numerical variables). Categorical data are presented in proportions.

### Statistical analysis

Noninferential statistics are used, using proportions and frequencies.

## Results

### Participants

The study included 23 patients, 17 in Group 1: knee arthroplasty (73.91%) and 6 in Group 2: hip arthroplasty (25.08%).

### Study group characteristics

Twenty-three patients were included in the present study: 15 men (65.21%) and eight women (34.79%). The average age was 67 years, ranging from 42 to 84 years. There were 7 patients (34.78%) between 40 and 64 years of age and 16 patients between 65 and 89 years of age (69.56%).

The most frequent cause of prosthesis change was mechanical in 15 cases (65.21%), followed by an infectious process in 8 patients (34.78%). Considering the time of onset of symptoms, adding instability in 17 (73.91%) and without instability in 6 cases (23.08%) (Table 1).

### Main results

Pain before revision arthroplasty was severe in 78.26% of cases (Table 2). The pain was mild, primarily in the postoperative period (Table 2).

Regarding the knee's range of motion, the average presurgical flexion was 93.5%. It was divided into two variables with a cutoff point of 130 degrees in flexion and from 0 to 10 degrees in extension (Table 3).

After the intervention, the mobility ranges improved significantly in the knee >130 degrees 0; <130 degrees 17; at hip level >130 degrees 1; <130 degrees 5; knee extension ranges were divided into two variables between 0 and 10 degrees 12; >10 degrees 5; at hip level >30 degrees 2; <30 degrees 4.

The components of revision arthroplasty were divided into the hip acetabular component and the femoral component and combined: acetabular revision 4 and total revision 2 (Table 4).

Concerning the functional results with the "Knee Society Score" (KSS) scale, it can be seen that of the 17 patients obtained, during their first control at three months, 10 (58.82%) of them received 60 to 69 points equivalent to regular results, and 7 (41.17%) patients had values of 70 to 79 points, which corresponds to good results, which improved over time. In the second control at six months, an improvement in the condition was evidenced: 8 (47.05%) patients received between 60 and 69 points equivalent to regular results, 5 (29.41%) patients had a value of 70 to 79 points equal to good results, and 4 (23.53%) patients had values of 80 to 100 points, which corresponds to excellent results (Table 5).

Regarding the functional results of the hip with the Harris scale, it can be seen that of the six patients obtained, during their first control, 1 (16.66%) of them obtained a result of fewer than 60 points; 60 to 69 points equivalent to regular results were obtained by 5 (83.33%) patients. In the second control at six months, improvement of the condition was evidenced, obtaining 1 (16.66%) patient between 60 to 69 points equivalent to regular results, and 5 (83.33%) patients had a value of 70 to 79 points equivalent to good (Table 5).

## Discussion

This study evaluated the clinical results of revision arthroplasty in 23 patients with knee or hip osteoarthritis. The average age of the patients was 67 years. The most common cause of revision arthroplasty was aseptic loosening (65.21%). Patients had severe preoperative pain (78.26%) and limited range of motion (mid-knee flexion, 93.5%).

Patients were treated with a hip or knee revision implant. Functional results were evaluated with the Knee Society Scale (KSS) and the Harris Scale (HHS).

The results showed a significant improvement in pain, function, and quality of life of the patients 3 and 6 months after surgery.

The average useful life of a complete denture ranges from 8 to 12 years. Some authors report a 90% survival of a prosthesis for 15 years in patients older than 60 years, that is, in patients with little physical demand [5, 6]. Overuse and wear of the prosthesis can lead to prosthetic failure, requiring revision and replacement.

Initially, the prostheses were implanted in patients older than 60 with a relatively sedentary activity level [7, 8]. However, in recent years, younger and more active patients have been implanted with prostheses. This has led to increased cases of prosthetic failure, as prostheses are not designed to withstand the activity level of younger patients.

**Table 1.** Onset of symptoms and joint instability in the study group.

Variable	n=23	Percentage
<b>Onset of symptoms</b>		
<2 years	8	34.78%
>2 years	15	65.21%
<b>Joint instability</b>		
Present	17	73.91%
Absent	6	23.08%

**Table 2.** Pre and post surgical pain in the study group.

Variable	n=23	Percentage
<b>Presurgical VAS</b>		
Mild	0	0%
Moderate	5	21.73%
Serious	18	78.26%
<b>VAS-post-surgical</b>		
Mild	18	78.26%
Moderate	5	21.73%
Serious	0	0%

VAS: Visual analog scale.

**Table 3.** Joint mobility ranges.

Variable	Presurgical		Post-surgical	
<b>Knee n=17</b>				
Flexion	<130°	>130°	<130°	>130°
cases	17	0	14	3
Extension	0 to 10°	>10°	0 to 10°	>10°
cases	12	5	17	0
<b>Hip n=6</b>				
Flexion	<130°	>130°	<130°	>130°
cases	5	1	2	4
Extension	<30°	>30°	<30°	>30°
cases	4	2	1	5

VAS: Visual analog scale.

**Table 4.** Onset of symptoms and joint instability in the study group.

Variable	n=23	Percentage
<b>Knee n=17</b>		
Hamstring + Suplex	2	11.76%
Tibial + Suplex	0	0%
Femoral + Tibial + Suplex	5	29.41%
Regular insert	3	17.65%
Constrained insert	4	23.53%
Enduro® Hinge	3	17.65%
<b>Hip n=6</b>		
Acetabular component	4	66.67%
Femoral component	0	0%
Combined	2	33.33%

Early diagnosis of prosthetic failure is essential. Patients with total arthroplasty should be followed up regularly to monitor the prosthesis status and detect any problems early.

A total denture can fail in some ways, one of which is wear or overuse of the polyethylene inserts or components. This can cause progressive misalignment and instability of the prosthetic complex, with associated complications. Prosthetic failure can lead to progressive damage and loss of bone stock [9]. This can make it difficult to revise the prosthesis in the future.

Infection is the worst complication of a total denture [10]. It can cause pain, swelling, redness, and fever. In severe cases, it may require removal of the prosthesis.

Other studies should evaluate the mean half-life of revision prostheses.

**Table 5.** Functional results of joint mobility.

	3 months	%	6 months	%
<b>Knee functionality-KSS n=17</b>				
<60 (bad)	0	0	0	0
60-69 (regular)	10	58.82	8	47.05
70-79 (good)	7	41.17	5	29.41
80-100 (excellent)	0	0	4	23.52
<b>Hip functionality-HHS n=6</b>				
<60 (bad)	1	16.66	0	0
60-69 (regular)	5	83.33	1	16.66
70-79 (good)	0	0	5	83.33
80-100 (excellent)	0	0	0	0

KSS: Knee Society Score. HHS: Harris Hip Score.

## Conclusions

The functional outcomes of revision arthroplasties over six months were significantly improved, with decreased pain and increased range of motion. These results were attributed to rehabilitation and continuous follow-up of the patients. Although there was a marked improvement in the functionality of the patients, some still experienced some pain and limited range of motion. This can be due to several factors, including age, general health, and joint condition before surgery. Overall, the results of this study suggest that revision arthroplasties are an effective procedure to improve function in patients with aseptic loosening and septic failure of knee and hip replacements.

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## Statements

### Ethics committee approval and consent to participate

Not required for observational studies.

### Publication Consent

Not required for not publishing images, X-rays, or figures of patients.

### Conflicts of interest

The authors declare they have no conflicts of interest.

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