

HIP ARTHRODESIS: A MINIMUM 20 YEAR FOLLOW-UP RETROSPECTIVE STUDY

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ABSTRACT

Objective: To evaluate the long-term results of seventy patients who underwent hip arthrodesis using the original technique described by Davis. **Methods:** We carried out a retrospective study involving seventy patients submitted to hip arthrodesis between 1982 and 1995. The presence of symptoms involving the lumbar spine, ipsilateral knee, and contralateral hip was noted, as well as the success of the arthrodesis fusion, its positioning, and the need for conversion surgery to total hip replacement. **Results:** The mean follow-up time was 21.6 years. A satisfactory hip fusion was found in 48 patients (85.7%). Lumbar spine pain was reported by 11 patients (19.6%) and ipsilateral knee osteoarthritis was found in

four patients (7.1%). **Discussion:** Two works, with a longer follow-up time (35 and 38 years) present more prevalent symptoms involving the lumbar spine (57% and 62%) and ipsilateral knee joint (45% and 57%), and higher conversion surgery rates (17% e 28%). **Conclusion:** Hip arthrodesis by the Davis technique presents satisfactory results until the 20th year after surgery, however lumbar spine disease seems to become more prevalent over the years, and the pain in the homolateral knee suggests an association with the initial position in abduction of the hip submitted to arthrodesis. **Level of Evidence:** Level III clinical study.

Keywords: Hip. Arthrodesis. Long-term effect.

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INTRODUCTION

Hip arthrodesis was initially described by DeBeule in 1909, and was a surgical technique used extensively up to the middle of the 20th century for the treatment of unilateral hip pathologies¹. However, after a long follow-up period, the consequences on the lumbar spine and homolateral knee joint causing pain and functional disability appeared frequent to the surgeons that used this technique. The technical difficulty when conversion surgery from arthrodesis to total hip replacement is necessary also began to be considered a clinical situation with the same severity as acetabular bone loss in total hip arthroplasty reviews, according to the North American classification.²⁻⁵ The 60's marked the beginning of the widespread disclosure of total hip arthroplasty with the name of Sir John Charnley.⁶ However, the results of this surgery in younger patients were discouraging with the need for early surgical reviews, and the subject of total arthroplasty on young patients is still under discussion today.⁷⁻¹⁰ The aim of this study is to evaluate the long-

term results of seventy patients that underwent hip arthrodesis using the original technique described by Davis.¹¹ Arthrodesis fusion, the presence of lower back and ipsilateral knee pain, as well as the need for conversion surgery for total hip replacement were the main topics evaluated.

MATERIAL AND METHOD

We conducted a retrospective clinical study with 70 patients, operated between 1982 and 1995, with a diagnosis of unilateral hip osteoarthritis. All patients were submitted to the same surgical technique by the same team of surgeons. Under the technique described by Davis, the surgeons created an iliofemoral approach, with dislocation of the femoral head and performance of a combination of extra and intra-articular arthrodesis. For extra-articular fixation, they used a pedicle iliac crest flap with its respective fixation on the acetabulum and in the intertrochanteric region with two cortical screws. The mechanical stability of the arthrodesis was obtained with the performance of subtrochanteric dome osteotomy, thus ensu-

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Study conducted at LIM 41 –Musculoskeletal Medical Investigation Laboratory of the Department of Orthopedics and Traumatology of the Faculty of Medicine of Universidade de São Paulo.
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ring 'mechanical silence' at the arthrodesis focus. The patients were kept in traction for 10 days then re-referred to the surgical center for final positioning of the arthrodesis and making of pelvic-podalic plaster cast. The desired hip position was characterized by 15 degrees of flexion, neutral abduction and 10 degrees of external rotation.¹¹

The inclusion criterion was follow-up time above twelve years with an updated and annual outpatient evaluation until 2008. The knee joint below the operated hip was evaluated for the presence of pain, signs of joint instability and of knee osteoarthritis. The presence of pain was evaluated in binary form, whether present or not. Joint instability was considered when the patient complained of instability with the concomitant presence of clinical signs upon physical examination, mainly lateral instability.

The diagnosis of knee osteoarthritis was confirmed by radiographs in the frontal and lateral orthostatic positions. Only patients that reported lower back pain after the surgery performed, without a previous history of this problem, were considered to have this pain present. The presence of pain in the contralateral hip was also evaluated, as was the radiographic diagnosis of osteoarthritis.

The hip submitted to arthrodesis was evaluated for local pain and presence of any degree of mobility, both considered characteristic effects of failure in terms of fusion. Besides the radiographic signs of fusion, the abduction angle was also measured between the central axis of the femur and the bilacral line, considering an angle between zero and five degrees of adduction satisfactory. (Figure 1)

The general characteristics of the included patients are contained in Table 1. At the end of 2008, four patients were excluded due to death, ten due to loss of follow-up, with 56 patients remaining.

RESULTS

The mean follow-up time was 21.6 years (13 -27). We observed a tendency for arthrodesis indication to decrease over the years. (Figure 2)

The presence of ipsilateral knee joint instability was observed in only one patient (1.8%) and that of painful osteoarthritis was radiographically confirmed in four patients (7.1%), while lower back pain was present in 11 patients (19.6%).

We did not observe any patient from the casuistry reporting



Figure 1. Total fusion with adduction above the acceptable level (more than five degrees).

Table 1. Casuistry.

| | |
|----------------------------|---|
| Gender | 30 women : 26 men |
| Mean age at surgery | 23.5 years (13 -62) |
| Side | 35 left : 21 right |
| Diagnosis | 18 - trauma 24 - bacterial infection 4 - epiphysiolysis 4 - cerebral paralysis 3 - tuberculosis 2 - hip dysplasia 1 -Pèrthes' disease |

pain in the contralateral hip or presence of local osteoarthritis. A satisfactory fusion was verified in 48 patients (85.7%), yet the eight remaining patients (14.2%) presented local pseudarthrosis with some degree of hip mobility, and infectious cause was diagnosed in two of these patients. In spite of the consolidation failure, only one patient of the eight with pseudarthrosis, reported local pain.

The abduction angle of the arthrodesis was considered satisfactory in 39 patients (69.6%), was adduced excessively (over 5 degrees) in seven patients and presented abduction over zero degrees in 10 patients, both of which are unacceptable situations.

Four patients exhibited postoperative infection at some stage of the follow-up period, with two evolving to pseudarthrosis. The four patients presented a diagnosis of infection prior to surgery and as a clinical situation giving rise to the indication of arthrodesis.

The indication of conversion surgery to total hip replacement was considered in four female patients (7.1%) due to reports of incapacitating lower back pain and general complaints such as difficulty walking and dissatisfaction regarding loss of hip mobility.

DISCUSSION

The original hip arthrodesis technique underwent modifications that brought better results particularly after the disclosure of 'snake plate' fixation, with a subsequent reduction in the occurrence of pseudarthrosis.^{12,13} Nowadays, we consider this technique to be superior to that described by Davis, in terms of morbidity and postoperative ease, in eliminating the need

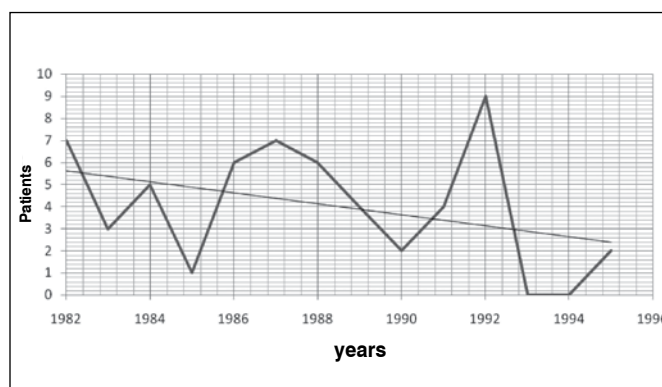


Figure 2. Indication of arthrodesis over the years.

for plaster cast use over 12 weeks in adult patients, a situation considered out-of-date in modern orthopedics.

As of the popularization of total hip replacement, there was a decline in the indication of hip arthrodesis in the majority of orthopedic services worldwide. Such decline is also corroborated by the actual patients when we share the two therapeutic options with them. The majority opt for arthroplasty, despite the modest results in very young patients and the future need for surgical review, often with aggravating factors such as the presence of local osteolysis.^{7,10}

Two works with a longer follow-up period than our study (35 and 38 years) presented more prevalent repercussions on the lumbar spine (57% and 62%), as well as pain in the homolateral knee (45% and 57%) and indication for conversion surgery into total hip replacement (17% and 28%), yet the authors of the two studies report that these findings were more frequent after twenty years of follow-up.^{14,15} We believe that this is the main justification for us to find lower rates than these two studies, due to our shorter follow-up time (21.6 years). With time the presence of these findings will certainly be more frequent in our casuistry.

Initially, most surgeons that performed arthrodesis sought a slight degree of abduction that was later related to the greater association with presence of low back and homolateral knee pain.^{14,15} Yet in our study, of the ten patients that presented excessive abduction, only three reported low back pain. However, of the four patients that evolved with knee osteoarthritis, three presented excessive hip abduction, which suggests the same association described by these authors.^{14,15}

Conversion surgery of hip arthrodesis into total replacement normally produces a significant improvement in low back pain and restoration of local mobility, yet in addition to the technical difficulty inherent to this surgery, remember that on the long term, the results are inferior to those habitually encountered in patients with hip osteoarthritis, with acetabular laxity between 15 and 20% after 10 years.¹⁷⁻¹⁹ Among the female patients, the difficulty in hip mobilization with negative repercussion on the conjugal relationship is a fact to be considered and was reported by the four patients that had desarthrodesis indication in our study.

The quantity of young patients requiring total hip replacement review has today become a problem of considerable dimensions in Brazil, due to the insufficient presence of services and resources available for this type of surgery. If we also consider the population that works in services of high physical demand, the indication of arthroplasty in these patients if the disease is unilateral, should perhaps be reconsidered. Since repercussions after hip arthrodesis are more frequent after the twentieth year, and after arthroplasty start in the tenth year, we believe that this situation in the long term should be clearly discussed with each patient.

CONCLUSION

We conclude that hip arthrodesis using Davis' technique presents results similar to literature and satisfactory up to the twentieth year, yet the presence of low back pain is more frequent over the years and pain in the homolateral knee suggests association with the initial position in abduction of the hip that has undergone arthrodesis.

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