

Total Hip Replacement in Young Adults Less Than Fifty Year Old: Our Experience

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Abstract

Background: We report a retrospective study of 47 total prosthesis of hip put in place among the young adult of less than fifty years in the service of Traumatology and Orthopedics at the Wing IV of the CHU Ibn Rochd of Casablanca, over a period from January 2008 to March 2014, with an average rate of decline of 42 months. **Results:** The deliberate group of 43 patients (47 hips including 4 bilateral) consisted of 26 women, either 60, 47% and 17 men, either 39, 53%. The average age of our patients was 36 years. In our series, the predominant etiology has been conducted for the indication of the hip replacement was the aseptic osteonecrosis of the femoral head which has represented 31.91%. With regards to the choice of implants, 85% of PTH were non-cemented, the cemented PTH has been used in 15% of cases. The Friction Torque metal/polyethylene was used in all cases. The functional outcome was appreciated by the rating of Merle of Aubigne before and after arthroplasty. The average rate of decline of 42 months, and the results were generally satisfactory. They were excellent in 27.78% of cases, very good in 19.44% of cases and good in 44.44% of cases. The results on the Pain were remarkable: the rating of the pain going 2.8 in pre-operative at 5.6 at the latest decline. The results on the walking and mobility were also good. It was noted as a complication: 4 cases of prosthetic dislocation, 1 case of aseptic descellement bipolar, 2 cases of early sepsis on hardware, 3 cases of paralysis of the sciatic external popliteal and 4 cases of periprosthetic ossification. In total, 5 total prosthesis of hip were occasions. The young age does not seem to be an obstacle to the prosthetic surgery. **Conclusion:** However, a major question remains concerning the distant future of these prostheses in young active subjects, because they will be submitted for many years in a job which can cause the descellement of prosthetic parts.

Keywords

Total Hip Replacement, Young Subjects, Hip Disease, Casablanca

1. Introduction

The goal of total hip replacement is to replace the worn surfaces of the ball-and-socket joint. The number of total prosthesis of hip (PTH) implanted by year is in perpetual increase in the industrialized countries but also in Morocco, the quality of life is better because of the increase in the life expectancy and the availability of prostheses in the public hospitals since the introduction of the medical assistance scheme (RAMED).

The indication by excellence of the total hip remains the coxarthrose, this traditional indication limited the practice of this technique to the elderly, but the excellent results of this technique have pushed the orthopaedic surgeons to the practice in subjects of more and more young people.

However, the implantation on young patients increases the risk of iterative occasions. The pre-operative planning is therefore paramount in the choice of the surgical technique and the choice of implants.

Through this retrospective study of 43 patients (47 total prosthesis of hip) collected at the service of orthopaedic traumatology wing IV of the Center Hospitalier Universitaire Ibn Rochd of Casablanca, we want to relate our experience in the total hip replacement in the subject of less than 50 years, while comparing our results in the light of different data in the literature.

2. Materials and Methods

Our study is concerned with the reviewing of 43 patients aged less than 50 years, having benefited from 47 total prosthesis of hip between January 2008 and March 2014 in the service of orthopaedic traumatology wing IV of the University Hospital Center (CHU) Ibn Rochd of Casablanca.

The clinical information, para-clinical scalable and have been collected from the records of the sick and collected by the means of a form, a copy of which is shown below. We have studied the data pre-therapeutic, the surgical act and suites post-operation. Our criteria of inclusions were: Patients who benefited from a total hip aged less than 50 years of age at the time of arthroplasty, autonomous patients, decline of minimum 6 months post-operative is required. Our criteria of non-inclusions were: age greater than 50 years at the time of the total hip replacement, psychomotor retardation, neuropsychiatric disorders, Comorbidities serious: dysimmunitary field, decompensated heart disease.

3. Ethics

Patients or their relatives gave informed consent to be part of the study.

4. Results

Epidemiological Study

-Age

The age of our patients was between 22 and 49 years with an average age of 36 years at the time of the intervention.

-Sex

In our series we note a predominance of women: 26 patients were women (either 60, 47%); 17 patients were men (either 39, 53%). With a sex-ratio male/female of 0.65.

-Operated Side

The right hip was operated in 24 cases, either 55, 81% and the left hip in 15 cases, either 34, 88%.

Four of our patients (9.3%) have benefited from a bilateral PTH at an average interval of 8 months.

Pathological History**-Medical History**

Thirteen patients had a medical history, either 30, 23%, presented in the **Table 1**.

-Medical treatment to the long course:

Six patients (13.9%) were treated in the long term by NSAIDS, including 1 in association with corticosteroids, 4 patients (9.3%) were treated by a corticosteroid to the long course of which 3 in association with immunosuppressive therapy.

✓ History of the hip place:

Ten patients of our series is 23.25% had orthopaedic history at the level of the hip place:

Osteosynthesis for fracture of the neck of the femur in 3 cases; Orthopedic treatment for fracture of the acetabulum in 1 cases; Biopsy of the hip in 2 cases; Femoral Epiphysiolysse higher in 1 cases; Bloody reduction of LCH in 2 cases including 1 associated with a pelvic osteotomy; Landfill by traction for OPH in 1 case.

- INDICATIONS

- The indications of total prosthesis in the hip in our series are listed in **Table 2**.
- Have been regarded as coxarthrose post-traumatic stress, osteoarthritis secondary to trauma of hip, former is not defined or a fracture of the acetabulum.
- Have been regarded as aseptic osteonecrosis post-traumatic, osteonecrosis secondary to a fracture of the femoral neck (failure of osteosynthesis) or to a Hip Dislocation post-traumatic stress is neglected.

Table 1. Medical history of patients.

<i>Medical history</i>	<i>Number of Cases</i>
Diabetes (type II)	1
Genital TB	1
Obsessive-compulsive disorders	1
Asthma	1
Anxiety Disorders	1
Ankylosing spondylitis (SPA)	5
Rheumatoid Arthritis (PR)	3

Table 2. Distribution of indications of the total hip.

Indication (%)	Number of hip
Primitive coxarthrose (4.26%)	2
Secondary coxarthrose	
-Coxarthrose post-traumatic (14.89%)	7
-Coxarthrose on congenital dysplasia (10.64%)	5
▪ The sequelae of LCH (8.51%)	4
▪ Cotyloïdienne dysplasia (2.13%)	1
-sequelae of primitive osteochondrite of the Hip (OPH) (2.13%)	1
-sequelae of epiphysiolysse (2.13%)	1
-The sequelae of coxite tuberculous infectious (6.38%)	3
-Aseptic osteonecrosis of the femoral head (ONATF) (31.91%)	15
▪ Post-traumatic stress disorder (12.77%)	6
▪ Secondary to a corticosteroid (2.13%)	1
▪ Secondary to an ethylisme (2.13%)	1
▪ The idiopathic (14.89%)	7
-Patella tendon inflammation of the femoral neck (2.13%)	1
-Other:	1
▪ Neurogenic Paraosteoarthritis (NENA) (2.13%)	
-Coxites inflammatory (23.40 %)	11
▪ Rheumatoid arthritis (PR) (10.64%)	5
▪ Ankylosing spondylitis (SPA) (12.76%)	6

Among the coxarthroses secondary to a legacy of LCH (4 hips or 8.51%), two were a LCH neglected and 2 had benefited from a surgical reduction during childhood.

The aseptic osteonecrosis of the femoral head and the inflammatory coxites accounted for more than 55%.

The inflammatory coxites were constituted of the ankylosing spondylitis in 12.76% and rheumatoid arthritis in 10.64%. The primitive coxarthrose was found in 4.26%.

Preoperative Study

✓ Physical activity

The level of activity of the patients has been appreciated according to the classification in 5 grades of Devane (**Table 3**).

In preoperative, 58.14% of patients were active, this is explained by the young age of the population studied.

Clinical Study

All our patients had a history made of pain and a functional discomfort to the mobility and walking. We assessed the functional outcomes of hips operated in accordance with the rating of Postel and Merle of Aubigne (LDCS).

Table 3. Results of the patients activities in preoperative according to the classification of Devane.

Rank	Type of Activity	Number of Cases	Percentage
1	Sedentary, depending	0	0.00%
2	Semi-sedentary, domestic activities	18	41.86%
3	Leisure activities, gardening, swimming	12	27.91%
4	Office work, lightweight sports "social"	8	18.60%
5	Physical work force, intense sport or competition	5	11.63%

-Pain

The rating of the intensity of the pain was less than or equal to 3 points in 74.4% of cases, to 4 points in 23.4% and only a hip was rated to 5 points according to the rating of LDCS, with an average of 2.8.

-The mobility

The rating of the mobility was less than or equal to 3 points in 68.09% and greater than or equal to 4 points in 31.91% with an average for the Mobility pre-operative of 3.

-Walking

The walk in preoperative was rated to 3 or less among 61.7% of our patients. It was rated to 4 among 31.9% of them with an average for the walk of 3.3.

In our series, the evaluation of the preoperative LDCS had found: a preoperative LDCS was bad among 28 hips (59.57%), poor in 15 hips (31.91%), and finally fair among 4 hips (8.51%).

Radiological Study***-Standard Radiology***

The radiological survey was conducted on x-rays of the face and profile of the Hip concerned and a radiography of basin of face. It was found constantly but in a variable manner: A pinch of the line spacing; Geodes and condensation; An osteophytose capital and/or cotyloïdienne.

For the ONATF, the classification of Arlet Ficat and showed 52% of the hips in stage IV.

-Computed Tomography (CT)

Four of our patients have benefited of a CT scan of the basin.

-Magnetic Resonance Imaging (MRI)

A patient has benefited from an MRI of the basin which has shown: a bilateral osteonecrosis of the femoral head.

-Study of operability***-Clinical study***

All our patients have benefited from a clinical examination of systematic and comprehensive in the search for an underlying pathology that can against-Indicate the surgical act.

The search for a home infectious (Oto-rhino-laryngologique (ENT), urinary, genital, digestive) and its treatment was systematic.

Treatment

✓ **Surgical technique**

-Preparation of the operative field

All our patients have benefited from a Preparation of the operative field on the eve of the intervention, which consisted of shaving the lower member and the pubis and a skin disinfection of the operative region by the dermal betadine before the operation.

The intervention took place in a room reserved exclusively to the aseptic surgery.

-Anesthesia

Among the 47 PTH, 30 have been put in place under general anesthesia (or 63.83%) and 17 put in place under rachianesthesia (or 36.17%).

-Installation of the patient

All our patients have been operated in lateral decubitus, with a sacred support pubic and to stabilize the patient during the surgical procedure.

-Tracks first:

All PTH of our series have been put in place by the track posterior external Moore.

-Additional Gestures

Of the bone gestures were required in 7 hips (14.89%) and all bone grafts were autologous.

A ring of supports Curboul type was placed in 1 case.

-Type of implanted prosthesis

According to the mode of fixation

The PTH implanted in our patients were cemented; in 7 cases, either 14.89%; not cemented in 40 cases, either 85.1% including: For 27 cases the acetabulum was screwed and for 13 cases the acetabulum was press-fit.

PTH dual mobility or conventional:

The PTH were of type “conventional” in 85% of cases and were of type double mobility in 15% of cases.

Metal/polyethylene (steel/polyethylene (PE) and cobalt-chrome/PE).

The Friction Torque steel/polyethylene represented more than 68% in our series.

✓ ***Different implants used***

-The sizes of implants

-Parts cotyloidiennes

The size of the COINS cotyloidiennes used is reported in the **Table 4**.

The femoral parts

Femoral stems

The size of the femoral stems used is reported in the **Table 5**.

The neck was: *Short* in 23 cases (48.94%), *medium* in 14 cases (29.79%), *long* in 9 cases (19.15%), *extra-long* in 1 cases (2.13%).

Femoral heads

Among the 47 PTH, all had a femoral head diameter of 28 mm except a single PTH which had a head of 22 mm.

Table 4. Size of parts cotyloidiennes used.

External diameter acetabulum	44 mm	46 mm	48 mm	50 mm	52 mm	54 mm	56 mm	58 mm	60 mm
Percentage	2.13%	8.51%	29.79%	25.53%	10.64%	12.77%	6.38%	2.13%	2.13%

Table 5. Size of stemmed femoral used.

Rod Size	1	2	3	4	5	6	7	7.5	8	9	10	11	12	13
Percent age	2.13%	2.13%	8.51%	4.26%	10.64%	8.51%	6.38%	2.13%	6.38%	12.77%	23.40%	6.38%	4.26%	2.13%

The postoperative care:

The thrombophylaxy was started systematically in postoperative in all the patients on the basis of low molecular weight heparin.

-Analgesics:

The postoperative analgesia has been ensured by administration of non-steroidal anti-inflammatory drugs (NSAIDS) and analgesics.

-Rehabilitation:

The rehabilitation has been started as soon as possible as well as the sitting position, the very day after the intervention. In the 2nd day lifted and wandering has been accompanied using a strut. The rehabilitation was continuing in the exercises of articular mobilization and strengthening muscles by isometric contractions with an upgrade in charge protected by bequillage and under the supervision of a physiotherapist.

This rehabilitation has been to rule, among all our sick.

For patients who have had a bone graft, the charging was outlawed up to consolidation.

Postoperative Complications**-Early complications (the first 3 months)*****General Complications***

No thromboembolic complications, cardiac, or early death has been noted.

Local complications

- No cases of superficial hematoma or femur fracture on prosthesis has been observed.
- We have had 1 cases (2.13%) of Early sepsis on hardware, to J5 Post-operative. An abundant washing and curettage of the infected tissues with bacteriological sampling has been carried out. The direct examination and culture was negative. Antibiotic therapy had been established. The evolution has been good. It was a patient aged 39 years operated on the left side for coxite inflammatory. Followed for PR since the age of 10 years under prolonged corticosteroid therapy in combination with methotrexate (Observation (obs) number (no) 16).
- We have had 1 cases of paralysis of the popliteal sciatic external (EPS): (obs. n°4), with a good evolution.

- In our series, 3 cases of Early dislocation of PTH have been noted, the Evolution was favorable year for all the CA:
- In 2 cases: the dislocation occurred respectively to J5 (obs. n°24) and J17 (obs. n°30) Post-surgery. The dislocation occurred for non-compliance of movements proscribed in the 2 cases. The reduction was made in urgency: orthopediquement in 1 case (obs. n°30) and in the other case, resumption of the PTH with a change in the head.
- In 1 cases: the dislocation had occurred at 1 months post-operative and was associated with a tilt of the cupule > 50° (obs. n°42). The reduction has been made surgically after change of the head.

Late complications (beyond the 3rd month post-operative)

-Descellements

We have noted 1 case of descellement bipolar aseptique occurred at 3 years post-op (obs. n°17), having need a removal of the initial prosthesis and install a new prosthesis cemented together at the same time.

-Late Dislocation

We have listed a case of late dislocation of PTH to 7 years post-surgery, after a false movement during a bath in the Hammam (OBS. N°1). The PTH has been resumed.

-Femur fracture

No cases of femur fracture has not been listed in our study.

Results at the latest decline

Patients reviewed and average decline

The latest decline of 32 patients (36 PTH) have been reviewed and 11 patients (11 PTH) have been lost sight of. The average decline for patients reviewed was 42 months with extremes ranging from 9 to 83 months. Among the patients reviewed: 24 patients (28PTH) have been reviewed in consultation for an assessment of radio-clinic.

8 patients (8 PTH) have not been able to move for reasons not related to the PTH and have been seen at home for a clinical evaluation. The radiological analysis at the latest decline has not been able to be carried out for these patients. (Last balance sheet dating back more than 2 years and not taken into account) (Figure 1).

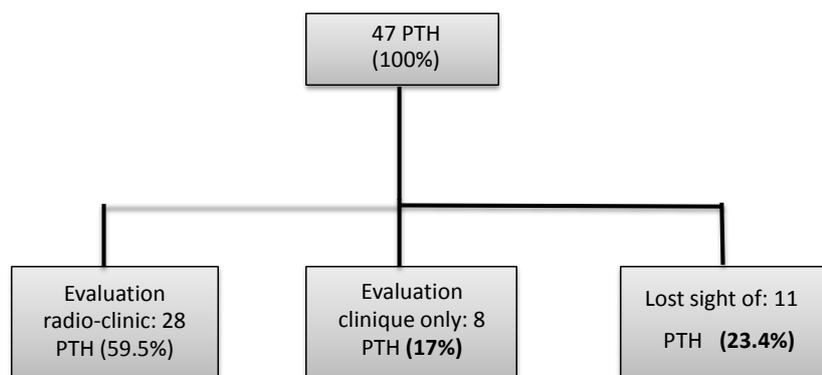


Figure 1. Distribution of patients to the latest decline.

Functional Evaluation

For patients reviewed, we resumed the criteria of Postel and Merle of Aubigne (LDCS), in order to assess the clinical condition of the patient and the function of their hip after decline.

Results on the Pain

The average rating of the pain to the last decline was 5.63. The latest decline 69.44% of hips were painless.

Results on the mobility

The average rating of the mobility in the last decline was of 5.08.

Results on the walk

The rating of the walk to the latest decline was 5.4 on average.

Score overall LDCS and appreciation to the latest decline

The score LDCS average overall to the decline was 16.1.

The functional outcome global according to the scoring LDCS, at the average rate of decline of 42 months, was excellent in 27.78% of cases, very good in 19.44% of cases and good in 44.44% of cases, fair in 2.78% of cases, poor in 2.78% of cases, wrong in 2.78% of cases (**Figure 2**).

We have grouped the functional results assessed according to the criteria of Postel-Merle of Aubigne (LDCS) by: Satisfactory for the excellent results, very good and good; **Unsatisfactory** for the results passable, poor and ill. The results were generally satisfactory (91%) to the average rate of decline of 42 months.

Comparison of preoperative LDCS and the latest decline

The average gain of the LDCS global at the latest decline was 7 points compared to the preoperative state. Among the items the score of the LDCS the gain the higher was the item "pain", it went from 2.8 to 5.6.

❖ Radiological Evaluation

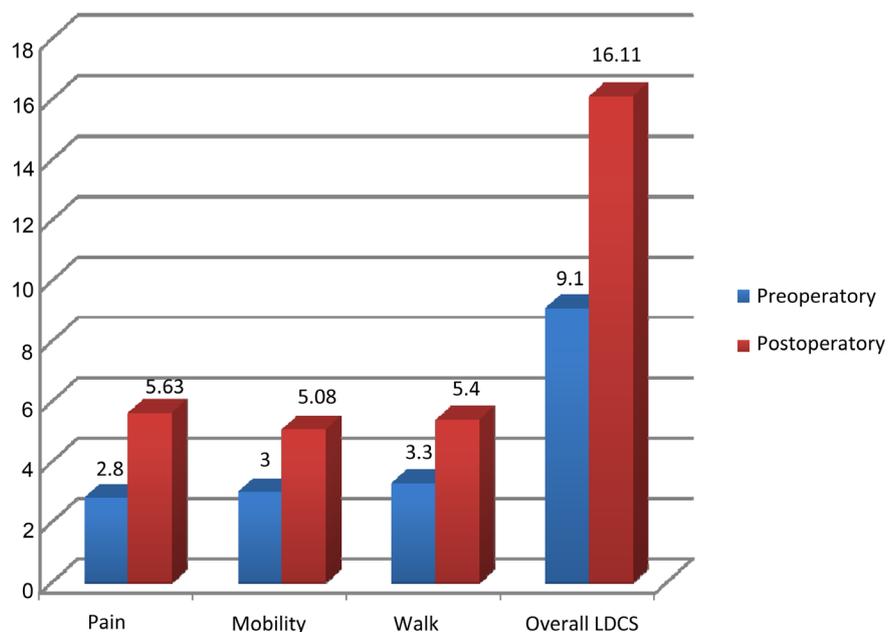


Figure 2. Comparisons of the score LDCS means before and after total hip replacement.

The radiological assessment has been based on x-ray images of the basin of strict face as well as radiographs of the hip surgery of the face and profile taking the totality of the prosthesis.

A careful study of the successive radiographs and their confrontation with the cliches post-operative, earlier had for the purpose of the search for signs of complications.

The radiological shots have been analyzed according to the following criteria: at the level of the workpiece cotyloïdienne, we checked:

- The angle of tilt of the Cup by report to the BI Line ischiatic. It is normally of 45°.
- The position of the acetabulum by report to the line innominee (Protrusion) and the upper part of the valve stem hole. It is normally < 2 mm.

The liseres were analyzed in the 3 areas of Lee and Charnley. At the level of the femoral exhibit, we checked:

- The position of the workpiece by femoral report to the axis of the femur: varus valgus, or normo-focused.
- Tail of the cement.

The femoral liseres were analyzed in the 14 zones of Gruen.

For the PERI ossification prosthetic-it has used the classification of Brooker.

In post-procedure

We have studied the radiographs of control of the post-operative of all patients (47 PTH).

✓ At the level of the Prosthetic acetabular

- 30 cases had a slope between 42° - 45°.
- 16 cases had a slope between 46° - 50°.
- A case of vertical cup with an angle >50° has been noted.

✓ At the level of the femoral exhibit

- Three PTH had a rod in a varus.
- Two PTH had a rod in valgus.
- The STEM was normo-focused in 42 PTH.

No border line has been found in post-operative immediate.

The last decline:

It is recalled that the x-ray analysis focuses on 28 PTH, the results are the following:

✓ At the level of the Prosthetic acetabular:

No cases of verticalisation of the Cup was noted. All the wells had a good positioning.

No wear has been observed at the level of the acetabulum to the last decline.

✓ At the level of the femoral part:

- 1 case of varisation of the femoral stem.

It was found 2 case of ossification peri-prosthetic appliances not having need for surgical recovery, according to the classification of Brooker:

- 1 case was of grade II: patient operated for neurogenic paraosteoarthropathie (obs. n°32) associated with a score of LDCS to 11;

- 1 case was in Grade I: patient operated for coxarthrose post-traumatic (obs. n°41).

In addition no sign pointing toward a descellement has been noted.

At total after an average rate of decline of 42 months:

Five PTH on the 47 implanted (10.6%), have undergone a surgical recovery:

4 times with a change of the implant and a resumption without change of implant.

Late complications (beyond the 3rd month post-operative)

-Descellements

We have noted 1 case of descellement bipolar aseptic occurred at 3 years post-op (obs. n°17), having need a removal of the initial prosthesis and install a new prosthesis cemented together at the same time.

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5. Discussion

Indications of the PTH

-General information on indications

The indications of the PTH remain dominated by the coxarthrose [1]-[6], but the main objective of the PTH is to combat the pain and to improve the function of the hip, thereby it finds its place in a lot of other traumatic pathology and degenerative diseases of the hip.

In France, the National Agency for the development of the Medical Assessment (ANDEM) [6] has made the following recommendations on the indications of the PTH:

- ✓ For the coxarthrose:

The PTH is indicated in the functionally coxarthroses causing a severe disability insufficiently daily improved by a medical treatment well led, after an observation period of a few weeks to a few months.

- ✓ For fractures of the neck of the femur:

No indication of the PTH in the fractures non-displaced from the neck of the femur.

In the cases of fractures in coxa Vara, beyond 70 years, a PTH can be used. However, before 50 years, the surgical treatment must give preference to the osteosynthesis.

In the United States, NIH (National Institutes of Health) has recommended the installation of arthroplasties total hip (ATH) for patients with chronic pain of the hip with alteration of the Quality of Life. The Glory (Global Orthopaedic Registry), an international registry of patients who received an ATH in first intention, had found that the selection criteria for an ATH varied in functions of countries of patients and surgeons. However, there is no international consensus for the indications of the PTH [7].

The total hip replacement is generally indicated in the symptomatic coxarthroses resistant to conservative treatment [4].

Epidemiological data

More than 1 million of total hip replacement are performed each year in the world, and this figure is expected to double in the next two decades. The rate of ATH of first intention has increased by 50 per cent in the United States between 1990 and 2002. In the UK between 2005 and 2010, this rate has experienced an increase of 16% and similar increases have been noted in Finland and Norway [7].

Kurtz, *et al.*, have made a projection on the period from 2005 to 2030 in the United States. They have used the data from the *Nationwide Inpatient Sample* (NIS) to formulate a model allowing for a projection of the number of cases per year and predict an increase in the number of ATH of first intention to 174% [8]. Kurtz, *et al.*, in another study, using the same method, on the period 2010 to 2030, predict a 50% increase in the number of ATH in younger patients [29].

In Morocco, an increase in acts of total hip replacement was also observed, especially since the introduction of the system of medical assistance (RAMED) ensuring an availability of the implants in the public hospitals.

The prosthetic surgery Hip in constant increase, also concerns the subjects of more and more young and active [7] [9] [10].

The current control of operational techniques, the improvement of drawings and quality of materials of prostheses have largely contributed to these increases of settlements [11].

-Age

The age as epidemiological element is important to take into consideration in the installation of a PTH. It is an important factor determining the functional outcome and the longevity of the prosthesis [32]. The results of the PTH before 50 years of age are variously assessed in the literature. It is traditional to say that they are overall less better on the long term than those of an older population [12]-[22].

In fact, youth patients seek mechanically their prosthetic way more important. Thus, for Johnsson, each decade of less during the intervention increases the relative risk of descellement of 1.8 [23] (Table 6).

The average age in our series is 36 years, she joined the Series P32 of the CHU Ibn Rochd [44] and is lower than those of the other series [32]-[42]. This lesser average age could be explained by the young age of the Moroccan population compared to the western population and by the frequency of pathologies affecting the young subject in our context: coxites inflammatory, coxarthrose post-traumatic.

-Sex

Classically, there is a predominance of women among patient candidates in a PTH [1] [7]. The female sex was predominant in our series, this joined the series of Aldinger [13], Chana [19] and Schmitz [20], Nich [25] and Archibeck [26] (Table 7).

To Woo and Morrey [27], the rate of dislocation is significantly higher

Table 6. Comparison of the average age with the series of less than 50 years.

	Year	Numbers of cases	Average Age (years)
Delaunay <i>et al.</i> [32]	2008	73	40.7
Roof series 32 of the CHU Ibn Rochd (P32 CHUIR) [44]	2009	31	36
Aldinger <i>et al.</i> [33]	2009	141	47
Migaud <i>et al.</i> [34]	2011	30	39.8
Hwang <i>et al.</i> [35]	2011	70	39.8
Teusink <i>et al.</i> [36]	2012	118	40.5
Takenaga <i>et al.</i> [37]	2012	100	40.1
Innmann <i>et al.</i> [38]	2013	91	42
Chana <i>et al.</i> [39]	2013	110	45
Schmitz <i>et al.</i> [40]	2013	126	37.6
Channel Babovic <i>et al.</i> [41]	2013	50	38.9
Ryan <i>et al.</i> [42]	2014	72	43.1
Our series	2015	43	36

Table 7. Distribution of PTH in young subjects on the basis of sex among various authors.

Authors	Year	Numbers of cases	Percentage of men (H) (%)	Percentage of women (F) (%)
Nich <i>et al.</i> [15]	2006	23	43.4	56.6
Archibeck <i>et al.</i> [16]	2006	91	49	51
Delaunay <i>et al.</i> [12]	2008	73	79.4	20.6
Series P32 CHUIR [14]	2009	31	51,61	48,38
Aldinger <i>et al.</i> [13]	2009	141	48.9	51.1
Migaud <i>et al.</i> [14]	2011	30	83.3	16.7
Hwang <i>et al.</i> [15]	2011	70	81.4	18.6
Teusink <i>et al.</i> [16]	2012	118	51.7	48.3
Takenaga <i>et al.</i> [17]	2012	100	63	37
Innmann <i>et al.</i> [18]	2013	91	67	33
Chana <i>et al.</i> [19]	2013	110	47.3	52.7
Schmitz <i>et al.</i> [20]	2013	126	48.4	51.6
Ryan <i>et al.</i> [12]	2014	88	51.4	48.6
Our series	2015	43	39.5	60.47

among women (3.8% F against 2.5% H), same as for Turner (5.5% F against 2.8% H) [28]. This difference can be attributed to a greater muscle weakness [27]. The predominance of women is even more clear in the late Luxations [29].

The male sex as to him, would be associated with a rate of aseptic descellement to be higher. The fact that the men are on an average are heavier and prac-

tice of physical activities are more important than women of the same age, would entail a solicitation that are more important of the implant leading to terms to the descellement [30] [31].

C-indications:

When a HIP is reached by a pathological process (coxarthrose primitive or secondary, osteonecrosis of femoral head, coxites ... etc.) the clinical expression is generally summarized to 3 functional signs associated with various degrees: pain, loss of mobility and lameness. These signs are reflected by a disability in the life of the sick. The indication of arthroplasties, is essentially based on the functional discomfort of patients [32].

The pathologies leading to the establishment of a total hip are multiple and well known. In young patients, the pathologies responsible of disability are specific. The legacies of diseases of the childhood are: primitive osteochondritis of the Hip (OPH), congenital dislocation of hip (LCH), Aseptic osteonecrosis of the femoral head in transplant recipients of marrow, sickle cell anemia, corticosteroids for various ailments, severe asthma or other. These are also of rheumatic diseases (juvenile idiopathic arthritis (JIA), ankylosing spondylitis (SPA), rheumatoid arthritis (PR)), the villo synovitis-nodular and quickly coxarthroses scalable. The sequelae of trauma also represent an important part: fractures of the acetabulum and the neck of the femur. The sequelae of pathologies of the children constitute a population where the morphological alterations are frequent and may complicate the surgical management [11].

In our series The ONATF was predominant which combined the results of Delaunay [12], Migaud [14], Hwang [15], Schmitz [16], Ryan [22] and Kim [33] (Table 8).

Table 8. Comparison of etiologies having conducted to the indication of PTH.

<i>Series</i>	Year of Publication	# of hips	Primitive Coxarthrose (%)	Coxarthrose post-traumatic stress (%)	Coxite inflammatoire (%)	Congenital Dysplasia (%)	ONATF (%)	Epiphysiolyse (%)	OPH (%)	Septic arthritis of the hip (%)
<i>Delaunay et al. [12]</i>	2008	83	23	4.8	-	27.7	42	-	2.4	-
<i>Series P32CHUIR [24]</i>	2009	35	11.42	22.85	34.27	-	25.7	-	-	5.70
<i>Aldinger et al. [23]</i>	2009	154	31	5	1	33	19	-	-	-
<i>Migaud et al. [24]</i>	2011	39	2.56	2.56	-	38.4	51.3	-	5.1	-
<i>Hwang et al. [25]</i>	2011	78	7.7	-	7.7	7.7	72	-	-	2.5
<i>Kim et al. [33]</i>	2011	228	14	-	4.5	1.95	66	-	-	11
<i>Teusink et al. [16]</i>	2012	144	20.83	4.86	8,97	12.5	26.4	6.25	4.86	0.7
<i>Takenaga et al. [17]</i>	2012	115	34	7.8	2.61	12.2	30.5	1.73	7	0.87
<i>Innmann et al. [18]</i>	2013	100	38	6	4	27	18	-	-	-
<i>Chana et al. [19]</i>	2013	120	63.3	-	3.3	25	4.2	4.2	-	-
<i>Schmitz et al. [20]</i>	2013	152	9.9	5.3	10.5	21.7	26.3	3.3	7.2	3.3
<i>Ryan et al. [22]</i>	2014	88	5.7	5.7	9.2	4.5	67	3.4	1.1	3.4
Our series	2015	47	4.26	14.89	23.40	10.64	31.9	2.13	2.13	6.38

The impact of the different aetiologies in the chance of the PTH and how they may influence the results of surgical, however remains unclear in the literature [22].

During the ONATF, the overall results of the PTH are classically less better in particular subjects under 50 years of age. In these young people patients with osteonecrosis aseptic, of anatomical differences compared to the primitive coxarthrose have been observed, leading some surgeons to propose shoots on measurement in order to adapt the implant to the patient in the hope of a better long-term Outcome [34] [35].

Radl *et al.* [36], in a retrospective study, have assessed the results of a femoral stem which is not cemented in young patients, made for coxarthrose (49 patients) and other for aseptic osteonecrosis (31 patients with Ficat stage III and IV), the average decline was 6 years. Using the technique EBRA (Einzel-Bild roentgen-analysis), a method of analysis assisted by computer to measure the displacement of implants, they noted a migration of the rod of 1.5 mm among operated for osteonecrosis versus 0.6 mm among those operated coxarthrose ($p < 0.001$). The analysis of the survival of the stem at the latest decline, with as event revision of the rod, was 74% among the group osteonecrosis versus 98% among the group coxarthrose. They have suggested that this difference could be attributed to a decrease in the stock of bone peri-prosthetics occurred during the osteonecrosis.

However, Ince *et al.* [37], in a retrospective study using the same method of analysis of implants (EBRA), have evaluated the results of the 41 young patients who had a non-PTH cemented (porous coating), all made for osteonecrosis advanced and they have found no revision of the rod or descellement (average rate of decline of 7 years). Similar results have been found by Min *et al.* [38], among young people under the age of 55 years with osteonecrosis of the femoral head, the rate of survival of the femoral stem was 95% to 10 years. However, the authors recommend a radiological monitoring particularly attentive in these patients treated for osteonecrosis aseptic.

In the case of osteonecrosis secondary to a corticosteroid treated by a PTH which is not cemented, biological anchoring is reduced because the corticosteroids directly inhibit osteoblasts and stimulate bone resorption. It has been shown that the results of the PTH for idiopathic ONA or post-traumatic stress are better than in the case of prolonged corticosteroid. It is therefore important to know the origin of the osteonecrosis to estimate the survival of the implant [35].

In our sample, the inflammatory coxite was the 2nd etiology in terms of frequency (23.40%) leading to the installation of hip replacement and was represented by the SPA (12.76%) and the PR (10.64%). The use of the PTH in the inflammatory coxites in our series and that of p32 (34.27%) [24] was more frequent in relation to other western series [33] [36] [37] [38] [39] [40] [42] and to the two Korean series [15] [33]. An early care and adequate inflammatory pathologies in our context by the biotherapies (anti-TNF) would delay the disabil-

ity and the surgery Prosthetics. These therapies are costly and are unfortunately not in the scope of more of the majority of our patients. The popularization of the joint arthroplasty surgery remains the last way to improve the prognosis of functioning and quality of life of these patients.

The inflammatory coxites during the ankylosing spondylitis and rheumatoid arthritis, occur in patients at a very young age and are most often bilateral. The surgery must be fairly early, before that the deletions joints are major (ankylosis, acetabular protrusion) and are not accompanied of surgical difficulties [29].

In the course of the PR, it has been reported that results in the long-term of the PTH cemented showed a high rate of sepsis and revision for descellement [29]. Eskelinen *et al.*, in their series based on the Finnish register, have studied 2557 PTH carried out in the framework of a PR, patients were all under the age of 55years. They noted that the risk of revision was more important for the femoral stems cemented than for those posed without cement [40]. The Hip arthritis is characterized by the frequency and timeliness of loss of bone substance on the two slopes of the articulation, this bone loss would be partly responsible for the aseptic descellements [41]. In addition, the PR is known as aggravating factor of infectious risks, through the auto character-IMMUN pathology and of therapeutic used in this context. Nevertheless, it is recommended to stop or NSAIDS, neither the corticosteroids, nor the disease modifying antirheumatic drugs (DMARDs) including methotrexate, before surgery [41].

The SPA is willingly responsible for an enraidissement, or even of a true ankylosis in a quarter of cases. The patients are usually operated young, between 35 and 40 years. Installing a PTH may require additional gestures: tenotomie adductor, correction of a contracture of the Knee... etc. The suites can be complicated by the appearance ossifications periprothetiques which limit the mobility in 12% to 45% of cases in the literature; they are rarely voluminous (8 to 23 per cent of classes III and IV of Brooker) and lead exceptionally at the reankylose [41].

In the course of arthroplasties total hip on coxarthrose post-dysplastic, the major problem encountered is the reconstruction of the acétabulum [42]. In effect, the congenital dysplasia of the Hip can lead to severe anatomical modifications of the articulation of the hip. These changes increase the surgical difficulties and can also threaten the long-term survival of the implant prosthetics [43]. Pidhorz Sedel *et al.*, have analyzed 1347 PTH with an average rate of decline of 6.7 years. The coxarthrose post-dysplastic represented 27% of the indications of arthroplasties of this series. The PTH on cervical dysplasia posed problems of surgical technique which interfered more on the result than the quality of the materials and of the friction torque: 35% of dysplasias had need a transplant acetabular [44].

In our series, the coxarthrose post-dysplastic represented 10.64% (5 hips) Indications. Among the 5 hips dysplastic, both hips (4.2%) had needed an acetabular reconstruction by transplantation Autologous bone.

The PTH on congenital dysplasia of the Hip would be associated with a higher

risk of dislocation that the PTH on primitive coxarthrose, probably due to the relative lack of abducteurs muscles but also due to the diameter of the acetabulum often imposing cupules of small size and therefore of prosthetic heads of small diameter [45]. Thillemann *et al.*, in their series of 56087 PTH, based on the Danish Registry of arthroplasties have compared the results of the PTH carried out for coxarthroses primitives (96%) to those of the aftermath of the pathologies of the children (cotyloïdienne dysplasia (1.6%), LCH (1.0%), epiphysiolyse (0.5%), OPH (0.7%)). Patients with cotyloïdienne dysplasia had a higher risk of recovery for a dislocated prosthesis during the 6 months post-operative compared to patients operated for coxarthrose primitive (relative risk = 2.8). In the Group of LCH this risk was not high in relation to the group primitive coxarthrose [46]. By contrast, Furnes *et al.*, have reported in their study a higher risk recovery for dislocation in this group (LCH) [47].

In our series of a hip dysplastic (2.13%), was resumed for a dislocated early prosthetic. The dislocation occurred in a context of non-compliance of luxant movements.

PTH on cervical dysplasia remains a challenge for the surgeon. A pre-adequate planning and an appropriate surgical technique, are essential to ensure a better outcome in the long terms in these patients [42] [43] [45].

In our series among the coxarthroses on congenital dysplasia (5 hips), 4 were sequellaires, a LCH of childhood.

The screening of the LCH at birth, although compulsory, is often neglected. In addition, it remains very little known or poorly practiced by physicians and the auxiliary health. This complicates the supported and the prognosis. The progress to be made in our context also concern well the time diagnosis that the time taken to load.

In our study, a patient (2.13%) had benefited from a PTH for para-neurogenic osteoarthropathie (NENA).

The NENA was following in our patient to a head trauma, it has been seen at the stage of ankylosis. The para-neurogenic osteoarthropathie or neurogenic osteomes of hip are ossifications periarticulaires heterotypic intracapsulaires secondary to a nerve lesion central or peripheral. It is a complication often asymptomatic incidentally discovery during a radiological examination. In our context, our patients are often supported at a late stage [68]. They have a functional impact important due to the limitation which articular can evolve up to the Ankylosis [48] [49] [50]. Several surgical techniques are used to operate the NENA, the most used is the arthrolyse with excision. More rarely can realize a prosthetic replacement in the event of destruction articular. The choice of the time of the surgery is important. It should wait for the maturation of the ostéome according to some authors, whereas other advocates a surgery early more [48] [49].

Preoperative Data

-Comparison of the average score LDCA with the literature

In our study, the functional assessment pre and post-operative was conducted by the LDCA (**Table 9**).

Table 9. Comparison of the average score of the Scoring LDCS in preoperative and the latest decline

Series	Average score preoperative	Average score at the latest decline
Nich <i>et al.</i> [25]	11.7	16.2
Delaunay <i>et al.</i> [12]	11.1	17.4
Series P32 [24]	9.65	13.9
Courpied <i>et al.</i> [51]	10.1	17.1
Vidalain <i>et al.</i> [52]	10.9	17.4
<i>Our series</i>	9.1	16.1

The average gain in the last decline was 7 points compared to the preoperative state. The average gain of our series was higher than that of the series P32, and was comparable to the other series of the literature. The average gain of the pain was remarkable, from 2.8 in pre-operative at 5.6 at the average rate of decline of 42 months, thus improving the quality of life of these young patients. The mobility and the walking were also improved in our patients.

Radiological study

The imaging plays a major role in the preoperative planning of prostheses, in their monitoring and in the search for possible complications at a distance.

Preoperative evaluation

The radiological cliches of the Hip provide essential information on the pathology and the model and the size of the prosthesis the more appropriate as well as the technical gestures such as the depth of the acetabular trimming, the level of resection of the femoral neck, positioning and orientation of the acetabulaires components and femoral [6] [53].

The preoperative planning, to determine the positioning of the cup and determine the femoral pivot adapted, requires a radiological balance sheet (Radiography: Pool facing, pathological hip face and profile) which the scale must be known in order to be able to use the layers of same magnification .The possible complementary Bone gestures are also studied through the Radiography: resection of osteophytes, osteotomy of the greater trochanter, bone grafting and acetabular strengthening. The preoperative radiography also allows account to be taken of any anomaly that may be a fear of a bad mounting and orientation [53].

The quality is also an important parameter in the choice of the prosthesis. It is the X-ray, which crudely reflects the state of bone as well as its architecture [6].

The telemetry can be performed to search for the reasons of the unequal length between the two States. Following the habits of surgeons, this examination may be carried out in a systematic manner or occasional. An MRI is performed in cases of osteonecrosis to ensure the diagnosis, assess the extent of necrosis and check the status of the opposite hip. The scanner is used when the geometry of the acetabulum and/or of the femur presents an Anatomic variation, particularly in young subjects [6].

Postoperative control

The radiological assessment is an essential complement of clinical follow-up of a hip replacement. It allows us to trace the main complications including the wear and the descellement which are inevitable, particularly in young subjects who have a higher life expectancy [41] [42].

In our series it was noted in the latest decline, a case of varisation of the stem but without sign of associated descellement.

Search for complications

The standard radiographic balance sheet also made the diagnosis of possible complications: descellement, osteolysis periprothetique, wear, instability, heterotypic ossification, and in a context that is often more acute periprothetique fracture or rupture of the implant.

Treatment

Anesthesia

The prosthetic surgery is a heavy surgery and hemorrhagic, may commit the vital prognosis. This surgery has largely benefited from recent progress of Anesthesia and resuscitation in particular in the field of transfusion economy (autologous transfusion programd (TAP), preoperative prescription of erythropoietin (EPO), devices for intraoperative recovery (RPO) [54] [55].

The two modalities of anesthesia used in the hip prosthetic surgery are: the general anesthesia (AG) and regional anesthesia (ALR) (rachianesthesie, epidural anesthesia).

The rachianesthesie is the technique of ALR most used for the installation of PTH. The choice between the different modalities anesthetic is still widely debated [55].

The meta-analysis of Rodgers *et al.*, appealed for a reduction of thromboembolic risk, respiratory infections, transfusion needs in case ALR by report to the AG [56]. The meta-analysis of Mauermann *et al.*, on the anesthesia during the total hip replacement, confirmed most of these results [57].

Other studies have shown that regional anesthesia is associated with analgesia the post-operative higher compared to the AG. In addition, the ALR shows a low incidence of nausea and vomiting [58] [59] [60]. In the Dutch Recommendations of 2011 for the total hip replacement, the ALR was advocated as a technique of Anesthesia [61].

However, the ALR often cause a urinary retention and a hypoblood pressure [59] [60].

For the acts of long duration and complexes such as times of total hip prostheses, general anesthesia is preferred [54] [55].

Outside of customary field problems in anesthesia (diabetes, heart disease, etc.), specific pathologies such as rheumatoid arthritis and ankylosing spondylitis can inquire a few problems: difficulty of intubation, poor tolerance to the Pain, risks associated with therapeutic with long course in these patients [55].

In our series, the general anesthesia was the most used with a rate of 63.83%. The rachianesthesie has been used in 36.17% of cases.

Antibioprophylaxis

The infection of a prosthesis hip by operative contamination remains the complication in the most formidable of this operation, the contamination surgical wounds at the end of the intervention is not exceptional, although it is of a clean surgery, with a complication rate sevenique often below 5% [62].

The impact of the post-operative infection in surgery articular prosthetic is 3% to 5%. The antibioprophylaxis allows to reduce the rate of infection to less than 0.5% [63].

In our series, the antibioprophylaxis was systematic for all patients.

Tracks first and surgical technique

The choice of a track first from the hip to the implantation of a prosthesis in total intention is the more often dictated by the habits acquired in the course of the training received by the orthopedic surgeon. The access to the hip may be earlier, anterolateral, lateral, posterolateral or posterior. The quality of a track first of the hip is often considered superior or inferior to that of another track in function of the comparisons of functional results of the Prosthetic arthroplasty performed. The objective of the surgeon who wants a total prosthesis of hip will therefore be to obtain the best compromise between the quality of operating conditions and of tissues periprothetiques [64].

The PTH by navigation [64]

The navigation by computer in the domain of the hip prosthetic surgery is the use of the computer tool in the aim of helping the orthopaedic surgeon in the planning and/or the achievement of a surgical gesture.

The installation in the supine position is classic, patient flat on the operating table under general anesthesia or rachianesthesie. The principle is to produce a digital image that will be used as a benchmark to guide the procedure by incorporating possibly by instruments.

It has been proven that the surgery of the PTH by navigation allows a better positioning of the acetabulum prosthetics.

Comparison of tracks first with the literature (Table 10)

The different types of total hip prosthesis

The PTH are distinguished primarily by their mode of fixation and according to the friction torque.

Table 10. Comparison of tracks of outskirts.

Series	Routes of Outskirts
Archibeck <i>et al.</i> [26]	Track posterior external of Moore
Nich <i>et al.</i> [25]	Track posterior external of Moore: 96.4% Track side with trochantérotomie
Courpied <i>et al.</i> [51]	Track trans-trochantérienne
Series P32 [54]	Track posterior external of Moore
Takenaga <i>et al.</i> [17]	Track posterior external of Moore
Chana <i>et al.</i> [19]	Track posterior external of Moore
Our series	Track posterior external of Moore

It prefers to cement a PTH as soon as the quality of the bone is presumed or proven wrong: In patients aged among osteoporotic patients or patients with a bone pathology likely to promote the occurrence of a fracture periprotétique per or postoperative [6] [25].

PTH not cemented

The prostheses not cemented were introduced at the end of the years 70 to find out a solution to a high failure rate of cemented implants in young and active patients. In effect, the survival of the PTH is particularly important in the young subject whose life expectancy is long and the request is strong and functional [6].

The PTH not cemented are most often used in patients young and active. In effect, this mode of fixation is preferable to young adults, because it esteems the bone capital and allows a real osteo-integration, union of the living bone to the inert implant. The deference of the bone capital is also important in these subjects young people whose recovery is inevitable [6].

Analysis of the means of securing in the literature

Archibek *et al.*, have studied the results of 100 PTH using second generation implants not cemented in patients less than 50 years. Has 9 years of decline, they noted 13 times, 1 Sepsis on hardware, 5 prosthetic luxations, 7 case of osteolysis (5 cotyloïdiennes Limited and 2 associated with a aseptique descellement). No cases of femoral descellement has been reported. Overall survival at 10 years was 87.5%. If one takes the failure resumption of the femoral component as a criterion, the survival to 10 years was 100% and as a criterion of failure the resumption of the acetabular component, the survival was 97.1% [46].

Ryan *et al.*, have recently reported (2014), the results of a series of 88 PTH not cemented in patients under the age of 55 years. The decline in 5 years, they noted 2 cases of recovery: 1 for prosthetic dislocation and 1 cases of sepsis on hardware. There had been no cases of descellement [22].

Kim *et al.*, in a retrospective study, evaluated the results of 166 patients aged less than 50 years who have undergone a total hip replacement. There were 114 hybrid PTH with rods cemented and 114 PTH not cemented (all without cement) with stems not cemented. The rate of revision of the femoral components and acetabulaires were not significant between the two groups. The overall survival of the implants were similar in the 2 groups. As well, in the group "hybrid" overall survival at 10 years was 93.6% to 15 years 91.8% [33].

In the light of these results, the total prosthesis of hip implanted in patients young appears to be good, and this, whatever the mode of fixation used.

The various studies do not show the advantage of a mode of fixation by report to the other. A condition to respect the basic rules, the two modes of fixation are reliable.

In its report dating from 2007 the HAS was not able to vote for the one or the other type of fixation in young subjects [15] The analysis of the data in the literature objectively shows the satisfactory behavior of the implants not cemented in the subject less than 50 years. A condition with respect to the principles has

been defined for the implantation of a PTH not cement. However, if the various studies carried out are state of an excellent survival for the prostheses having this mode of fixation, the problem of aseptic descellement is nevertheless not resolved. Reactions of osteolysis related to wear particles are also found, even that of migration of stemmed femoral and pain of thighs. The ablation of a PTH not cemented can be very difficult at the level of the barrel femoral and sometimes requires a component of osteotomy diaphyseal [15].

In our series the dominance of prostheses not cemented was significant. In Effect 85% of PTH were non-cemented and 15% of PTH were cemented. This choice is explained by the young age of our patients with more often a good bone quality.

Friction Torque

Within the factors likely to affect the longevity of total prosthesis of hip, and this regardless of the mode of fixation, the friction torque plays a preponderant role.

The couples of friction of arthroplasties are in constant evolution. The choice is important for young subjects in order to reduce the Chess [65].

Up until the middle of the 1990s, the majority hip prostheses included a friction torque with a metal head and a prosthesis acetabular polyethylene (metal/polyethylene). Different studies have concluded that the wear of the polyethylene was the main cause of failure. To improve the results, that is to say the duration of these arthroplasties, two major channels have been proposed: improve the couples using polyethylene or change of torque using the so-called couples hard/drive: metal/metal or ceramic/ceramic [65].

Polyethylene torque-metal

The Friction Torque conventional polyethylene-metal is the reference torque which are compared to all other couples of friction. The prostheses to conventional friction torque polyethylene-metal have the longest clinical decline. Their survival is known up to 30 years for large series of patients. The survival rates reported are 85% to 20 years, 80% to 25 years and 78% to 30 years [15].

The relationship between the wear of the polyethylene and osteolysis responsible for the aseptic descellement of the prosthesis has been shown in the literature.

The polyethylene remains the most widely used material because of its low cost and ease of manufacture [17].

Conventional polyethylene

This material of high molecular weight combines the crystals and long polymeric chains, the mechanical properties are directly related to the crystallinity and spatial cohesion of macromolecules. The disadvantage lies in the existence of free radicals, source of areas where it will happen the oxidation and therefore of wear. The wear particles cause inflammatory reactions by the intermediary of leaching of cytokine. These reactions can lead to the prosthetic explaining the descellement [66].

The retrospective series to 20 years of decline have revealed an average wear of

0.1mm per year of the EP conventional. The survival of the implant is strongly conditioned by the presence of wear. There is a correlation between the rate of wear and tear and survival curve of the implants of PTH. Sochart *et al.*, have demonstrated a direct relationship between the importance of the wear and the survival of the implants, if the wear is 0.1mm per year, the survival to 25 years is around 70%, if the wear is greater than 0.25mm per year, the survival passes to less than 20% at 20 years of retreat [67].

It has been shown that the significant parameter influencing the wear of the conventional PE was the activity of the patient and the age (more than three million cycles per year among an active subject) [66].

To compensate for the failure of the conventional PE a new type of cross-linked polyethylene, source of less than wear debris and osteolysis appeared [66].

Polyethylenes highly reticulated (cross-linked polyethylene “cross-linked”)

The principle is to improve the reticulation chains between the crystals by irradiation and to avoid the free radical oxidation by a thermal treatment. This change of structure must significantly improve the resistance to wear and reduce the release of particles of wear of PE. The doses of irradiation vary from 5 to 10m rads and manufacturers announce a decrease of the wear between 42 and 100% compared to a conventional PE.

However, irradiation leads to alterations in the mechanical properties of polyethylene, in particular an increase in the rigidity [66].

Antonio, *et al.*, in a retrospective and comparative study including 108 prostheses, showed a significant difference between the two types of PE. They reported a linear wear annual at 59 months of decline in average of 0.055 mm/year for the cotyledons uncemented polyethylene in highly reticulate, and wear annual linear to 63 months of decline on average 0.138 mm/year for the cotyledons not cemented in conventional polyethylene [67].

Channel Babovic *et al.*, reports the results to medium term of PTH with PE highly reticulate in 50 patients (54 PTH) under the age of 50 years. They reported a rate of annual wear of 0.020 ± 0.0047 mm/year. Having 10 years of decline, no cases of recovery for osteolysis nor descellements of implants has been noted. Overall survival at 10 years was 100% [21].

The wear measured in the short term of cotyledons in polyethylene highly reticulate is significantly lower than that of cotyledons in conventional polyethylene. The data for long-term survival of these implants are however not yet known [15].

Torque metal-metal

The implants to a torque metal-metal, have been reintroduced at the end of the 1980s to have been widely used in the years 1950 and 1960. They are composed of an alloy of chromium and cobalt.

The prostheses using a friction torque metal-metal have an excellent resistance to wear, bringing to favor their use among the topics most actively.

It was noted in this friction torque a release of particles of chromium and cobalt in the blood, the tolerance of the body to the production of ions by the in-

terface of friction are not yet known. The ions are eliminated by the urine, which against-indicates this torque in patients with renal impairment. A risk of carcinogenesis is mentioned, but it has never been demonstrated, reactions allergic immune against the metal ions have also described [17].

Kim, *et al.*, in 2004 reported a series of 70 prostheses in patients less than 50 years. The average decline was 7 years, the clinical results were excellent, and no cases of descellement nor stripe have been observed after use of the torque metal-metal [68].

Ceramic torque/ceramic

The Friction Torque ceramics/ceramic has been developed and proposed as an alternative by the French Pierre Boutin since 1972. The purpose was to avoid the wear of prosthetic components and its consequences, in order to increase the longevity of implants and to enable their use in young and active patients more and more [69].

The torque ceramics/ceramic is composed of a head and an insert in ceramic massive. The insert is attached in an acetabular cup metal. Two ceramic type are used, the alumina and the zirconia.

The most used ceramic is the alumina. This torque is used since 30 years. The tolerance is excellent with a wear virtually zero: less than 0.0015 mm/year.

The behavior in friction of ceramics is very much higher than that of other couples used in arthroplasties, including the torque metal-metal. It reflects the characteristics of exceptional surface Ceramics (hardness, very low roughness, wettability, coefficient of friction very low) [69].

Chana, *et al.*, have reported the results of 110 patients aged less than 55 years, having benefited of PTH to a torque Ceramic-ceramic. Has 10 years of decline, the wear was undetectable. The survival for the 2 components with as a criterion of failure recovery for whatever the cause was 96.5% [29].

Baek *et al.*, in their series, analyzed the results of 71 PTH to a torque Ceramic-ceramic, without cement, implanted for osteonecrosis in patients less than 50 years. The average decline was 7.1 years. No cases of descellement, osteolysis or fracture of implant has been observed. In 13 patients (20%) of the phenomena of noise have been reported [70].

In 2007 report, the HAS recommends the friction torque Ceramic-ceramic, the fact of the low production of wear debris, among patients aged less than 50 years [15].

If the torque Ceramic-ceramic proves to be competitive for young patients in terms of longevity of prosthesis, it presents however of notable drawbacks [69]:

- Risk of fracture of implants,
- Use impossible for sizes < 46 mm, which would make the insert too fragile,
- Phenomenon of noise (“squeaking”) of the torque,
- High cost.

The dual mobility

Designed by Gilles Bousquet as early as 1975, it has experienced significant growth as a result of the passage of the patent in the public domain and when

the secondary fastening (by bone regrowth on the surface prosthetics) cupules metal-back is become reliable with the contribution of the hydroxyapatite. This type of cupule is indicated in patients with a high risk of dislocation: high age, neurological pathologies, alcoholism, low muscle trophicite, resumption of prosthesis, tumor pathology.

The problems of wear are occurring at the beginning of the experience because the surface condition and the geometry of the Prosthetic collar also intervene in the phenomena of wear, bringing in favor of smooth collar devoid of notch of extraction.

Despite a rate of wear and survival comparable to the fixed polyethylene, the risk of dislocation intraprothetique (2%) own to this type of implant, must make their prudent indication in particular in young subjects and assets. On the other hand, it is possible to recommend their use because of their excellent stability as soon as it is a HIP to risk [17].

Phillipot *et al.*, have reported the results of 46 PTH to double cupule implanted mobility in subjects less than 50 years. 10 years of retreat 2 descellements acetabulaires isolated, 1 dislocated intra-prosthetics by wear of the retention and an advanced wear, have been observed. The rate of survival of overall actuarial to ten years of this cupule was 90.8%. There has been no episode of prosthetic dislocation in this series [71].

In our series 15% of PTH were of type double mobility, no cases of prosthetic dislocation or intra-prosthetics was observed in these patients.

Conclusions on the friction torque:

The metal torque-polyethylene is the most used and which has the longest decline. In younger patients, the failures of this torque, are in relation with the descellement due to the wear of the polyethylene resulting in an osteolysis. The wear of the polyethylene can be decreased by the use of a head of ceramic and improving the qualities of polyethylene by reticulation (cross-linked polyethylene).

The torque metal-metal has as benefits of limited wear and the possibility of use of implants of large diameter or very large diameter. Its main drawback is the ionic leaching. The consequences of the accumulation of these ions are currently unknown.

The couple Ceramic-ceramic is the couple which has the rate of wear more low and without ionic leaching. The fracture of the ceramic, remains the main inconvenience of this couple.

In our series, the use of a torque PE/metal was used, because it is the least expensive, most available, and because it is accustomed to work with this material.

6. Conclusions

The patients, whose age are less than 50 years constitute a sub group to the characteristics and specific characteristics. In this effect, these patients usually have a physical activity still high at the time of implantation of the prosthesis, and wear of the friction surfaces is increased. In addition, their life expectancy chiefly

makes them more likely to have undergone a resumption of their implants.

In this retrospective study of 43 patients (47 hips) operated before the age of 50 years between January 2008 and March 2014, we find 5 times of PTH is having a failure rate of 10.6% for a duration of mean follow-up of 42 months. But despite this failure rate, the clinical results appear more important with an average score LDCS clinic who spent 9.1 pre-operative at 16.1 in postoperative, either having average gain of 7 points.

The higher the gain has increased pain and 69.44% of hips were painless. In addition, the Final Clinical Evaluation of the patients shows an overall result judged satisfactory. These clinical results should encourage the surgeons to less restraint in the decision-making socket of the installation of a total hip among these young patients, including most of the time already multi-operated and suffering from a severe infringement of the articulation coxal-femoral. As to the choice of materials and means of mounting, the superiority (theoretical) of the friction is the torque metal-metal or ceramic.

Ceramics in terms of wear is an indisputable parameter in young subjects and assets. However, the friction torque metal-polyethylene gives good results and appears to be adapted to our context, given its availability and its cost price.

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