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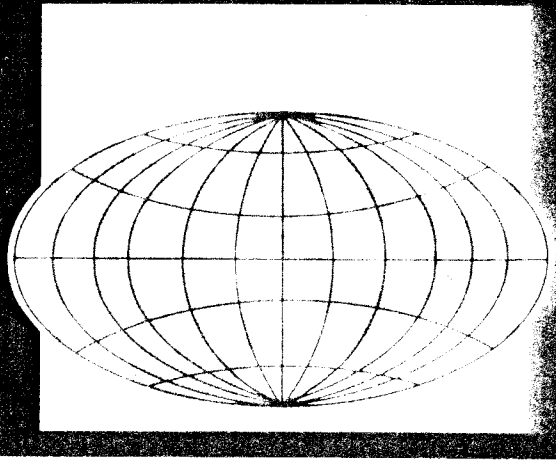

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Multiple revision of total hip arthroplasty

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ABSTRACT: The Authors present 85 cases of multiple reimplantation of total hip arthroplasty (THA), analyzing the complex problems connected to this type of intervention, and putting in evidence primary objectives related technical procedures. (Hip International 1992; 2: 53-62)

KEY WORDS: Total hip arthroplasty, Multiple reimplantation of THA

INTRODUCTION

Considering that hip arthroplasty is an antiphysiological intervention, it is comprehensible that 9-15% (12, 16-20, 23) of primary total hip arthroplasty implants need surgical revision and prosthetic reimplantation.

It has also been shown that the percentage of reimplantation failure increases in relation to the number of successive reimplantations, and the time passed from the first implant (Tab. I).

Overall, the causes of reimplantation failure are the same as for those which provoke the first implant failure (Tab. II).

In relation to this and to clinical and radiographic phenomenology we have identified four levels of importance for primary implantation or reimplantation failure:

1st level Mobilization of only one prosthetic component, stem or cup, associated with middle thigh pain.

2nd level Mobilization of both components associated with beginning alterations of bone trophism, implant geometry and pain; the deambulation still remains unaltered.

3rd level Mobilization or breakage of both components associated with limb dysmetria, implant geometric alterations, invalidating pain, and disharmonious limping deambulation.

4th level Mobilization of both components, erosion, osteolysis, staving, migration, luxation, vascular-nervous insufficiency, ankylosis, and upset of implant geometry with absolute impossibility of deambulating.

General problematics of multiple reimplantation concerning the patients' age, generally over 75, include the following: general condition; psychological condition, especially related to the anguish of past failures; local problems concerning massive bony defects; almost total absence of femoral neck; egg-shell-shaped corticals with high possibility of false via or intraoperative fractures.

Concerning the reimplantation, the problems related to poor alignment between articular skeletal components have to be associated.

TABLE I - UNSUCCESSFUL REIMPLANTATION

1st reimplantation	6%
2nd reimplantation	8%
3rd reimplantation	9-12%

TABLE II - CAUSES FOR REIMPLANTATION

- Loosening
- Luxation
- Osteolysis
- Components usury/breakage
- Femur fractures
- Inadequate prosthesis design
- Implant errors
- Infections

All the previously stated problems can concern either cotyle or femur, or both articular components.

Previous reimplantation problems, often having an equivalent importance, are those of explantation or rather problems involving the surgery of cicatricial tissue and, above all the cement ablation in cemented prosthesis, fibrohistocytic tissue in cemented and cementless prosthesis.

In this context, some eventual problems related to the removal of periprosthetic calcification also have to be associated (2).

About reimplantation, however, the major problems concern osseous loss which can be classifiable either to a cotyloid or a femoral level (Tabs. III, IV).

Based on the previous statements, the strategies of cotyloid and femoral reimplantation can be planned. In the first case, the fundamental position will be represented by determining the neocotyle center around which the acetabular cavity is remodeled, filling all the eventual osseous defects with osseous grafts or synthetic materials (hydrossiapatite, bioglass, cement with osseous grafts). This will permit choosing the most appropriate acetabular prosthesis (Fig. 1) in obtaining the best primary stability and durability.

The procedure for femoral reimplantation is similar to that of the cotyloid in choosing the most appropriate prosthesis, always oversized, if not modular or personalized.

TABLE III - ACETABULAR BONE DEFICIENCY

— Partial
— Cavitary
— Combined
— Peripheric
— Central
— Total = pelvic dysjunction

TABLE IV - FEMORAL BONE DEFICIENCY

— Proximal	partial
	intercalary
— trochanteric	segmental
— distal	
— complete	angular
	ectatic
	osteolytic
	stenotic
	discontinued

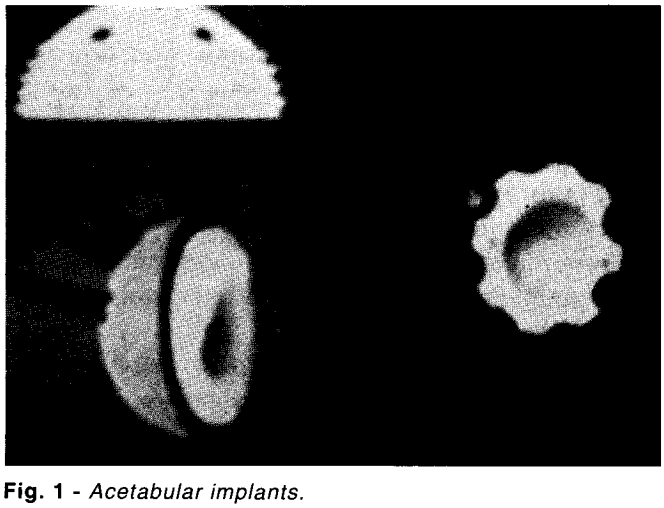


Fig. 1 - *Acetabular implants.*

MATERIALS AND METHODS

In our Clinic from January 1983 to December 1990, a total of 85 prosthetic reimplantations were performed, more specifically 75 first reimplantations, 5 second, 4 third and 1 fifth. In this context 68 cemented and 17 cementless prosthesis were performed, 39 being total implants, 10 acetabular reimplantations and 36 femoral.

From the 39 total implants, 7 were cemented, 19 cementless and 13 mixed.

From the 10 acetabular reimplantations, 3 were cemented and 7 cementless. Of the 36 femoral reimplantations, 10 were cemented and 26 cementless.

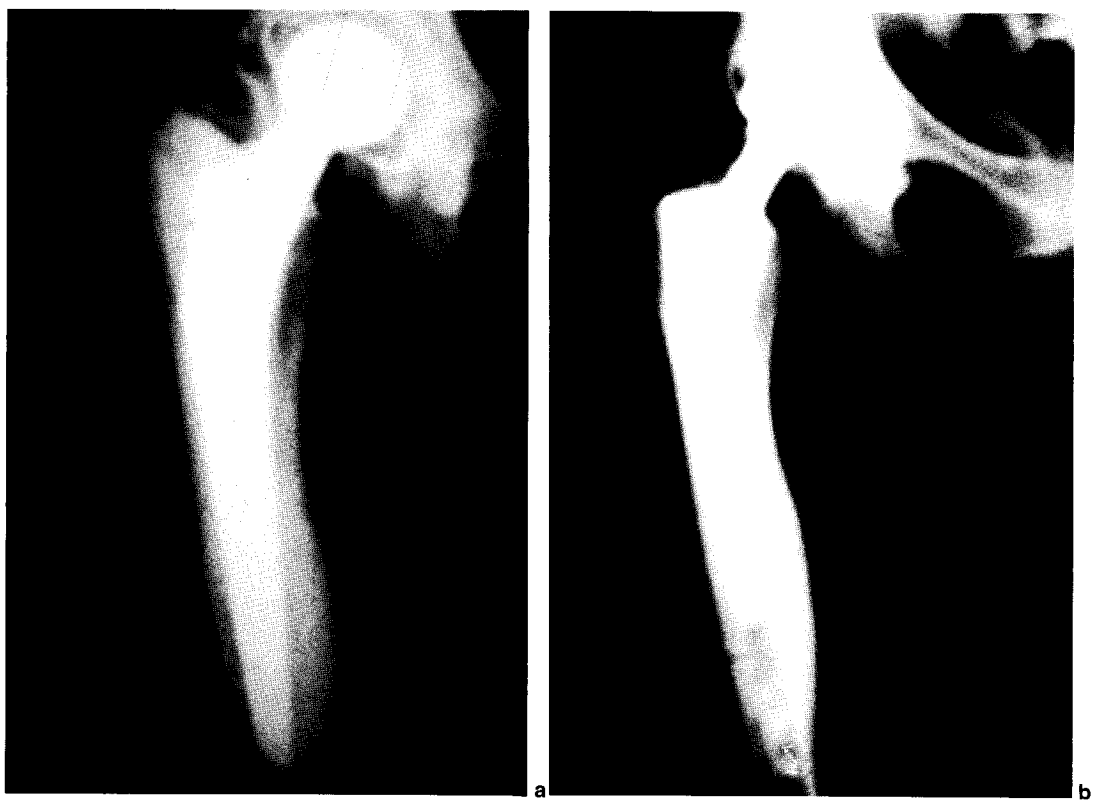
A total of 43 osseous grafts were performed, 21 at an acetabular level, 17 at a femoral level and 5 at both levels (11, 13, 14, 21, 26).

All the patients underwent a follow up at an average of 4, 5 years, and were evaluated by the Mayo Clinic score of 100 points (80 points for the clinical and 20 for the radiographic evaluation) (10, 22, 24, 25).

In Figures 2 to 13 some cases are presented.

Fig. 2
a) *Primary endoprosthesis failure.*
b) *Total arthroplasty reimplantation and cerclage of intraoperative femoral diaphysis fracture.*

Fig. 3
a) *Cemented arthroplasty failure - noting a strong femoral cortical hypertrophy at the third distal of the prosthetic stem.*
b) *Femoral stem reimplantation by previous fenestration of the femoral cortical for cement removal.*



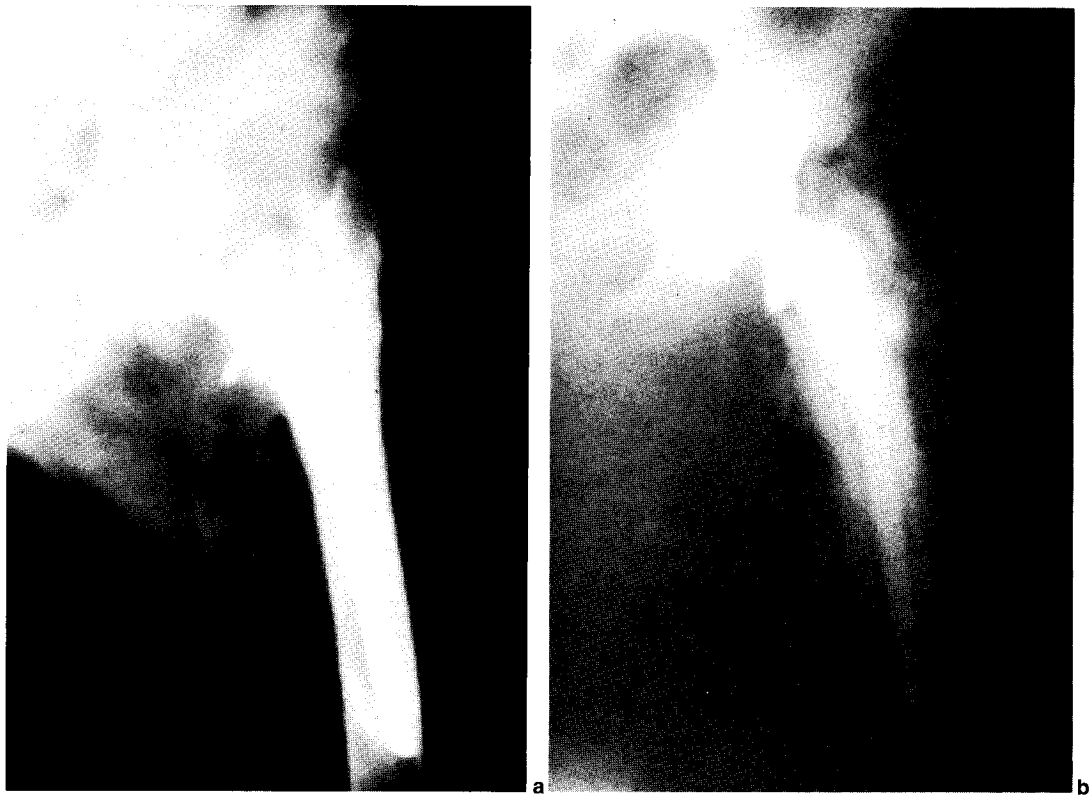
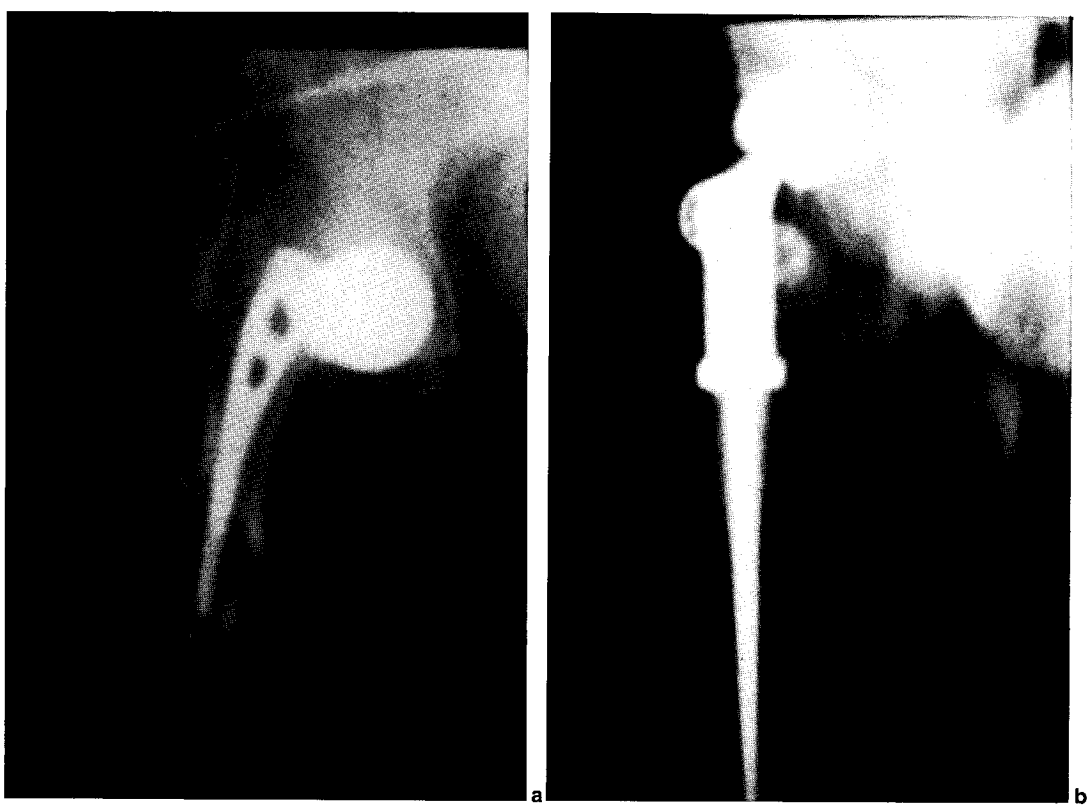


Fig. 4
a) *Cementless hip arthroplasty failure.*
b) *Acetabular reimplantation with screwed cotyle and femoral reimplantation with mod. P.M. porus coated stem.*

Fig. 5
a) *Acetabular component failure in total arthroplasty.*
b) *Reimplantation with special acetabular prosthesis.*

Fig. 6
a) *Acetabular component failure in total arthroplasty.*
b) *Reimplantation with screwed cotyle and osseous grafts.*

Fig. 7
a) *Endoprosthesis failure associated with femoral diaphysary fracture at the third proximal.*
b) *Modular biarticular endoprosthesis reimplantation.*



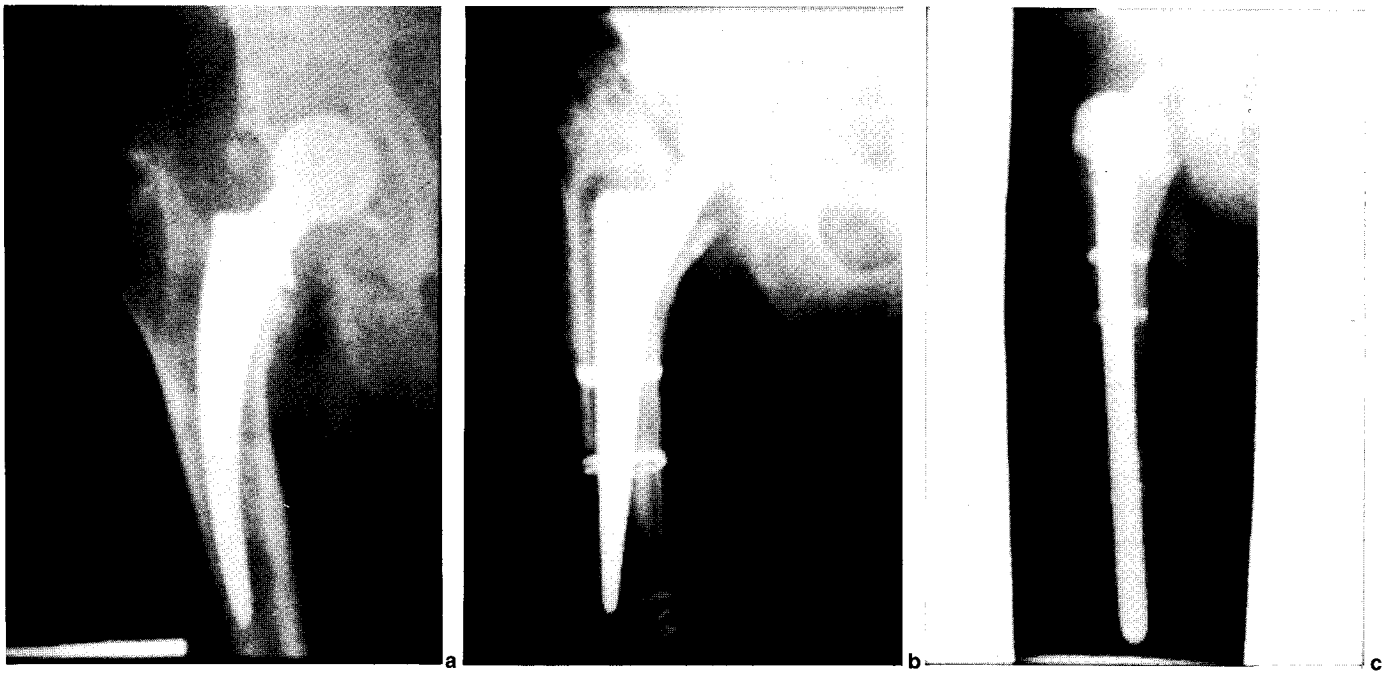


Fig. 8 - a) *Primary hip arthroplasty implant failure.*
b) *Femoral reimplantation failure. Noting cerclages for synthesizing intraoperative fracture at the third middle proximal of femur.*
c) *Femoral reimplantation by long stem bypassing a diaphysary fracture site.*

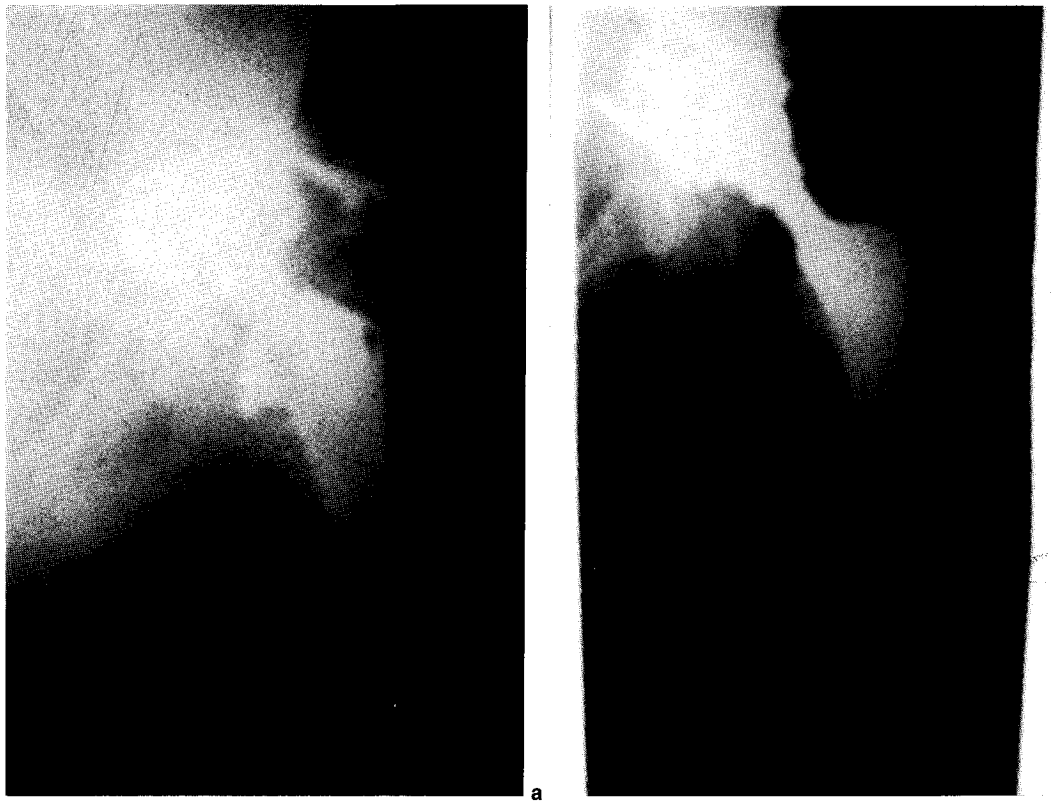


Fig. 9
a) *Primary hip arthroplasty implant failure, complicated by a septic build up of staphylococcus aureus.*
b) *Total reimplantation by implanting a special acetabular cup and an overdimensioned stem 4 months later than the primary arthroprosthesis explant.*

Fig. 10
a) *Total hip arthroplasty reimplantation failure after acetabular migration with pelvic staving in, and femoral stem mobilization in patient already submitted to pelvis synthesis due to pelvic disjunction.*
b) *Total reimplantation with special acetabular prosthesis and overdimensioned femoral stem. Noting cerclages for synthesis of intraoperative diaphysary fracture.*

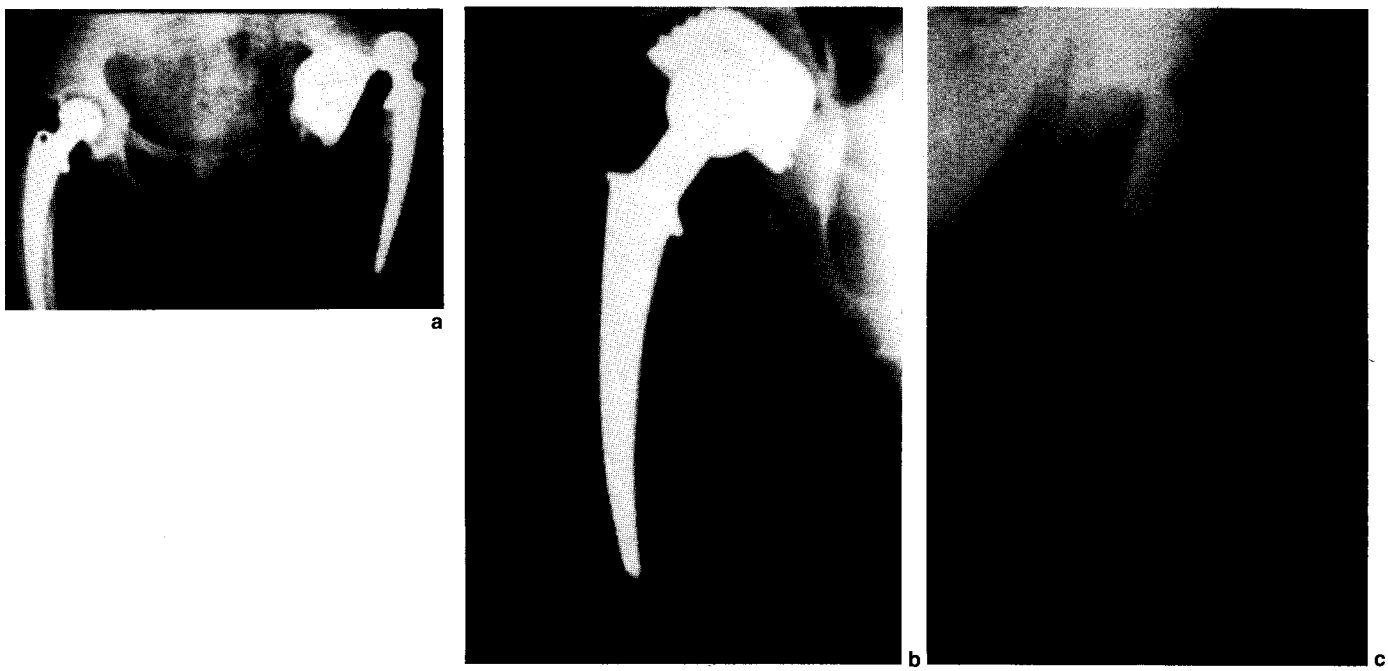


Fig. 11
a) *Total hip arthroplasty reimplantation failure due to femoral component luxation.*
b) *Second reimplantation failure due to femoral stem mobilization. Noting good acetabular component holding and good annexation of osseous "stave" grafts on the acetabular ground.*
c) *Third reimplantation with substitution of femoral stem with modular prosthesis.*

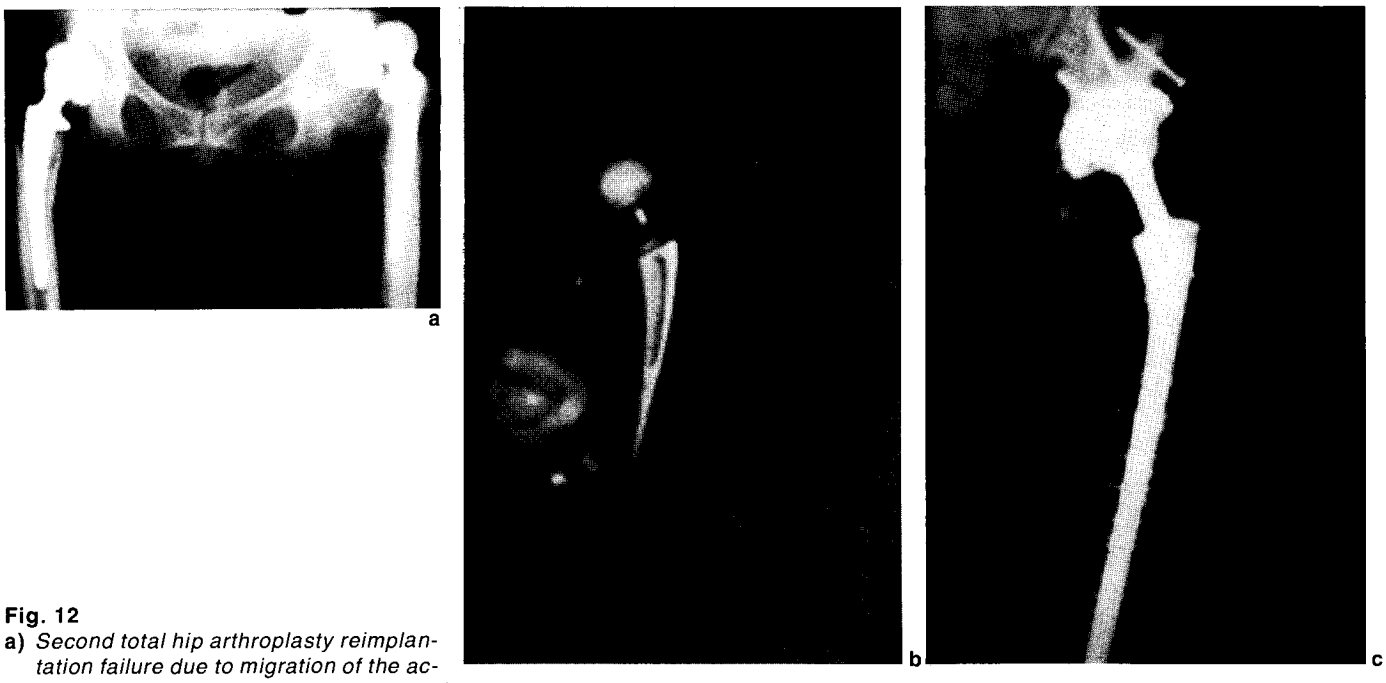


Fig. 12
a) *Second total hip arthroplasty reimplantation failure due to migration of the acetabular component and femoral luxation.*
b) *Explantation of both femoral components and cement.*
c) *Third total hip arthroplasty reimplantation by special cotyle implant with annexed osseous grafts and long overdimensioned femoral stem. Noting multiple cerclages to synthesize longitudinal diaphysary fracture.*

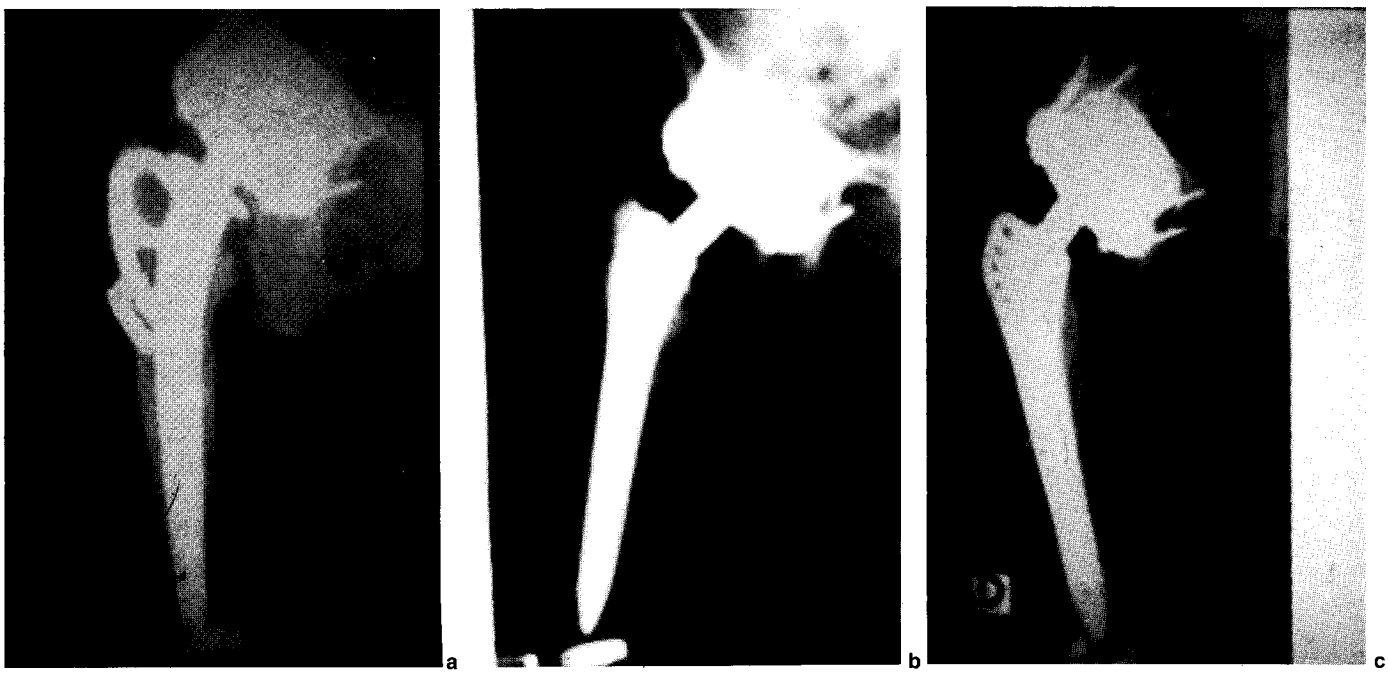


Fig. 13
a) *Third total hip arthroplasty reimplantation failure due to femoral stem mobilization.*
b) *Fourth reimplantation failure due to further mobilization of substituted prosthetic stem.*
c) *Fifth reimplantation by overdimensioned femoral stem implant. Noting the clamps to synthesize the intraoperative longitudinal fracture of the femoral diaphysis.*

RESULTS

Based on the follow up the of 85 reimplantations performed we obtained the following results: 44 were good, 31 discrete, 5 sufficient and 5 poor.

DISCUSSION

From our experience and from literature, the results for primary or multiple reimplantations are always less satisfying than those for primary implant. Almost always infact, at an average of 4 years cotyle mobilization in reimplantations is constantly noted, while femoral mobilization is less frequent.

The incidence of intraoperative and postoperative fractures in reimplantation interventions is very high, and in our study the incidence was respectively 3.6% and 4.28%.

It must also the incidence of infection, with all its problems, is particularly high in reimplantations.

In conclusion, it appears logic that reimplantation intervention itself represents a complex event for both the surgeon and the patient, nevertheless its necessity is incontestable especially when related to clinical-radiographic phenomenology, and its solution must be confronted with absolute sharing of goals.

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