

Total hip replacement for Mseleni Joint Disease undertaken in a rural hospital: five-year follow-up

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Abstract

- Objective:** The objective of this project was to ascertain whether it is reasonable to perform specialist surgery for Mseleni Joint Disease (MJD) in a rural hospital by assessing the medium-term outcome of surgery for MJD performed at Mseleni. The study was designed as a review of patients at Mseleni Hospital in rural KwaZulu Natal, five years after the procedure had been performed. The subjects were patients who had undergone hip surgery at the hospital between August 1993 and June 1995. The measures according to which the outcomes were based were: pain, function and mobility, which were scored on a modified Harris hip score both pre- and postoperatively. An X-ray assessment of the prosthesis was also done. The results showed that there had been a significant improvement in all scores after primary .
- Design:** Patient review 5 year follow-up hip replacement surgery, as well as good pain relief for patients with Girdlestones, without any deterioration in function or mobility. The X-ray appearance of loosening was common, although clinical symptoms were not associated with the findings. It was therefore found that hip surgery in this setting is of great benefit to Mseleni Joint Disease patients, although further attention needs to be paid to the problem of aseptic loosening of the hips.
- Subjects:** Patients who had undergone hip surgery between August 93 and June 95 at Mseleni Hospital Main outcome measures: pain, function and mobility were scored on a modified Harris hip score pre and post operatively and an AP X-ray assessment of the prostheses was done.
- Results:** There was a significant improvement in all scores for primary hip replacement surgery and good pain relief for patients with Girdlestones without deterioration in function or mobility. The X-ray appearance of loosening was common though clinical symptoms were not associated with the findings.
- Conclusions:** Hip surgery in this setting is of great benefit to the Mseleni Joint Disease patients but further attention needs to be paid to the problem of aseptic loosening of the hips.

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INTRODUCTION

MJD is a symmetrical arthropathy affecting young adults and is peculiar to an area of Maputaland¹ between the foothills of the Ubombo Mountains and the coastal dunes. The area affected by the disease stretches from the Mkuze River in the south over the boarder into Mozambique in the north, centring on Bangizwe, Mseleni and Mlamula.² This area is known as mid-sand forest, an area with scarce water supplies but a moderately high rainfall and extremely sandy soils deficient in most plant

nutrients and trace elements. The economy of the area is based on subsistence farming, migrant labour and pensions, which leaves many people with little disposable cash for anything but the basic necessities of life.³ Crops are mainly for household consumption. Wild fruit of the forest, such as amahlala, amakwakwa, amabunsi, amabungwa, insundu and umkhuhlu, are widely eaten. Various green leaves are gathered and eaten and are collectively known as imifino. Amaganu and lala palm are used for the local alcohol brew, which is sometimes fortified by adding

sugar. Beer and a lightly fermented brew called amahewu are prepared from maize.⁴

Until recently, water was collected from open water shared with the cattle and houses were mainly built with branches, grass and mud. Shrubs around the home provided privacy for toilet purposes. Parasitic infestation was common. Hookworm and roundworm infestations are found in more than 60% of school children in the area. Around watercourses, bilharzia is found in more than 90% of the population.⁵ Diarrhoeal disease is extremely common, with 11%

of people experiencing loose stools in a two-week period in a survey done in 1995.⁶

Medical services in the area were extremely limited in the first half of the century. Missionaries arriving in 1906 found the place infested with malaria and a host of other unidentified fevers. The first nursing services at Mseleni were started in 1936 and were supported from the hospital at the top of the mountain (Bethesda). It was not until 1959 that the first doctor, Peter Vos, became resident and a hospital was started.

Dr Vos became aware of the joint problem during his first ten years in the area. He drew attention to the disease and the first report on it was published by W Wittmann and SA Fellingham in a letter to *Lancet* in 1970.⁷ Over the years, services have been built up with the development of a hospital and clinics. By the end of 1999 there were eight doctors serving the 72 000 people in the Mseleni health ward, with eight fixed clinics and a mobile team visiting the surrounding areas. About 90% of the population live within 5 km of a health point.

Prof du Toit of Pretoria was the first to do hip replacement surgery for Mseleni Joint Disease sufferers.⁸ Dr Adams and then Dr Pieczkowski of Ladysmith provided a surgical service from the early 1980s to the early 1990s. Dr Pieczkowski introduced Dr Christoph Meyer to the problem and they spent a weekend studying cases and X-rays at Mseleni in 1993. This was to be the beginning of hip surgery at Mseleni and a cause to which both men contributed a significant amount of time and thought. During the following seven years, more than 150 operations were performed at Mseleni Hospital.

METHODS

Subjects

All patients who had had surgery between August 1993 and June 1995 were identified and requested to attend the follow-up clinic for assessment.

Data collection

Visiting registrars and consultants from Durban were requested to interview and

examine these patients and fill in a report form using a modified Harris hip score (**Box 1**) and a one-view X-ray assessment. (**Box 2**).

When pain was assessed, the pain experienced after prolonged exercise or

only on occasional days was recorded as occasional, pain every day was recorded as moderate and pain disturbing night rest on most days as severe.

Distance walked was the distance until the first need to stop and rest, using the support described.

CALCULATIONS AND STATISTICAL ANALYSIS

The total hip score was divided into pain freedom, function and mobility scores and preoperative scores were compared with five-year postoperative scores. The difference between pre- and post-operative scores was calculated and tabulated using an Excel spreadsheet. The average score and the confidence limits at 95% were calculated for each group and the pre- and post-operative scores were compared using a paired t-test.

X-ray results were tabulated and the X-ray scores were compared with matched clinical scores.

RESULTS

Thirty-three patients were operated on between August 1993 and June 1995. Of these, 23 were female and 10 were male. The average age at surgery was 51 years, with a range from 30 to 72. Five patients were younger than 40 and 10 were older than 60.

Of these, one revision surgery patient died of a suspected pulmonary embolus and three died of unrelated causes in the intervening years.

Of the others, three reviewed at five years had no prior recorded assessment, while 26 had pre- and post-operative assessments and a five-year follow-up. Of these:

- ¥ seven had Girdlestones (failed implant removed) during their first operation at Mseleni,
- ¥ two had revisions (failed previous implants replaced with new ones),
- ¥ 17 had primary total hips (no previous hip replacement).

One total hip was removed for aseptic loosening two years after implant.

Clinical scores

There was a marked and significant improvement in pain, (**table 1**), function

Box 1: Hip score

Pain	Mobility	Function	Foot care
None	40	<i>rising from chair</i>	
Occasional	35	easy	5
Moderate	20	difficult	3
Severe	0	unable	0
		<i>Distance Walked</i>	<i>foot care</i>
		easy	5
		difficult	3
		>1km	15
		unable	0
		0,5—1 km	12
		<i>Limp</i>	
		100—500m	7
		none	5
		indoors	2
		slight	3
		unable	0
		severe	0
		<i>Supports</i>	<i>stairs</i>
		None	5
		normal	5
		Occasional	4
		with rail	4
		1 stick	3
		one step	
		2 stick	2
		at a time	2
		walker	1
		unable	0
		unable	0

Box 2: X-ray score

Acetabulum	Femur
Incomplete bone-cement lucent line	Incomplete bone-cement lucent line
10	10
Complete line static up to 1mm	Complete line static up to 1mm
8	8
Progressive line since surgery 1mm	Progressive line since surgery 1mm
7	7
Complete or progressive line in any one zone >1mm	Complete or progressive line in any one zone >1mm
4	4
Component migration	Subsidence up to 2mm
0	4
	Prosthesis-cement lucent line <1mm
	4
	Prosthesis-cement lucent line 1—2mm
	2
	Subsidence > 2mm
	0
	Prosthesis-cement lucent line >2mm
	0

Table 1: Clinical scores and statistical probability of significant difference

	Pain freedom			Function			Mobility		
	pre op	post op	p	pre op	post op	p	pre op	post op	p
Girdlestone	8	28	0,01	12	13	0,43	8	9	0,34
Revision	10	35	0,06	7	15	0,07	5	13	0,09
THR	0	34	8,3E-23	12	16	0,0003	7	13	6,1E-06

Table 2: X-ray scores

Patient	R acetabulum	R femur	L acetabulum	L femur	Comments
1	10	7	10	10	
2	10	7	10	4	
3	10	4	7	4	
4	10	10	10	10	
5			10	10	
6	10	10			
7	10	4	10	4	
8	10	10	10	10	
9	10	10	10	7	
10	7	10			Heterotopic ossification
11			10	7	
12	10	10			
13	10	10	10	10	
14	0	0			Hip removed
15			10	10	
16	7	4	10	10	

(table 2), and mobility, (table 3), in the primary total hip patients. Due to the size of the sample, the improvements in pain, function and mobility scores for the two revision hips did not achieve statistical significance, even though they were quite big. The excisions achieved a great improvement in pain and did not cause any deterioration in function or mobility.

Graph 1 shows the improvements in clinical scores with a 95% confidence range for each type of operation.

X-ray appearances for 16 total hip replacement (THR) patients

The X-rays for one patient were not found. Twenty-five implants in 16 patients were reviewed from X-rays. (Table 4). One patient had had the

implant removed at two years due to aseptic loosening and six of the remaining 24 implants showed signs of aseptic loosening in the femoral components. Three acetabulae and four femoral components showed progressive bone cement lucent lines. One patient showed excessive heterotopic bone formation.

There was no correlation between the clinical scores and the X-ray scores. (Graph 2)

DISCUSSION

A review of MJD patients operated elsewhere prior to 1993 showed that the most common problem was aseptic loosening, but the clinical results were still encouraging enough to warrant the

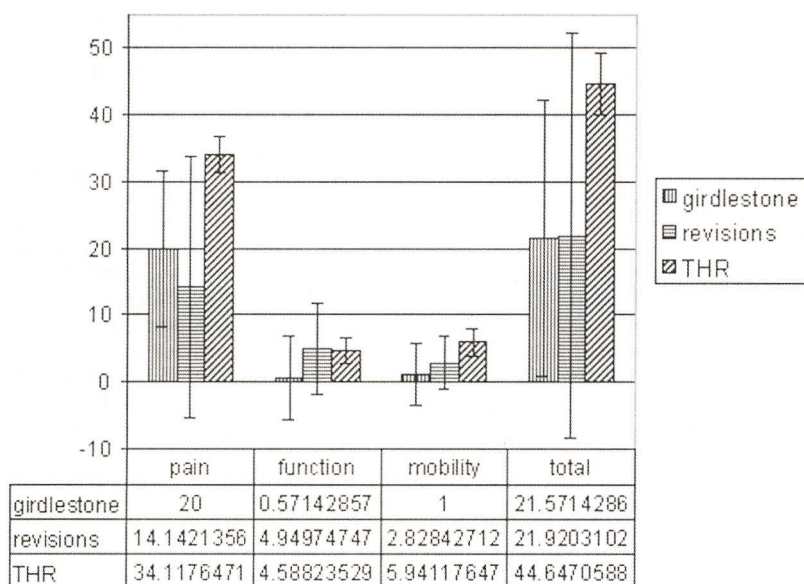
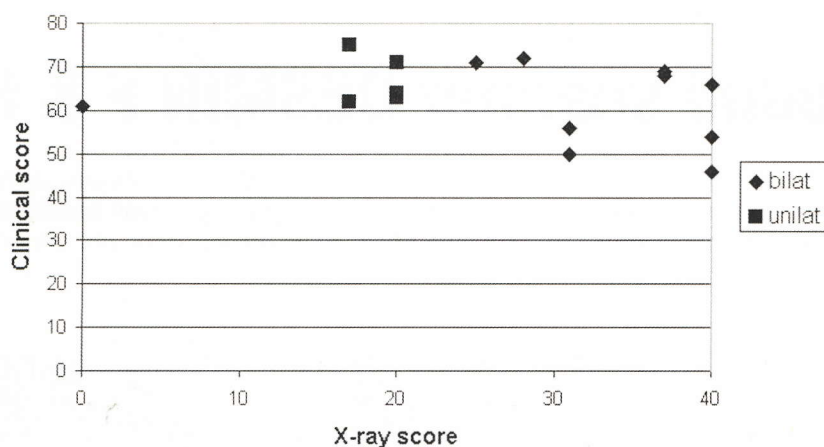
recommendation of surgery to the patients.

In this study, one patient had already had to have the prosthesis removed for loosening (4%). Six more showed X-ray signs of loosening (25%). No correlation could be detected between the clinical score and the X-ray score. This problem is likely to become symptomatic in the coming years, but so far has little effect on the patients perception of their condition. This compares with a 3,2% revision rate and 8,8% actual failure rate in the Trent region in the UK⁹ and a 3,3% revision rate for patients under the age of 65 in the Norwegian register.¹⁰ However, further attention needs to be given to technical improvement of the cement/bone bond.

The use of the modified hip score and not the full Harris hip score¹¹ was occasioned because, when the author started keeping clinical records of these patients in the early 1980s, the same was obtained from a group of patients in Johannesburg, South Africa. The reasons for the difference are not clear.

Measurement of pain is extremely subjective and difficult. In this study and in all related scoring of hips, the endeavour has been to use a simple system with only four points. This also means that it is difficult to make comparisons that show minor benefits. Pain is, however, the greatest problem faced by patients. The relief of pain is the most important outcome of surgery and the area of greatest benefit. People who are relatively free from pain can only imagine the effects of chronic pain on the physical, mental, emotional and spiritual lives of the sufferers.

The patients undergoing primary THR all rated their preoperative pain as severe and experienced significant restriction of function and mobility. Some of these patients were very young but so severely restricted that it was felt that even bilateral Girdlestones would

Graph 1: Improvement in hip score**Graph 2: Comparison of clinical and x-ray assessments**

be an improvement on their condition. In view of the expense involved and the higher risk of revision surgery, the modus operandi of the team was to consider primary THR and then excision arthroplasty as the normal salvage procedure for failed replacements. As can be seen from the Girdlestons performed on patients on whom operations had been previously performed, this has been a reasonably successful approach and has met with a considerable degree of success.

In all the groups, pain relief was clinically significant at the five-year

follow-up. However, the revision group, consisting of two people, made the comparison of statistics for the group highly suspect.

The scores for improvement of function and mobility in the total hip replacement patients were highly significant statistically and very satisfying clinically.

Those patients who had had to have a previously implanted prosthesis removed due to loosening showed that the salvage operation achieved its goal of pain relief without any deterioration in function or mobility.

A considerable demand is made on the joints of patients in their 30s and 40s who receive joint replacements. Virtually the sole means of transport in rural areas by foot and it is not unusual for a patient to walk 5 km through sandy tracks and unmade roads to collect water, firewood or food. Most of the women are involved in daily agricultural activities and traditionally sit flat on the floor and squat for toilet purposes. This has not proved to be a great problem, especially with regard to the fear of dislocation, but it may contribute to the loosening of the prostheses. There were no dislocations in this group, compared to 5% in the Trent region.⁹

The death of one patient during the immediate postoperative period was probably due to a pulmonary embolus, although a post-mortem was not performed.

The death in the intervening years of three (14%) more patients from unrelated causes demonstrates the reduced life expectancy in rural South Africa. Only 4% of the population in the Mseleni health ward is over 65 years old, whereas 12% are under five (unpublished Community health worker survey — Mseleni). In Germany 10% of patients in a similar age group had died by the time of a 10-year follow-up.¹²

CONCLUSIONS

The desire of the patients for their surgery to be done at Mseleni Hospital has never been in doubt, as being near to their families and amongst people they know removes many of their fears. Friends and relatives visit them regularly during the short time they are in hospital. This was not possible when surgery was provided at Ladysmith, Pretoria or even in the Cape Province and their time away from home was considerably longer. However, it is also important that the results of the surgery are acceptable. The rural practitioner was either assistant or surgeon in the operations done in other centres and has gone on to do more than 200 total hips replacement at Mseleni Hospital during the following years. Patients who would have had extremely limited access to such a service without this programme have been able to benefit from advanced technological solutions applied in their

own setting. Whilst there is room for improvement, the evidence to date from this five-year follow-up indicates that surgery has been of substantial benefit to these patients. □

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Competing interests:

None

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