# CHAPTER 5

# DISCUSSION

The results of this study have shown that there is no significant difference in the functional outcome of patients who have undergone primary total hip arthroplasty by the day of discharge from hospital, between those whose rehabilitation had only a mobility programme, and those who had a mobility programme and bed exercises. This is in regard to all three of the objectives measures viz. function, pain at rest, ROM of the operated hip.

In this study the primary outcome measure was functional ability post-THA. Functional ability was assessed using the Iowa Level of Assistance (ILOA) Scale, which is considered a reliable and valid test of function (Jesudason & Stiller, 2002; Shields et al, 1995). "This test assesses the patient's ability to perform four functional activities, namely, supine to sitting on the edge of the bed, sitting on the edge of the bed to standing, walking 4,57m and climbing up and down three stairs." The patient's walking speed over a 13,4m distance is also assessed. The advantage of using this test is that the tasks used to assess the patient's function, are very similar to the rehabilitation milestones that the patient has to fulfil before being considered ready for discharge from hospital (Jesudason & Stiller, 2002). The test therefore seems to serve as a way of convincing patients of the importance of achieving these milestones.

Tables 4.8.1 and 4.8.2 shows that there was no significant difference in overall functional ability, between patients in the control and experimental groups either on day three/four ($p=0.35$) or day seven/eight ($p=0.99$) postoperatively. The lack of a clinically significant difference seems to indicate that the performance of bed exercises does not facilitate the earlier attainment of functional milestones in the acute phase. This is reinforced by the results illustrated in Tables 4.9.1 and 4.9.2, where the individual functional tasks making up the ILOA Scale were assessed. The results obtained here showed there was also no significant difference between the control and experimental groups' performance of the functional tasks making up the ILOA Scale. Also of importance is that there seemed to be no significant difference between the two groups, in the rate of progress for performance of any of the tasks from day

three/four to day seven/eight. This seems to suggest that the rate of attaining the required functional milestones is the same with or without the addition of bed exercises.

The secondary outcome measures in this study were severity of resting pain and active range of operated hip flexion and abduction. Resting pain was assessed using the visual analogue scale which is a reliable and valid test of assessing pain levels (Myles & Urquhart, 2005; Ameen et al, 2004; Goddard et al, 2004; Bernstein et al, 2003). The results showed that there was improvement in the patients' pain levels from day three/four to day seven/eight postoperatively, in both the control group and experimental groups. However the level of preoperative pain would have to be ascertained in order to judge if THA reduces hip pain. In the literature evidence can be found for changes in pain during the first five days after hip arthroplasty (Aarons et al, 1996). Tables 4.7.1 and 4.7.2 shows that although there was a general decrease in pain levels experienced by all research patients postoperatively, there was no significant difference in the improvement of pain levels between subjects in the control and experimental groups either on postoperative day three/four ($p=0.48$) or day seven/eight ($p=0.83$). This suggests therefore that the addition of bed exercises does not seem to further contribute toward decreasing pain levels post THA in the acute phase.

With regard to active range of movement of the operated hip, the results seem to indicate that there was no significant difference between the control and experimental groups' results, for movements of abduction and flexion, on either day three/four or day seven/eight postoperatively. This is clearly illustrated in Tables 4.6.1 and 4.6.2.

With regard to postoperative complications, 3/20 (15%) patients in the control group and 4/16 (25%) patients in the experimental group developed complications. In the control group two patients had low haemoglobin (Hb) levels postoperatively, that required blood transfusions; one patient developed a urinary tract infection. In the experimental group three patients had low Hb levels that required blood transfusions; one of those patients also developed a deep vein thrombosis (DVT); one patient experienced excessive oozing from the wound on day seven postoperatively. There (was however no significant statistical difference between the groups ($p=0.68$) to

allow for any conclusions to be drawn as to the lack of bed exercises contributing to the development of complications. The researcher can therefore not comment on the possibility of certain bed exercises for example foot pumping, preventing complications such as DVT's.

From the process of random allocation of the patients into the control and experimental groups, homogeneity of both groups was successfully achieved in regard to gender, age, musculoskeletal history and preoperative mobility status (Illustrated in Tables 4.1, 4.2, 4.3 and 4.4 respectively). The main presenting symptom that the patient population had preoperatively was pain, with 31/36 patients reporting this as their biggest problem (86%). This was followed by decreased function being reported by 4/36 patients (11%) and then stiffness by 1/36 patients (3%). One of the exclusion criteria of this study was inability of the patient to walk prior to admission, therefore all patients included in the study were able to walk a minimal distance of 4.57m, although not all were able to climb 3 steps independently (5/36 patients) preoperatively.

There is a large amount of emphasis placed on the attaining of functionally based milestones, to assess readiness for discharge from hospital postoperatively. Longer term determination of success of THA is also based on how well the patient is doing functionally (Ganz et al, 2003; Wang et al, 2002; Zavadak et al, 1995). Zavadak et al, (1995) stressed how attaining these milestones is indispensable for normal functioning following THA. For example the transfer tasks of getting from supine to sitting, and sit to stand, are necessary to allow for the patient to be independently mobile. The authors pointed out that sit to stand transfers are necessary to permit the patient "to safely get in and out of bed, on and of the toilet, and in and out of chairs." Therefore patients who are unable to perform these transfer tasks independently, predispose themselves to decreased levels of functional independence and mobility. The complications that are associated with this decreased state of mobility would include increased risk of pressure sores due to patients being confined to the bed or a chair. The amount of walking that the patient does may also be limited due to decreased transfer ability, thus increasing the risks for osteopaenia and muscle atrophy.

It is the researcher's opinion therefore that it appears to make sense, to have the acute hospital rehabilitation programme be centred on functionally based milestones and activities. Since the performance of bed exercises during this acute post-operative period does not appear to assist the earlier attainment of these functional milestones, the researcher therefore proposes that they not be included in the post-operative protocol for this subgroup of patients. The benefit of adopting an approach where the focus during the acute phase of rehabilitation of THA patients is attaining functional milestones, is that in understaffed public sector Physiotherapy Departments, the time saved by not doing bed exercises with this subgroup of patients, may be better utilised by focusing on more functional aspects of these patients' rehabilitation or with other patients.

The other possible benefit, directed more to the private health sector, is the monetary savings incurred by the THA patients and medical aid schemes, if the patient does not have to pay for exercises that the physiotherapist would normally do daily. Working on current fee schedules (SASP Recommended Fee Structure) for specific physiotherapeutic treatment interventions, the THA patient stands to save 22% of the likely daily physiotherapy charges. The 22% cost saving is what the THA patients would normally pay, for having a physiotherapist teach and supervise their bed exercise programme.

Since the performance of bed exercises does not appear to be of additional benefit during the immediate postoperative phase following primary THA, it could be recommended that the performance of bed exercises with this population of patients may be of no added value during the acute rehabilitative phase. However this recommendation cannot be extrapolated to primary THA patients who develop significant complications post-THA that require them to remain in bed for the first few days postoperatively, or to other patient groups where bed exercises are utilised.

The selection of the specific exercises included in both of the above studies (the exercises are identical to allow for comparison), were based on what is commonly included in most physiotherapy rehabilitation programmes. The exercises selected in these two studies are very similar to those recommended by Enloe et al (1996), where consensus was gained from experts in the field of post-THA rehabilitation. In fact

five out of seven exercises recommended by Enloe et al (1996), are included in the researcher's and the Jesudason & Stiller (2002) bed exercise programmes. These exercises being: hip and knee flexion and extension to neutral; hip abduction and adduction to neutral; ankle dorsiflexion and plantarflexion; static quadriceps contraction; and inner range quadriceps contraction. In the Enloe et al (1996) study, there was alternative exercises suggested by the panel of experts, but because there wasn't a 50 % or more consensus, they were not included in the final recommended protocol. The final protocol was accepted by 76% of the panel. These alternative suggestions were: "hamstring sets, stationary bicycling, hip flexor and quadratus lumborum stretching, knee range of motion." The authors recommended that the treating clinician needs to decide for a particular patient whether other exercises would be more beneficial. The authors also stressed the importance of ongoing research with regards to investigating "if deviations from that protocol improve or worsen a patient's treatment outcome." This is not only with regard to the specific exercises utilised, but also the variation of key components of the rehabilitation approach in general.

Another recommendation by the researcher is further exploration of the benefit of outpatient group/individual based exercise rehabilitation, once the THA patient is discharged from hospital. Shih et al (1994), in their investigation to determine the recovery of strength of the muscles around the hip joint post-THA, found that this subgroup of patients even at one year post-operation, still had weakness of the hip muscles on the operated limb when compared to the normal side. These authors' therefore suggested that an exercise programme be followed by THA patients for one year and possibly longer.

A randomised control trial done by Wang et al (2002) showed that a perioperative exercise programme, performed by patients before and after THA, is effective in improving the rate of recovery in ambulatory function in the first six months after THA. The exercise programme was extensive and was performed for eight weeks preoperatively and for three months postoperatively, commencing three weeks post-THA.

Sashika et al (1996) found favourable outcomes in patients post-THA that were given a six week home exercise programme to perform independently without any supervision from health practitioners. The subjects in this study were all six to forty-eight weeks post-THA. There appears to be value in patients' following a prescribed exercise programme post-discharge from hospital. In these studies one commonality was that none of the exercise programmes commenced earlier than three weeks post-THA (Wang et al, 2002; Shashika et al, 1996). This approach appears to make reasonable sense as it allows patients time to recover from the rigours of the THA itself.

A limitation of this study is the lack of long term follow up post discharge from hospital. However Jesudason & Stiller (2002) pointed out in their randomised controlled study, the reason for not following up the patients post discharge is that there are various confounding variables that would be difficult to control, thus giving an incorrect result. Yet since these patients who require THA suffer from chronic conditions, and one of the benefits of THA is the proposed improvement of the patients' functional abilities and activity levels, it would seem that long term follow up would allow for any differences in outcome between the two groups to be detected. Aarons et al (1996) found that patients post-THA can expect marked functional improvement at seven weeks post-operatively. Shih et al (1994) showed that functional results (pain, range of motion, and walking ability) showed improvement by the one year follow up examination. It would therefore seem plausible that proposed follow up time periods could occur seven weeks, six months and one year post operatively.

This study therefore appears to indicate that the outcomes of function, pain and range of operated hip motion are the same, regardless of whether bed exercises are performed, during the acute hospitalisation phase following primary THA. The possible long term effects of adopting an approach, where only a functionally based mobility programme is practiced still need to be investigated.