

# THE MEDIAL APPROACH IN PRIMARY TOTAL HIP REPLACEMENT SURGERY, A MICROINVASIVE SINGLE INCISION TECHNIQUE IN A PROSPECTIVE STUDY

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**Introduction:** In the 1950s the surgical treatment of developmental dislocation of the hip (DDH) has been an issue in order to perform reduction surgeries less invasive. The wide exposure method (360-degree circumferential capsulotomy) has become unpopular since Ludloff's medial approach has been published. To our knowledge his approach has never been used for other hip surgeries especially not for THR. The purpose of this study was to provide information regarding the differences in clinical outcome between a medial approach and a conventional antero-lateral implanted total hip replacement using the same femoral neck prosthesis type.

**Materials and Methods:** 47 patients (26 men / 21 women) provided informed consent to participate in the study (Table 1). The inclusion criterion for the study was the diagnosis of osteoarthritis of the hip joint and a Charnley A classification. The average age at operation was 53.7±10.4 years. All patients were provided with a CUT® prosthesis with a polyethylene liner was implanted on the acetabular side. All patients were allowed to bear weight as tolerated post-operatively. Physiotherapy was carried out for one week in a hospital, followed by another three weeks in the outpatient department.

All patients were examined clinically and X-rayed preoperatively as well as postoperatively at three days, two weeks, six weeks and six months. The functional hip scores according to Harris and the Oxford hip score were obtained preoperatively and at the defined intervals postoperatively. The surgical duration (time from skin to skin) and the intraoperative (suction minus syringe) as well as the postoperative blood loss (amount of fluid in the drain bottles within 48h) were measured for each patient. Abductor muscle function (as measured by the Trendelenburg sign and limping) and the number of steps a patient was able to walk without walking aids on a treadmill at a velocity of 5km/h (a maximum of 100 steps was measured) were assessed preoperatively as well as three days, two weeks, three months and six months postoperatively. At three days postoperatively, the leg lengths were measured. Major complications (infection, nerve palsy, deep vein thrombosis, dislocation, and surgical revision) were also noted at each visit.

The X-rays taken on day three after surgery were used to assess stem varus-valgus angle. The anterior-posterior X-rays obtained at the six-month follow-up were analyzed for heterotopic ossification as classified according to Brooker et al. and for radiolucent lines and stem subsidence. Multifactorial analyses of variance and Chi-square tests were performed at a probability level of 95% ( $\alpha=0.05$ ). SPSS for Windows Version 11.0 (SPSS Inc., Chicago, Illinois, USA) was used for the analysis.

**Results:** Based on the numbers available there were no significant differences between the two groups in the distribution of patient age ( $p=0.604$ ), gender ( $p=0.654$ ), weight ( $p=0.180$ ) and height ( $p=0.295$ ). No significant differences in the calculated Harris score ( $p=0.723$ ) were found pre-operatively. The amount of steps the patient was able to walk was not different between the approach groups ( $p=0.636$ ). The total amount of blood loss (intra- + post-OP) was even significantly lower in the medial approach group ( $p=0.009$ ). Three days post-operatively the leg lengths were assessed. The difference was not statistically significant based on the numbers available ( $p=0.926$ ). The overall correlation between Harris and Oxford score was significant ( $r^2=0.63$ ,  $p<0.001$ ). Three days post-operatively a slight, but significant better Harris ( $p<0.001$ ) and Oxford scores ( $p=0.001$ ) could be observed in the medial approach group. The number of steps the patient was able to walk

without help or crutches was significantly higher in the medial approach group ( $p=0.001$ ). The Trendelenburg sign ( $p<0.001$ ) and the limping criterion ( $p<0.001$ ) were significantly less in the medial approach group. Two weeks post-operatively the Harris ( $p=0.001$ ) and the Oxford ( $p=0.046$ ) scores were significantly better for the medial approach group. The number of steps the patient was able to walk without help or crutches was significantly higher in the medial approach group ( $p<0.001$ ). The Trendelenburg sign ( $p<0.001$ ) and the limping criterion ( $p<0.001$ ) were significantly less frequent in the medial approach group. After six weeks Harris and Oxford scores were still significantly better in the medial approach group (both  $p<0.001$ ). Whereas the number of patients with positive Trendelenburg sign and limping criterion decreased in the antero-lateral approach, the differences were still significant ( $p<0.001$  for both). The number of steps the patient was willing to walk without help or crutches was significantly higher in the medial approach group ( $p<0.001$ ). After six months the differences in the Harris score ( $p=0.353$ ) and Oxford score ( $p=0.267$ ) were no longer statistically significant (based on the numbers available). Whereas the number of patients with positive Trendelenburg sign and limping criterion decreased in both groups, the

		pre OP		3 days		2 weeks		6 weeks		6 months	
		n	%	n	%	n	%	n	%	n	%
AL	followed up	24	100%	24	100%	22	92%	23	96%	22	92%
M	followed up	23	100%	23	100%	21	95%	23	100%	21	91%
AL	Harris	42.4±7.9		40.4±10.1		44.5±5.9		67.3±10.7		80.8±9.6	
M		41.4±11.6		50.7±10.3		64.1±7.5		46.3±7.6		83.9±13.3	
AL	Oxford	52.8±4.9		54.4±4.2		45.1±8.9		43.4±7.6		19.3±4.7	
M		48.8±7.8		42.2±8.0		33.2±7.2		31.0±7.0		21.5±8.5	
AL	steps	89.6±26.3		5.9±5.1		18.1±9.8		66.3±22.6		93.3±20.1	
M		85.7±30.1		19.6±14.0		59.1±26.2		92.2±13.1		98.3±8.3	
Sig.	Harris	0.723		0.001		<0.001		<0.001		0.353	
	Oxford	0.043		<0.001		<0.001		<0.001		0.267	
	steps	0.636		<0.001		<0.001		<0.001		0.283	

Table: Hip score and steps vs. time point

difference was still significant ( $p<0.001$  for both).

**Discussion:** The medial approach is clinically feasible to perform the implantation of a femoral neck prosthesis. The accuracy of the stem implantation reflected in both the leg lengths and the postoperative X-ray alignment was not different between the groups. The approach did only affect the hip scores up to six weeks after surgery. After six months there was no significant difference between the conventional antero-lateral approach and the medial approach in the presented study. Similar results have been reported by Berger et al. using the double incision technique. This findings might be explained with muscle restoration during the interval between six weeks and six months.

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