

# Periacetabular osteotomy: sporting, social and sexual activity 9-12 years post surgery

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*Hip joint survivorship and functional outcome are traditional outcome measures applied after periacetabular osteotomy (PAO). Younger adults however have greater demands and expectations on the function of their hip joints and these demands are not expressed using traditional outcome assessment tools. The main purpose of this study was to explore alternative functional and quality of life measure after PAO. A cross sectional survey of preserved hip joints following PAO was performed. Fifty-two patients (68 hips), mean age 41 years (range 24-67), returned a questionnaire examining satisfaction, willingness to repeat surgery, quality of life, abilities in social activities, sports and sex-life, pain, limp, and stability of the hip.*

*Median satisfaction was 5 (range 1-5) and 44 of 49 patients were willing to repeat surgery. Significant improvements were seen in quality of life, ability to do sports, participate in social activities and sex-life ( $p$  values  $<0.001$ ) (although sex-life for males ( $p = 0.102$ )). Traditional outcomes (pain, stability and limp) showed significant improvements ( $p < 0.001$ ). Lasting improvements in patients' sex life, social life and ability to do sports nine to 12 years following PAO were reported. Such factors are important measures of outcome in a younger adult cohort.*

**Keywords:** Hip, Health-related quality of life, Periacetabular osteotomy, Acetabular dysplasia, Total hip arthroplasty, Femoral acetabular impingement

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## INTRODUCTION

Since Wiberg's thesis in 1939 many studies have confirmed the relationship between acetabular dysplasia and secondary osteoarthritis (OA) in the young adult patient (1-6). In an attempt to prevent or postpone the development of OA in these patients, the periacetabular osteotomy (PAO) first described by Ganz et al, and later modified, is used worldwide as a joint-preserving procedure (6-19). By reorientation of the acetabulum and increasing femoral head coverage, stability is improved and abnormally high loads across the hip joint are reduced. Several studies have reported good medium- to long-term hip joint survivorship and functional outcome (9, 12, 13, 16, 17, 19-22).

Increasingly, recent reports have focused on survival and function of the joint, with few studies describing health-related quality of life (HRQoL) and other activities of daily living (16, 20, 21). Patients are often young and have high demands and expectations of the function of their hip, both in everyday life, during recreational activities, and at work. These other aspects should be considered when evaluating the outcome of PAO and should be reported at medium- to long-term follow-up.

Due to the lack of focus in contemporary literature on alternative, yet very important, aspects of outcome measurement, our aims were to explore other functional and quality of life aspects after PAO surgery. We aimed to answer the following questions: 1) does PAO affect the patient's sex-life; 2) does PAO affect the patient's ability to participate in

sports; 3) does PAO affect the patient's ability to interact socially; and 4) are the patients satisfied with the outcome of the procedure at medium to long-term follow-up?

## MATERIAL AND METHODS

The study is a retrospective cohort, cross-sectional review of preserved hip joints a minimum of nine years following PAO surgery. Hospital records identified 100 patients (121 PAOs) operated by KS from December 1998 through December 2002. The medium-term outcome for this cohort has previously been reported (16). Indications for PAO were, symptomatic acetabular dysplasia of the hip defined by persistent pain in the hip or groin, a Wiberg (23) centre-edge angle  $<25^\circ$ , a congruent hip-joint, flexion of the hip  $>110^\circ$ , and internal rotation  $>15^\circ$ . All surgery utilised an ilioinguinal approach (16).

Five of the 121 PAOs were performed in four foreign citizens and were thus lost to follow-up. At review an inquiry to the National Patient Registry identified 36 PAO procedures (in 35 patients) had been converted to THA. The 61 remaining patients (80 preserved hip joints) were asked to participate in a questionnaire-based follow-up. Fifty-five patients (70 preserved hip joints) accepted and constituted the study population. A questionnaire concerning aspects of functional ability, patient satisfaction, expectations, and quality of life following PAO was developed, and validated by the authors. Fifty-two patients (68 preserved hip-joints) returned the questionnaire (response rate: 85%), 77% females. Thirty-six patients had been operated with PAO unilaterally and sixteen bilaterally. Mean age at surgery was 31 years (range 14-56) and at follow-up 41 years (range 24-67). Mean follow up was ten years (range 9-12). Mean preoperative CE-angle was  $12^\circ$  (range  $-29^\circ$ - $30^\circ$ ) and postoperatively  $29^\circ$  (range  $4^\circ$ - $52^\circ$ ). Preoperatively all hips had a Tönnis grade 0-1 and at follow-up 83% had a Tönnis grade 0-1. One author (AT), blinded as to the status of the hip, assessed all radiographs.

### *Development of the questionnaire*

No existing questionnaires met our requirements and therefore we developed our own questionnaire. A semi-structured interview was conducted including 20 members of the staff comparable to PAO patients with respect to age and gender. After corrections a new semi-structured

interview was conducted including 20 patients in the Orthopaedic Department at the Copenhagen University Hospital, Hvidovre, Denmark. The last round of interviews revealed no need for changes. This validation process, validated the content by face validity. The questionnaire consist of 11 items concerning the status at follow-up: 1) satisfaction with the outcome of PAO; 2) quality of life; 3) social ability; 4) daily activity; 5) work-life; 6) sexual life; 7) sports activity; 8) pain; 9) limp; 10) stability of the hip; and 11) willingness to repeat PAO surgery. Items 2) to 10) consisted of three questions: 1) preoperative status; 2) status at follow-up; 3) satisfaction with their current status. Answers were given on five-point or six-point Likert scales with 1 being the worst status and 5 or 6, respectively, the best status.

### *Statistical analysis*

Descriptive statistics were performed and data primarily presented as prevalences. The Wilcoxon Signed Rank test for paired data was used to compare preoperative and postoperative data. A p-value  $<0.05$  was considered statistically significant. Data were analysed using SPSS 20.0 (IBM, Chicago, Illinois, USA.).

## RESULTS

Median overall satisfaction with the outcome of treatment was 5 at follow-up (range 1-5). At follow-up 44 of 49 patients were willing to undergo treatment again with the experience and knowledge they have today (three patients returned invalid answers). Improvements were seen in all quality of life parameters; quality of life, ability to do sports, ability to participate in social activities and sex-life (p values  $<0.001$ ), (except for ability in sex-life for males,  $p = 0.102$ ) (Tab. I). The median pain score before PAO was 2.0 and 4.0 at follow-up ( $p<0.001$ ). The median limp score was 2.0 before PAO and 4.0 at follow-up, indicating statistically significantly less limping ( $p<0.001$ ). The median stability score was 3.0 before PAO and 4.0 at follow-up, indicating a reduced feeling of hip instability ( $p<0.001$ ).

## DISCUSSION

Valenzuela et al reported that 25%-40% of female patients experienced positive changes in their sex-life after PAO (21).

**TABLE I - PRE- AND POSTOPERATIVE SCORES, P-VALUES AND SATISFACTION FOR QUALITY OF LIFE, FOUR ALTERNATIVE FUNCTIONAL OUTCOMES AND THREE TRADITIONAL FUNCTIONAL OUTCOMES**

	<b>Score</b>	<b>Preop. status</b>	<b>Postop. status</b>	<b>P-value</b>	<b>Median (range) satisfaction with the result at follow-up*</b>
Quality of life Median score (range)	1 = extreme disabled 2 = disabled in some degree 3 = moderately disabled 4 = almost not disabled 5 = not disabled	2.0 (Range: 1-5)	4.0 (Range: 1-5)	P<0.001	4.0 (Range: 1-5)
Ability to do sports	1 = always disabled by my hip 2 = nearly always disabled by my hip 3 = sometimes disabled by my hip 4 = rarely disabled by my hip 5 = never disabled by my hip	2.0 (Range: 1-5)	3.0 (Range: 1-5)	P<0.001	4.0 (Range: 1-5)
Ability to participate in social activities	Same score as above	3.0 (Range: 1-5)	4.0 (Range: 1-5)	P<0.001	4.0 (Range: 1-5)
Ability in sex-life female	0 = no sex-life due to other reasons than the hip** 1 = no sex-life due to my hip 2 = always disabled by my hip 3 = nearly always disabled by my hip 4 = sometimes disabled by my hip 5 = rarely disabled by my hip 6 = never disabled by my hip	4.0 (Range: 1-6)	5.0 (Range: 2-6)	P = 0.008	4.0 (Range: 1-5)
Ability in sex-life male	Same score as above	5.5 (Range: 3-6)	6.0 (Range: 5-6)	P = 0.102	5.0 (Range: 4-5)
Pain	1 = pain that disturbed the sleep 2 = pain when in rest 3 = pain under physical activity 4 = pain under hard physical activity 5 = never pain	2.0 (Range: 1-5)	4.0 (Range: 1-5)	P<0.001	4.0 (Range: 1-5)
Limp	1 = always limp 2 = limped after a few hundred metres 3 = limped after 1 kilometre 4 = limped after 3 kilometre 5 = never limp	2.0 (Range: 1-5)	4.0 (Range: 1-5)	P<0.001	4.0 (Range: 1-5)
Stability	1 = never stable 2 = sometimes unstable at rest 3 = unstable under physical activity 4 = unstable under hard physical activity 5 = never unstable	3.0 (Range: 1-5)	4.0 (Range: 1-5)	P<0.001	4.0 (Range: 1-5)

\*1 = not at all satisfied; 2 = very little satisfied; 3 = satisfied in some degree; 4 = mostly satisfied; 5 = fully satisfied.

\*\*not included in statistics.

Our results showed improvements in the sex-life of both females and males lasting nine to 12 years after PAO surgery. However, only the improvements observed in females were statistically significant as the improvements in males failed to show statistical significance ( $p = 0.102$ ). The ability of males in sexual performance following PAO has not previously been reported. Van Bergayk et al reported improvements in participation in sports at short term follow-up after PAO surgery (20). We found a significant improvement in the ability to do sports at long-term follow-up. A general decrease in the ability to do sports is expected during a 10 year period and this is probably the reason why the improvement is only marginal. The lasting improvements after PAO observed with respect to pain reduction, increased hip stability, and reduction of limping supports that patients would achieve improved abilities to do sports. We found a significant improvement in the patients' ability to interact in a social context (meeting friends, going to the movies, concerts, shopping etc.). We acknowledge that our results may be affected by recall bias (see below), and in addition changes in lifestyle during the near 10 year follow-up period may also affect the findings. As in other studies we found statistically significant improvements in HRQoL (16, 20, 21), and both satisfaction with the result and willingness to repeat were high indicating lasting success of PAO surgery. The following limitations to our study should be acknowledged. Firstly, the study cohort as selected only includes preserved hips. This may bias the outcome to be better than can be expected in general. Secondly, recall bias is introduced by the questions regarding the preoperative status. This might result in a bigger difference between

the preoperative and postoperative scores than is actually the case. Finally, the used questionnaire was designed specifically for this study, which could result in generalisability problems. However, this is a general problem when evaluating the outcome in younger patients following joint preserving hip surgery. There is a lack of standardised outcome measures that are able to differentiate improvements in these high demand patients. When using standardised patient reported outcome measures developed for osteoarthritic hips, this group will show a ceiling-effect. In conclusion, our results suggest that it is possible to achieve lasting improvements in the patients' sex life, social life and ability to do sports nine to 12 years following PAO. Only few previous reports document the outcome of these alternative outcome measures. However, given the high demands to the performance of the hip joint that these young patients have, these outcome measures are important to document all aspects of the long-term success of PAO surgery.

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