The Trajectory of Patient-Reported Outcome after Hip Preservation Surgery: A National Registry Study

Junya Yoshitani[1], Seper Ekhtiari, Ajay Malviya, Vikas Khanduja[2]
[1]Young Adult Hip Service, Department of Trauma and Orthopaedics, Addenbrooke's - Cambridge University Hospitals NHS Foundation Trust, [2]Young Adult Hip Service, Department of Trauma and Orthopaedics, Addenbrookes - Cambridge University Hospital

INTRODUCTION: Hip arthroscopy (HA) for femoroacetabular impingement (FAI) and periacetabular osteotomy (PAO) for hip dysplasia and retroversion are commonly performed to preserve the hip joint and delay arthroplasty in young adults. It is important to accurately predict the detailed post-operative trajectory of patient-reported outcome measures (PROMs), because it plays a crucial role in patient selection and pre-operative consultation with the patient. Previous studies investigating the trajectory of post-operative PROMs after HA have limitations, such as being single-center, single-surgeon series, and having a relatively small sample size, making it challenging to generalize the results Additionally, comprehending the factors influencing the post-operative trajectory of PROMs can improve the evaluation of surgical indications and enhance post-operative outcomes.

This study analyzes PROMs up to two years post-surgery using the UK's nationwide registry and assesses the impact of potential confounders on these trajectories.

METHODS: This study was a registry study based on the UK's Non-Arthroplasty Hip Registry (NAHR) dataset. Approval for this observational study was granted by the NAHR steering committee.

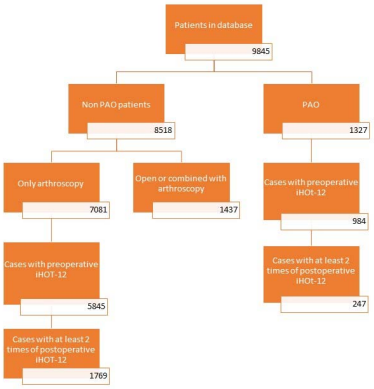
Eligibility criteria for inclusion in this study were as follows: 1) Patients who were included the NAHR undergoing hip preservation surgery between May 28th, 2012 and March 1st, 2) Patients who were 14 years or older at the time of inclusion in the registry, 3) patients who had a pre-operative iHOT-12 score, and 4) who had iHOT-12 scores recorded for at least two of the following three timepoints: 6 months, 1 year, and 2 years. From the registry, information regarding patient age, body mass index (BMI), sex, specific surgical procedure(s), operative side, presence of FAI, presence of arthroscopic acetabular cartilage damage, and total iHOT-12 scores at all accessible timepoints were extracted. The primary outcome is iHOT-12 scores. A *plateau* in trajectory refers to the initial timepoint after surgery where there is noimprovement or decline in iHOT-12 scores beyond the minimal clinically important difference (MCID) compared to the previous timepoint. To analyze the characteristics of the trajectory after hip preservation surgery, Latent Growth Curve Modeling (LGCM) was performed.

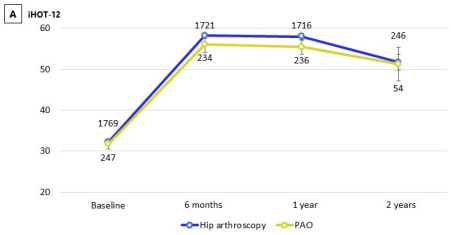
RESULTS: Overall, 9,845 patients were included in this study. 7,081 patients underwent a hip arthroscopy, and 1,327 patients underwent a periacetabular osteotomy (Figure 1). The trajectory of iHOT-12 after HA and PAO is represented in **Figure 2.** For hip arthroscopy, there were significant improvements in iHOT-12 scores from baseline to 6 months [32.2 to 58.2], but no significant change from 6 months to 1 year [mean: 58.0]. There was a decrease within minimal clinically important difference from 1 year to 2 years [mean: 51.7]. For periacetabular osteotomy, there were significant improvements in iHOT-12 scores from baseline to 6 months [31.7 to 56.0], but no significant change from 6 months to 1 year [55.4], and from 1 year to 2 years [51.3]. **Figures 2B and C** show the individual differences of the linear trajectory of HA and PAO by LGCM. LGCM showed that BMI and sex had a significant impact on pre-operative iHOT-12 scores, while age and sex significantly influenced the recovery slope.

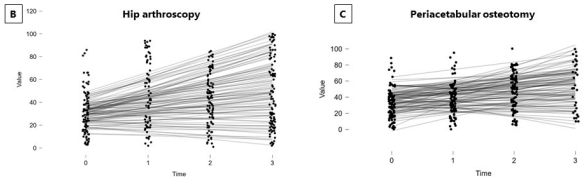
DISCUSSION AND CONCLUSION:

This research possesses various notable advantages. Firstly, it relies on data obtained from a nationwide registry, which encompasses information from a diverse group of surgeons with varying levels of expertise and experience, as well as varying numbers of cases handled. This enables a more comprehensive understanding of the patient group under investigation. The limitaions of this study is that the NAHR does not currently require data submission, which may introduce bias as it is voluntary for surgeons and institutions to contribute their data to the registry. The number of patients at the 2-year post-operative mark is small, which may introduce potential attrition bias.

The most important finding of this study is that there is a *plateau* in the trajectory of PROMs following hip preservation surgery in the first 2 years. A significant decrease in iHOT-12 scores was observed from 1 year to 2 years in HA groups, although the change was within the MCID. Factors influencing the trajectory of both HA and PAO included BMI, age, and sex. LGCM revealed that BMI and sex significantly affected the pre-operative PROMs of HA and PAO patients, while age and sex significantly influenced the recovery slope after HA or PAO. These results underscore the importance of post-operative follow-up and effective preoperative communication with patients.


Patients in database
9845
Non PAO patients
8518
PAO
1327
Only arthroscopy
7081
Open or combined with arthroscopy
1437
Cases with preoperative iHOT-12
984
Cases with preoperative iHOT-12
5845
Cases with at least 2 times of postoperative iHOT-12
247
Cases with at least 2 times of postoperative iHOT-12
1769


A
iHOT-12
60
50
40
30
20
1769
247
1721
234
1716
236
246
54
Baseline
6 months
1 year
2 years
Hip arthroscopy
PAO


B
Hip arthroscopy
Value
Time
C
Periacetabular osteotomy
Value
Time