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1 Introduction

The 2nd Annual Report of the Non-Arthroplasty Hip Registry (NAHR) was launched, at the British Orthopaedic Association (BOA) meeting, in Liverpool, in September 2017. The first report was presented to the British Hip Society (BHS) in March 2016 and the decision to delay the second report was made following discussion at the NAHR User Group.

Data collection in the National and Private Health sectors, as a whole, is variable in both quantity and quality. It became apparent that the time between data collection and data upload to the NAHR portal meant that collecting meaningful data up to the end of 2016 would not be possible in time for a launch at the BHS meeting in London (March 2017). In part, this explains the disparities between year on year data shown in this report and that in the 2016 report.

The data presented in this report reflects procedures recorded between January 2012 and December 2016. Due to the variability of data collected during the first years of the Registry, data from 2012 is censored in some graphs to improve the interpretation where low numbers make data comparison difficult. The growth in data entry over the past year has been steady but it is clear that there are still a significant number of non-arthroplasty operations, which are not being recorded in the registry, both in the public and private sector. Any meaningful estimate of the numbers involved is extremely challenging. However, we are beginning to see statistically significant results for some procedures and this will only improve further if the numbers in the Registry continue to improve as well. At a time when commissioners of healthcare are looking closely at procedures they perceive to have limited clinical value and given the lack of level 1 evidence for many forms of hip preservation surgery, it is imperative that surgeons engage and contribute data to the registry. If we, as a group of specialists, cannot present reliable outcome data then it is highly likely that funding for these procedures will be withdrawn or, at the very least, only be offered following consultations with exceptional funding bodies.

The NAHR is now an integral part of TORUS (Trauma & Orthopaedic Registry Unifying Structure) a work programme that arose out of the Quality Outcome work stream commenced by the BOA in 2014. This project came about following the creation of a large number of new registries in T&O, each initiated by specialist societies and lead clinicians in those areas. The initial aim of TORUS to support, improve and provide a harmonisation of approach continues. In addition, other benefits around legal indemnity, investigation of breaches of data collection, contract negotiations with registry providers and dealing with issues related to information governance are all potential benefits. Furthermore, backing of the BOA and its support in encouraging healthcare providers and commissioners to engage with the Registry is a key benefit and we hope this will improve compliance moving forwards.

The NAHR User Group meets several times a year and minutes of these meetings are published on the BHS website. Early in 2017, Marcus Bankes stepped down as Chairman of the group having been in place since its creation. Marcus’ enthusiasm and hard work in developing the Registry interface, minimum dataset and early engagement with TORUS was greatly appreciated and we are pleased that he continues to be involved as a member and a major contributor to the dataset.

At the BHS meeting in 2017, a new position on the Executive was created, the Registry Representative, and Mr Vikas Khanduja, Young Adult Hip Lead from Cambridge was duly elected to this position. Part of this role means that Vikas took over the Chair of the User Group and we have already benefited from the leadership of this new role. In January 2017, the User Group appointed two new members, Callum McBryde from Birmingham and Ajay Malviya from Northumbria. Both are accomplished hip preservation surgeons whose contributions to the Group are much appreciated. This year we are also pleased to have involved the assistance of Richard Holleyman, an Orthopaedic STR from the North-East, in preparing the statistical analysis and graphical representations.

Industry Support for the registry has been instrumental in allowing us to develop and promote the registry and we appreciate contributions from Smith and Nephew and Stryker Orthopaedics. The unfortunate financial issues faced by the BHS over the last year may well have an impact on how these funds can be utilised in the future. However, this does not appear to have affected the willingness of industry, who see the benefit of Registry data, to continue to contribute to the NAHR and we appreciate their ongoing support.

The NAHR remains the world’s only national registry of its kind and, together with the BOA, represents the opportunity to lead the world in the field of registry data for hip preservation surgery. The data contained in this report represents just the first few years of the NAHR, but it will allow us to follow the outcome of non-arthroplasty surgery over the lifetime of our patients.
2 Aim of the NAHR

The NAHR, which is open to members and non-members of the BHS, aims to benefit both patients and surgeons by collecting longitudinal data on patients with hip pathology, whether or not they undergo surgery. Relevant operations include: arthroscopic and open surgery for femoroacetabular impingement (FAI); peri-acetabular osteotomy (PAO); femoral osteotomy; surgery for slipped capital femoral epiphysis (SCFE); surgery for developmental dysplasia of the hip (DDH); and other treatments for extra-articular hip problems such as trochanteric bursitis, abductor tears and external snapping of the hip. In fact, any operation other than arthroplasty and acute fracture treatment is suitable for being recorded on the NAHR. It is quite likely that private institutions as well as NHS Trusts will soon require proof that outcome data is being collected.

The NAHR data will be used to bring direct benefits to patients by:

• improving patient awareness of the outcomes of operations on the hip, since results will be available in the public domain
• comparing the success rates of different operations and surgical approaches to the hip
• helping to identify whether they would benefit from a specific surgical technique
• identifying which surgical procedure is most likely to bring benefit for a specific diagnosis

The NAHR data will bring additional long-term benefits to surgeons and hospitals by:

• providing feedback to orthopaedic surgeons to define which patients will benefit from surgery and what details of the operative procedure will define a good result; validated outcome data will be available to the surgeon
• identifying which patients are likely to benefit from a particular procedure
• promoting open publication of outcomes following surgery
• potentially linking to Hospital Episode Statistics (HES) and National Joint Register (NJR) data to enable follow-up into arthroplasty, and accurately follow the lifespan of a patient’s hip joint

3 Background of the NAHR

In 2011, the National Institute for Health and Clinical Excellence (NICE) published guidance on open and arthroscopic treatment for femoroacetabular impingement. This guidance recommended inclusion of this type of surgery into a non-arthroplasty hip register. In response, the NAHR was launched at the BHS Annual General Meeting in 2012, and it continues to develop in response to feedback from users and the NAHR User Group.

The interface and forms have been simplified and a new Minimum Dataset (MDS) defined. The simplified NAHR went live on Monday 4th November 2014. New forms were designed with a similar feel to the NJR forms, to enable hospitals to use their existing NJR data entry infrastructure, freeing surgeons from data entry. Forms are available for download on the BHS website (www.britishhipsociety.com).

The MDS 1.1 includes information sheets, consent forms, mandatory scoring sheets, and forms for surgical details and findings. As well as a mandatory MDS, surgeons may also wish to complete the Enhanced Dataset. Following entry into the NAHR, and providing an email address has been included, all further follow-up is automated, as patients are emailed and asked to complete on-line mandatory scores at six, 12 and 24 months post-operatively.

Clinicians can use the NAHR to collect and display comprehensive outcome data on all their patients using various outcome measures. The information sheet, consent form and minimum dataset version 1.1, which can be downloaded here, are designed to reflect the familiar format of the National Joint Registry (NJR) forms. They contain a basic mandatory dataset as well as an enhanced dataset for surgeons to record additional surgical findings.

At each Annual General Meeting of the BHS, an update of the NAHR is presented and a workshop arranged to encourage surgeons to join and submit data to the NAHR. This, the second Annual Report, provides a summary of the data available and can be used to guide further development of the register.
4 Overview of the data

4.1 Pathways per year

In the NAHR, a pathway is created when an operation is performed. Each patient has a maximum of two pathways, one for each hip, which follows the ‘journey’ of that hip through every hip preservation operation right to arthroplasty as the end point, if this occurs. If a patient changes surgeons during their treatment, then the pathway follows the patient and is taken over by the next operating surgeon. Two pathways cannot be created for patients with the same demographic data, particularly unique identifiers such as the NHS number. The inclusion of an NHS number potentially allows linkage of the NAHR pathway with other registries such as the NJR. Therefore, it is highly desirable that this number is included for all patients.

There are currently a total of 5561 pathways entered in the registry. The number entered NAHR has steadily increased year on year and 2016 saw a 20% increase in the number entered compared to 2015, 1616 compared to 1362, as shown in Figure 1.

Figure 1 Pathways uploaded per year

Figure 2 shows the number of pathways split into surgical approach. In last year’s report due to the small number of ‘combined approach procedures’ (0.25% in 2016) we used a logarithmic scale. For the 2017 report, for ease of presentation we have excluded the patients who had combined open and arthroscopic approach and mini-open approach from the graphs (n=18). Arthroscopy accounts for around 69% of recorded pathways, with 15% open including osteotomies and open surgical dislocation for hip impingement. This proportion is similar to 2015. The remainder are not recorded or combined approach.

Figure 2 Pathways per year broken down to surgical approach

4.2 Number of surgeons using NAHR

A total of 66 surgeons have entered data on the NAHR at some point, Figure 3 shows the number of unique surgeons entering pathways per year since 2012. This has steadily increased such that 45 surgeons were entering data in 2016. The majority of surgeries were performed by a relatively small number of high volume surgeons. The number of surgeons ‘experimenting’ with the registry seems to be reducing, and the number of ‘regular’ users is increasing slowly. Whereas the NJR has a good mechanism for understanding the denominator of surgeons performing joint arthroplasty, there is no similar surrogate in hip preservation and therefore accurately calculating what percentage of surgeons are uploading data is difficult.

Figure 3 Surgeons adding data to the NAHR
4.3 Surgeon-patient procedures
Thirty-four surgeons have submitted more than 20 cases and only 14 have submitted more than 100 pathways. One particularly high volume surgeon and dedicated user of the registry has personally uploaded over 21.8% of all pathways on the registry. This contrast demonstrates the difference in attitudes of surgeons with some seeing the potential benefits to their own practices and patients in the follow-up of outcome data.

![Graph showing procedures per surgeon](image1)

**Figure 4 Procedures per surgeon**

NB. To better demonstrate the range of surgeons uploading smaller number of procedures, the single highest user has been removed from Figure 4.

4.4 Funding source for surgery
The funding by surgical approach is shown in Figure 5. This demonstrates that the proportion of arthroscopic procedures funded by the National Health Service have increased over time from 55% in 2012 to 72% in 2016; while the numbers recorded in the independent sector have remained similar over this time (110, 25% in 2012 vs 173, 11% in 2016). It is highly likely that the data from the independent sector is not completely being recorded in the Registry or that data upload is not as accurate. There remains a high proportion of ‘not recorded’ in this category (17% in 2016) and this is one area of the dataset that is likely to become mandatory for completion over the next year.

![Graph showing funding of surgery per year](image2)

**Figure 5 Funding of surgery per year**
5 Demographics

5.1 Patients by age and approach

The analysis of patient age in Figure 6 shows a skewed distribution towards a younger age for both open and arthroscopic procedures, with open surgery slightly younger than arthroscopic. The distribution of cases with ‘no approach recorded’ is slightly different which is difficult to explain. In future, as this field is made compulsory, we may see a shift in distribution. Fifteen cases were removed as no age was recorded.

Given the excellent results of hip arthroplasty, several commissioners, perhaps reasonably, place age restrictions on hip preservation surgery. Of the data recorded in the registry, 3.2% of cases were performed on those aged 60 years or over. 88% of cases entered on the NAHR were between the ages of 15 and 50 years and 54% were between the ages of 20 and 40 years with 2.6% being over 60 years of age.

There are large numbers of paediatric hip preservation procedures performed that are not being recorded with less than 0.6% of procedures having been performed on patients less than fifteen years old. The management of slipped femoral epiphysis and Perthes is currently a topic of research and the British Orthopaedic Surgery Surveillance (BOSS) programme (www.boss.surgery) has been running since March 2016. At the time of writing, 807 cases had been accrued by BOSS. It is not clear how many of these cases have had surgical management but very few appear to have been submitted to the NAHR. The NAHR can also be used for simply monitoring progression of outcome scores in patients being treated conservatively and therefore many patients, including those in the BOSS study could be entered regardless of whether they have undergone a procedure. One aim of the NAHR should be to publicise this aspect of the Registry’s work.
5.2 Gender distribution by surgical approach

Overall, the majority of patients with data entered on the NAHR are female (62.6%). Of those patients undergoing hip arthroscopy, 60% were female compared to 82% of patients undergoing open procedures. Again 24% of procedures have no approach specified, another area that will be considered mandatory moving forwards. See Figure 7.

5.3 Body mass index (BMI) by operation type and gender

Body Mass Index (BMI) was recorded in only 22.4% of cases but the rate of data acquisition, in keeping with many parameters, has improved over the first few years of the register. Of the cases for which BMI is available, 83.8% of patients were recorded as having a BMI of between 18.5 and 30 with 3.8% recorded as having a BMI greater than 35 and 2.3% less than 18.5. See Figure 8.
6 Compliance

6.1 Follow-up and linkage data

2016 saw an increase in the number with an email address recorded, 90.4% compared to 83.3% in 2014. Part of the proposed benefit of the NAHR is the automated email follow-up at six, 12 and 24 months and therefore inclusion of an email is essential. However, as shown in Section 7, there is a poor collection of follow-up scores. The reasons for this are unclear and need exploring. Whether the emails are not being received or are being rejected may explain the poor compliance at later time points.

In addition to this, a mobile phone number is requested to allow follow-up of patient via phone should emails remain unanswered. It appears patients are increasingly reluctant to add a mobile phone number to the contact details on the consent form with only 39.6% supplying one compared to 48.7% in 2014. This is shown in Figure 9.

The recording of an NHS number has remained fairly consistent at 78.5% in 2016. Obtaining an NHS number in the private sector is possible but time-consuming and this may be a barrier to increasing this figure. Clear advice on how to obtain the NHS number for private patients is available on the NAHR pages of the BHS website.

6.2 Consent rates

As discussed in the Introduction, the involvement of the NAHR with TORUS has highlighted the importance of good governance and consent to data upload. The percentage of recording of consent for data upload to the NAHR has increased from 46% in 2013 to 96.5% in 2016 (see Figure 10). A part of this increase is due to the Consent tab being made a mandatory field on the website. It is important that surgeons are not recording any data on patients who have not given explicit consent. Reasons for non-consenting and rejection of consent via the patient portal should be explored.

Figure 9  Pathway compliance

Figure 10  Recording of Consent to data collection

.
7 Collection of mandatory scores

7.1 Overview of scores
The NAHR offers clinicians the opportunity to use various hip scores for patient assessment pre- and post-operatively. The NAHR User Group, following review of evidence defined that only two hip scores would be mandatory for collection in the minimum dataset, with others available depending on surgeon preference. The mandatory scores are the EQ-5D-5L (including the EQ-5D-VAS) and the iHOT-12. Scores are recorded pre-operatively then routinely, via email or in person, at six months, one and two years post-operatively.

7.1.1 EQ-5D Index
The EQ-5D index score is based on five domains (mobility, self-care, usual activities, pain/discomfort and anxiety/depression) each with five options (no problems, slight problems, moderate problems, severe problems and extreme problems).

7.1.2 EQ VAS
The EQ Visual Analogue score records the respondent’s self-rated health on a 20cm vertical scale where endpoints are labelled ‘Best imaginable health state’ (100 points) and ‘Worst imaginable health state’ (0 points).

7.1.3 iHOT-12
This is a short form equivalent of the International Hip Outcome Tool-33 which was developed by the Multicenter Arthroscopy of the Hip Outcomes Research Network (MAHORN). The iHOT-33 was developed for active patients (18-60 years; > Tegner 4) presenting with a variety of hip conditions. The shorter 12 question patient-derived, patient-reported outcome measure demonstrates excellent agreement with the long version.

This report only includes the findings related to these mandatory scores. The scores are recorded as complete or incomplete and results are shown in Figures 11-13.

7.2 Rates of score collection
7.2.1 EQ-5D Index
Figure 11 shows the rate of collection of the index scores at the various time intervals. Rate for pre-operative score collection has increased significantly from 30% in 2013 and 82% in 2016. The rates for collection at post-operative time points remain poor, however they do appear to be improving (e.g. 12 months follow-up data for 2016 has almost reached 2015 levels but with a further six months of data collection remaining for capture of 12 month follow-up for pathways performed towards the end of 2016). Again the reasons for this need exploring. The patient application, which is planned for 2018 will hopefully help in this respect.

Figure 11 EQ-5D Index score collection compliance
The collection rate of the VAS score mirrors that of the Index due to the fact that collection of these scores is presented on the same datasheet. See Figure 12.

Figure 12  EQ-5D VAS score collection compliance

The iHOT-12 score was presented to the International Society of Hip Arthroscopy (ISHA) in 2011. It is therefore a relatively new scoring system and hence less well known amongst surgeons. This may be reflected in the slightly reduced uptake of this score in the first two years of the NAHR, despite it being a mandatory score for the minimum dataset. Since 2014, this score has been collected as part of the same scoring sheet as the EQ-5D and the collection rates since are very similar to those for EQ-5D. See Figure 13.

Figure 13  iHOT-12 Score Collection Compliance
8 Surgical procedures

8.1 Overview

Figures 14 to 16 show the different types of surgical procedures recorded in the NAHR, including core acetabular and femoral procedures, additional surgical procedures and the different combinations of femoral and acetabular osteotomies. (Note that the data presented in this section reports the frequency of procedures recorded and that more than one or any combination of surgical procedures may be recorded within a single patient pathway. Proportions are therefore proportions relative to all procedures recorded in the NAHR at the given surgical site (‘acetabular’, ‘femoral’, ‘additional procedures’) and not proportions of all pathways recorded).

8.2 Acetabular procedures

Labral debridement remains the most commonly performed acetabular procedure in arthroscopic surgery, accounting for 32.4% of acetabular procedures compared to 20.9% indicating labral repair. Compared to the 2016 report, there has been a slight reduction in labral debridement and an increase in labral repair. There are plans for revisions to the dataset to include labral reconstruction/grafting, a procedure which is being increasingly performed. Regarding all acetabular procedures performed by open approach, labral debridement comprises 10% of procedures as compared with labral repair, which accounts for 60% of open acetabular procedures. The difference in these figures between open and arthroscopic surgery and labral surgery are likely to reflect the surgical challenges perceived in labral stabilisation/repair.

![All Acetabular Procedures](chart)
8.3 Femoral procedures

Figure 15 shows the range of femoral procedures recorded on the NAHR. Cam removal is the commonest femoral procedure accounting for 88.4% of all femoral procedures performed. Cam removal accounted for similar proportions of total femoral procedures recorded via arthroscopic (n=2,199 of 2,479, 88%) and open (n=74 of 95, 78%) approach. It is technically more challenging to perform an adequate cam resection arthroscopically with many proponents of open surgery citing inadequate resection as a reason for failure of hip arthroscopy for femoroacetabular impingement. Future reports may be able to study difference in outcome between these two groups. A very small number of cartilage procedures are recorded, including debridement, microfracture, cartilage grafting and core decompression.

![Graph showing femoral procedures](image)

Figure 15  All Femoral procedures
8.4 Additional surgical procedures

The NAHR dataset records a wide range of additional surgical procedures performed during hip-preservation surgery, the majority of which relate to extra-articular structures and soft tissue releases. Relatively few of these procedures are recorded and the majority were performed as part of an arthroscopic approach.

Figure 16 shows the frequency of additional procedures recorded in the NAHR. Psoas release is still the most common additional procedure performed. Trochanteric bursal debridement has been recorded 75 times, compared to just 28 in the 2016 report. Together these two procedures account for approximately two-thirds of all additional procedures performed.

![Additional Procedures](image)
8.5 Periacetabular osteotomies

A total of 423 periacetabular osteotomies have been reported of which 399 were isolated and 24 combined with femoral osteotomy, the distribution of which is as below in Figure 17.

![Figure 17: Combination of femoral osteotomies with PAO](image)

8.6 Femoral osteotomies

A total of 58 femoral osteotomies have been recorded in the NAHR, 34 of which were isolated and 24 combined with PAO. The distribution of isolated femoral osteotomies is as below in Figure 18.

![Figure 18: Types of isolated femoral osteotomies](image)
9 Outcome scores

9.1 Overview
All scores are presented as a mean score with +/- one standard deviation error bars. In most cases, raw data has also been plotted and, where appropriate, a violin plot is also provided to demonstrate the data distribution. It is acknowledged that showing two standard deviations would show 95% confidence intervals. As the primary indication of hip arthroscopy is femoroacetabular impingement (FAI), we have reported the results for impingement surgery in detail in this section.

9.2 Outcomes of surgery for FAI

9.2.1 Overall
We have reported the outcomes of FAI surgery where cam and/or acetabular rim recession has been performed. Patients who had additional procedures to the cartilage (approximately 700 cases), in the form of debridement and/or microfracture have been removed. Scores of these cases are shown in Figures 19-21. For the whole group there was significant improvement in the iHOT-12 score at six months (n=661, p<0.0001) and 12 months (n=528, p<0.0001) post-operatively compared to pre-operative baseline [Paired t-test]. Female gender was significantly associated with a greater improvement in iHOT-12 score (compared to pre-operative scores) at six months (p<0.0001) and one year (p=0.005) post-operatively, likely influenced by the fact that men start from a higher baseline pre-operative iHOT-12 score [independent t-test]. Data from two years was not analysed due to the small number of results at this time-point (n=58).

Figure 19  iHOT-12 – whole cohort

Figure 20  EQ-5D Index score – whole cohort

Figure 21  EQ-5D VAS score – whole cohort

Figure 22 shows the iHOT-12 score with gender distribution. Females may start with a lower preoperative baseline score, but catch up by one year. The numbers for two-year data (3.7% females and 3.9% males) are too small to make any meaningful conclusions and therefore not depicted.

Figure 22  iHOT-12 with gender distribution
9.2.2 Results of FAI surgery for cam lesion

In this group, patients who had surgery for pincer lesion have been excluded. Results of the three scores are shown in Figures 23-25 and the gender distribution is shown in Figure 26. For isolated CAM lesion surgery, there was significant improvement in iHOT-12 scores at six months (n=379, p<0.0001) and 12 months (n=295, p<0.0001) post-operatively compared to pre-operative baseline [Paired t-test]. Female gender was associated with significantly greater improvement in iHOT-12 scores compared to baseline at six months (n=379, p=0.006) however significance was lost at 12-month follow-up (n=295, p=0.221) [independent t-test]. Data from two years was not analysed due to small numbers (n=20).
9.2.3 Results of FAI surgery for pincer lesions

In this section, patients who had surgery for cam lesion and a cartilage procedure on the acetabular or femoral side have been excluded. For isolated pincer lesion surgery, there was significant improvement in iHOT-12 scores at six months (n=75, \( p<0.0001 \)) and 12 months (n=63, \( p<0.0001 \)) post-operatively [Paired t-test]. These scores are shown in Figures 27-29. Small numbers in the male group precluded any statistical analysis based on gender. Data from two years was not analysed due to small numbers (n=12).

Regarding acetabular rim recession, the NAHR records this as either complex (involving labral reattachment) or simple, which would include retro-labral rim recession, leaving the chondro-labral junction intact or rim recession of a calcified labrum with no clear labrum to detach. The outcomes of the iHOT-12 scores are shown in Figure 30.

Figure 27 iHOT-12 – pincer lesion

Figure 28 EQ-5D Index – pincer lesion

Figure 29 EQ-5D VAS – pincer lesion

Between-group analysis comparing labral re-attachment vs simple rim recession showed no statistically significant difference in iHOT-12 score improvement at six months (n=75, \( p=0.413 \)) or 12 months (n=63, \( p=0.950 \)) post-operatively compared to pre-operative baseline [independent t-test].

Figure 30 iHOT-12 - rim recession: simple vs complex (with reattachment)

The iHOT-12 at two years for simple rim recession without reattachment appears to decline to pre-operative levels at two years. However, the number with two-year scores is small, and any apparent changes are not statistically significant, therefore not shown in the graphs.
9.2.5 Labral repair vs labral debridement

The optimal management of labral pathology is unclear. Although some studies have shown better outcomes with labral repair and preservation, these studies have not been randomised trials and selection bias makes interpretation difficult. Although similar bias is clearly relevant in this report, the data from the NAHR is grouped into three distinct categories – labral repair, labral debridement and those recorded as having both techniques. The outcomes of the three mandatory scores for labral debridement vs labral repair are shown in Figures 31 to 33. For patients undergoing pure ‘labral repair’ or ‘labral debridement’ as an acetabular procedure, there was significant improvement in combined iHOT-12 scores at six months (n=364, p<0.0001) and 12 months (n=295, p<0.0001) post-operatively [Paired t-test]. There were, however, no significant between-group differences in iHOT-12 scores when comparing ‘labral repair’ vs. ‘labral debridement’ at each stage of follow-up (all p>0.05, independent t-test). Pre-operative scores between the two groups are similar and there is a trend towards improvement out to one year with no clear difference between the two treatment groups. The EQ-5D VAS perhaps showed less evidence of an improvement post-operatively than other groups. Data from two years was not analysed due to small numbers (n=24).

Figure 31 iHOT 12 - Labral debridement vs repair

Figure 32 EQ-5D 5L Index - Labral debridement vs Repair

Figure 33 EQ-5D VAS - Labral debridement vs repair
Figure 34 represents the outcome of iHOT-12 scores for the whole cohort with labral pathology against age. There appears to be good improvement with labral debridement or repair regardless of age. The graph show scatter plots of age vs outcome score with a LOESS method-smoothing curve along with 95% confidence interval.

9.3 Outcome following isolated periacetabular osteotomy (PAO)

There are 399 PAOs recorded without simultaneous femoral osteotomy. The following graphs (Figures 35 to 37) show the three mandatory scores for these cases in isolation. For patients undergoing PAO with no concurrent femoral osteotomy there was significant improvement in iHOT-12 score at six months (n=187, p<0.0001) and 12 months (n=150, p<0.0001) post-operatively compared with pre-operative baseline [Paired t-test]. Data from two years was not analysed due to small numbers (n=25).

There was no statistically significant difference in iHOT-12 scores between genders at each stage of follow-up for patients undergoing PAO. Note that there were only small numbers in the male group (<17 cases).

9.3.1 iHOT-12 - PAO

There is a trend towards improvement in the iHOT-12 score at six months and one year post-operatively.
9.3.2 EQ-5D Index – PAO

Similar trends are shown with the index score with an improvement on the pre-operative scores, which appears to be maintained out to two years post-operatively.

![Figure 36 PAO EQ-5D Index scores](image)

9.3.3 EQ-5D VAS – PAO

As with the results of FAI surgery, there is a flat response to PAO with no clear trend in the VAS post-operatively.

![Figure 37 PAO EQ-5D VAS scores](image)

9.3.4 Results of PAO vs age at time of surgery

Figure 38 illustrated the iHOT-12 scores of various age groups. All ages seem to benefit from surgery. 2-year data not presented due to small numbers. Graph shows scatter plot of age vs outcome score with a LOESS method smoothing curve along with 95% confidence interval.

![Figure 38 PAO iHOT-12 scores with age distribution](image)

9.3.5 Results of PAO as per gender

Approximately 10% of patients undergoing PAO are males. Figure 39 shows the iHOT-12 scores of patients vs gender. It appears that both males and females benefit equally from the procedure.

![Figure 39 PAO iHOT-12 scores with gender distribution](image)
10 Summary

2016 has seen a 20% increase in the number of pathways uploaded compared with the previous year, with 1616 separate entries recorded. Forty-five surgeons have entered data into the registry however 75% of the total number of pathways have been entered by only 14 surgeons, with a few high volume surgeons dominating. There are clearly several high volume practices in the UK not contributing data at all. The reasons for this are not entirely clear but are likely to be multiple.

The inappropriate use of data contained in registries is commonly cited as a reason some high volume hip preservation surgeons are not willing to upload the data they collect in their practices. We acknowledge that the data presented in this registry cannot and should not be interpreted at surgeon or unit level and the dataset is arguably limited to the point that this may never be possible in its current form. The NAHR and the BHS owns the data collected and will continue to protect it from inappropriate use. The association with the BOA and TORUS will, we hope, continue to provide this reassurance. The other common reason quoted for non-compliance is duplication of data. Most of the high volume surgeons maintain their own databases and feel that submission of data to another source leads to duplication of effort. To circumvent this issue, we have worked hard to produce a minimum dataset (MDS) for the NAHR, which makes the process fairly swift and user friendly.

The data presented in this report clearly demonstrates the high degree of variance in outcome scores across multiple procedures recorded in the NAHR. With such variance, the possibilities for showing any statistically significance changes are limited at present. The fields collected in the dataset have been kept to a minimum to improve compliance and data entry but this will naturally limit the depth to which this data can be interrogated. In addition, the subjective nature of recording to what extent a procedure (e.g. cam resection or labral debridement) has been performed will undoubtedly add to this variance and is difficult to overcome in the short-term.

Compliance for data entry has improved very slightly over the past few years but remains at about 75% for pre-operative scores dropping off significantly for all post-operative scores. We are hopeful that the patient app will improve compliance in this area once released, hopefully in 2018.

In the 2016 report, the variance and limited data at that stage did not allow a demonstration of significant changes in PROMS scores. This report, with only four years of data is already able to demonstrate significant improvements in PROMS data (EQ-5D and iHOT-12) for peri-acetabular osteotomy, when performed in isolation at both six and 12 months post-operatively. In addition, surgery for both CAM and pincer surgery in femoroacetabular impingement surgery both show significant improvement in PROMS scores at the same time periods.

When comparing labral debridement with labral repair there is likely to be a selection bias in that those labrum which are deemed too degenerate for repair may be debrided. The difference may also reflect the views and operative skills of the operating surgeon. In addition, one may surmise that the more degenerate labrum, not suitable for repair may be part of a more degenerate joint and therefore results may be affected. Bearing all of this in mind, it is interesting to note that there is no difference between the pre or post-operative scores of either group and both show significant improvements in PROMS scores at six months and one year. It is encouraging that with the limited data and length of follow-up we are already seeing significant changes. It is disappointing that the small numbers with two year follow-up make useful analysis at this point not possible but as compliance improves, we will be able to present longer term data.

There are a large number of fields (such as surgical approach), which are entered as ‘not recorded’. It is difficult to know why this is the case. The dataset is not onerous to complete and moving forwards the User Group will have to consider which fields should be made mandatory to try and improve this basic data capture. The balance between ensuring complete data capture and making data entry straightforward is sometimes challenging.

As with the National Joint Registry, it will be several years before the data contained in the NAHR can be utilised for useful analysis but the steady growth of contributing surgeons and data entry is encouraging. The National Joint Registry of England, Wales, Northern Ireland and the Isle of Man has published its 13th Annual Report and in spite of significantly more support, resources, funding and data than the NAHR, there is still concern and criticism over how that data is interpreted, collected and validated. We appreciate these same issues affect this registry but it is only through the engagement of surgeons, patients, healthcare providers and commissioners that we can address these issues and begin provide useful data to drive forward patient care and inform research ideas.
11 Future plans

The NAHR continues to expand and the work of the User Group with the support of the BHS and the BOA is largely to thank for this. The User Group are committed to working with TORUS and the BOA to improve data governance, consent issues and comply with information governance.

We have seen several improvements in the NAHR over the last year and many of these are aimed at improving surgeon engagement. The development of a reporting function on the NAHR website to allow appraisal reports to be generated, similar to that provided by the NJR, is a welcome addition. The future development of a mobile app to allow patients to complete scores more easily will hopefully improve compliance in this area and reduce the loss of important data moving forwards. The creation of a dedicated website, similar to that developed by the National Ligament Registry (www.uknr.com) is one area the User Group are working on and is expected to come on line in Q1 of 2018.

Local guidance for hip preservation surgery is being prepared for several Clinical Commissioning Groups (CCGs) and the same guidance has also been discussed with private medial insurers who have shown in interest in mandating data entry as part of remuneration for these procedures in the private sector. We look forward to their continued support in the coming year. The User Group is quite keen to engage with the BOA and produce guidance which is evidence based and can be used by all CCGs to commission non-arthroplasty hip surgery in their region.

In addition, we would like to thank Bluespier and Amplitude, in particular Corri Conrad, for their support in developing the user interface and database. Their help in developing the app in the next year is an exciting milestone and one that we hope will engage both surgeons and patients. The minimum dataset is also in the process of being updated and fields such as labral reconstruction, capsular repair and sciatic nerve decompression reflect the changing practice in the field of non-arthroplasty hip surgery.

The NAHR User Group will also aim to improve publicity amongst surgeons and hospitals with regular newsletters and updates, in addition to the Annual Report. Wider interest in the NAHR has been shown throughout the world with invited presentations at hip preservation meetings in Madrid and at the International Society of Hip Arthroscopy (ISHA) meeting later this year. Formal reports have also been published in the ISHA newsletter for 2017. The User Group is also exploring the possibility of producing the first manuscript from the data derived from NAHR looking at the outcomes of arthroscopic intervention for FAI surgery.

We look forward to presenting the next report in 2018, and although the data is not mature as yet, we hope that you have found this report interesting and thought-provoking.
12 Units submitting data to the NAHR

- Addenbrooke’s Hospital, Cambridge
- Alexandra Hospital, Redditch
- BMI Harrogate Hospital, Harrogate
- BMI The Alexandra Hospital, Stockport
- BMI The Droitwich Spa Hospital, Droitwich Spa
- BMI The Ridgeway Hospital, Swindon
- BMI Winterbourne Hospital, Dorchester
- Chapel Allerton Hospital, Leeds
- Colchester General Hospital, Colchester
- Derriford Hospital, Plymouth
- Dorset County Hospital, Dorchester
- Frimley Park Hospital, Frimley
- Great Western Hospital, Swindon
- Guy’s Hospital, London
- Harrogate District Hospital, Harrogate
- Hereford County Hospital, Hereford
- Hexham General Hospital, Hexham
- Hospital of St John and St Elizabeth, London
- James Paget Hospital, Great Yarmouth
- Leeds General Infirmary, Leeds
- Leicester General Hospital, Leicester
- Lister Hospital, Stevenage
- London Bridge Hospital, London
- London Clinic, London
- Neath Port Talbot Hospital, Port Talbot
- Nuffield Health Exeter Hospital, Exeter
- Nuffield Health Glasgow Hospital, Glasgow
- Nuffield Health Leicester Hospital, Leicester
- Pembury Hospital, Pembury
- Peterborough City Hospital, Peterborough
- Princess Grace Hospital, London
- Queen Alexandra Hospital, Portsmouth
- Ramsay Ashtead Private Hospital, Ashtead
- Ramsay Duchy Private Hospital, Truro
- Ramsay Fitzwilliam Private Hospital, Peterborough
- Ramsay Oaks Private Hospital, Colchester
- Ramsay Pinehill Private Hospital, Hitchin
- Royal Berkshire Hospital, Reading
- Royal Bolton Hospital, Bolton
- Royal Cornwall Hospital, Truro
- Royal Devon & Exeter Hospital, Exeter
- Royal Infirmary of Edinburgh, Edinburgh
- Royal London Hospital, London
- South West London Elective Orthopaedic Centre, Epsom
- Southern General Hospital, Glasgow
- Spire Clare Park Hospital, Farnham
- Spire Harpenden Hospital, Harpenden
- Spire Manchester Hospital, Manchester
- Spire Murrayfield Hospital Edinburgh, Edinburgh
- Spire Norwich Hospital, Norwich
- St Anthony’s Hospital, Sutton
- St Michael’s Hospital, Hayle
- Stepping Hill Hospital, Stockport
- University College Hospital, London
- Wansbeck General Hospital, Ashington
- Wrightington Hospital, Wigan
13 Surgeons submitting data to the NAHR

We are grateful to the following individuals who have submitted their data to the Non-Arthroplasty Hip Registry. Their support, appreciation and understanding of what the NAHR is trying to achieve are appreciated.

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