



Non-Arthroplasty Hip Registry

8th Annual Report 2023

Chairman’s Foreword

As I reflect on my three years as the Chairman of NAHR, I conclude with a degree of contentment that the Registry continues to make positive strides and is well-recognised as an exemplary model across the international hip preservation network. When the NAHR was conceptualised in 2012, the primary aim was to provide a platform for conscientious surgeons to compile data on non-arthroplasty interventions that were becoming standard. It must have emerged as a daunting undertaking to allow scrutiny of individual data, especially of procedures that did not, ostensibly at that time, have a robust evidence base. However, in ten years, we have more than 18,000 pathways in the Registry, 113 contributing surgeons, and we are into MDSv3 of our data collection form. We have endeavoured to expand the team and nurture enthusiastic colleagues to join and furnish renewed visions. The Regional Representatives have been entrusted with the unenviable position of being local champions and establishing regional young adult hip networks for governance and quality assurance purposes.



Eighth Annual Report

The Eighth Annual Report has added flavours, which I expect everyone will find interesting to read. As is apparent from the monthly report we get from Amplitude, the number of pathways continues to grow, which will be gratifying for everyone invested in the NAHR.



Richard Holleyman, BHS-ORUK Research Fellow, has consistently produced advanced-level statistical analyses for us in his spare time, to which we are indebted. We have further reported on contemporary practices in anchor usage for labral repair. In the future this will be meaningful enough to explore if the number and type of anchors used have a bearing on the outcome of surgery; more importantly, we will be able to identify if any type of anchor has consistently poor results. This valuable information demonstrates the significance of utilising the Registry in enabling compliance with the recommendations of the Cumberlege report. We have also added further insights into revision hip arthroscopies and their outcomes. My special appreciation extends to Alistair Mayne, Hip Preservation Fellow at ROH, Birmingham and Callum McBryde, who have delivered exceptional work to furnish the report on time.

Embedding Research into Registry - Pfizer Feasibility study

Mr Mark Sohatee, as part of the BHS-supported BOA Future leadership programme, performed a feasibility study to investigate if research can be embedded into Registries and, particularly, whether we can enhance patient engagement by provisioning local support. Six high-volume centres, across the country, participated in this pilot. It has been demonstrated that with local administrative support, patient compliance can improve to 88.7% at 30 days and 81.4% at 90 days. NHS organisations should therefore possibly consider investing in an Outcomes team to ensure that patients are encouraged locally to complete their outcomes. The study affirms that it is feasible to embed trials within the registry, and this is the trajectory NAHR are endeavouring to pursue.

FAI and dysplasia – best practice guidelines

Guidance documents help streamline care, and the BHS executive suggested generating best practice recommendations for some common disorders we encounter. The NAHR board has delivered on these, and the FAI and Dysplasia best practice guidelines now appear on the BHS website under the “Resources” section for clinicians to observe. It was a collaborative endeavour of our young, budding Hip preservation surgeons – Mr Mark Sohatee, Mr Christian Smith, Mr Rajpal Nandra and Mr Ed Dickinson.

Thanks also to Holly Doyle and MJ Sharp for preparing the Hip Dysplasia information booklet for patients (<https://www.nahr.co.uk/wp-content/uploads/2022/03/Hip-Dysplasia-in-teenagers-young-adults.pdf>), which now appears on our website. This is an informative resource for patients who wish to understand their condition better.

Minimal Data Set modification

The minimal dataset form continues to mature as surgical techniques evolve, and the information we wish to gather has also been modified. We are currently into MDSv3.0, which compiles more information on capsular management, options for cartilage graft, the medication used for thromboprophylaxis, heterotopic ossification and prevention of adhesion and intra-articular adjuncts used during surgery, including Hyaluronidase, PRP and stem cell preparations. We also collect more information on the diagnosis field for rotational malalignment of the leg.

Although these appear like minor alterations, any modification in the data collection form requires substantial adaptation to the pathways and analyses. Mr Marcus Bankes requires noteworthy recognition for enabling us to accomplish these changes.

Education

We have continued with the educational updates delivered at the annual BHS and BOA congress. At the BOA 2022 Congress, the emphasis was on modern advancement in terms of technology, with the use of AI in predicting outcomes, the use of modern generational navigation tools to improve the accuracy of surgery, motion analyses to understand pathology better and virtual reality to enhance training in hip preservation. At the BHS meeting in 2023, we have embraced a case-based discussion format with representative cases that all hip surgeons see in their clinical practice. NAHR members continue to be involved in hip preservation teaching on various regional, national and international stages, with a particularly strong representation at the recently concluded International Hip Preservation Annual Congress in Glasgow in October 2022, with the Programme Chair being Mr Vikas Khanduja and local host Mr Sanjeev Patil.

National MSK Registry

Unlike other MSK registries in the United Kingdom, NAHR remains on a sound economic footing. We have industry sponsorship to thank for this, and Mr Tony Andrade has ensured ongoing support. The financial independence has allowed us to fund various projects for NAHR, including the alterations to the MDS. At the MSK Registry session at the BOA meeting in Birmingham, Chaired by Prof Skinner, it was quite heartening to hear about the vision for the National MSK Registry, in light of the recommendations of the Cumberlege report. Prof Tim Briggs and Scott Pryde presented NHS England’s plans to help support national registries and improve surgeon and patient compliance. Prof Briggs reiterated the initiative of making data entry into Registries mandatory. It would therefore be time for all the Trusts to start supporting surgeons to submit data to the NAHR and support collection of their outcomes.

Research Fellow

Many thanks to ORUK and BHS who have funded the recently appointed NAHR Research Fellow, Justin Green. Justin is an early-years orthopaedic registrar involved in clinical informatics and AI innovation within healthcare. He was awarded the NAHR Fellowship in 2022 to explore the use of AI in determining long-term outcomes following orthopaedic surgery. Justin acts as the Clinical Data Science and Technology Lead on the OpenPredictor project from Northumbria Healthcare Trust. His role includes ensuring the development of robust and responsible clinical decision support systems using AI and machine learning. His experience and research will help us in the next echelon of data computations and predictive modelling in hip preservation surgery. Congratulations also to Lucca Nero and Khurram Baig, medical students at Newcastle University for achieving their MRes with distinction using NAHR data. Their focus was sexual health in patients undergoing hip preservation surgery. NAHR is an excellent resource to deliver projects, and I would encourage contributors with resourceful ideas to encourage trainees to avail of this opportunity to publish. The data request form is available on the website (<https://www.nahr.co.uk/documents/>).

Regional Representatives

The NAHR team is gradually expanding, and my cordial welcome to our latest regional representatives – Peter Wall (Birmingham), Geraint Thomas (Oswestry), Simon Newman (Oxford), Owen Diamond (Belfast) and Ashwin Kulkarni (Leicester). All our regional representatives are high-volume, committed hip preservation surgeons and will, hopefully, help establish regional networks and assist clinicians around them to evolve their approach, discuss complex cases by organising regional MDTs and mentor junior colleagues. We are living in exciting times with opportunities to collaborate in numerous forms, including research, and this position constructs associations between the local groups and the NAHR board.

My heartfelt thanks to all members of the NAHR board and the British Hip Society, for their support over the last three years. The success of NAHR is in its entirety credited to the surgeons and patients contributing to the Registry. It has been an honour and privilege to serve and lead this group.

User Group



Ajay Malviya (Chair)

Mr Ajay Malviya is a Consultant Orthopaedic Surgeon at Northumbria Healthcare NHS Foundation Trust. He trained in the Northern Deanery and has done specialist fellowships in hip preservation and joint replacement surgery in Cambridge, London and Switzerland. He specialises in hip arthroscopy for femoroacetabular impingement, trochanteric pain syndrome and periacetabular osteotomy for hip dysplasia using a minimally invasive approach. He deals with sports injuries of the hip and has published and presented widely on the results of hip arthroscopy in athletes and general population. He has completed a PhD on the role of hip arthroscopy in femoroacetabular impingement.

He was awarded the prestigious ABC (America-Britain-Canada) fellowship in 2016 by the British Orthopaedic Association that involved visits to various high-profile centres in USA and Canada learning about new systems and techniques. He is a very active researcher with more than 75 peer-reviewed publications in esteemed journals. He is in the British Orthopaedic Association Education and Careers committee and the national lead of the UK and Ireland orthopaedic in-training examination, which is an annual assessment of orthopaedic surgeons in training. He is an examiner for the Royal College of Surgeons (FRCS T&O).



Vikas Khanduja (Past Chair & Trustee)

Mr. Vikas Khanduja is a Consultant Orthopaedic Surgeon & Research Lead (Elective) at Addenbrooke's - Cambridge University Hospital, specialising in hip and knee surgery and has a particular interest in arthroscopic surgery of the hip. He has been instrumental in setting up & developing the tertiary referral service for Young Adult Hip Surgery & the Young Adult Hip Research Group in Cambridge .

Complementing his clinical practice, his research interests centre around disease stratification of FAI using novel imaging techniques, better pre-operative planning tools using dynamic analysis and optimisation of arthroscopic management of FAI via precision surgery to improve outcomes. He has authored over 175 peer reviewed articles and three books.

Vikas is the recipient of the American and British Hip Society Travelling Fellowship in 2011, the Arnott Medal presented by the Royal College of Surgeons of England in 2013, the Insall Fellowship presented by the American Knee Society and Insall Foundation in 2014 and the Hunterian Professorship by the RCS England in 2021.

Vikas sits on the Executive Committee of the British Hip Society as the President, ESSKA as the Chair of the European Hip Preservation Associates, SICOT as President Elect and the NIHR MSK NSG as the Orthopaedic Lead for the Eastern Region.

Tony Andrade



Mr Tony Andrade is a consultant Orthopaedic, Hip and Knee surgeon with a special interest in Young Adult Hip problems. He was appointed to the Royal Berkshire Hospital in 2002, where he established a hip arthroscopy and hip preservation service that quickly evolved into a tertiary referral centre. Since then he has been at the forefront of the evolving surgical techniques in arthroscopic and other types of hip preservation surgery, and this led to a visiting surgeon program where surgeons from the UK and across the world are able to join him to learn these surgical techniques. He established a Lower Limb Arthroplasty Fellowship in 2004, and a Hip Arthroscopy Fellowship in 2016. He sits on the UK Non-Arthroplasty Hip Registry (NAHR) user group for the British Hip Society and has been an active member of the International Society of Hip Arthroscopy (ISHA) since it was founded in 2008. He joined the board as the ISHA membership secretary in October 2012 and was the host chairman for the ISHA Annual Scientific Meeting in Cambridge in September 2015. He is the President of ISHA – The International Hip Preservation Society since October 2020.



Marcus Bankes (Past Chair & Trustee)

Mr Marcus Bankes is the senior surgeon on the Hip Unit at Guy's and St Thomas' Foundation NHS Trust and was appointed Consultant Orthopaedic Surgeon in 2002. His practice consists almost exclusively of the surgical treatment of young adult hip disorders, including arthroscopic and open hip preservation techniques and arthroplasty, particularly with ceramic-on-ceramic bearings. Recognised as an opinion leader in hip surgery, Marcus is a regular speaker at national meetings and ISHA (The Hip Preservation Society) as well as being a reviewer for a number of orthopaedic journals. He pioneered the use of the British Non-Arthroplasty Hip Registry (NAHR) and was the first Chair of its User Group. He remains on the User Group of the NAHR and has recently led on the Minimum Data Set 2.0 project. His interests outside work include film, TV, pop music, Apple electronic goods, and most sport, particularly cycling.

Tim Board



Professor Tim Board specialises in complex primary and revision hip surgery and hip arthroscopy at Wrightington Hospital, Lancashire. He trained in Manchester, gaining an MD for research into bone grafting and an MSc in Orthopaedic Engineering. Tim then undertook Fellowship training in Sydney, Hannover and Wrightington. Wrightington now performs over 1000 hip and 1000 knee replacements every year and is the tertiary orthopaedic unit in the North West.

Tim is the GM CLRN lead for orthopaedics and chairs the British Hip Society Research Committee. He also sits on the executive committee of the British Hip Society and the North West Surgical Trials Centre. He is a full time NHS consultant but has a strong academic interest in both basic science and clinical research having presented over 200 papers at National and International scientific meetings and published over 100 papers in scientific journals and written numerous book chapters. He is an Honorary Professor and has numerous research collaborations with the Universities of Manchester, Leeds and Salford.



Jon Conroy

Mr Conroy has been a Consultant at Harrogate District Foundation Trust since 2006. This has included 4 years as Clinical Director for Surgical Services. He was fellowship trained in Computer Navigation Surgery at the Prince Charles Hospital in Brisbane 2005-2006. Completing his MSc in Mechanical Engineering in 2006 he has since been involved in implant design for both Hip and Knee replacements.

The Royal College of Surgeons of England approved Harrogate Hip Fellowship has been led by Mr Conroy for almost 10 years. Specialty interests includes Robotic Hip and Knee Surgery performed at Leeds Nuffield Hospital since 2017 and a Regional Hip Arthroscopy service that has led to his position on the Non-Arthroplasty Hip Registry board.



Callum McBryde

Mr. Callum McBryde is a consultant hip surgeon at the Royal Orthopaedic Hospital in Birmingham appointed in 2011. He is proficient in all aspects of hip surgery both hip preservation surgery such as hip arthroscopy and pelvic osteotomy but also complex primary total hip replacement and hip resurfacing. He is considered an expert in the treatment of conditions such as developmental dysplasia, avascular necrosis, femoro-acetabular impingement and slipped upper femoral epiphysis. He completed his undergraduate training at The University of Manchester, completed his surgical and orthopaedic training in Birmingham whilst also completing a Doctor of Medicine higher degree at The University of Birmingham. He then completed a number of international specialist hip fellowships in Australia and Switzerland. He has won a number of prizes and accolades for his research and work including the McKee prize, the European Fellowship and the McMinn scholarship from the British Hip Society.

He has been instrumental in the development of the multidisciplinary young adult hip unit in Birmingham which is a recognised centre of excellence and national referral centre. He is recognised as an opinion leader with a large number of peer reviewed publications and is regularly invited both nationally and internationally to share his knowledge and experience to other surgeons.



Paul Gaston

After graduating from University of Edinburgh Medical School in 1993, Paul undertook surgical training in Edinburgh, followed by Orthopaedic training in Oxford and Edinburgh. He completed his training with Specialist Fellowships in Brisbane, Australia and Edinburgh, and was then appointed as a Consultant in the Arthroplasty Service at the Royal Infirmary of Edinburgh in 2004. His practice mainly involves primary hip and knee joint replacement and revision hip joint replacement. Since becoming a consultant he has developed an interest in Young Adult Hip Disorders, mainly Femoro-Acetabular Impingement (FAIS). He has been undertaking Hip Arthroscopy since 2008. Originally from Northern Ireland, he has lived in Edinburgh for 30 years and has three daughters. His interests include rugby and cycling to keep fit.



Richard Holleyman

Richard completed his undergraduate education in Newcastle (MBBS) and London (MSc) and has been a Trauma and Orthopaedic specialist registrar in the Northern Deanery since 2016. He has a passion for health research, in particular, epidemiology and data science and has worked extensively with large national datasets and with the NAHR since 2017.



Alistair Mayne

Alistair completed his orthopaedic training in the East of Scotland and Northern Ireland, winning the Sir Walter Mercer Gold Medal in 2021. He has an interest in surgical training and education, undertaking a Masters in Clinical Education with Queens University Belfast during higher surgical training. He is currently undertaking a post CCT Fellowship in Arthroplasty and Young Adult Hip Surgery at the Royal Orthopaedic Hospital, Birmingham under Callum McBryde, Angelos Politis and Peter Wall. Following this, he plans to travel to Perth, Australia for further fellowship training in young adult hip and knee surgery.

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Introduction

We are delighted to present the 8th Annual Report of the NAHR. After more than 10 years since the launch of the NAHR it is has proven to be an invaluable resource for clinicians across the globe who are involved in the care of patients undergoing operations other than arthroplasty to the hip, or around the hip joint. It remains the largest registry in the world of its type and has gone from strength to strength, year on year. In the last 12 months nearly 800 procedures have been entered onto the registry further adding to the information that can be gained from such “big data’ sets. The current minimum data set (MDS 3.0) was introduced in 2021 which included further information such as revision procedures which are presented for the first time in this report. The number of pathways remains at approximately half that of prior to the pandemic and the number of surgeons contributing data to the registry has continued to fall. There are many potential factors which may or may not be related to the impact of the pandemic on healthcare provision in the UK. There has been a change in the proportion of procedures performed in the private sector in comparison to the national health service and thus access to or delays in treatment may be having an impact. This report again demonstrates that these procedures when performed by surgeons who are contributing to the NAHR provide significant improvement in patient reported outcomes, improving both the patients’ symptoms and their quality of life. Surgeon compliance remains voluntary and until

the findings of the Cumberlege report are implemented and data submission is mandated then it remains a challenge to encourage all surgeons to contribute data. Patient compliance in the completion of follow-up data is always a challenge with a registry. During the last 12 months a study funded by Pfizer and led by Mark Sohatee investigated whether the NAHR would be able to support registry based RCTs. The study identified that if additional administrative support was provided then improved follow-up was seen to the extent that RCTs would be feasible. This adds to the message that the NAHR pre- and post-operative data collection should be mandated as resources, including personnel, are required to provide the most valuable information. This report is the first to report on the outcome of revision hip arthroscopic procedures. It is interesting to see that revisions do offer patients improvements in PROMS but as to be perhaps expected not to the extent that primary surgery offers patients. It will be interesting to see over the coming years as to the role of revision hip arthroscopy in the management of these patients.

Aim of the NAHR

The NAHR is open to data submission by members and non-members of the BHS. The aim is to benefit both patients and surgeons by collecting longitudinal data on patients undergoing an elective surgical procedure for hip pathology excluding patients who are having an arthroplasty or who have had an arthroplasty operation. Relevant operations include: arthroscopic and open surgery for FAI; PAO; reverse PAO for retroversion, 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. Collection of outcome data and reflection on the results is also considered an important component of the appraisal and revalidation cycle.

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

- *improving patient awareness of the outcomes of operations on the hip, because results are 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*

- *comparison of patient reported outcomes for an individual surgeon with the national average and this document forms a part of the appraisal process*
- *potentially linking to Hospital Episode Statistics (HES) and NJR data to enable follow-up into arthroplasty, and accurately follow the lifespan of a patient's hip joint*

History of the NAHR

The creation of a NAHR was initiated by Professor John Timperley, Consultant Orthopaedic Surgeon at the Princess Elizabeth Orthopaedic Centre in Exeter and former President of the BHS. He identified the rise in hip preservation surgery but noted, in contrast to joint replacement surgery, a lack of outcomes data outside of small scale published series. Given his interest and expertise in joint replacement registries from around the world, setting up a registry for non-hip replacement hip surgery seemed a logical thing to do. The motion to set up such a registry was unanimously supported by the Membership of the BHS at the Annual General Meeting in Torquay in March 2011 and the membership agreed that the BHS should fund the registry. The Registry went live in March at the 2012 BHS Annual Meeting in Manchester and was formally launched at the BOA Annual Congress in September 2012. NICE (National Institute for Clinical Excellence as it was then known) Interventional Procedure Guidance on Arthroscopic (IPG408) and Open (IPG403) Femoroacetabular Surgery for Hip Impingement Syndrome, published in September and July 2011 respectively, noted that clinicians should submit details to this national registry.

The User Group, initially chaired by Professor John Timperley and then Mr Marcus Bankes, developed during 2012 and 2013 and consisted of Mr Tony Andrade, Professor Tim Board, Professor Max Fehily, Mr Paul Gaston, and Mr Matt Wilson, with assistance from Mr Johan Witt and Professor Damian Griffin. A major streamlining exercise was undertaken in 2013 to improve surgeon compliance following meetings of interested parties at the BHS in Bristol in March and of the original NAHR User group at the BOA Congress in October. Whilst many arthroscopic and hip

preservation surgeons were enthusiastic about the development of the NAHR in principle, many already had their own databases and were unsurprisingly unwilling to duplicate data entry. It was therefore decided that use of the data collection infrastructure which already existed for the NJR in every hospital in England and Wales was essential for success to minimise surgeon involvement in data collection and capture cases.

In addition, a Minimum Data Set (MDS Version 1.0) was defined which included a pre-operative specific and general health measures, namely the iHOT-12 (International hip outcome tool - 12 question version) and the EQ-5D-5L (five-dimensional measure of health-related quality of life, five level questionnaire developed by the EuroQol Group) respectively. Standardised paper data collection forms were redesigned to have a similar appearance to NJR forms to help with this process. Whilst it may seem outdated to develop a paper-based system, availability of convenient hardware, particularly in clinic and theatre environments, varies immensely between hospitals. Post-operative outcome data is electronic however, and patients are currently invited to complete outcome questionnaires at six, twelve and twenty-four months after their operation with an email, linking them directly to the online forms.

Growth of the Registry continued and the MDS Version 1.1 was launched in February 2015 to include data fields for the extent of pre-existing articular cartilage damage on both sides of the joint. Whilst there was little change in the way data was collected, there was increasing interest in non-joint replacement registries from other specialties from the BOA, led at that time by the then President Colin Howie. This led to the formation of an umbrella organisation for these registries called TORUS in 2016 of which the NAHR was an original member. The formation of TORUS provided a shared operating framework that allowed

consistency of practice and a central support function (to deal with issues such as data governance, contracting and managing registry suppliers, and resolving day-to-day issues) to reduce the burden on individual registries and introducing efficiencies. The importance of the NAHR being part of TORUS has been particularly highlighted recently in view of the introduction of GDPR. Full release of MDS Version 2.0 along with the updated GDPR complaint consent form was therefore launched and has been in use. Elements of the enhanced dataset included: labral grafting and details of the graft length and material; number and type of labral anchors used, details of extra-articular procedures and there has been a further refinement of pelvic osteotomy types recorded.

The form has undergone further developments and the MDS Version 3.0 is now available for use and will collect more information on capsular management, thromboprophylaxis, heterotopic ossification medication and adhesion prevention. It will also be recording data on articular cartilage repair techniques and intra-articular adjuncts reflecting the ever-developing field of hip preservation. 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 3.0, which can be downloaded [here](#), are designed to reflect the familiar format of the NJR forms. They contain a basic mandatory dataset as well as an enhanced dataset for surgeons to record additional surgical findings.

The importance of the NAHR to the BHS was demonstrated further in 2016 by a vote at the annual meeting in Norwich to add another elected post to the Executive of the BHS with direct responsibility for the Registry and to chair the NAHR Steering Committee. Mr Vikas Khanduja from Cambridge was elected to the role at the BHS meeting in London in March 2017. Paul Gaston and Max Fehily stepped down from their roles

in 2015 and 2016 respectively, with their roles taken over by Mr Ajay Malviya, Mr Jon Conroy, and Mr Callum McBryde.

The board and the leadership have altered over time and currently consists of seven surgeons from across the country who dedicate a significant proportion of their time to the Registry. They lead by example, not just by contributing patients but also by ensuring updates, improving the quality of data analyses, working on the surgeon and patient compliance, maintaining finances, website development and annual reports.

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 8th Annual Report, provides a summary of the data available and can be used to guide further development of the registry.

Overview of the data

Pathways per year

A pathway on the NAHR is created when a patient's details are entered for a non-arthroplasty procedure. The patient should have already completed their relevant pre-operative scores. The demographic data and in particular unique identifiers such as the NHS number allow for different treatments, potentially in different centres and by different surgeons, that follow the 'journey' of that hip through one or multiple hip preservation operations. 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.

Up until the 2022 annual report, we included pathways with missing operative data (these pathways have always been included within the denominator when reporting numbers). Pathways with missing operative data were particularly prevalent during 2020 and therefore the NAHR user group decided to exclude all pathways with missing operative data from the analysis, beginning from 2021 and including 2022. This was also applied retrospectively to the registry, hence the apparent change in pathways for previous years compared to earlier annual reports (Figure 1).

Between January 2012 and December 2022, a total of 11,978 pathways have been entered in the registry where operative data was also recorded. There remains approximately half the number of pathways in 2022 (n= 786) in comparison to pre-pandemic levels and the reasons for the continued reduced volume of pathways is not clear.

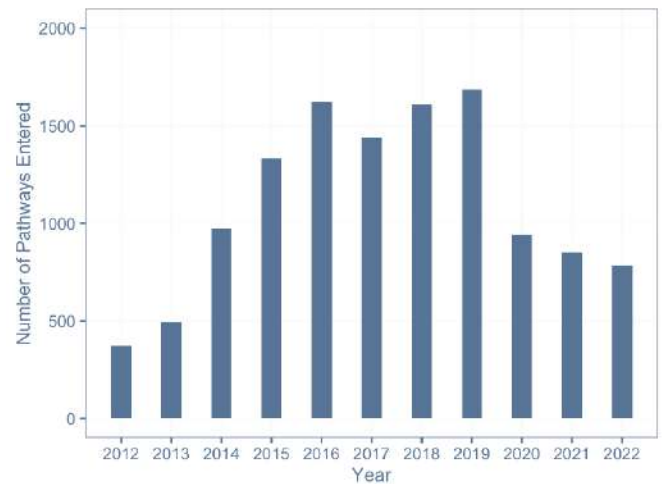


Figure 1 Pathways uploaded per year

Figure 2 shows the number of pathways by surgical approach; open or arthroscopic. Arthroscopy continues to account for more than two thirds of recorded pathways. Due to patients with missing operative data now being excluded, the number of surgical approach pathways with this information not recorded has significantly reduced.

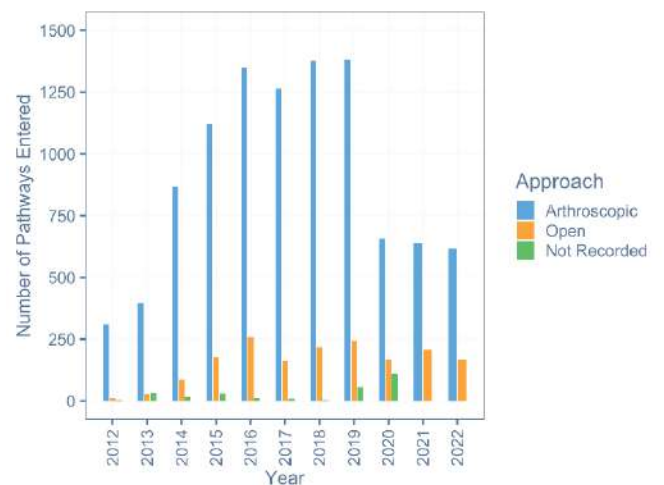


Figure 2 Pathways per year by surgical approach

Number of surgeons using NAHR

After an initial increase in the number of surgeons entering data onto the NAHR to 2018, there has been a drop over the last 4 years. Figure 3 shows the number of unique surgeons entering pathways per year since 2012. This has decreased from a peak of 65 in 2018 to 39 in 2022. The majority of surgeries in the registry have been

performed by a small number of high-volume surgeons. Explanations for the reduction in surgeons contributing data include that surgeons with a low number of non-arthroplasty hip procedures have either stopped their practice or now no longer contribute to the NAHR. It is vital that hip preservation surgeons are encouraged to contribute data to the registry, especially in light of the Cumberlege report. Whereas the NJR has a good mechanism for understanding the denominator of surgeons performing joint arthroplasty, there is no similar surrogate in hip preservation surgery and therefore accurately calculating what percentage of surgeons are uploading data is difficult.

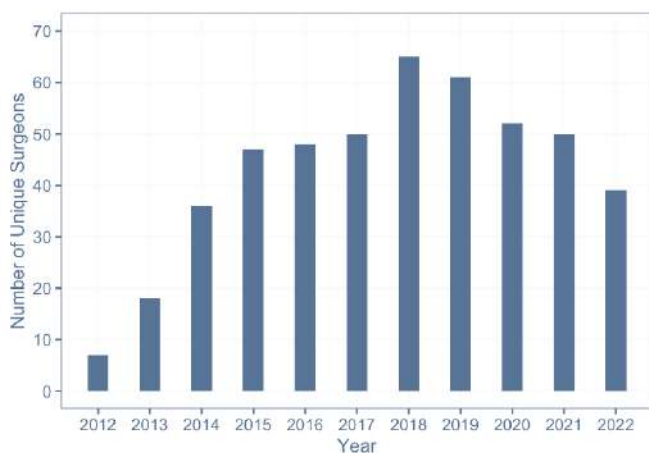


Figure 3 Surgeons contributing data to the NAHR

Surgeon procedures

Forty-one surgeons have submitted more than 50 cases, 27 more than 100, 16 have more than 200 and six more than 500 (Figure 4). One particularly high-volume surgeon and dedicated user of the registry has personally uploaded over 16.6% of all pathways on the registry. The contrast in surgeon engagement with the registry 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.

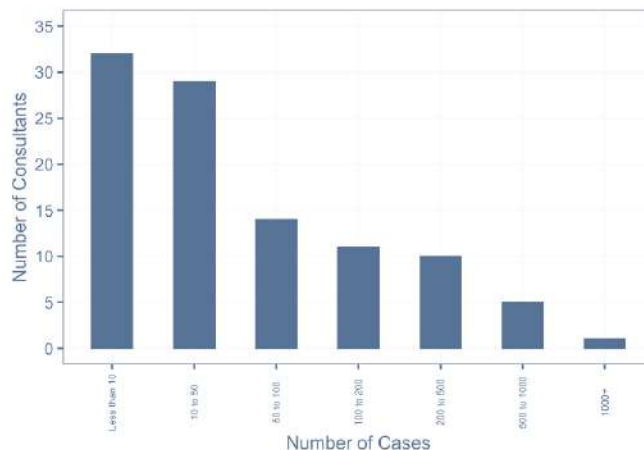


Figure 4 Number of cases per surgeon

Funding source for surgery

Figure 5. demonstrates that approximately one-third of cases in 2022 were performed in the independent sector. It is thought that data from the independent sector was not completely recorded by the Registry or that data upload was not as accurate in the early years of the registry. However, independent sector surgical volume has now remained relatively static over the last few years and therefore the decrease in the overall number of patient pathways post-pandemic is mainly due to reduced NHS surgical volumes, most likely resulting from a disproportionate effect on the NHS provision of elective orthopaedic care following the pandemic. It will be interesting to see if there is a recovery in these numbers over the coming years.

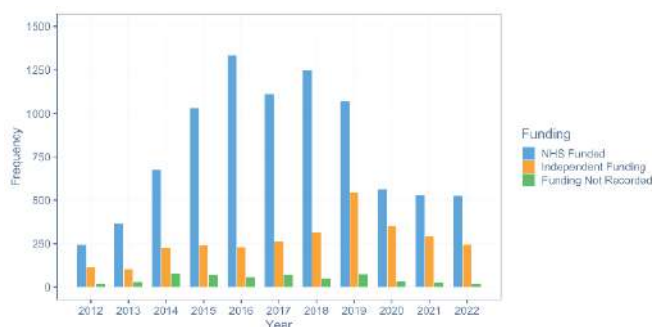


Figure 5 Funding source for procedure

Demographics

Patients by age and approach

As demonstrated in Figure 6, the vast majority of arthroscopic procedures are performed on patients under the age of 55 and for open procedures under 50 years of age. Very few procedures are recorded on the NAHR in patients under the age of 16. This may be due to those surgeons contributing to the NAHR being surgeons without a paediatric practice as well as paediatric orthopaedic surgeons performing hip preservation surgery being unaware or unsupported in data submission to the NAHR.

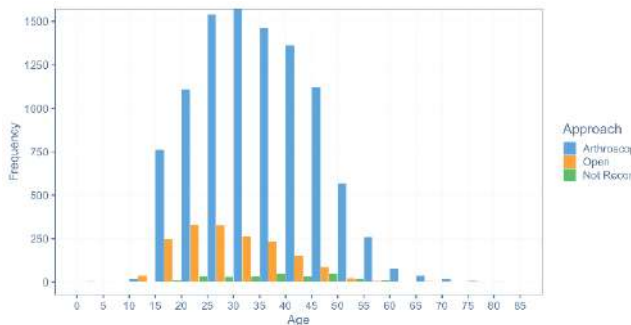


Figure 6 Patients' age distribution by approach

Gender distribution by surgical approach

Overall, females account for the majority of patients with data entered on the NAHR (63.7%). Of those patients undergoing hip arthroscopy, 60% were female compared to 86% of patients undergoing open procedures, suggestive of the increased diagnosis of hip dysplasia in females, more commonly treated with open surgery than arthroscopic management (Figure 7.)

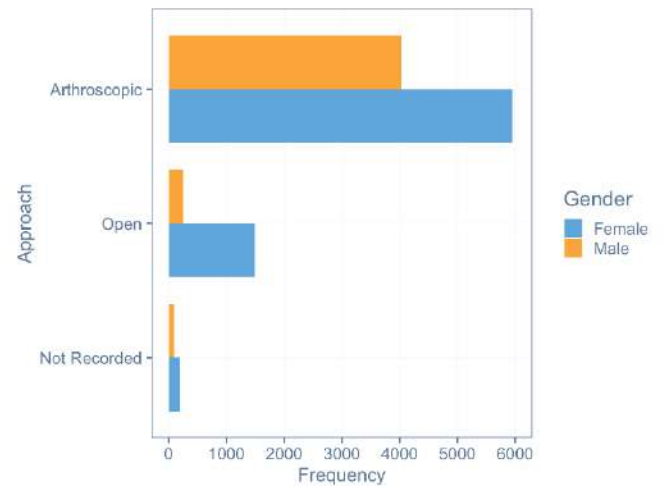


Figure 7 Gender distribution 2012-2022

Body mass index (BMI) by operation and gender

Body Mass Index (BMI) was recorded in 57.6% (N=6,476) of cases but completion of BMI data continues to improve, with 68.8% of cases in 2022 having their BMI recorded. Obvious outliers (BMI > 70 and <10) were removed as it is anticipated these were errors in data entry, See Figure 8.

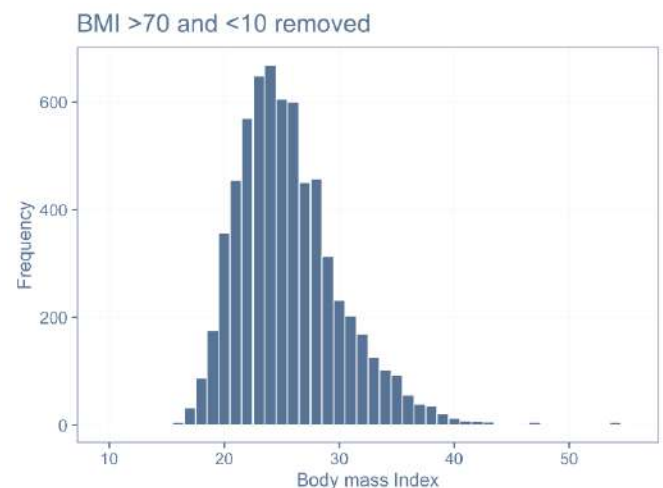


Figure 8 BMI distribution

Compliance

Follow-up and data linkage

A high proportion of patients (96.5%) record their email address, continuing the trend from 2015 onwards. 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, collection of follow-up scores continues to be challenging.

To help aid follow-up, in addition to an email address, a mobile phone number is requested to allow follow-up of patient via phone should emails remain unanswered. The proportion of patients who provide their mobile phone number continues to improve (Figure 9) and this is to be welcomed, given the additional opportunity this affords in improving follow-up compliance.

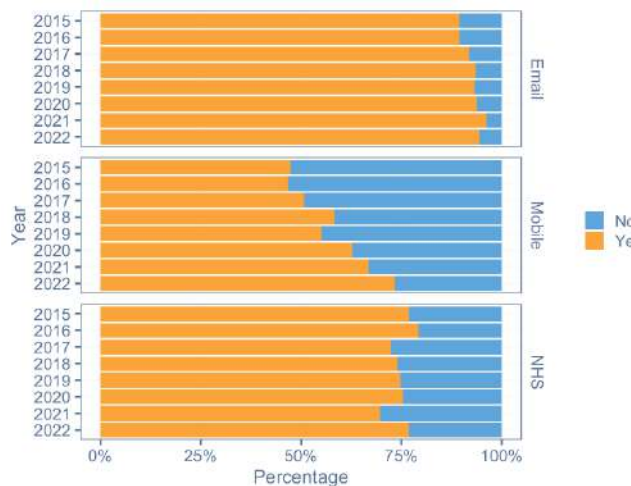


Figure 9 Patient contact details and NHS unique identifier

The recording of an NHS number has remained fairly static over the duration of registry. 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 and we encourage clinicians to submit this data where possible.

Consent rates

A record that the patient has given consent to have their data recorded by the NAHR is a mandatory field when creating a patient pathway. In 2022 all patients gave consent with one patient subsequently withdrawing consent (Figure 10)

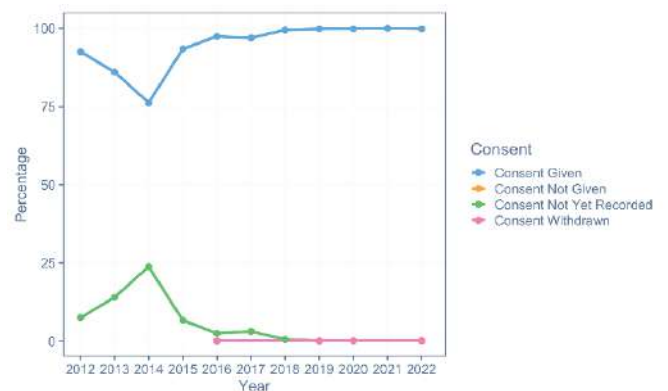


Figure 10 Consent for data collection

Collection of mandatory scores and statistics

Overview of scores

The NAHR offers clinicians the opportunity to use various hip scores for patient assessment pre- and post-operatively. Following a review of available evidence, the NAHR User Group defined that only two hip scores would be mandatory for collection in the minimum dataset, with others being made 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. Some patients will also receive a text message reminder or telephone phone call to improve follow-up, but this is not universal. Surgeons can select to use other, additional PROM scores if desired.

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).

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).

This is a short form equivalent of the iHOT-33 which was developed by the Multicentre 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 with a minimum clinically important difference of 6.1 points. 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 11-12.

Statistical note

Statistical analysis was performed by Richard Holleyman using STATA version 15 (StataCorp. 2017. *Stata Statistical Software: Release 15*. College Station, TX: StataCorp LLC). The statistical approach was agreed previously in consultation with Keith Gray, PhD (Statistician, R&D Department, Northumbria Healthcare NHS Foundation Trust). A p-value of 0.05 was deemed statistically significant. It is acknowledged that p-value adjustment would be appropriate when making multiple comparison within each analysis/pathology cohort and future reports will aim to incorporate this.

Rates of score collection

EQ-5D index

Error! Reference source not found. shows the rate of collection of the EQ-5D index scores at the various time intervals. In 2020 46.1% (n=414) patients completed a 6-month EQ-5D and in 2021 this increased to 55.8% (n=258). Unfortunately, this follow-up rate has fallen below 50% again, with 48% of patients completing 6 month follow-up in 2022. Increasing patient compliance with follow-up PROMs remains a challenge for the registry. The use of e-mail and the updating of the NAHR are measures that are being employed to improve this. Further work by the user group, in collaboration with Amplitude, is ongoing and includes looking at a variety of other measures to increase completion and this a major focus for the NAHR over the next year.

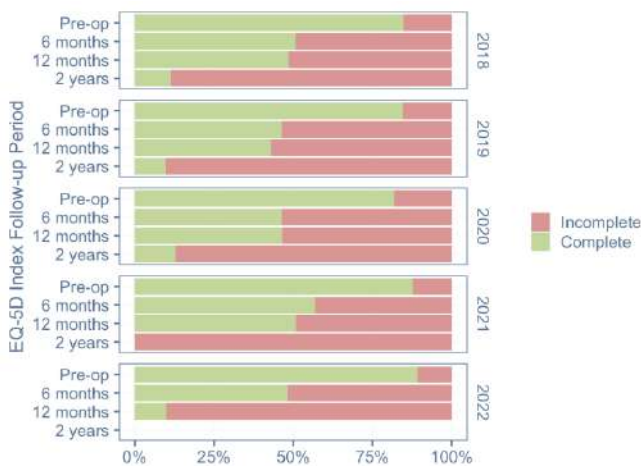


Figure 11 EQ-5D index score completion

iHOT-12

The iHOT-12 score was presented to the International Society for Hip Arthroscopy (ISHA) in 2011. Since 2014, this score has been collected as part of the same

scoring sheet as the EQ-5D. In 2022, 47% of patients submitted 6 month iHOT-12 follow-up scores, with follow-up remaining similar to the last few years (Figure 12).

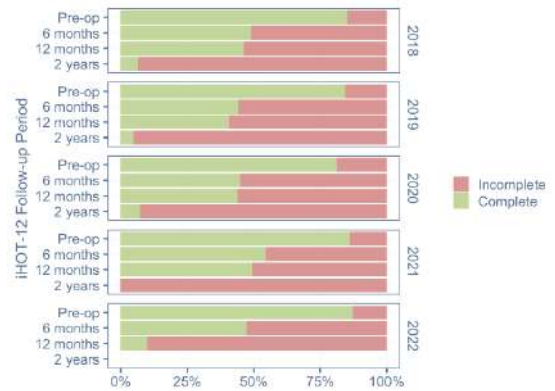


Figure 12 iHOT-12 Score completion

Surgical procedures

Overview

Figure 13 and Figure 14 show the different types of acetabular and femoral surgical procedures recorded in the NAHR. (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 performed in a single case).

Acetabular procedures

Labral repair is the most commonly performed acetabular procedure in the registry. (Note that multiple acetabular procedures may be performed in a single patient). There has been a move from acetabular labral debridement towards acetabular labral repair over the duration of the registry. Labral repair accounted for 74.7% of acetabular labral procedures in 2022 (Figure 14). The increasing use of labral repair rather than labral debridement is likely to be multifactorial but includes the increasing evidence within the literature that labral repair appears to offer better outcomes than labral debridement. Labral reconstruction remains a relatively rarely performed procedure in the UK, with only 14 cases entered in the registry.

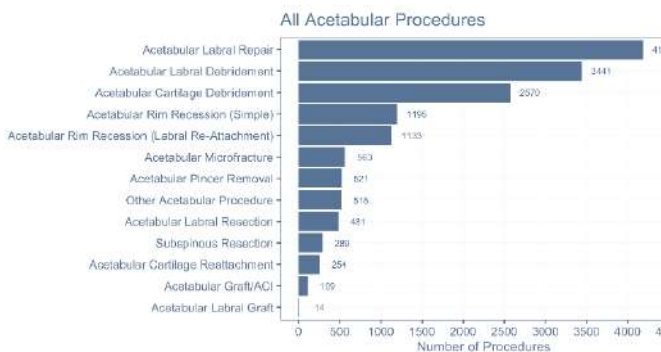


Figure 13 Acetabular procedures performed

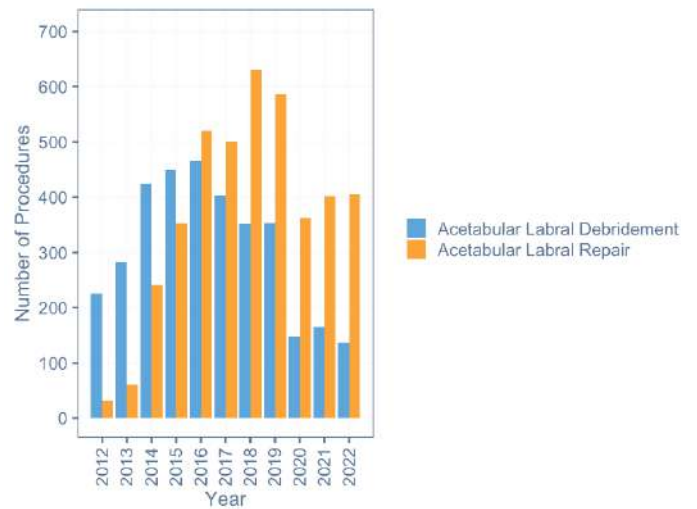


Figure 14 Arthroscopic labral debridement and labral repair per year

Femoral procedures

Figure 15 shows the range of femoral procedures recorded on the NAHR. Cam removal is the commonest femoral procedure, accounting for 90% of all femoral procedures performed. In contrast to the acetabular side, a much smaller number of femoral cartilage procedures were recorded, including debridement, microfracture, cartilage grafting and core decompression.

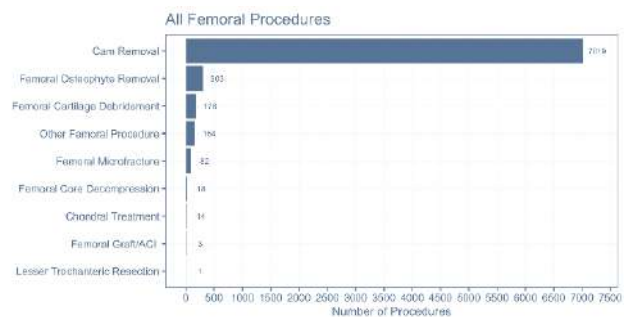


Figure 15 Femoral head/neck procedures performed

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.

Multiple procedures can be recorded in a single pathway and many of these additional procedures are performed in combination with other acetabular/femoral procedures. The majority were performed as part of an arthroscopic approach. *Error! Reference source not found.* shows the frequency of additional procedures recorded in the NAHR. Psoas release is still the most common additional procedure performed. The board acknowledge that there are increasing numbers of arthroscopic psoas release in patients who have had prior joint replacement within this group. Trochanteric bursal debridement has been recorded 107 times, compared to just 28 in the 2016 report. Together these two procedures account for two-thirds of all additional procedures performed. Gluteal tendon repair was performed infrequently, with only 22 cases entered.

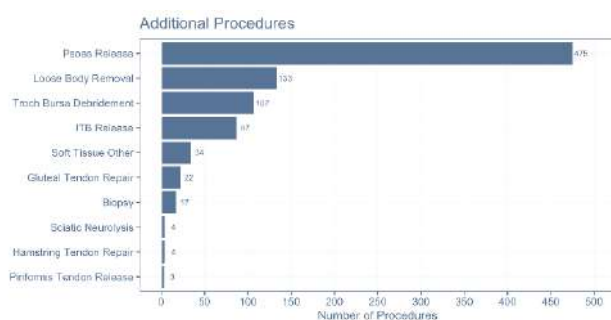


Figure 14 Additional surgical procedures

Revision Hip Arthroscopy

There have been 250 revision hip arthroscopy pathways created in the registry. It is likely that a small additional number of patients will also have undergone revision procedures but who have not been recorded correctly or who underwent revision surgery prior to this coding being available on the NAHR patient pathway form. The majority of revision procedures are performed by the primary case surgeon (56%).

Periacetabular osteotomies (PAO)

There were 177 periacetabular osteotomies recorded in 2022. Overall, a total of 1437 periacetabular osteotomies have been recorded, of which 1383 were isolated and 54 combined with femoral osteotomy.

Femoral osteotomies

A total of 142 femoral osteotomies have been recorded in the NAHR, 86 of which were isolated and 56 combined with a PAO (Figure 15)

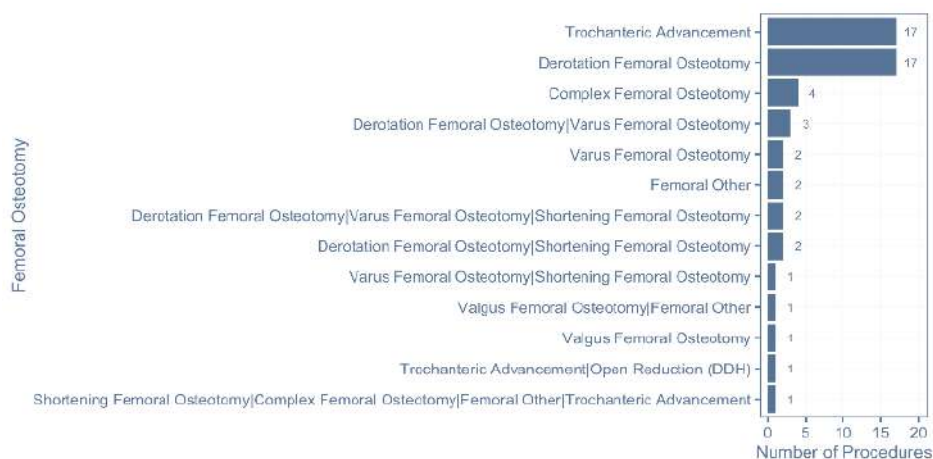


Figure 17 Combination of femoral osteotomy with PAO

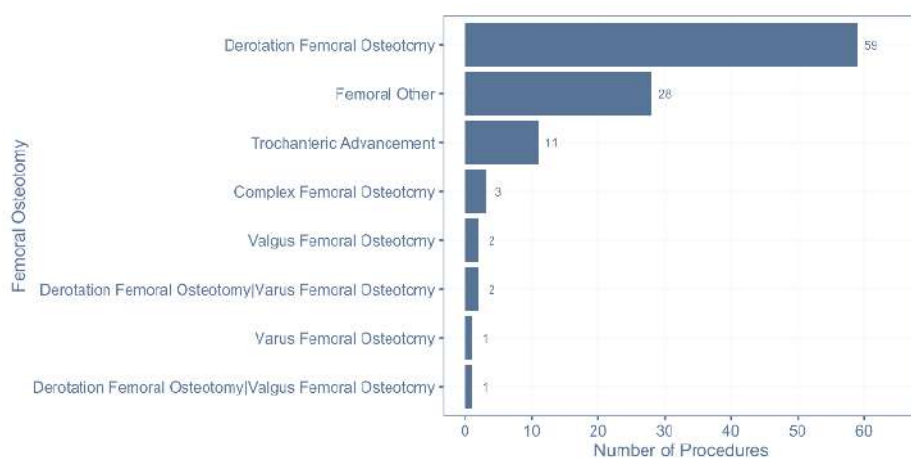


Figure 15 Femoral osteotomies performed by type

Outcome scores

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.

Outcomes of surgery for FAI

Overall

We have reported the outcomes of FAI surgery where cam and/ or acetabular rim recession or acetabular pincer removal has been performed. Cases for which concurrent microfracture or other cartilage procedure were excluded as in previous reports. Scores for these cases are shown in Figure 16 and Figure . For the whole group with pre-op scores (4,253) there was improvement in the pre-operative iHOT-12 score at six months (mean iHOT-12 change 33.25 (n=4,253) to 58.34 (n=2,309), $p < 0.0001$ (Paired t-test) $n = 1,974$ [n.b. lower 'n' as t-test derived from patients with both pre and post-op scores]) and 12 months (mean iHOT-12 change 33.25 (n=4,253) to 58.44 (n=2,057), $p < 0.0001$ (Paired t-test) $n = 1,771$) post-operatively.

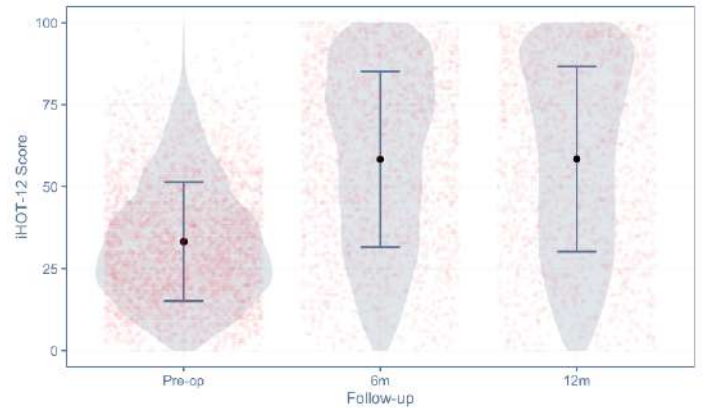


Figure 16 iHOT-12 - whole cohort for FAI

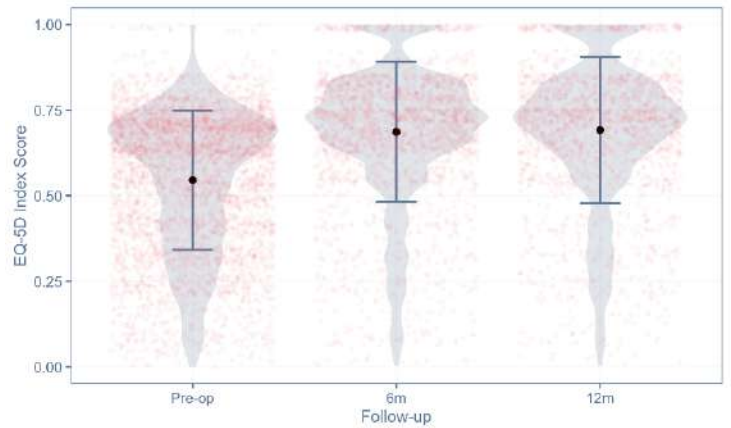


Figure 20 EQ-5D index score - whole cohort for FAI

Figure 17 shows the iHOT-12 score with gender distribution. As identified in previous reports, females may start with a lower preoperative baseline score but catch up by one year post-operatively.

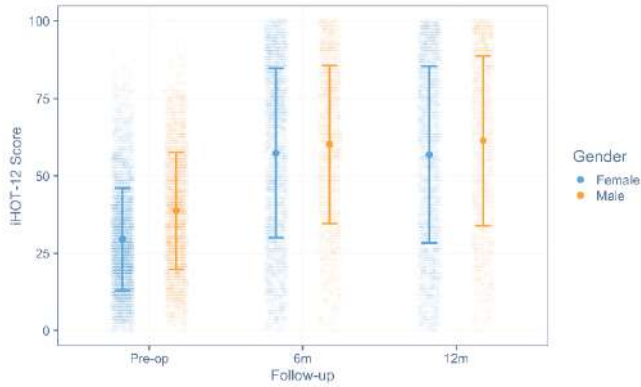


Figure 17 iHOT-12 by gender for FAI

Results of surgery for cam lesions

In this group, patients who had surgery for pincer lesions or any case with cartilage debridement have been excluded. Results of the scores are shown in Figure and 23, and **Error! Reference source not found.** reported by gender in Figure 19. For isolated cam lesion surgery, there was improvement in pre-operative iHOT-12 scores at six months (mean iHOT-12 change 33.4 (n=2,505) to 58.1 (n=1,293), $p < 0.0001$ (Paired t-test) n=1,129) and 12 months (mean iHOT-12 change 33.4 (n=2,505) to 59.24 (n=1,132), $p < 0.0001$ (Paired t-test) n=990) post-operatively.

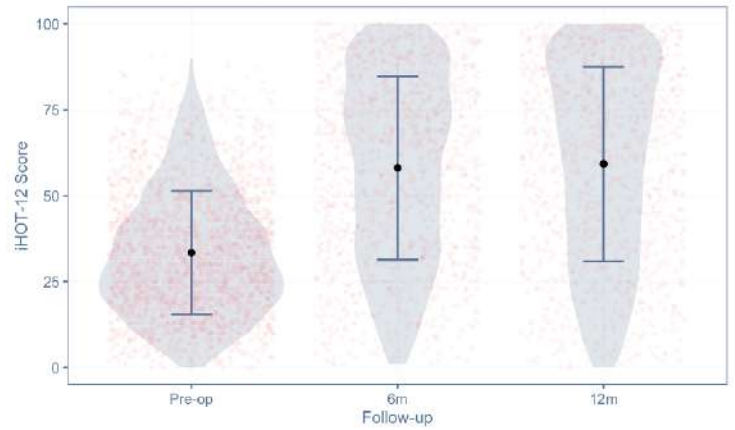


Figure 22 iHOT-12 - surgery for cam lesion

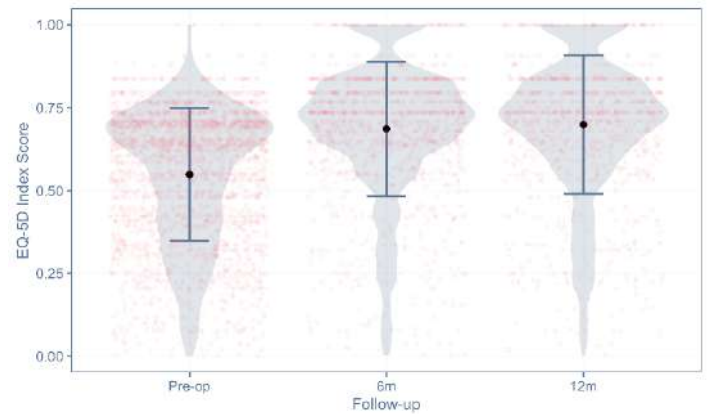


Figure 18 - EQ-5D for cam surgery

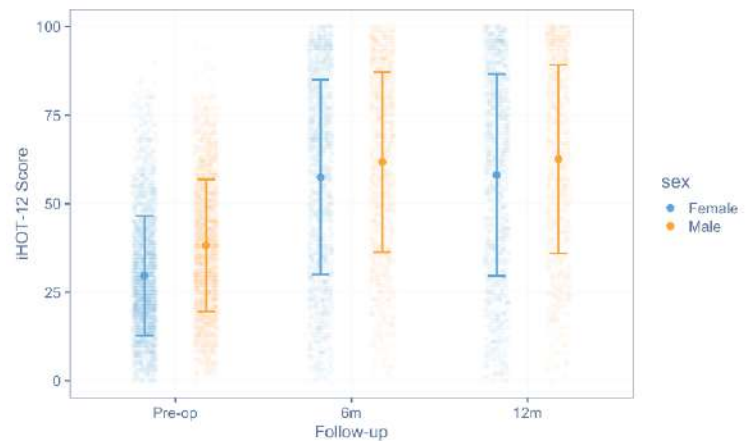


Figure 19 iHOT-12 by gender for cam

Results of surgery for pincer lesions

In this section, patients who had surgery for a cam lesion and/or a cartilage procedure on the acetabular or femoral side have been excluded. For isolated pincer lesion surgery there was improvement in pre-operative iHOT-12 scores at six months and 12 months post-operatively. These scores are shown in Figure 25 and Figure 26. For pincers there was improvement in pre-operative iHOT-12 scores at six months (mean iHOT-12 change 30.34 (n=389) to 54.50 (n=233), $p < 0.0001$ (Paired t-test) n=178) and 12 months (mean iHOT-12 change 30.34 (n=389) to 52.50 (n=216), $p < 0.0001$ (Paired t-test) n=174) post-operatively.

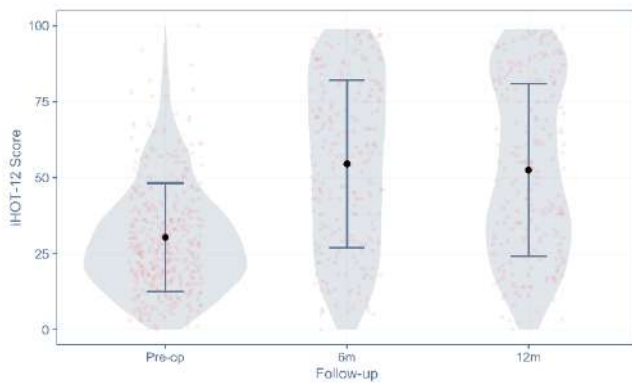


Figure 25 iHOT-12 - surgery for pincer lesion

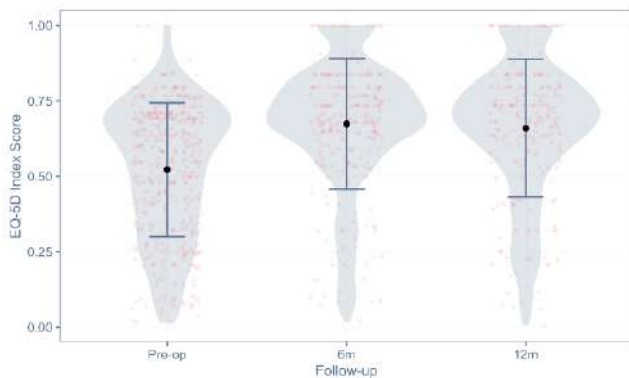


Figure 26 EQ-5D Index - surgery for pincer lesion

Outcome following isolated periacetabular osteotomy (PAO)

The following figures (Figure 20 and Figure 21) show the outcome scores for periacetabular osteotomy cases performed in isolation. There are 1,383 PAOs recorded without simultaneous femoral osteotomy. For patients undergoing PAO with no concurrent femoral osteotomy there was improvement in pre-operative iHOT-12 score at six months (mean iHOT-12 change 29.89 (n=1,253) to 55.19 (n=747), $p < 0.0001$ (Paired t-test) n=673) and 12 months (mean iHOT-12 change 29.89 (n=1,253) to 61.93 (n=673), $p < 0.0001$ (Paired t-test) n=637) post-operatively.

iHOT-12 in Pelvic osteotomy

There is improvement in the iHOT-12 score at six months and one year post-operatively.

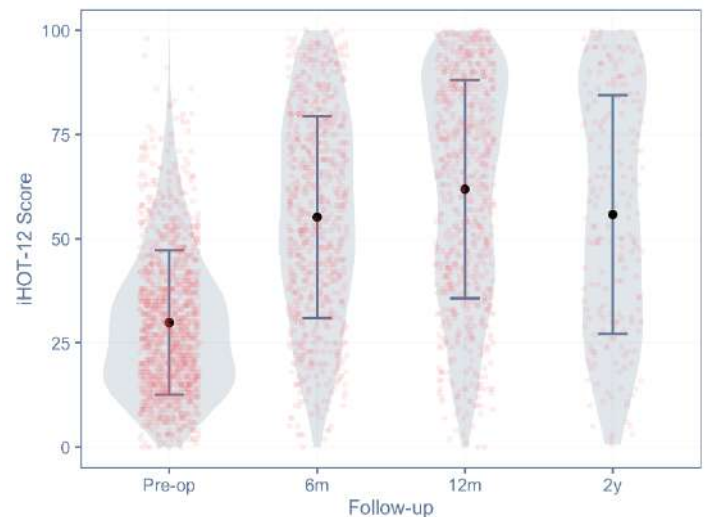


Figure 20 iHOT12 in Pelvic Osteotomy surgery

EQ-5D index in PAO

Similar trends are shown with the index score with an improvement on the pre-operative scores, which appears to continue to improve at 12 months.

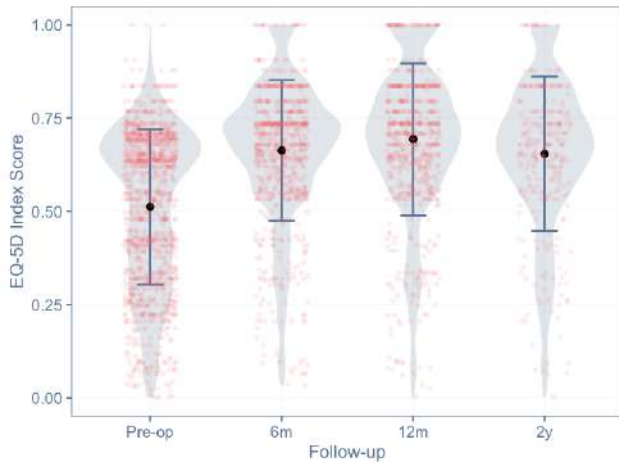


Figure 28 EQ-5D Index scores for Pelvic Osteotomy Surgery

Results of PAO vs age

Figure 29 illustrates the iHOT-12 scores of various age groups. All ages seem to benefit from surgery. 2-year data not presented due to small numbers. The graph shows scatter plot of age vs outcome score with a LOESS method smoothing curve along with 95% confidence interval. Patients of all ages appear to benefit from surgical intervention.

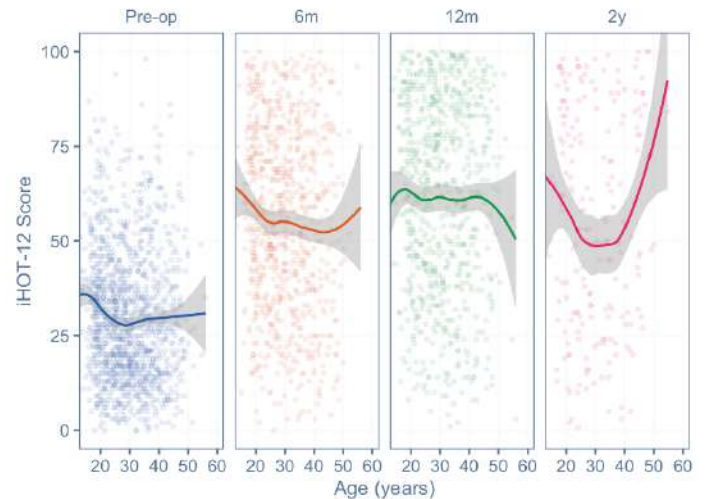


Figure 29 iHOT-12 scores with distribution for pelvic osteotomy surgery

Results of Peri-acetabular Osteotomy vs gender and BMI

Female gender is associated with a lower pre-operative iHOT-12 score but overall show a greater improvement than male patients with a PAO (Figure 30). Both genders have most improvement in the first 6 months with some further improvement to the 12-month point. As demonstrated in Figure 31, the vast majority of PAO surgery is performed in patients with a BMI of < 35. Higher BMI demonstrates worse scores pre-operatively and post-operatively although all groups demonstrate improvement in iHOT-12 scores post-operatively.

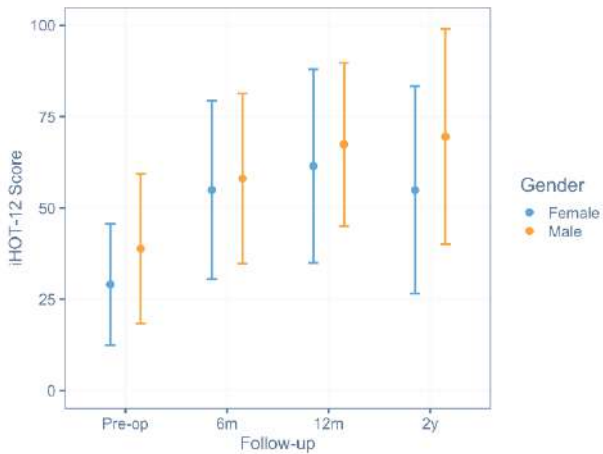


Figure 21 iHOT-12 scores with gender distribution for pelvic osteotomy

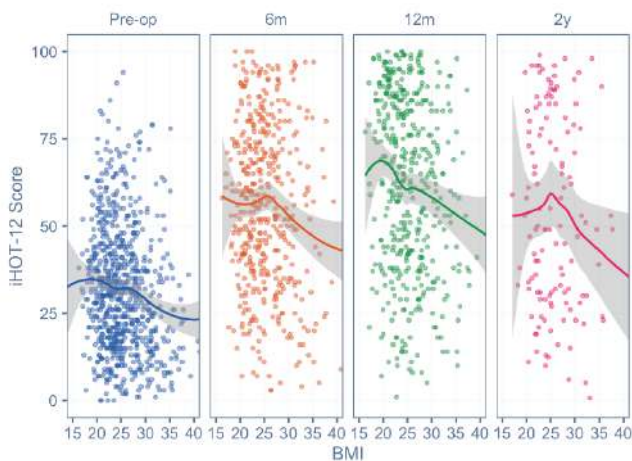


Figure 31 iHOT-12 scores with BMI for peri-acetabular osteotomy

Results of Revision Hip Arthroscopy

Due to smaller numbers, we have grouped the outcomes of all revision hip arthroscopy procedures together, excluding “planned return” cases. For the whole group with pre-op scores (n=190) there was improvement in the pre-operative iHOT-12 score at six months (mean iHOT-12 change 31.12 (n=190) to 48.41 (n=108), $p < 0.0001$ (Paired t-test) n=88 [n.b. lower ‘n’ as t-test derived from patients with both pre and post-op scores]) and 12 months (mean iHOT-12 change 31.12 (n=190) to 51.81 (n=100), $p < 0.0001$ (Paired t-test) n=84) post-operatively (Figure 32). Similar trends

are noted in the eq-5d index score, with patients continuing to improve to 12 months as demonstrated in Figure 33.

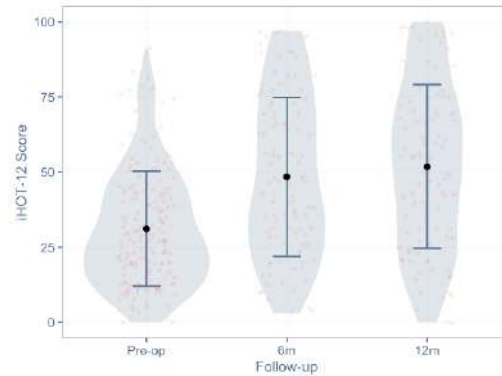


Figure 32 – iHOT-12 scores for all revision hip arthroscopy pathways

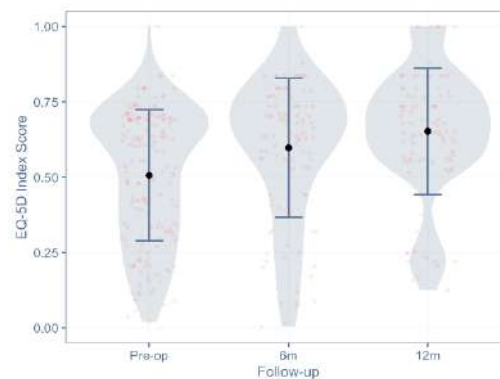


Figure 22 EQ-5D Index scores for all revision hip arthroscopy pathways

Anchor Usage

There have been 1330 pathways with anchor data usage recorded. As shown in Figure 34, the majority of cases have had two anchors inserted (43%). Figure 35 demonstrates that PEEK anchors are the most commonly used type of anchor (66%), followed by all suture anchors (32%). Knotless anchors are used in approximately two-thirds of cases (Figure 36).

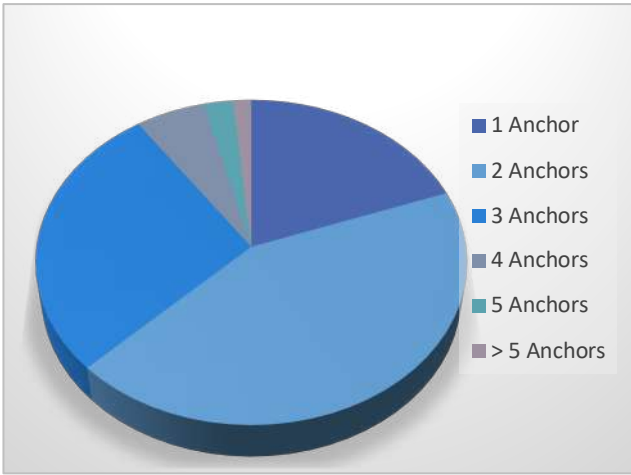


Figure 34 – Number of acetabular anchors used per case

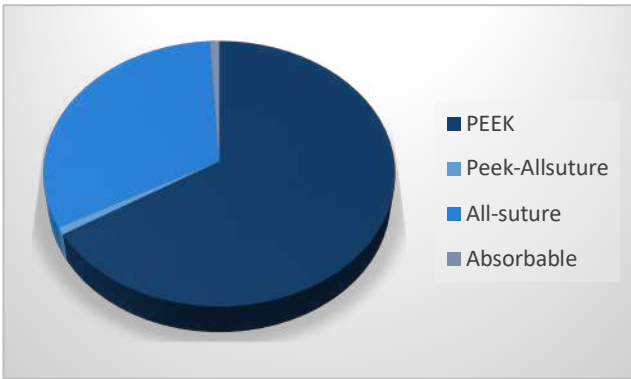


Figure 35 – Type of anchor

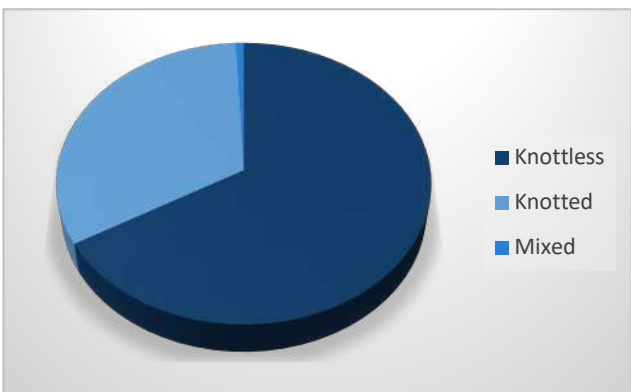


Figure 36 – Anchor type, by knotting configuration

Summary

This report demonstrates the value of a registry of non-arthroplasty surgical treatments by providing valuable information to clinicians, patients and policy makers. The number of procedures recorded on the NAHR remains approximately half those recorded annually prior to the pandemic. The number of surgeons entering data has also reduced and from a peak of 65 surgeons in 2016 to 39 surgeons in 2022. This may reflect the concentration of these procedures to high volume surgeons or centres. It is recognised that not all non-arthroplasty procedures are captured by the NAHR and surgeon compliance with submitting data remains a focus of the NAHR board. The NAHR have welcomed regional representatives to act as advocates for the registry and improve surgeon engagement and compliance.

The PROMS data presented here as in previous years demonstrates that the surgical treatment of femoroacetabular impingement syndrome and acetabular dysplasia provide significant improvements for patients.

This report is the first to report on the outcome of revision hip arthroscopy. It can be seen that patients benefit from revision hip arthroscopy but as perhaps expected do not see on average the same magnitude of benefit seen with primary surgery. As further data is

collected on this cohort it will be possible to look back at the primary surgery to identify trends that influence the likelihood of revision hip arthroscopy. Following the introduction of the MDS 3.0 the registry is now also collecting data on several other aspects of non-arthroplasty hip procedures such as the number and type of anchors used, capsular management, acetabular cartilage repair techniques, novel soft tissue procedures and interventions to prevent thrombosis, heterotopic ossification, adhesions and other adjuncts such as platelet rich plasma. The collection of this data is increasingly important following the publication of the Cumberlege report which highlighted the essential role of registries in monitoring implanted medical devices. Anchors used for labral repair are considered an implanted medical device and thus it should be mandatory that when used data should be entered onto the NAHR.

Finally, the BHS and NAHR would like to again thank members of the user group along with all the surgeons, administrative staff and patients that have contributed data to the registry, allowing the NAHR to continue to lead the way as a voluntary register of non-arthroplasty hip procedures.

Future plans

The NAHR has now established a large dataset of patients who have undergone hip preservation surgery, and this has led to a number of outcome studies using the registry data to be published. This is an area where the registry would like to expand, and on this note, we have appointed Justin Green with the help of funding from the BHS and ORUK. Justin has expertise in clinical informatics and AI innovation within healthcare and aspires to produce predictive modelling to assist decision-making in hip preservation surgery.

There are an increasing number of specialist young adult hip physiotherapists, and work on designing national physiotherapy protocols is ongoing that will provide significant benefits to clinicians and patients. The initial focus has been on a pathway for femoroacetabular impingement, and this work is nearing completion. NAHR would benefit from having physiotherapy representation and is something to be explored. With the help of regional representatives, we can potentially develop regional and national non-arthroplasty hip networks of surgeons and allied healthcare practitioners.

Finally, with the lessons learnt from the feasibility trial of embedding research into the registry, we are optimistic about this area of expansion. Nested trials are the future in trials research offering the advantage of numbers being added exponentially whilst being very cost-effective. We are already in discussion with various research partners and hopefully will be able to come up with some exciting collaborations soon. Finally, from an administrative point of view mandating the entry of data into the NAHR by surgeons performing this type of surgery in the UK and hiring a part time research nurse to improve patient compliance remain key to its success and both of these are actively being worked upon.

NAHR Publications

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Hospitals that have submitted data to the NAHR during 2022

Royal Orthopaedic Hospital, Birmingham
Guy's Hospital, London
Nuffield Health Cambridge Hospital, Cambridge
University College Hospital, London
Wansbeck General Hospital, Ashington
Fortius Surgical Centre
Hexham General Hospital, Hexham
Schoen Clinic, London
London Clinic, London
Spire Manchester Hospital, Manchester
Royal Infirmary of Edinburgh, Edinburgh
Royal Berkshire Hospital, Reading
Addenbrooke's Hospital, Cambridge
Gartnavel General Hospital, Glasgow
Spire Leeds Hospital, Leeds
Royal Devon & Exeter Hospital, Exeter
BMI Harrogate Hospital, Harrogate
Wrightington Hospital, Wigan
Chapel Allerton Hospital, Leeds
Salisbury District Hospital, Salisbury
Spire Cambridge Lea Hospital, Cambridge
Alder Hey Childrens NHS Foundation Trust, Liverpool
Royal Hallamshire Hospital, Sheffield
Spire Montefiore, Hove
BMI The Ridgeway Hospital, Swindon
BMI The Princess Margaret Hospital, Windsor
Sheffield Childrens Hospital, Sheffield
Great Western Hospital, Swindon
The Vale Hospital, Hensol
Nuffield Health Leeds Hospital, Leeds
Nuffield Orthopaedic Centre, Oxford
James Paget Hospital, Great Yarmouth
Ramsay Pinehill Private Hospital, Hitchin
Lister Hospital, Stevenage
Spire South Bank Hospital, Worcester
Northern General Hospital, Sheffield
Spire Little Aston Hospital, Sutton Coldfield
One Hatfield Hospital
BMI The Alexandra Hospital, Stockport
Nuffield Health Glasgow Hospital, Glasgow
BMI Mount Alvernia Hospital, Guildford
Spire Clare Park Hospital, Farnham
Nuffield Health Warwickshire Hospital, Leamington Spa
The Alexandra, Cheshire
Nuffield Health Exeter Hospital, Exeter
Spire Murrayfield Hospital Edinburgh, Edinburgh
Frimley Park Hospital, Frimley
Spire Hull And East Riding Hospital, Hull
Doncaster Royal Infirmary, Doncaster
Southern General Hospital, Glasgow

Surgeons that have submitted data to the NAHR during 2022

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