

Teamwork in hip preservation: the ISHA 2019 Annual Scientific Meeting

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ABSTRACT

Hip preservation surgery is now an established part of orthopedic surgery and sports medicine. This report describes the key findings of the 11th Annual Scientific Meeting of International Society for Hip Arthroscopy—the International Hip Preservation Society—in Madrid, Spain from 16 to 19 October 2019. Lectures, seminars and debates explored the most up-to-date and expert views on a wide variety of subjects, including: diagnostic problems in groin pain, buttock pain and low back pain; surgical techniques in acetabular dysplasia, hip instability, femoroacetabular impingement syndrome, labral repair and reconstruction, cartilage defects, adolescent hips and gluteus medius and hamstring tears; and new ideas about femoral torsion, hip–spine syndrome, hip capsule surgery, impact of particular sports on hip injuries, registries, robotics and training for hip preservation specialists. Surgeons, sports physicians, radiologists and physiotherapists looking after young people with hip problems have an increasingly sophisticated armoury of ideas and techniques with which to help their patients. The concept of hip preservation has developed incredibly fast over the last decade; now it is clear that the best results can only be achieved by a multidisciplinary team working together. The 2020s will be the decade of ‘Teamwork in Hip Preservation’.

INTRODUCTION

The International Society for Hip Arthroscopy (ISHA), now known as the Hip Preservation Society, was founded May 2008 in Paris with a vision to become the international society for education and research in arthroscopic hip surgery [1]. Hip preservation was once perceived to attract clinicians with an affinity for unusual ideas, as well as those who strived to be surgical and scientific innovators. Now, training courses around the world are consistently filled

with active waiting lists. Peer-reviewed publications are increasing, and hip preservation surgery is a well-established field. The society’s success was achieved by hard work, dedication and persistence by numerous passionate individuals. Society members are united by a common interest, to spread hip preservation knowledge on a global scale via enhanced surgical expertise, with the ultimate goal of improving patient outcomes. To achieve this vision, ISHA utilizes educational meetings, events and peer-

reviewed publications. The annual meeting was established in 2009 and has become a primary driver to network a myriad of healthcare professionals in the field of hip preservation.

Drs Luis Perez-Carro and Oliver Marin-Pena hosted the 11th ISHA Annual Scientific Meeting in Madrid, Spain from 16 to 19 October 2019. The scientific program was devised and chaired by Professor Damian Griffin from Warwick, UK. A total of 101 faculty and 685 delegates came from 54 countries for 3 days of fantastic fellowship, learning and debate. Hip preservation and rehabilitation professionals were invited to present and exchange their knowledge, best practices and important research results. The scientific program began with a 'Principles of Hip Preservation' day, in which parallel didactic courses were run for English, Spanish and Asian language speakers and for physiotherapists. Over a hundred delegates came from all over the world for lectures and case discussions, including a patient presentation from a Spanish athlete whose FAI syndrome surgery had enabled him to represent Spain in the last seven Olympic Games, the most ever appearances by a male track and field athlete. A wonderful story to kick off a hip preservation conference!

The main program was made up of 16 seminars and several debates and keynote lectures on the most current and controversial topics in hip preservation. The central theme was 'Teamwork in Hip Preservation Surgery'. Physiotherapists, surgeons and others worked together throughout the conference. Networking activities were included within the program, providing ample opportunity to interact on a personal level with thought leaders from around the world. These included the President's dinner in the Santiago Bernabeu Stadium (home of Real Madrid football team) and the Gala dinner at the beautiful Casino de Madrid. Those who were able to extend their stay enjoyed a renowned cultural city known worldwide for its gastronomy and vibrant nightlife.

The enthusiasm and dedication presenters infused into this year's conference cannot be captured in writing and is something that was great to experience. Nevertheless, this summary intends to synthesize and condense the information presented by a diverse group of experts during the meeting. 'Teamwork' was the unifying thread binding each day's activities, which incorporated vantage points from different countries and different disciplines.

The following report is laid out as:

SEMINARS

1. Dysplasia
2. Inguinal and adductor-related groin pain
3. Femoral torsion

4. Lateral hip pain
5. Hip instability
6. Posterior hip pain
7. The capsule
8. Planning, navigation and robotics
9. Children and adolescent's hips
10. The hip in sport
11. Labral repair
12. Communicating risk and managing complications
13. Surgery for FAI syndrome
14. Hip-spine syndrome
15. Cartilage injury and repair
16. Teamwork and training

B. LECTURE SERIES

1. Registries and hip preservation around the world
2. Developments in hip preservation
3. Building the hip preservation team
4. Evidence in treating FAI syndrome

C. DEBATES

1. Should we treat patients with FAI syndrome with hip arthroscopy or physiotherapy?
2. Should we be doing more primary labral reconstruction?
3. Should we intervene early for the hip at risk?

D. THE RICHARD VILLAR TRAINEES' PRIZE

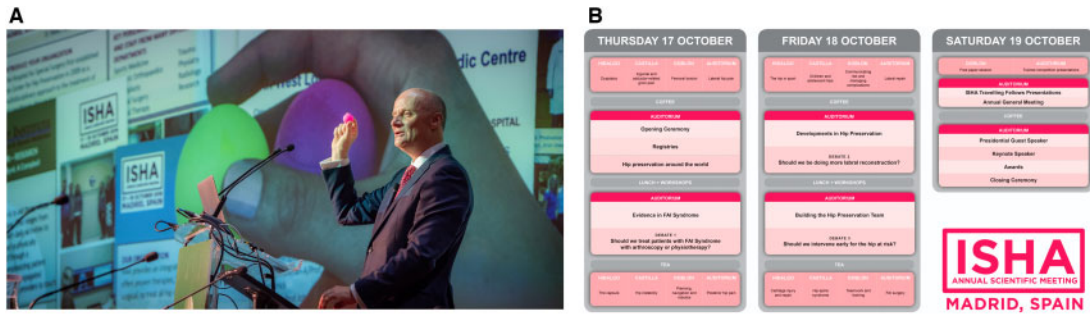
E. KEYNOTE LECTURES

SEMINARS

The 16 seminars were each focused on one controversial topic. Each included several lectures from renowned experts, several original research papers on that topic and then an extended discussion period. A summary of each is given below.

Dysplasia

Dr Klaus Siebenrock began with a comprehensive analysis of current literature on the results of treating hip dysplasia (DDH) with a periacetabular osteotomy (PAO). PAO has demonstrated favorable results during a long-term follow-up, with some series reporting a 40% survivorship at 30-year follow-up [2]. Notably, PAO surgery is capable of changing the natural course of DDH [3]; though, patient selection is critical. According to Dr Siebenrock, the best results can be achieved within patients under 30 years old with non-arthritic hips. In contrast, Dr Inger Mechlenburg presented a study that analyzed PAO surgery versus non-surgical treatment using progressive resistance training [4]. At 8 weeks, patients diagnosed with DDH showed significant improvement in The Copenhagen Hip and Groin



Professor Griffin introduces the scientific program.



Wonderful flamenco dancing at the Gala Dinner.

Outcome Score and the visual scale analog (VAS) for pain. Currently, the authors are working on a 12-month follow-up study. However, several questions may arise: what are the results in the short-, mid- and long-term? Are we doing the best for the patient by delaying a well-proven surgical treatment, PAO, that can change the natural course of DDH? For severe DDH cases or with and lateral center edge angle (LCEA) $<20^\circ$, Dr Jit Balakumar argued hip arthroscopy (HA) is useful as a complementary tool to address inter-articular pathology (e.g. labral tears) prior to PAO. We still have no data to prove that the addition of arthroscopy to PAO is better or even beneficial in DDH management. Dr Omer Mei-Dan discussed interesting topics during this lecture: labral repair without capsular elevation, stage surgery

with HA followed by PAO with 5–7 days apart. This timeline avoids the disruption of anatomy due to soft tissue infiltration during the arthroscopy and a minimally invasive PAO technique. A key point addressed was the current changes in the patients' demands and needs since the original PAO techniques over 40 years ago. We must evolve according to these changes and serve as an instrument to achieve these aspirations.

Interestingly, LCEA is still used as the main radiographic measure to define DDH; nevertheless, it has limitations, as DDH is truly a tridimensional pathology and relying only on the LCEA during the decision-making process is not appropriate. Dr Jit Balakumar defined borderline dysplasia with an LCEA between 20° and 25° . In this selected

group, HA with capsular plication and labral restoration may be a valid alternative. Thus, future research is needed to improve image analysis for DDH patients.

Inguinal and adductor-related groin pain

Dr Srino Bharam proposed and supported an anatomic and systematic approach to evaluating groin pain. He is a proponent of a three-phased exam, including palpation, provocative testing and manual strength testing (for deficits). Adductor-related groin injuries are predominately seen in male athletes. Improved understanding of groin anatomy can improve our diagnosis and imaging interpretation. Further, Ernest Schilders highlighted the current discrepancy in our understanding of anatomy and current theory. He provided a master class in anatomy, including stepwise cadaveric dissection. His anatomic concept of adductor injury is anchored by the pyramidalis-anterior pubic ligament-adductor longus complex [5].

Dr Struan Coleman presented a comprehensive review of literature identifying an association between FAI syndrome and core muscle injury. Decreased hip rotation precipitates increased force across pelvis-harness muscles tear from the pubic bone. The hallmark of FAI syndrome is a lack of IR at 90 flexion, commonly seen in rotational sports. Hip loss of IR disrupts kinetic chain and predisposes to other injuries. Professional baseball pitchers with core injury will have reduced IR and arc. Reduced motion leads to secondary injury around the pelvis.

Dr William Meyers explored core injuries, which he defined as mid-thigh to mid-chest as one core unit. Most important are three adductors: adductor longus, adductor brevis and pectineus. He used the 'Baseball concept' [6] to explain how muscle attaches to fibrocartilage around the bone, at which point an avulsion occurs. Additionally, he cautioned about the use of plasma-rich protein (PRP) injections, which he notes cause a lot of heterotopic ossification in this region.

Dr Ulrike Muschaweck discussed the sportsman's groin, a weakness of the posterior wall of the inguinal canal. The canal will widen and precipitate rectus involvement and pubic pain secondary to increased tension. She emphasized this is not a hernia, and current hernia techniques cannot be used. Additionally, a dynamic ultrasound is required for diagnosis. Her technique allows for the return to sport in a few days because it preserves tissue and only opens the defect. Lastly, she emphasized no mesh implants in athletes.

Femoral torsion

Dr Philip Noble began by highlighting that one in seven hip patients will be found to have a low femoral torsion, but this finding will not be related to symptoms; instead,

the modification to their range of motion might. He also emphasized that impingement is always a multi-deformity and multi-factorial issue, and never a radiological finding.

Dr Martin Beck then spoke of the radiological diagnostic processes involved in femoral torsion. The assessment of femoral torsion is paramount when dealing with hip patients. Communication with the radiologist about the used technique is essential.

Dr Richard Field pointed out that roughly 60% of the population (1 standard deviation) falls in the range of the current concept of 'normal' femoral version (between 0° and 19°) [7] but that there is a greater percentage of asymptomatic people with high version and a higher percentage of symptomatic patients with low femoral version, where a 'complex anatomy' is also found. He suggested that kinematic analysis in these patients would be essential. He also pointed to the incredible stability of hips with a low femoral torsion, and the majority of patients with a version condition will be amenable to arthroscopy (~75%) rather than to an osteotomy [8, 9]. He concluded by asking everyone to get in touch with him about their experiences with snapping hip and femoral version.

Dr Carlomango Cardenas described three types of osteotomies he used when treating high and low femoral torsion and revealed his technical pearls. He demonstrated how the subtrochanteric osteotomy is easily accomplished through a minimally invasive approach, with an intramedullary nail, enabling rapid recovery.

Lateral hip pain

Dr Athanasios Papavasiliou proposed that lateral hip pain is incorrectly called trochanteric bursitis, which is an inconsistent feature. Greater trochanteric pain syndrome includes trochanteric bursitis, gluteus medius/minimus tendinopathy or tear and external coxa saltans. He highlighted there are no reliable clinical tests beyond palpation, and that diagnosis is more clinical than imaging. X-ray and MRI are often without useful clinical findings [10, 11]. He provided his thoughts on treatment options: neuromuscular performance training is preferred to physiotherapy, including rolling, or compression, and injections are useful 4–6 weeks [12] though one-third of patients will need another. Although this is a common condition, the criteria for diagnosis and management are not well-established [13].

Dr Ali Bajwa identified three factors: vascularity, collagen strain (stiff or not) and micro/macro tear, which is most important to consider regarding biologic treatments. He reviewed different types of biologics, shared his thoughts on current literature and the future of each treatment modality. PRP classification and methods of use are

the strongest in the literature. PRP [14] and mesenchymal stem cells (MSCs) appear to have a role in the future, but there is a lot that requires elucidation: the need to crystallize indications, concentrations, delivery methods and scaffolds used.

Dr Dror Lindner reviewed the history of the ‘rotator cuff tear of the hip’ [15, 16]. Including indications for surgery, the timing of surgery [17] and surgical technique. The physical exam is most important to determine if HA is indicated. Technique pearls included decortication as a key element for better healing, though he cautioned it weakens the bone [18]. Double row and single row sutures have no research to when to use them, though double row is stronger [19]. He recommended a single row unless the tear is large. To conclude, he suggested gluteus medius tears are an underrecognized cause for pain and weakness. Future research is needed to determine the optimal timing of surgery, single versus double row and when not to operate (size tear, fatty infiltrate and so on).

Dr Olufemi Ayeni reviewed anatomy, indications for repair versus transfer, technique [20] and outcomes [21]. He cautioned there is a need to worry about the longevity and be cognizant of tissue defects. MRI should help quantify tissue defects. The goal is to recreate the capsule and gluteus medius/minimus effects. This problem is difficult to manage due to a flat learning curve, which is complicated by its uncommon nature. Thus, evidence in the literature is level IV.

Hip instability

Dr Dean Matsuda presented a rare but severe condition with lesions like labral tear and acetabular or femoral head chondral damage/fracture. In theory, intra-articular lesions can be addressed in a minimally invasive manner through HA; nevertheless, it is extremely important to balance the pros and cons of HA within this setting [22].

Dr Marc Safran provided color to this evolving concept of microinstability [23, 24]. Although the name refers to the word ‘instability’, pain is the cardinal symptom, and caution must be taken when making the diagnosis. The situation involves an abnormal femoral head movement that leads to labral and capsular stress, labral tearing, capsular stretching and pain. Conducting a proper physical exam is critical. The FEAR index [118] was proposed as a validated alternative for the decision-making between HA alone or in combination with PAO.

Dr Keelan Enseki explained you cannot treat what you do not know. It is important to know about the instability of the hip in the physiotherapist environment. Muscular strengthening is key when trying to compensate for the

capsular deficiency [25]. Regardless, if a PAO or arthroscopy is needed, physical therapy is a must.

Dr Jason Brockwell suggested that instead of asking ourselves if we can, the real question is if ‘we should’ treat instability with arthroscopy [26]. Good outcomes with DDH and PAO have been published by many authors [27, 28]. Additionally, the decision-making process should not be made based on a single radiographic measure like LCEA (also highlighted in dysplasia session); rather, a more comprehensive classification that considers important variables, such as anterior/posterior coverage, is needed [29]. Indeed, patient selection is vital if soft tissue surgery (arthroscopic capsular plication) is chosen. The FEAR index can be a good tool for this task.

Posterior hip pain

Dr Eyal Amar described how the four layers/levels during the diagnostic process can and should be applied when facing a patient with posterior hip pain and that the muscular layer is one to be especially taken into account when dealing with posterior pain.

Both Dr Luis Perez-Carro and Dr Jovan Laskovski shared surgical and post-operative pearls for endoscopic exploration and treatment of the deep gluteal space. They shared their endoscopic limits in this posterior compartment and identified when to take back the scalpel and retractors. Dr Perez-Carro explained the surgery is safe and most important is choosing the right patient. He emphasized the importance of being cognizant of sciatic nerve anatomic variations of sciatic. He cautioned against cutting the obturator internus, which caused his patients to undergo long recovery periods. Dr Jovan Laskovski focused on the recognition of ischiofemoral impingement (IFI). Posterior hip pain is vague and confusing. He relies on the Gait Stride Test and Johnson Test, which are most useful. It is important to be aware of sciatic nerve compression with external rotation and adduction. Although he started as a posterior hip surgeon, he transitioned to anterior because it is more informative and more accessible.

Dr Carlos Guanche spoke about endoscopic hamstring repair [30, 31] suggesting there are two varieties to be aware of. Surgical pearls included recommending intraoperative abduction [32] awareness of a possible bifid sciatic nerve, and beware of traversing vessels and their variants. Retraction stitches can aid in planning, viewing and repairing; though, this requires organization and careful suture management. To mitigate pitfalls, he recommended a stress test after repair to help determine if you can push a patient in PT, if the anatomic reduction was achieved, and if you need to augment the repair with acellular graft. Bleeding and fluid management are a concern—open if

necessary. Ultimately, Dr Guanche recommended open management in chronic (>4–5 weeks) or retracted (>8.0 mm) proximal hamstring ruptures.

The capsule

This seminar focused on the hip capsule, a structure that has had increasing significance in the anatomy, function and pathology of the hip. Dr Brian Giordano discussed its anatomy and function. The four components of the capsule contribute in unique ways: the iliofemoral ligament responsible for the ‘screw home mechanism’, the pubofemoral ligament provides the sling, the ischiofemoral ligament resists internal rotation and the zona orbicularis prevents pistoning (functions as a locking ring around the femoral neck). With these emerging concepts, there has been a paradigm shift from the traditional dogma of the capsulotomy [33] being therapeutic, towards respecting the anatomy and its function. With microinstability possibly being underreported and arthroscopic hip surgeons seeking to restore this, the question now has shifted to capsular insufficiency and if it is a real problem in revision cases, and if so, why?

Dr Derek Ochiai took the stage to discuss his approach to capsulotomy [34]. There are mainly three variations of the capsulotomy. First, the limited capsulotomy comprising small puncture holes with the thought that these could heal without destabilizing the capsule, thereby negating the need for any capsular management—secondly, the interportal capsulotomy where the working portals are joined with the capsulotomy. Thirdly, the T-type capsulotomy [35] where a vertical limb is created to the interportal capsulotomy to improve visualization of the femoral neck. With the latter two options, traction sutures are helpful. However, prior to starting a case, it is essential to have a plan to handle the capsule, and the patient’s pathology, not ease of access, should determine capsular management. On the other hand, Shane Nho presented techniques for capsular repair. The last decade has seen an increased emphasis on protecting the iliofemoral ligament, as proven by biomechanical studies [36, 37]. More stitches add to stability, and one stitch for every hour on the acetabular clock-face or for every centimeter of capsule incised is recommended. Moreover, there is a dose-dependent effect on the amount of force required to distract the hip and size of capsulotomy, necessitating repair for larger capsulotomies. Level III evidence [38–40] exists for capsular repair. His preferred method of capsular repair for a T-type capsulotomy, his workhorse, comprised three stitches in the vertical limb and three for the interportal cut, plicating as necessary.

Dr Mat Brick shed light on capsular shift and reconstruction techniques. The capsular shift should be part of an arthroscopic hip surgeon’s armamentarium. The essential question of why the hip is unstable should be answered before managing the capsule, as there could be bony [41] and/or soft tissue contributions to instability. The ideal plication patient is one with microinstability and normal coverage. His interportal capsulotomy tends to be a ‘smiley face’ as he curves it distally in the medial limb and then plicates it (asymmetric closure) with four to five no. 2 vicryl absorbable sutures. Capsular reconstruction may be reserved for symptomatic iatrogenic capsular ablation for which an Achilles allograft can be used and attached medially to the zona orbicularis.

Planning, navigation and robotics

Radiologist Dr Moises Hernando Hernandez reviewed the normal anatomy and pathological imaging of the hip. He showed how MR arthrography can be used to demonstrate labral, capsular, ligamentum teres and articular cartilage pathology. He illustrated the potential advantages of the MR arthrography with traction. He showed how different sequences and orientations can be used to identify different pathologies, emphasizing the need for communication and teamwork between radiologist and surgeon. Adequate imaging requires high spatial resolution, a small field of view and a variety of sequences. For the future, he believes there is great opportunity for radiologists and surgeons to work together on motion simulation to plan bone resection and osteotomies, to improve cartilage mapping and to develop dynamic MRI to assess real-time kinetics.

Dr Vikas Khanduja considered the value of navigation in surgery for FAI syndrome. He reviewed trials of osteochondroplasty using navigation compared with fluoroscopy [42, 43]. Navigated operations were more accurate but took longer and exposed the patient to more radiation. He also explained that navigation alone was not sufficient; we need to consider the dynamics of impingement in addition to the static morphology. Beyond that, only bone is currently considered within current prototypes of navigated arthroscopic hip surgery, but soft tissue factors are likely to be very important and need to be addressed.

Dr Justin Cobb pointed out there is no consensus on what an ideal plan should be, so robotic assistance does not necessarily help. We use surrogate endpoints for pre-operative planning because our understanding is not complete yet. Though we can quantify pincer and cam morphologies very well, the pathophysiology of FAI syndrome is complex: these shapes do not always correlate with symptoms. Additionally, the hip–spine [44] connection needs to be considered. He explained that there is

currently no robotic platform for osteochondroplasty, but he did illustrate the value of assistive technologies available now, like CT navigation and virtual reality for teaching.

Children and adolescent's hips

Dr Michael Dienst discussed cam resection in adolescents with FAI syndrome. A combination of activity and cam shape is what leads to articular cartilage damage. There is usually no cam-shape lesion before age 12, supporting the correlation with vigorous sporting activity. Operative results in adolescents are good and remain stable mid-term. Avoiding high-intensity training and early identification of painful FAI syndrome is important. Prophylactic surgery was not recommended. Both open and arthroscopic techniques are effective. Is cam resection in adolescence too early? No! Especially given that cartilage damage occurs early.

Dr Moritz Tannast noted that about 50% of patients with Perthes' Disease develop symptoms and should be treated. He presented an algorithm [45] on how to manage these patients. Considering the femoral side, both intraarticular and extraarticular pathomorphology exists. Cam shapes, head-induced pincer and functional retroversion were described. Extraarticular pathomorphology includes the greater and lesser trochanter. On the acetabular side, concurrent secondary dysplasia can occur, as well as acetabular retroversion and joint incongruency. All of these entities should be individually considered and managed. Both arthroscopic and open techniques are potential treatment options, but there are limitations as to what can be done with an arthroscope. These are young patients, and hip preservation should always be considered first. Additionally, corrected pathomorphology leads to easier arthroplasty if necessary.

Dr Klaus Siebenrock discussed modern treatment options for SCFE [46] and the Bernese experience. The gold standard is *in situ* pinning, but residual deformity can lead to impingement, cartilage damage and OA. Restoration of normal anatomy was emphasized while avoiding avascular necrosis (AVN). In Bern, slips with Southwick angle $<30^\circ$ undergo simultaneous pinning and arthroscopic CAM resection. For slips that are unstable or slip angle $>30^\circ$, a modified Dunn procedure with a re-orientation of the capital femoral epiphysis is undertaken. This is because most slips have some degree of chronicity, and hence posterior neck callus may impinge on the retinacular vessels during reduction. This procedure has a high survival rate and a very low rate of AVN. He recommended against 'gentle reduction', which he feels is unpredictable and has the highest rate of AVN.

Dr Jens Goronzy discussed the anatomy, ossification and closure of the triradiate cartilage (TRC) [47] and

considerations with various pelvic osteotomies. Mean time to closure is similar in males and females (around age 10–12)—males tend to ossify later. Pemberton and Salter osteotomies are indicated for younger children. These hinge on the TRC. Triple osteotomies and the Bernese PAO are reserved for after skeletal maturity. A 'Bernese style' PAO in skeletally immature patients can mimic a PAO but avoids a full ischial cut which may violate the TRC.

The hip in sport

Dr Joshua Harris talked about 'impingement sports' and 'flexibility sports'. Each sport and each athlete has a different problem [48, 49]. He cautioned to avoid linear reasoning and blindly treating imaging [50]—know where the impingement is occurring. Per the Warwick Agreement [51] FAI syndrome is a motion-related clinical disorder of hip with a triad of symptoms, clinical signs and imaging findings. Education is an important part of surgical and non-surgical treatment. The morphology of pincer and cam were differentiated as more congenital and developmental, respectively.

Dr Travis Maak talked about 'cutting sports' (soccer, basketball, hockey and rugby) [52, 53]. Echoing Joshua Harris, he discussed how the CAM would form in 'developing hips' and ultimately be present in young adults that had their hips 'exposed' to certain activities and positions for long training and playing hours during adolescence. Therefore, it is important to try and quantify the relationship between joint shape and function because the form has been shown to dictate function.

Dr Lauren Pierpoint reviewed the theory of screening research to determine at-risk populations [54] identifying hip at risk, and how to manage them. She highlighted that training load, age and sport [55] contributes to the development of symptoms and disability. Screening research has provided these risk factors. She argued that screening may help the natural history and etiology of FAI syndrome, which is not yet known.

Labral repair

Dr Christoph Gebhart posited the labral tear is probably the most common finding in HA; but, most of the time, its presence is related to a condition, such as FAI syndrome and/or instability. Restoration of the labral seal [56] is currently a key factor for achieving favorable outcomes in hip preservation surgery [57]. Hence, the labral repair is becoming the gold standard choice to debridement [58]. Reconstruction is a hot topic, with a small minority of reports in its favor.

Dr Jeffrey Nepple suggested a consensus regarding the meaning of debridement needs to be reached. Is

debridement just stabilization of the labral margin (selective labral debridement) or a complete labrectomy [59]? Selective debridement has a role in modern HA, but it is critical that the labral sealing effect is restored when this alternative is performed. Currently, we have studies that are level of evidence 1 favoring labral repair over debridement [60–62].

Dr Patrick Carton asserted that with the currently available evidence, the method of labral repair does not matter [63]; however, despite the method selected (looped, based and so on), the same principles are applied by the surgeon: labral seal restoration, avoid labral eversion and avoid the subchondral plate during anchor placement. He followed with a comprehensive overview of techniques and evidence behind various methods currently practiced worldwide when considering a labral repair. In addition, there are concerns that knotted anchors may increase the risk of adhesions, knot slippage and failure might be more common in knotless anchors. Although there is no scientific evidence to suggest the superiority of one technique over the other, increasingly the preservation of chondral junctions is becoming more recognized and may offer clinical benefits in the long term.

Dr Marc Philippon explained labral repair is not always possible, especially in the revision setting. Labral reconstruction has been described as an alternative to complete debridement or labrectomy. However, he described an option that can substitute a full labral reconstruction. Circumferential fibers of the native labrum are required and preserved for this technique, and augmentation with autologous fascia lata autograft is used to restore the labral seal by incorporating the graft to the native tissue. Labral augmentation outcomes and results have been favorable and even statistically superior to reconstruction. He followed with an algorithm for labral pathology management. The labral graft is seen as having a dual function: reinforce labral tissue and a ‘spacer effect’, which may have a role in preventing adhesions.

Communicating risk and managing complications

Dr Paul Beaulé suggested objective classification of complications is necessary to validate procedures, compare them, evaluate reproducibility, and to identify refinements [64, 65]. Defined common endpoints and mechanisms of failure can help optimize the value of care [66]. All grades of adverse events need to be reported. Reporting reoperation rate will not help change practice, but if the mode of failure is understood, then you can adjust.

Dr Thomas Wuertz established the importance of defined language, so we may better understand the issue at hand. Mode of failure [67] is important to define, echoing

Paul Beaulé. This field is rapidly changing, and complications will be encountered. The most common complication is arthroscope damage [68], which may be decreased with adequate traction. Though, with increased traction, there is an increased risk of pudendal neuropraxia.

Dr John Clohisy presented the complications and risk profile of open procedures through an objective classification system for hip preservation surgery [69]. How to minimize the risk of complications? He recommended targeting modifiable factors [70]. His presentation included specific steps to be aware of to avoid complications during PAO procedures.

Majid Hassan is a medical defense lawyer from the UK. He reviewed the history relevant to the general principles relating to surgical risk disclosure to patients and consent. The patient has the right to make the decision after the doctor has medically informed them. Material risks must be disclosed, and patient informed consent is required. He emphasized two-way communication is important. The test of materiality is a subjective test used by courts. A general position used by judges is, if it was not in the notes, it was not said.

Surgery for FAI syndrome

Dr Benjamin Domb shared his wisdom on performing an ideal arthroscopic cam reshaping with simplicity: make a sphere. This is a challenge, and preoperative planning is key. Implementing it surgically involves three main vantage points, which he compared with ascertaining the sphericity of the Earth. First, the arthroscopic view, akin to a beach, shows it up close. Secondly, a fluoroscopic view, much like viewing the Earth from the moon shows it distantly, but in two dimensions. This helps create a circle. However, true sphericity is best seen moving the hip with multiple fluoroscopic views, replicating Earth’s rotation. Care must be taken not to over-resect, as he showed from his study that over-resecting could lead to a 30% conversion to total hip replacement (THR) [71].

Dr Thomas Sampson discussed his method of managing pincer impingement. He emphasized rim trimming without labral takedown to maintain the integrity of the chondrolabral junction. Arthroscopic management allows for an over-the-top technique of visualizing the rim and central compartment visualization for concurrent assessment of chondrolabral junction [72, 73]. Global pincer resection can be more challenging [74], and hence preoperative imaging evaluation is key [75]. The labrum can vary based on bony morphology but preserve the labrum if possible.

Dr Bent Lund shed light on os acetabuli [76]. Multiple etiologies exist, including an unfused secondary ossification center, rim fractures in hip dysplasia/trauma/

impingement/retroverted acetabulum. Options include complete excision if LCEA post-resection is adequate, partial resection if LCEA is borderline, fix the entire fragment if large enough, or partial resection combined with a reverse PAO in severe acetabular retroversion. Imaging evaluation is essential. CT often helps preoperative assessment. Partial or complete resection follows similar principles as a pincer excision arthroscopically. Fixation, however, can be with screws or using a suture bridge technique that he demonstrated.

Dr Diego Collado spoke about surgical dislocation and its role in FAI syndrome surgery [77, 78]. His preferred method is using Gibson's approach with osteotomy of the greater trochanter. This approach allows for a wide range of views for significant correction and is useful in addressing significant femoral head deformities, allows for mosaicplasty for femoral head cartilage lesions (difficult to address arthroscopically) and allows the possibility of concurrent PAO. Finally, it can be a good approach for tumor resection.

Hip–spine syndrome

Dr Juan Gomez-Hoyos detailed how the hip can influence the spine [79, 80]. Abnormal hip motion results in compensation at the level of the pelvis and spine. This forms the basis of the lumbopelvic-hip complex, as demonstrated by increased facet and disc pressures in this situation—typified by the arthritic condition termed hip–spine syndrome. In the non-arthritic hip situation, the abnormal hip motion should be considered as a reason for various spine disorders, including loss of flexion, such as in FAI syndrome, extension such as in IFI or multidirectional loss of hip motion as seen with hip arthrosis or congenital hip dislocation.

Dr Hal Martin discussed how IFI relates to spine pathology [81]. He noted that, generally, 20° of internal rotation is necessary for normal locomotion. When considering concurrent hip and spine pathology, it was suggested that the hip be treated first, which may result in the resolution of spine symptoms. Regarding IFI [82–84], a clinical diagnosis is much more relevant than abnormal MRI measurements. He noted that the influence of femoral version on the spine is substantial, and one has to consider derotation osteotomy as part of treatment. Treatment of IFI, including lesser trochanter resection or derotation femoral osteotomy, can improve patient's back symptoms. Thus, spine specific tools such as the Owestry disability index should be included with hip PROs.

Dr Filiep Bataille explored the effect of spine pathology on the hip. Sagittal balance of the lumbar spine and pelvis is inherently affected by a patient's pelvic incidence, as

measured on sitting and standing lateral X-rays of the spine and pelvis [85]. Lumbar spine flexibility can influence one's ability to compensate for an abnormal PI [86]. This may have an effect on hip impingement. Two types of hip-spine syndrome were described. Type I occurs in younger patients, which is usually muscular and has the potential to be treated with physical therapy. Type II usually occurs in older patients with a degenerative spine and is less likely to respond to muscle strengthening.

Dr Sochi Uchida discussed the relationship between FAI syndrome and osteitis pubis [87] and sacroiliac joint pathology [88]. Decreased hip range of motion can result in these pathologies [89]. Treating the FAI syndrome may improve concurrent symptoms. In some instances, osteitis pubis may also need to be treated with symphysectomy and the sacroiliac joint with ultrasound-guided injection of corticosteroid or platelet-rich plasma.

Cartilage injury and repair

Dr Christoph Zilkens started by emphasizing the need to obtain advanced cartilage imaging in order to assess disease severity accurately. Biochemically sensitive MRI has a crucial role. Other essential 2020 imaging tools are: (i) 3D sequencing; (ii) standard morphologic evaluation with T2-, PD- and T1-weighted sequences; (iii) radial reconstructions; (iv) cartilage mapping through double-echo steady-state sequencing—morphologic and quantitative measurements and (v) biochemical mapping.

Dr Nicolas Bonin discussed microfracture (MF) [90], autologous matrix-induced chondrogenesis (AMIC) and scaffolds. He advocated that ACI showed good results without MF, proving the latter not essential for membrane adhesion. AMIC and other scaffolds are options for chondral defects. According to literature, MF is indicated for cartilage defects up to 2–3 cm². Higher defect areas (3–8 cm²), require AMIC/scaffolds [91] with a proven lesser rate of progression to THRs, after 12 months. AMIC versus autologous chondrocyte implantation (ACI) showed similar long-term results, with the first having the advantage of being a lower cost, one-step procedure. On the post-operative rehabilitation topic, there was no weight-bearing for 4 weeks (6 weeks if cartilage procedure performed).

With the aim being to create the best possible cartilage, Dr Rodrigo Mardones [92, 93] began speaking of matrix-associated chondrocyte implantation. It represents a technical evolution, as self-adherent properties are added to arthroscopic implantation. He explained the technical details of two different matrix-associated chondrocyte implantation products, 'Novocart' and 'Chondrosphere'. He presented on MSCs [94], which can differentiate into chondrocytes and produce growth factors and cytokines.

MSCs were found to obtain good results in big lesions. Bone marrow concentrate is an available tool that can deliver MSCs onto chondral defects. Finally, another alternative was approached: MF, followed by *BST-Cargel* (chitosan scaffold) application; it was considered a safe and reliable method to grant sustained long-term results.

Teamwork and training

Dr Per Holmich proposed that hip pain is groin pain [95] and reviewed the Doha agreement [96] on groin injury terminology. Addressing this problem relies on the patient, referring colleagues, radiologists, physiotherapists, an operating room team and surgeon. There is not a one-person problem, and working together is best. He discussed that both surgery and physiotherapy work for this problem, so it is important to find the right treatment for the right patient.

Dr Mike Voight reviewed Nashville Hip Institute's process. The first evaluation is completed by a physiotherapist, which gets forwarded to the surgeon. Their interdisciplinary team relies on a dynamic process of complementary backgrounds and goals to optimize patient care. Each has its own skillset to bring to the table. In support, he discussed that medical error is third leading cause of death in the USA [97] many of which are attributable to poor team dynamics. Dysfunctional teams are responsible for up to 70% of medical errors. Teamwork improves efficiency and productivity.

Dr Michael Muldoon asserted that the most important is having a dedicated and consistent team: efficient surgery is safe surgery [98]. Teamwork enables attention to little details. He touched on the importance of relaxation and/or paralysis. Stressful events compromise patient safety [99] and these come in the form of a breakdown in teamwork. Teamwork is more efficient, safer, less stressful and more enjoyable.

LECTURE SERIES

Four sets of lecture were presented on topical issues: registries and hip preservation around the world; developments in hip preservation; building the hip preservation team and evidence in treating FAI syndrome. They are summarized below:

Registries and hip preservation around the world

Dr Vikas Kahnduja [100] presented information regarding the UK Registry [101, 102], including background information, fourth annual report and future plans. The registry's formation was inspired by Lord Kelvin, 'if you can't measure it, you can't improve it.' They wish to provide feedback with validated outcome data. Details may be

found in the Non-Arthroplasty Hip Registry Fourth Annual Report 2019.

Dr Bent Lund discussed the Danish Hip Registry [103–105]. This is self-funded by participating surgeons, with 18 surgeons entering data. He discussed how the registry functions, including a collection of data and presented preliminary data. Limitations of registry data were discussed. He concluded that broadly young patients do better, so if they have symptoms, operate early.

The Cartilage Registry of German-speaking countries 4-year results were discussed by Dr Stefan Fickert. This registry's benefits include its independence from industry and systematic recording of complications. The registry is reproducible and stable, a data-safe tool that captures conservative and surgical therapy. He mentioned that randomized control trials (RCT) do not reflect clinical reality. Results were presented from the registry and he mentioned the register improved understanding of the presentation of hip pathologies.

Dr John Christoferetti had an upbeat presentation regarding worldwide influences on hip preservation surgery. We respond to unique personal qualities and patient background. Regional variation exists, with different focuses, and variation is not necessarily bad. He cautioned that it is essential to think about who was not talked about, rather than who was. Critical contributions to hip preservation from different regions of the world were highlighted.

Dr Victor Ilizaliturri presented a historical overview of HA and the eras of HA: introductory era (pre-90s), consolidation era (the 90s), expansion era (2000s) and diversification era (2010 onwards). Spanish-speaking surgeons were involved with HA in all eras. Spanish-speaking authors must overcome the challenges of language because they must publish in the English literature; otherwise, it is unlikely to be recognized internationally. He emphasized the Orthopaedic Learning Center was essential to the development of HA. Special appreciation was given to the pioneers from Spain in hip arthroscopic surgery and publication, especially the anatomists from Barcelona. We should appreciate their quality and dedication because their advanced research was critical to the expansion of HA.

Developments in hip preservation

Dr Sarkhell Radha presented the ISHA Delphi Consensus Project on Best Practice Guidelines [106] in assessing patients and arthroscopic interventions for FAI syndrome. The presentation articulated the importance of standardization of practice internationally through statements produced from this Delphi Consensus Study. This study and presentation highlighted the moral obligation of international societies and companies to help the less fortunate



Dr Ilizaliturri demonstrates the hip joint during the ultrasound workshop.

continents where access to specialist investigations and interventions is scarce. The best practice guidelines will be published as a manuscript in the 'Journal of Hip Preservation Surgery'. Subsequently, there will be a book with all the Best Practice Guidelines for FAI Syndrome.

Johnny Huard presented his work on the future of biologics in hip preservation. The audience seemed to be incredibly interested in the anti-aging medications reported in his work. This advancement in biology has shown to promote healthy aging in mice. Early results have shown mass killing of senescent cells has a role in delaying or stopping the ageing process in cartilage.

Dr Paulo Rego presented a series of complex hip deformities suitable for complex osteotomy. These complex deformities are difficult to classify due to the number of pathologies involved. Complex osteotomy combinations including femoral head, femoral neck, femoral shaft and acetabulum is not a contraindication to hip preservation, and patients who attain head containment seem to do well in the long term.

Dr Brian White argued strongly for full labral reconstruction rather than labral repair. In his published work, he reported a failure rate of 31% in their primary labral repair and no failure in the reconstruction group. The conversion rate to total hip arthroplasty was also higher in his published work following labral repair. Additionally, he explained that the labral reconstruction procedure requires a specialist and is a costly procedure. This was a precursor to the subsequent debate on labral reconstruction (see below).

Building the hip preservation team

Dr Benjamin Domb covered the evolution of medicine and hip treatment, a story of sub-specialization. Hip preservation is a new field and developing rapidly. We are part of this evolution, and there is much to discover. This puts ISHA in a unique position to guide training standards because all its members have been educators. There are many hip preservation fellowships around the world (Dr Domb highlighted the Fellowships Fair to be held later in the meeting), and a wide variety of courses. He described the work being done by Professor Griffin and the Education Committee to develop an ISHA Pathway that would support fellows and young surgeons as they specialize and start in practice in hip preservation.

Dr Amir Takla covered the road to becoming a specialist hip physiotherapist. Importantly, he mentioned knowing when to refer and participating in research as critical for professional development. He highlighted deficiencies in training he felt he needed to overcome, including improved understanding of PRO and lack of time in the operating room. Once trained, specialist trained physiotherapists are integral members of the team. They can improve symptoms of FAI syndrome, and pre-operative physiotherapy is effective in reducing post-operative PT.

Dr Hugh West emphasized that collaborative teams improve decision-making. Complexity increases the risk of treatment variation. If you are too focused on certain fields of view, you miss others. Human capacity is reached at four variables [107], so you cannot account for all variables on your own. Empower the team to give opinions and improve decision-making.

Dr Nick Mohtadi discussed the importance of working as a team and identifying the correct patient. There are issues with registries, including poor surgical or patient compliance, incomplete data input and ownership of data. Are the correct outcomes included [108]? Surgeons and patients think differently, so we must take that into account. Engage the patient to find out what is important. He uses the iHOT score information for history and as an outcome tool. Make the patient part of the team and give them understanding. This makes the patient become the central player driving success.

Dr Richard Mather explained cost-effectiveness analysis (CEA) [109]. Its unit of measure is the cost per quality-adjusted life-year. The societal perspective incorporates tradeoff assessments that include comprehensive costs and resource allocations with a long-term perspective. CEA is the current method of choice to answer questions from a societal perspective [110]. Importantly, he made a salient point regarding their increasing influence (worldwide), and that they may affect access to care (USA) [111]. He cautioned that it is not an argument to pay or not to pay; instead, to find the right treatment, for the right patient, at the right time. These are a framework for analysis, not an answer. CEA is an evolving, imperfect analysis. An Easter egg provided by Richard Mather to share with your colleagues: FAI syndrome treatment provides more relative economic benefit than ACL and TKR surgery, as defined by the NHI Survey Function Index Value.

Evidence in treating FAI syndrome

Dr Moritz Tannast began with a presentation on the natural history of FAI syndrome, with a brief review of how to determine etiology. Case-control studies provide strong evidence for cam but not for pincer deformities. These studies often had selection biases as well as technical issues. Longitudinal cohort studies demonstrated that dysplasia and cam deformities progress to OA, but no evidence currently for pincer deformity progression. Actionable clinical information was reviewed and he posed questions that are still not answered in the literature.

Dr Brendan Higgins shared his review of the US Army RCT of surgery versus physiotherapy [112]. Both groups improved; the surgery group improved more, but this was not statistically different due to low numbers in the non-operative group.

Professor Damian Griffin provided background and analysis of the UK FASHIoN study [101]. He explained that in about 2012 the National Health Service had nearly stopped funding HA across the UK. The NHS defined a research question which they would fund in order to decide whether to continue to offer HA: Best conservative

care (physiotherapist-led rehabilitation) compared with HA in patients with FAI syndrome. He discussed the design, strengths, limitations and conclusions of this very large multicentre randomised controlled trial. Again both groups improved, but there was a clinically and statistically significant benefit of HA at 12-months follow-up. Professor Griffin explained that follow-up will continue to ten years, but that the one-year results published in the Lancet [101] had already secured the funding for HA in the UK.

Dr Parminder Singh described the additional MRI and biomechanical studies included in the Australian FASHIoN study [113], which was designed to use the same protocol as the UK study. Preliminary results and theoretical justification of the design were presented.

Dr Tony Andrade presented the FAIT RCT [102]. He discussed the requirements and difficulties of RCT in surgery. The results of this trial were reviewed. Again, patients with FAI syndrome treated with HA improved more than those treated by physiotherapy. The speed of recovery was quicker in surgical patients.

Dr Olufemi Ayeni [114] explained the rationale and background of the FIRST RCT which was designed to compare arthroscopic reshaping surgery to arthroscopic lavage. Results were not yet available, but he reviewed the formalized quality checklist created to evaluate the arthroscopic hip surgery.

Dr Kristian Marstrand Warholm discussed the on-going HIPARTI RCT [115] comparing HA to sham surgery. This is important because surgery has a well-known placebo effect. Both groups will undergo physiotherapy, which will have compliance tracked.

Dr RobRoy Martin discussed physiotherapy in FAI syndrome. To assess the effect of functional movement control on PROs, a standardized evaluation was developed. Rehab is meant to improve neuromuscular control through biomechanical training, strengthening of muscles and improved functional control. The single-leg squat was validated to identify motor control deficiency. Improved motor control leads to improved outcomes, including decreased pain, improved self-reported function and improved satisfaction.

This group of lectures provided a comprehensive description of the world's evidence, to inform the subsequent debate below.

DEBATES

Three big debates were center-pieces of the meeting: treating FAI syndrome, primary labral reconstruction and early intervention surgery. These were hard-hitting and no-holds-barred: almost literally because the protagonists came out on stage to loud music wearing boxing gloves as

well as red and blue dressing gowns! Among all the fun, we got to the nitty-gritty of some really tough questions in hip preservation, and everyone went away, if not with a final answer, at least with a much better idea of the arguments on both sides.

Should we treat patients with FAI syndrome with HA or physiotherapy?

Dr Richard Mather chaired this 'supreme court on FAI syndrome'. In one corner, pro-surgery advocates, Dr J.W. Thomas Byrd and Dr Mat Brick stood draped in red boxing robes. Physiotherapy advocates Dr Joanne Kemp and Dr James Moore stood opposite cloaked in blue. Before the debate bell rang, Mather presented a case and asked for the audience's opinion: 34% in support of physiotherapy and 66% of surgery.

To open, Dr Byrd revealed the red team's good cop-bad cop strategy. Dr Brick would deliver the Mike Tyson KO later. He argued that physiotherapy is a temporary measure, which may be utilized successfully, but arthroscopy offers a permanent treatment. Simply advocating for physiotherapy instead of surgery is a flawed understanding of the underlying mechanism of injury. Dr Kemp opened with emotional and less than favorable patient reviews of surgery. Humorously, she explained the need to move beyond 'gut feeling' to the critical scientific evidence. In support, she cited a meta-analysis questioning the effect size and clinical significance of the reported favorable surgical results, and a relatively high cost for minimal benefit.

Dr Brick opened with an anecdote about his son with FAI syndrome. Recommendations (from Dad) for conservative treatment were followed, and his hip progressively deteriorated with mechanical damage. His point was FAI syndrome occurs when your lifestyle collides with the shape of your hip. Anecdotes give way to science, citing the FASHIoN and FAIT RCT trials in support of surgery. Not to be one-sided, he cited the US Army trial with no difference. This study had 70% crossover to surgical, mitigating the strength of conclusions. He ended with the fact that no level 1 evidence has been published in support of physiotherapy.

Dr Moore began citing published data: two-thirds of young athletes have CAM morphology; 60% have a labral tear regardless of symptoms or not; only half of athletes return to sport at the same level, 17% at an optimal level. Simply put, common surgical targets and pain are not well correlated.

The debate ended as swiftly as it began. Clearly the audience, many of whom were orthopedic surgeons, sided with HA as a definitive management for FAI syndrome. However, most surgeons agreed that a trial of

physiotherapy is appropriate in most patients before moving to surgery.

Should we be doing more primary labral reconstruction?

Mr Richard Villar chaired this debate superbly. In the red corner were 'crooked' Dr Andrew Wolff and 'lyin' Dr Tony Andrade arguing in favor of primary labral reconstruction. Standing in the blue corner were Dr Shane Nho and Dr Stephen Aoki (or 'Western Shane' as he was nicknamed by the red team). An audience poll revealed 92% were initially in favor of primary repair compared with 8% for primary reconstruction.

Dr Wolff opened by arguing chronically damaged tissue with insidious onset of symptoms can be readily amenable to repair, but what about when it is not? Reconstruction removes all pain generating tissue. He cited an article that concluded reconstruction overcame significantly more patient pathology than repairs did, but with equivalent outcome scores.

Dr Nho disagreed, explaining the labrum should be preserved at all costs. This is the gold standard for three reasons: clinical evidence, anatomic and biomechanical principals and common sense. He argued the debate was not about a clearly irreparable labrum, but of primary reconstruction. Removing labrum devitalizes and damages labral communication, causing chondral damage. He led a 'save the labrum' chant, with audience participation. Lastly, he argued reconstruction evidence must prove superiority, not equivalence.

Dr Andrade posed a rhetorical question to the audience: 'If it looks normal, why does it tear?' Because it is torn, we know it is abnormal. Why repair it, strangle it and make it more painful? He cited the Karasak model and advocated application to surgery. Repair may compromise patient care because it is comfortable. In conclusion, he argued strongly that we are moving into the 'Reconstruction Era'.

Dr Stephen Aoki rebutted the article cited by Wolff, arguing the repairs that were inferior to reconstruction were not in line with published literature. They relied on 'voodoo math' to make significance go away. With a more critical review of the papers in support of primary reconstruction, methodological and data questions are revealed.

It became clear in this debate that primary labral reconstruction has a long way to go before convincing an international audience of its utility. Of Dr Nho's three reasons to save the labrum, the idea that it is 'common sense' prevailed in this debate. Repairing a damaged labrum is appropriate if one pays close enough attention as to why it was injured in the first place. In other words, understanding and treating the pathophysiology of labral damage, for example FAI syndrome or hip instability, should accompany



Dr Sampson looks on as Dr Ayeni makes his point to Drs Nepple and Matsuda in the debate on early intervention!

labral repair. We look forward to further studies to define the role of this challenging new technique.

Should we intervene early for the hip at risk?

Dr Al Stubbs chaired the debate, having the audience stand if they have radiographic evidence of a cam, pincer or dysplasia. He quipped that the entire audience should have been standing. He started the competition: 11 years of ISHA versus 10 000 years of evolution. In the red corner was Jeff ‘bone crusher’ Nepple and Dean ‘volcano’ Matsuda arguing for intervention. Standing in blue, Olufemi ‘boom-boom’ Ayeni and Richard ‘king’ Field argued against. Stubbs got the audience into this theme by challenging everyone to decide whether or not they would want surgery, were they diagnosed with ‘radiographic’ asymptomatic hip impingement, and labeled as ‘hip at risk.’ The audience was polled, 69% were against intervention.

Dr Nepple highlighted that surgical treatment of cam shapes could be compared with that offered to ACL tears, in terms of correcting malalignment and preventing unremitting degenerative changes. Similar to dysplasia, early intervention can prevent osteoarthritis (OA). Symptoms and arthritis are not a certainty, but there is room for improvement in finding patients to intervene early. Symptoms are not a good indicator. He suggested a shift in attitude toward early intervention despite an absence of symptoms. In the end, an article strongly linking cam type FAI syndrome to OA was presented.

Dr Field was concerned regarding this topic because the evidence is still so grey. An appeal to the audience was made: hip preservation is robustly supported now, why throw it away on performing unnecessary surgery? He urged us to treat the patient, not the X-ray. He highlighted that it is the responsibility of everyone not to forget the role of physiotherapy. Asserting that we are all ‘surgeon-scientists’, he said that our actions should reflect scientifically proven evidence-based concepts. To conclude, he said we should not be obsessed with morphologic corrections; instead, we must respect the diversity of Nature, and do no harm to our patients.

Dr Matsuda advocated for ‘gentle’ early intervention on cam and pincer shapes. In cases of bilateral ‘hips at risk’, he affirmed they should be simultaneously addressed, so that patients do not end up developing secondary lesions, such as lumbar disc disease, proximal hamstring tendonitis, OP or ACL tears. We must be aggressive with these early corrective measures before arthritis and arthroplasty become unavoidable realities. He concluded by saying that the price of inaction is greater than the risk of an unlikely potential mistake.

Dr Ayeni, confident in his KO punch, challenged the opponents to 10 push-ups. Their arguments were so weak that he wanted to make sure he broke a sweat. He emphasized the difference between a surgical business and a surgical practice. It would be incorrect to generalize from the small cohort of patients with symptoms who we treat now to the much larger asymptomatic population. Also, the

idea of changing the natural history of asymptomatic patients by changing just their shape is incorrect, since the origin of OA is multifactorial. He also noted that there are some well-known possible complications arising from arthroscopic surgery of the hip, that we all should bear in mind before performing surgery on an asymptomatic patient. In the end, Dr Ayeni questioned the cost-effectiveness of treating asymptomatic patients.

And just like that, the lunacy of performing surgery on asymptomatic patients was KO'd. The idea hit the ground with such force that it created a dent in stage. Dr Ayeni and Field had enough time remaining following the bout to pose for photos with their fans, while their opponents were taken by medic to the nearest emergency department for evaluation.

THE RICHARD VILLAR TRAINEES' PRIZE

We were fortunate to have six superb papers short-listed for the 'Richard Villar Trainees' Prize'.

Dr Edward Beck discussed clinically important improvement after surgery for FAI syndrome [116]. VAS was correlated with patient measurements and meaningful outcomes. Predictors for achieving MCID, substantial clinical benefit and patient acceptable symptomatic state were obtained. For MCID, the threshold was a decrease in 14.8 points in VAS. For substantial clinical benefit, an absolute score of 15.4 or a decrease of 25.5 points was needed. To achieve a patient acceptable symptomatic state, an absolute score of 21.6 points in VAS was found to be the threshold. There were modifiable and non-modifiable factors interfering with post-operative pain improvement outcomes.

Dr Rintje Agricola discussed a prospective cohort of early symptomatic patients. After 10 years of follow-up, in the ones with an alpha angle (AA) $>60^\circ$, the adjusted odds ratio (OR) and positive predictive value (PPV) to end-stage OA were 10.2% and 26%, respectively; in patients with an AA $>78^\circ$, the OR was 15.7 and the PPV of 39%; finally, in patients with an AA $>60^\circ$ and internal rotation $<25^\circ$, the values were 26.3% and 33%. FAI syndrome is strongly predictive of OA; high PPV demands preventive measures, as FAI syndrome may be a modifiable risk factor.

Dr Roxana Vlamont studied [117] the evolution of 24 patients (ages 28.7 ± 7.4 years) that underwent mosaicplasty because of osteochondral defects of the femoral head. The lesions measured $1.6 \pm 0.7 \text{ cm}^2$ (range 0.8–4.0). Patients were operated through a minimally invasive anterior approach, using autografts (cylinders) from the non-weight-bearing portion of the femoral head. There was a generalized clinical improvement, that decreased with

lesion size. This procedure may be considered adequate for lesions $<2 \text{ cm}^2$ and diameter $<16 \text{ mm}$.

Dr Mark Sohatee presented a very extensive review of conversion to THR for patients undergone HA or PAO. For HA, there was a conversion rate of 9.5%. For PAO, 8.3% of hips were converted to THR. The large sample size in this study and the low rate ($<10\%$) of conversions represent a strong message of efficacy to patients and orthopedic surgeons. It will also help us identify risk factors associated with conversion and highlight the areas for future work.

Dr Pranal Buddhdev presented his study, which represented the largest cohort of X-ray (ischial spine, posterior wall and crossover signs) and CT measurements (cranial and central version) of acetabular retroversion in slipped upper femoral epiphysis. It concluded that retroversion has a role in slipped upper femoral epiphysis etiology. Relevant topics to be addressed in future studies are: clinical outcomes, prophylactic pinning, monitoring the disease and patient counseling.

Dr Lionel Lazaro's study focused on osteochondroplasty at the femoral head edge level. The suction seal is considered vital to maintain a normal function of the joint. This facilitates intra-articular fluid pressurization that protects the cartilage matrix and creates a suction effect that maintains stability. His work found that leaving a sharp ledge does not compromise stability. On the contrary, trying to contour this ledge may take you too proximally and jeopardize the sealing effect and, thus, stability itself. Consequently, caution is advised against over-resection, when performing femoral osteochondroplasty.

KEYNOTE LECTURES

Finally, we were very fortunate to have two tremendous keynote lectures.

Dan Drawbaugh, the CEO of The Steadman Clinic and the Steadman Philippon Research Institute in Vail, Colorado gave a brilliant talk on the future of predictive analytics, machine learning and artificial intelligence. Striding about the stage, with stunning slides, his presentation was reminiscent of the late Steve Jobs. His ideas were equally revolutionary, showing us all how important it is for us to start to use these advanced digital technologies in our practice. They are coming, sooner rather than later!

Larry Mullen Jr., the founder and drummer of the world-famous rock band U2, made a heartfelt plea for teamwork in hip preservation. He described how only with teamwork can a band get together, make good music and stay together, and how only teamwork will give them a chance for sustained success. He then showed how all of this applied equally to the surgical team, and how real



Tremendous participation from all over the world.

teamwork was an absolute requirement for the highest quality of care for our patients.

CONCLUSION

An international community came together, breaking traditional disciplinary boundaries between surgeons, physiotherapists and radiologists, to reflect on what has been achieved, question long-standing beliefs, present new ideas and stimulate future endeavors. There were 177 invited presentations, 79 oral presentations of original research and 248 e-posters. A total of 217 videos of presentations were recorded. All of this can be accessed through the ISHA Academy website.

Dr Paul Beaulé will host the next ISHA annual meeting in Ottawa, Canada. The next decade will kick off with ‘The Science of Hip Preservation’, a theme underscoring the

advancements made through quality research to establish this field. Dr John Clohisy will be Program Chair. This meeting will continue the structure of prior meetings, and you can expect the meeting to attract an international audience of healthcare professionals eager to present and exchange knowledge, best practice and fresh research results.

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CONFLICT OF INTEREST STATEMENT

None declared.

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