



Highlights of the 22nd Annual Scientific Meeting of the Australasian Musculoskeletal Imaging Group [AMSIG] 2018, Gold Coast, Queensland, Australia

Ryan Shulman¹ · Timothy Dickson² · Gregory Cowderoy³ · Philip Lucas⁴ · Morgan McMeniman¹

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Introduction

The Australasian Musculoskeletal Imaging Group (AMSIG) held its 26th Annual Scientific Meeting (ASM) at the QT Hotel, on Queensland's Gold Coast over 2 days on the fifth and sixth of May. Convenors Drs. Ryan Shulman and Morgan McMeniman presided over a program which focused on pathology of the spine and upper limb. It included local and international speakers from an array of clinical and imaging subspecialty areas addressing contemporary issues in the imaging of musculoskeletal disease. The venue was full to capacity with approximately 250 delegates composed of general and subspecialty radiologists, orthopedic surgeons, sports medicine physicians, radiographers, and sonographers whom attended the informative lectures and interactive workshops over the 2-day conference. One hundred people attended the sold-out gala dinner held at Rick Shores restaurant on the beach at Burleigh Heads overlooking the Surfers Paradise coastline. Ten (10) RANZCR continuing professional development (CPD) points were awarded for attending the conference.

The organizing committee for the AMSIG Annual Scientific Meeting 2019, to be held in Queenstown, New Zealand, 30–31 March 2019, look forward to welcoming you to the meeting featuring; MR Neurography, Injectable Therapies Update, MSK Tumour Imaging Update and MRI MSK Advanced Update.

✉ Gregory Cowderoy
gcowderoy@gmail.com

¹ Queensland X-Ray, Brisbane, Australia

² Melbourne Radiology Clinic, Melbourne, Australia

³ Brisbane Private Imaging, Brisbane, Australia

⁴ PRP Imaging, Sydney, Australia

Plenary session 1: Rheumatology, oncology and intervention

Latest developments in the treatment of spondyloarthritis; Professor Matthew Brown

Professor Brown initially outlined how new biological agents, particularly TNF and anti-interleukin 17 inhibitors, have revolutionized treatment of patients with inflammatory spondyloarthritis in recent years. The Modified New York diagnostic criteria for ankylosing spondylitis were reviewed and their relevance for predicting outcomes and limiting expenditure on these extremely high cost medications was discussed. He reviewed data that demonstrated excellent short- and long-term outcomes in patients with ankylosing spondylitis treated with biological agents, and that these were very well tolerated. He pointed out an average delay in diagnosis of 5–7 years from onset of symptoms—this statistic has not changed significantly over the last 30 years despite the advent of MRI. Patients that have a delay in diagnosis tend to display disease progression and at an accelerated rate. Professor Brown emphasized the importance of accurate diagnosis as early as possible in the course of the disease as this results in improved response rate, as well as the potential for disease modification and remission induction.

Axial spondyloarthritis imaging: What the rheumatologist would like to know; Dr. Nivene Saad

Dr. Saad began describing the difference between radiographic axial spondyloarthritis (r-axSpA) and non-radiographic axial spondyloarthritis (nr-axSpA) with a review of the radiographic modified New York Criteria for grading sacroiliitis. She explained that the current prevailing opinion is that axial spondyloarthritis (SpA) represents a disease spectrum from

nr-axSpA progressing to r-axSpA. MRI protocol was reviewed with emphasis that contrast administration was not necessary as it would not change diagnostic criteria as per the Assessment in SpondyloArthritis International Society (ASAS) criteria. MRI features of SpA were categorized by sequence - acute inflammatory lesions (STIR) characterized by bone marrow edema; and structural lesions (T1) characterized by erosions, periarticular fatty metaplasia, backfill, sclerosis, and ankylosis. Dr. Saad reviewed example cases and pointed out imaging features that helped to differentiate SpA from its mimics and developmental variants.

Image-guided management of persistent pain in palliative care and post-cancer treatment; Dr. Craig Buchan

Dr. Buchan began by summarizing the scope of cancer burden within the community and the number of patients affected by cancer pain syndromes such as direct local effects of neoplasia, paraneoplastic syndromes, and iatrogenic factors. The various types of cancer pain, such as nociceptive, neuropathic, mixed, and central causes and their traditional pharmacologic management were reviewed. Dr. Buchan went on to outline the various image-guided interventional options for the treatment of cancer pain such as peripheral/regional nerve and plexus blocks including pulsed radiofrequency ablation, neurolytic techniques such as alcohol, phenol, and cryoablation. He also raised the possibility of radiologists providing intrathecal neurolysis, catheter systems, and cordotomy procedures at some stage in the future. The differences between pulsed (PRF) and continuous radio frequency (CRF) techniques and indications for each were reviewed. He discussed case examples of intercostal PRF or CRF for the treatment of post-mastectomy pain syndrome, post-thoracotomy syndrome, herpetic neuralgia; ganglion of impar bipolar RFA for pelvic/perineal malignancy and coccydynia; celiac plexus and splanchnic nerve neurolysis in upper abdominal malignancies particularly pancreatic cancer; brachial plexus blocks for tumor invasion; as well as combination of RFA with vertebroplasty for axial skeletal metastases.

Common and uncommon tumors around the shoulder and arm; Associate Professor Anthony Doyle

Assoc. Prof. Doyle reviewed the imaging protocols and features of various soft tissue tumors around the shoulder. These ranged from typical lipomas to liposarcomas and synovial sarcoma. He described the steps involved in standard management of soft tissue masses undertaken by a sarcoma service. He highlighted evidence that some therapies offered by radiology, such as cryotherapy, are playing a role in the treatment of fibromatosis and some tumors. Assoc. Prof. Doyle then went on to review multiple cases of tumors centered on the

bones of the shoulder girdle. He gave advice on how to manage the indeterminate intramedullary chondroid lesions often discovered incidentally, which was useful given the relatively limited usefulness of most imaging modalities and biopsy, in arriving at a definitive diagnosis in these cases (yearly radiographic follow-up suffices in almost all scenarios). He concluded with an example of intra-osseous hydatid disease.

Plenary 2: Shoulder pathology 1

Shoulder arthroplasty: The role of the CT scan; Dr. Ashish Gupta

Dr. Ashish Gupta commenced his talk showing that there has been a 115% increase in shoulder arthroplasties over the past decade. There is an increasing trend towards short-stem or stemless humeral components in total shoulder arthroplasty implants. There has been a landmark change in reverse shoulder arthroplasty design, which has medialized the center of rotation with improved results. Nine years of data from the Australian Orthopaedic Implant Registry demonstrates twice the failure rate of total shoulder arthroplasty in comparison to reverse shoulder arthroplasties. The number one cause for failure in TSA is glenoid failure. Pre-operative CT scanning is of use and the Walch Classification is used by the National Orthopaedic Registry and can be reported by radiologists. A retroverted glenoid of over 20 degrees is associated with an unacceptably high revision rate. Imaging of the whole scapula and humerus is of use for pre-operative planning to correctly calculate glenoid version. Further classification of glenoid bone loss defects and scapular morphology is also of use to recreate normal anatomy and the joint line by bone graft to reduce failure rates. Standardized pre-operative CT scanning and computer-assisted pre-operative planning with regard to implant positioning and bone grafting was demonstrated on a number of real-time videos. Complications of total shoulder and reverse shoulder arthroplasties were also discussed. The utility of en face CT examination for anterior shoulder instability assessment was also briefly discussed in closing.

Imaging shoulder arthroplasty; Dr. Kenny Nwawka

X-ray, CT, ultrasound, and MRI may be utilized as techniques to image shoulder arthroplasties and specific MRI techniques utilized at The Hospital for Special Surgery, New York were discussed in opening. Indications, imaging, and complications of shoulder hemiarthroplasty, total shoulder and reverse shoulder arthroplasty was discussed. Complications discussed in detail with regard to TSA included infection, loosening, wear-induced synovitis, implant failure, and dislocation. Assessment of the rotator cuff on MRI and US for TSA implants was discussed. With regard to the reverse TSA,

complications discussed included scapular notching, loosening, failure of the central glenoid screw of the glenosphere component, acromial and scapula spine stress fractures.

Neurogenic thoracic outlet syndrome—pathological condition vs. myth; Dr. Ashish Gupta

Neurogenic thoracic outlet syndrome is a diagnostic conundrum because the neurology and MR imaging findings are usually normal despite the strong clinical presentation. Neurogenic compression may in fact present first before vascular (arterial/venous) presentation of thoracic outlet syndrome. The causes of thoracic outlet syndrome were discussed including anatomical variations that should be easily identified on MR imaging. This condition is most common in people doing overhead work or sport and is generally due to a chronic traction-type insult. Upper plexus pathology tends to present with shoulder and chest wall pain, whereas lower plexus pathology tends to present commonly with C8 dermatomal symptoms. Currently, it is a clinical diagnosis of exclusion combined with specific provocative maneuvers on clinical examination including a positive Tinel's sign over the lower brachial plexus either at rest or in shoulder abduction, which were demonstrated with video presentations. Surgical options depend on the level of the plexopathy with upper plexopathy surgery performed by vascular surgeons and lower plexopathy treated by rhizolysis of the brachial plexus and tenotomy of the pectoralis minor tendon. This is able to be performed by arthroscopic surgeons. A video demonstration of this arthroscopic surgery was shown including suprascapular nerve decompression.

Imaging of the brachial plexus; Dr. Kenny Nwawka

Dr. Nwawka gave a talk on brachial plexus imaging with specific interest given to discussion of the post-ganglionic anatomy and pathology on both MRI and ultrasound. MRI technique at her institution was discussed. It is performed on a 3-T platform with DIXON fat-saturation sequences and tailored sequences depending on the anatomical level of the suspected pathology. Coronal sequences should be obtained along the plane of the subclavian vessels and then the sagittal sequences orthogonal to the coronal sequences for optimal imaging. Ultrasound [US] protocol was then discussed with still and cine imaging recommended for assessing the paravertebral, interscalene, supraclavicular, and infraclavicular regions. Comparative contralateral side imaging is recommended. Assessment of the axilla is often limited and the T1 nerve root cannot be assessed in the paravertebral region due to the 1st rib. Multiple cine loop videos of ultrasound assessment were then shown with specific examples of the suprascapular nerve. Thoracic outlet syndrome (TOS) assessment on MRI and US was then discussed. MRI example

cases of thoracic outlet syndrome were shown with attention paid to narrowing of the costoclavicular space, aberrant anatomy, and signal abnormality. US assessment included dynamic maneuvers of head turning, ABER imaging, and clinical reproduction of symptoms. US-guided injection of Botox into the scalene and pectoralis minor muscles was discussed for the management of TOS. Brachial plexus trauma was then discussed in detail with description of the imaging classification of post-traumatic neuritis, neuroma, or transection on MRI and US. MRI gives the added benefit of muscular denervation signal changes, whereas high-resolution US can give better assessment of neuritis vs. neuroma and examples on both modalities were presented.

Interesting shoulder cases; Dr. Brian Carey and Dr. David Connell

Dr. Brian Carey, in conjunction with Dr. David Connell, presented eight interesting MRI shoulder cases with the MR images, findings, and associated research presented and discussed. The cases included (1) sentinel cyst formation in association with rotator cuff tendinopathy; (2) thickening of the coracoacromial ligament with age-related thickening, anatomical variation, and association with shoulder impingement; (3) multi-directional instability and its association with axillary pouch/IGHL thickening secondary to repetitive microtrauma to the ligaments; (4) full-thickness humeral head chondral defects usually occurring in a posterocentral location; (5) post-traumatic bony remodeling of the humerus secondary to childhood injury; (6) coracoid fractures and avulsion fractures of the shoulder in adolescents; (7) osteochondritis dissecans of the glenoid; and (8) scapula fracture.

Plenary session 3: Shoulder pathology 2

Surgical management of pectoral injuries; Dr. Michael Thomas, upper limb surgeon, Gold Coast University Hospital and Gold Coast Surgical Hospital

He stated that pectoral injuries occurred predominantly in males in the 20–40-age group performing activities involving high force eccentric muscle contraction such as weight lifting. There is a strong association with anabolic steroid use, which is thought to stiffen tendons, reducing their elasticity and energy absorption.

The injury is often more obvious clinically than on imaging. The abnormality is almost always tendon avulsion from the humerus, which can be masked on MRI due to the clavicular head inserting superficial to the sternal component masking the tendon avulsion. Presentation to the surgeon is often delayed due to misinterpretation of the imaging.

Surgery is the treatment of choice with excellent results following primary repair. Good outcomes are also being achieved following delayed diagnosis, using interposition grafts.

Pectoralis major muscle injuries; Dr. Paul O'Connell, radiologist, Brisbane private imaging

Dr. O'Connell proceeded to present a complementary talk demonstrating pectoral anatomy and its relevance to the imaging of pectoralis major injuries. He presented a useful tip of locating fluid/tendon in the delto-pectoral groove and following it back to the humerus as a basis for achieving an accurate diagnosis. He reiterated the observation that pectoralis injuries were predominantly tendon avulsions from the humerus but may appear to be partial injuries or musculotendinous tears due to the sternal head insertion lying deep to the clavicular head, which is less often injured than the sternal head [4]. MR and ultrasound are both useful imaging tools but MR provided the most consistent accurate diagnosis and is preferred by most surgeons.

Imaging of biceps pathology; A/Professor David Connell, radiologist, imaging@Olympic Park, Melbourne

A/Professor David Connell provided a comprehensive review of imaging of biceps pathology.

Cuff-related shoulder pain and impingement, the radiologist's search for meaning in an evidence-based world; Dr. James Linklater

Shoulder pain is the third most common pain complaint after lumbar and cervical spinal pain. The rotator cuff is thought to be the source of two-thirds of this pain.

The development of impingement theory and treatment was discussed as well as the anatomy supporting these theories.

The relatively poor relationship between subacromial bursal thickening, mechanical evidence of impingement, and pain was discussed.

The tendinopathy cascade from tendinopathy through to full thickness rotator cuff tears is now thought to be the likely cause of rotator cuff pain. Bursal thickening/bursitis is thought to be secondary to this. There is a poor correlation between improvement in shoulder pain and subacromial decompression.

Acromial morphology was discussed with weak evidence that acromial morphology is associated with shoulder pain.

Intrinsic tendon degeneration is now thought to be the dominant cause of rotator cuff pain but with extrinsic factors such as bursitis and impingement playing a role.

Dr. Linklater proposed that subacromial pain syndrome or rotator cuff-related shoulder pain should replace the term rotator cuff impingement.

Plenary session 4: Elbow, hand, and wrist

Imaging of elbow pathology; Dr. Aziz Osman

Initially, there was a very informative talk on the MR imaging in throwing athletes by Dr. Osman from Queensland. The spectrum of injuries from acute to chronic that occur in this population of athletes was well demonstrated in pictorial review.

Surgical management of wrist pathology; Prof. Randy Bindra

Dr. Bindra, a surgeon also from Queensland, followed on with a presentation of his approaches to various common wrist pathologies including his techniques for minimally invasive treatment of fractures, and arthroscopic techniques for repairing ligaments and carpal tunnel treatment.

Imaging of wrist pathology; Dr. Sanjay Dhupelia

Dr. Dhupelia, from Queensland X-ray, gave a detailed review of wrist instability, with both anatomical and radiological correlation and provided a good overview of this difficult subject.

Imaging of finger pathology; Dr. Gregory Cowderoy

Finally, Dr. Cowderoy from Brisbane, Queensland, reviewed the anatomy and pathology of the finger including discussing tendon pathology and the common ligament injuries such as Stener's lesions of the thumb.

He also touched on common tumor and tumor-like conditions that are seen in the fingers with good demonstration of imaging of glomus tumors.

Overall, it was a very good and informative session.

Plenary session 5: Proffered papers and scientific presentations

Plenary 5 of AMISG saw local centers present proffered papers developed over the preceding 12 months. This session was presided over by Dr. George Koulouris and Immediate Past President, Dr. Sanjay Dhupelia.

FAVA. A recently recognized and often-overlooked diagnosis; Dr. Mark Coates

Dr. Coates introduced a relatively recently discovered complex mesenchymal malformation known as fibro-adipose vascular anomaly, first described in 2014. He described the typical clinical features in predominately teenaged patients with a presumed diagnosis of vascular malformation. The patients display severe/disproportionate pain and dysfunction with contractures and hyperesthesia. Histopathology of the focal and diffuse forms demonstrates lymphoplasmocytic aggregates, muscular fibrofatty infiltration, and extensive vascular and lymphatic malformations. Imaging appearances are typically of an intra-muscular lesion displaying heterogeneous T1 signal and T2 hyperintensity with tubular regions of enhancement on MRI and heterogeneous echogenicity with non-compressible hypoechoic tubular components on ultrasound (US). The presence of intra-lesion T1 hyperintensity and absence of compressible venous structures on US help differentiate from the primary differential diagnosis of vascular malformation, as does the predominate clinical feature of intractable pain. Dr. Coates reviewed two of his recent cases in which cryoablation, the current treatment of choice, was utilized with success.

A proposed treatment protocol for the management of pars interarticularis pathology in children and adults; Ms. Emma Johnstone

Ms. Johnstone presented a novel management protocol (developed by a multidisciplinary team of a spine surgeon, sports physician, physiotherapist, and musculoskeletal radiologist) used in the treatment of pars interarticularis injury. Its aim is to reduce radiation exposure from repeated CT examinations, achieve rapid pain relief, and reduce the probability of progression to spondylolisthesis. She outlined the two typical clinical cohorts: those with predisposing anatomy such as hypoplastic pars, and those who sustain excess osseous load typically from participation in sports with repeated lumbar extension. Ms. Johnston reviewed recent literature that supports the use of MRI in the identification of pars stress response before changes are evident on CT. She explained that with conservative management including the use of hard bracing, such ‘early’ lesions have excellent outcomes. A clinical index of suspicion scoring system was developed to determine which patients should be referred for MRI. The MRI protocol consisted of a T1 VIBE, water excitation gradient echo and STIR, aimed at identifying those injuries with pars bone marrow hyperintensity and hence a potential to heal. A 12-week staged physiotherapy and bracing regime was implemented successfully in 12 cases. Validation of the protocol with a formal study is planned.

Signal intensity changes in non-contrast MRI in spondylodiscitis; Dr. Appukutty Manickam

Dr. Manickam initially reviewed the risk factors and pathophysiology of spondylodiscitis. Typical MRI appearances, common mimics, and risks of gadolinium contrast administration were reviewed. The aim of his team’s study was to assess the value of non-contrast MRI evaluation in ruling out spondylodiscitis. To date, the study population has been representative of that reported in the wider literature, and it appears that the absence of paraspinal soft tissue inflammation and less than three sites of signal abnormality may be able to exclude spondylodiscitis on non-contrast MRI. Further data are being collected.

Ulnar-sided wrist pain in elite tennis players: MRI abnormalities of the non-dominant wrist; Dr. Sidney Levy

Dr. Levy explained that non-dominant ulnar sided wrist pain is an increasingly common clinical presentation amongst elite tennis players. The aim of his team’s study was to assess which structural abnormalities were associated with symptomatic ulnar-sided pain of the non-dominant wrist. A prospective study of 40 patients was conducted via Tennis Australia’s injury surveillance program. Two musculoskeletal radiologists independently reviewed numerous structures within the wrist and were blinded to clinical history. Ulnar-sided, non-dominant wrist pain in elite tennis players was found to be associated with an increased incidence of dorsal radioulnar ligament and ulnar-sided carpal (lunate, triquetrum, or hamate) MRI abnormalities versus controls.

Out-of-plane puncture for CT-guided RF denervation of lumbar facet joints: Review of technique and efficiency; Dr. Amit Lakkaraju

Dr. Amit explained the limitations of the CT-guided in-plane technique utilized in unipolar radiofrequency ablation (RFA) systems—specifically that a theoretically shorter segment of the medial branch is treated. Placement of the unipolar electrode aligned parallel to the medial branch produces a more optimal denervation lesion but requires an oblique trajectory. Some authors argue that ‘CT-guided’ RFA should not be performed for this reason. Dr. Amit described his oblique out-of-plane CT-guided method, which replicates the parallel alignment purported to be more efficacious by advocates of fluoroscopic techniques. In his small cohort, single operator study, 83% of patients showed significant improvement in pain with an average reduction in numerical pain score of 5.4 (from 7.5 to 2.1/10). He explained the technique is fast, accurate, easy to learn, emulates the fluoroscopic technique whilst maintaining

the advantages of CT guidance, and is cheaper than using a dual-tine electrode (which can be used in-plane).

Lesions of the conus and cauda equina: What the musculoskeletal radiologist needs to know; Dr. Peter Hughes

Dr. Hughes initially provided data showing increasing utilization of MRI imaging of the lumbar spine over the preceding years. He pointed out that whilst lesions of the conus are rare, the large volume of scans currently being performed increased likelihood of members encountering pathology in this region. A case-based review of glial and nonglial neoplasms, nerve sheath tumors, cystic lesions, vascular anomalies, and miscellaneous masses was undertaken. Excellent examples were shown that demonstrated features that help differentiate the various types of lesions.

Fat fraction quantification of bone marrow in the lumbar spine; Dr. Patsy Robertson

Dr. Robertson presented her preliminary findings of her team's study, which was the recipient of a 2017 AMSIG research grant. She began by reviewing the pathophysiology and epidemiology of non-neuropathic type 1 Gaucher disease in Australia. Effective treatment is available; however, it is expensive and requires monitoring for response and identification of osseous complications. MRI is the method of choice for the staging and surveillance of bone marrow infiltration by Gaucher cells—the lumbar vertebrae (sagittal T1 and T2) and femoral marrow (coronal T1 and T2) are traditionally assessed. Multiple quantitative and semi-quantitative techniques are utilized around the world. The inter- and intra-observer variability for semiquantitative methods of assessing bone marrow infiltration have been reported as suboptimal and Dr. Robertson has begun evaluating quantitative means of determining fat fraction. The first part of the study utilized the fat-only and water-only MR Dixon acquisitions (VIBE sequence coronal plane) obtained from ten healthy adult volunteers, which enabled formation of a fat-fraction dataset using a widely available commercial software application (LiverLab – Siemens Healthcare, Erlangen, Germany). Two MRI studies were performed on each patient. Inter-observer as well as inter-rater variability was assessed for fat fractions derived from regions of interest obtained at L2, L3, and L4 vertebrae. Mean fat fraction for all subjects was comparable to prior published research which utilized 'in-house' specialized non-commercial software. Excellent inter-observer and inter-rater reproducibility was demonstrated. Assessment of the clinical utility of this method with Gaucher patients began May 11, 2018, and data collection for this cohort is ongoing.

Plenary session 6: Pathology of the spine

Surgical management of spinal pathology; Dr. Simon Gatehouse

Dr. Gatehouse focused on pediatric scoliosis, particularly on adolescent idiopathic scoliosis. He reviewed the etiology of scoliosis including neuromuscular and congenital causes, along with the infancy and adolescent peaks. He defined scoliosis and outlined Risser scoring as a marker of skeletal maturity, along with the relationship of trunk growth velocity to the risk of developing scoliosis. He also discussed how skeletal maturity shapes approach to treatment and risk of progression. Traditional imaging was reviewed including appropriate follow-up protocols. EOS imaging and its advantages, including 2D and 3D modeling, was touched on followed by a discussion of indications for MRI in the setting of scoliosis.

Simon gave a brief overview of the Lenke classification of scoliosis and treatment of scoliosis including observation, bracing, and surgery and the risks and benefits of each method along with the indications for surgery including thoracoscopic resection.

Imaging of spinal hardware; Dr. David Lisle

Dr. Lisle gave an approach to imaging of spinal hardware. Initially outlining a historical perspective, the Harrington rod and their limitations, he moved on to outline advances in recent imaging and treatment, along with improved material technology. He stepped through advances since Harrington rods including the Luque system, the Cotrel Bubousset through to pedicle screw fixation and common complications. David then discussed lumbar interbody fusion, including the fusion and posterior stabilizing materials. He outlined the main surgical approaches along with the complications, including immediate postoperative complications, late complications such as loosening and cage subsidence, along with adjacent segment degeneration. Assessment of fusion was then covered, including the relevance of locked pseudoarthrosis. He outlined risks and benefits of motion-preserving devices such as total disc replacements and posterior dynamic devices. He finished with a discussion of cervical discectomy and fusion along with common complications including hardware failure and non-fusion. David finished with a discussion of vertebrectomy and corpectomy.

Lumbosacral kinematics in athletes—the myth of core stability; Dr. Kerrie Evans

Dr. Evans approached three myths revolving around core stability. The first was the belief that all athletes should be given core stability exercises. She defined core stability and outlined the traditional exercises to aid stability in the setting of low

back pain, including focusing on transversus abdominus activation. She gave examples of how multifidus assessment and fatty atrophy affects return to play and outcomes in injury. She outlined how altered lumbopelvic kinematics can alter the load and shear forces through the lumbar spine and how this can affect the athlete. The second myth related to the belief that imaging findings do not relate to pain, disability, or affect management. She outlined recent research that the number of MRI findings is correlated to the risk of low back pain in the athlete. Finally, Kerrie examined the belief that the clinician needs only to consider the biological part of the biopsychosocial approach, including factors such as sleep and stress. She outlined current research in pain tolerance and threshold. She finished with three case studies.

Use of particulate steroids in spinal injections; Dr. Timothy Dickson

Dr. Dickson then gave an update on the state of particulate steroid use in Australasia. He initially outlined the recent history of spinal infarcts with particulate steroid use in transforaminal epidural steroid injections and the proposed mechanisms of arterial embolization or arterial injury leading to spinal cord infarct, along with various techniques to mini-

mize risk. He then outlined the results of a 2017 AMSIG member survey regarding steroid use in spinal injections. It showed that 70% of AMSIG members perform cervical nerve root blocks or intraarticular facet injections; 97% are using dexamethasone for nerve root blocks. For cervical intraarticular facet injections, 60% are using dexamethasone and 40% particulate steroids. In the thoracic spine, 75% of members are performing injections, 91% using dexamethasone for nerve root blocks, 50% using dexamethasone for thoracic facet injections, and 50% particulate steroid; 100% of respondents performed lumbar injections; 75% are using dexamethasone for nerve root blocks, 25% particulate steroids. Greater than 50% are using particulate steroids for lumbar facet injections, with 75% of respondents also using dexamethasone for interlaminar steroid injections. Respondents gave the reasons for persisting with particulate steroid injections; one-third referrer preference, two-thirds a belief by the respondent that particulate steroids are more efficacious. Dr. Dickson then outlined the current literature including SIS guidelines and SIMS guidelines. He finished with current Australian and New Zealand College of Radiology guidelines to use non-particulate steroids in all nerve root blocks, while also commenting that particulate steroids remain safe in facet joint injections and interlaminar injections.