Issue 2, November 2020

ANZBMS Newsletter

ANZBMS Annual Scientific Meeting goes virtual

ANZBMS Awardees

Member publications

Meet our newest members

Cover image: Tissue Biobanking
Courtesy of Jennifer Byrne, NSW State BioBank

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ECI Issue : Early Dec. 2020
Next Issue: Late Jan. 2021

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@ANZBMSoc

Welcome to ANZBMS newsletter

Welcome to the November Issue of the ANZBMS newsletter! Our last general newsletter for this year. We have plenty of exciting news to share, including coverage of our first virtual ANZBMS Annual Scientific Meeting, awards and achievements, committee updates, member publications and new member highlights.

This year has marked the 30th ANZBMS meeting and the very first virtual meeting, which has been a fantastic success! Thank you to the Program Organising committee, all of the presenters and to everyone that joined us! For many of us, this has been our first meeting in our homes, more specifically our pajamas! But as always was jam-packed with amazing presentations and interactive sessions. See pg. 3 and 4 for more details on the meeting. On pg. 5 and 6, we congratulate the recipients of this year's ANZBMS awards. This congratulations is further extended on pg. 9 and 10, where achievements by ANZBMS members are also listed.

In order to recognise the many contributions of ANZBMS members to musculoskeletal research, we have made modifications to the publication section of the newsletter. We are continuing to highlight between 3 and 5 articles per month and will now include an extensive reference list detailing publications published in the 4 months prior to the general newsletter distribution. For further information about this section, please see pg. 12.

Thank you to everyone that has contributed to this issue of the newsletter. We very much appreciate your encouragement and contributions.

Happy reading!

Newsletter Editorial Board

ANZBMS Newsletter Editorial Board

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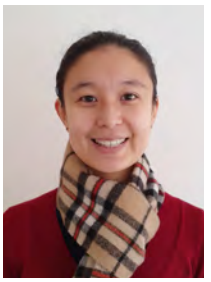


Natalie Wee

Emma West

2020 Inaugural Virtual Conference

Thirty years on from our society's first ever annual scientific meeting, this year the Australia and New Zealand Bone and Mineral Society's ASM took another historic first step by going virtual, and was largely deemed a huge success.

The origins of our society date back to a series of successful bone research symposia held in Adelaide starting as early as 1978. The establishment of our society built on this early success, with the aim of creating an inclusive society that represented researchers across the whole of Australia and New Zealand. Indeed, many speak about the Society's "family feel", with collegiality and inclusivity staples that have guided it's development over the past three decades. Support for young investigators, both clinical and biomedical, has also always been at the forefront of our Society's goals, evidenced by the early establishment of Young Investigator Awards and the encouragement given by senior members during talks.

At it's heart, our Society is built on people, and it is by keeping to the society's founding principles that led to such a successful first virtual meeting. Many have been impressed by the interactive nature of the virtual meeting, a component of the meeting that has been commented on by graduate students "attending" for the first time, and by established research leaders. The support for young investigators also evident by the bright cheery eyed faces in the corners of our screens delivering clear and insightful talks.

When talking to Jill Cornish about the first ever ANZBMS meeting back in 1990, her strongest memory is sharing a glass of Margaret River wine with Jack Martin at the reception. While many missed the person-to-person interactions of a "normal" meeting, rumours of informal wine and cheese zoom meetings seem to have provided a level of interaction that is important in the current climate. Going forward we can only hope that as a society we continue to build on our history of inclusivity and use future meetings, whether in person or virtual, to establish lasting relationships and memories that we can talk about in another 30 years.

David Musson

Meeting coverage:

Presentations are still available to watch if you missed one (or if you simply want to revisit some of the talks or posters). Just sign in on the conference website again with your details, and click on the Program button, or the E-Poster button.

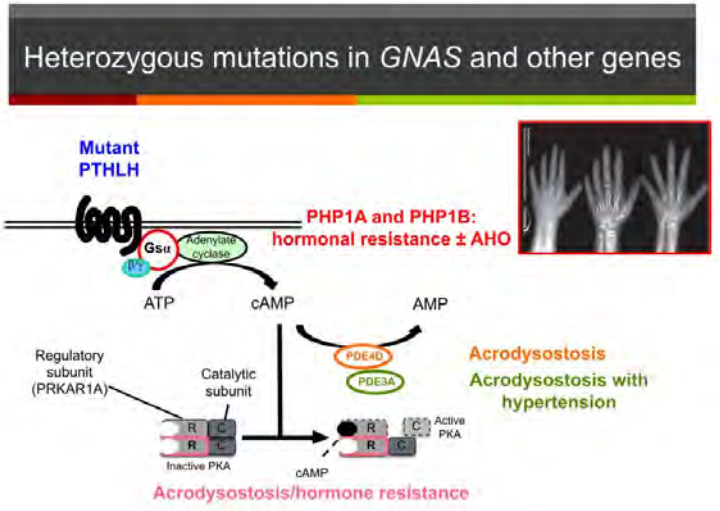


Image provided by keynote speaker Prof. Harold Jueppner from his talk, PTH-resistance syndrome: genetics and epigenetics

2020 Inaugural Virtual Conference

ECI perspective on the Annual Scientific Meeting

This year, the ANZBMS Annual Scientific Meeting was held in a virtual format from 12-14th October with over 300 registrants. With the impacts of COVID-19, the face to face Annual Scientific Meeting was cancelled and the POC took on a huge task of organising the first virtual meeting. The POC chaired by Michelle McDonald, Craig Munns and Christian Girgis established a hard-working team and along with Jim and the team from ASN events to organise a brilliant virtual meeting.

The first day commenced with an opening by the ANZBMS President Prof Natalie Sims and a plenary talk by Prof Harald Jueppner, Harvard University. The conference started strong with presentations by the researchers receiving Outstanding Abstract Awards. Following this, the Roger Melick session included fantastic presentations by current higher degree students or clinician trainees. Despite not being together in person, there was still a tremendous amount of interaction between delegates with the chat function used to share thoughts, ideas and provide positive encouragement to presenters. Dedicated posters sessions throughout the meeting also encouraged delegates to view the posters and ask questions. This allowed feedback and ideas to be shared. The first day ended with two ECIC sessions. The Career Development Session focussed on improving chances for fellowship success and was joined by over 100 delegates. The Clinical Cases session featured talks and discussion on topics including bone health in obesity and weight loss, prescribing exercise for osteoporosis and bone health in young women with primary or secondary hypogonadism.

Day 2 started strong with the Christopher and Margie Nordin Young Investigator session followed by national invited speaker Khoon Lim, University of Otago. The Christopher and Margie Nordin Young Investigator session included presentations from current higher degree students or clinician trainees. The day also included basic and clinical orals along with an invited plenary talk on biobanking from Prof Jennifer Byrne, University of Sydney. The lunchtime session was the Kyowa Kirin Medical Education Symposium. The AGM was held at the end of day with announcements of all awards. Congratulations to all those who received awards at this year's meeting.

The final day started with the ECIC networking breakfast, "Stop, Collaborate and Listen" followed by two national invited speaker talks from Prof. Ego Seeman, University of Melbourne and Dr. Sabashini Ramchand, Harvard University/University of Melbourne. The clinical and basic oral sessions included great talks on a range of topics with several questions being asked of the presenters. The Amgen lunchtime session featured Prof Mary Bouxsein, Harvard University, who delivered a presentation on non-invasive imaging in fracture risk assessment. The meeting finished with the B.O.N.E program plenary talk by Dr. Yuki Yoshimoto, Tokyo Metropolitan Institute of Gerontology and a closing ceremony hosted by Prof. Natalie Sims, A/Prof. Michelle McDonald and Dr. Sabashini Ramchand. Throughout the meeting, sessions were chaired by both senior members and ECIs who did a fantastic job fielding questions in the Q&A sections for each talk. It was lovely to see the names of those who asked questions which made it feel like we were getting the chance to interact with our colleagues.

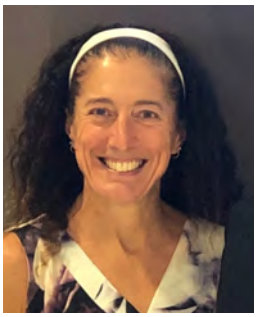
Overall this virtual meeting was a tremendous success and provided a brilliant opportunity for all to share research, ideas, thoughts and provided that well known support and comradeship that ANZBMS is well known for. Although we do hope for a face to face meeting in 2021, we now know that a virtual meeting of such a high calibre is absolutely possible.

Melissa Cantley, Sabashini Ramchand

and Ayse Zengin

ANZBMS Outstanding Abstract Awardees

Congratulations to the following members who have been awarded AMGEN-ANZBMS Outstanding Abstract Awards! These awards recognise ANZBMS members that submitted the highest ranked abstracts to this year's annual meeting.

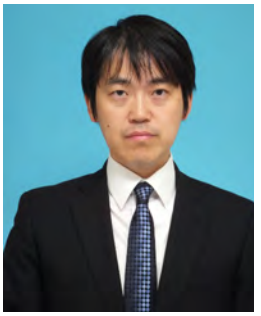


Sandra Iuliano (University of Melbourne/Austin Health)

Dairy supplementation reduces fractures and falls in institutionalised older adults: a cluster-randomised controlled trial

Audrey S Chan (The University of Melbourne)

Bone geometry is altered by follistatin-induced muscle growth in adult male mice



Tsuyoshi Isojima (St Vincent's Institute of Medical Research)

Interaction between osteocyte SOCS3-dependent signaling and the bone marrow microenvironment maintains cortical bone integrity

Peter R Ebeling (Monash University)

Subject characteristics and changes in bone mineral density after transitioning from denosumab (DMab) to alendronate (ALN) in the Denosumab Adherence Preference Satisfaction (DAPS) Study

Victoria D Leitch (RMIT)

An essential physiological role for MCT8 in bone in male mice

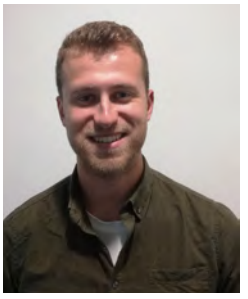
ANZBMS Awardees 2020

OA/AMGEN/ANZBMS Research Grant
A/Prof David Scott, Deakin University

ANZBMS Highest Ranked Student Abstract
Lena Batoon, Mater Research Institute
"Osteal macrophage contributions to post-menopausal osteoporosis bone pathology"

Christopher & Margie Nordin Young Investigator Award
Ruby Oberin, Hudson Institute of Medical Research
"Determining the role of maternal epigenetic inheritance in bone development and disease"

Roger Melick Young Investigator Award
James Smith, Garvan Institute of Medical Research
"Single-cell mapping of bone identifies key intercellular interactions within the endosteal bone microenvironment"



Kaye Ibbertson Award
A/Prof David Scott, Deakin University
Award for productivity (based on 5 publications in last 8 years)
For work on Obesity and fragility fracture

Sol Posen Award
Junjie Gao, Perron Institute for Neurological and Translational Science
Award for best paper (in last 18 months)
Gao et al. (2019) Endoplasmic reticulum mediates mitochondrial transfer within the osteocyte dendritic network. Sci. Adv. Nov 20;5(11):eaaw7215.

Committee news

Clinical Practice Committee Update

Continuing education: The committee will coordinate the next Advanced Clinical Postgraduate meeting to be held in the 2nd half of 2021, which is planned as a virtual function with wider participation from endocrinology, geriatrics, renal, rheumatology, rehabilitation and orthopaedics.

RACP: The committee is discussing the planned Continuing Professional Development (CPD) changes proposed by the Medical Board of Australia and the MCNZ to the RACP. The committee will update members via the ANZBMS website as information is available and will feed back to the College members' concerns.

Engagement with Osteoporosis Australia and NZ. The committee has discussed patient representation on research panels to provide consumer input. If you have a research project that requires such input, please contact the committee. Osteoporosis Australia is keen to include younger clinicians in its work and we will advise initiatives on the website. We are seeking members willing to engage with those national bodies so let us know if you are willing to volunteer.

Osteoporosis refracture prevention: Links to tools for fracture prevention initiatives will be more prominent as the website is redesigned.

Engagement with other societies. There has already been one ANZBMS and ECTS exchange arranged by the ECIC. The Clinical Practice Committee has contacted the Singapore Osteoporosis Society regarding a potential exchange between academic units in Singapore and Australia or New Zealand in 2021.

For full details about committee activities, please read the Committee reports provided in the Annual General Meeting Information

Densitometry Committee Update

In order to meet ongoing training requirements, a virtual Densitometry Course has now been organised and will take place 7-8 November 2020. DXA workshops will be supported through an AWS platform developed mainly through the work carried out by Julie Briody and Chris Schultz. Course participants will be able to login to virtual DXA machine software for the afternoon workshops.

Research Committee Update

New Members: The committee welcomes Belinda Beck, Brya Matthews, and Nigel Morrison. Former member, Matthew Summers, has moved to industry, and resigned from the Committee. We thank Matthew for his service to the Committee over the past 4 months, and wish him all the best in the new venture.

Submission to the Australian Medical Research Advisory Board (AMRAB) on medical research and innovation priorities 2020-22: The Committee has formed a task group (Tania Winzenberg, Rob Blank, David Findlay, Peter Ebeling and Tuan Nguyen) to provide a response. In consultation with Greg Lyubomirsky at OA and with Council, a document has been drafted and submitted to AMRAB. This response is the first step in working towards increased funding for ANZBMS-aligned research.

ANZBMS Awards: The Committee has worked with Rachel Davey to review the ANZBMS awards. Based on the review, the wording and criteria for each award has been modified and published in the Society's website. This year, the Committee received 8 applications for the Sol Posen Award and 5 applications for the Kaye Ibbertson Award. The Committee has developed 4 criteria for the Sol Posen award (scientific rigor, innovation, significance, and interest) and Kaye Ibbertson award (innovation / significance, author's contribution, journal prestige and citations). Based on the criteria the Committee has selected one winner for each award.

Committee news

Therapeutics Committee Update

1. Romosozumab

Having played a pivotal role in advising the PBAC on the value of romosozumab through its independent portal. The Committee was delighted to hear that the concept of financial support for a rebate for romosozumab was approved at the March meeting.Since then negotiations within Amgen regarding supply have been proceeding. We look forward to success in the near future for this major advance in the management of improved skeletal structure in those with insufficiency.

2. Familial hypophosphatemic rickets

The Committee is pleased to announce that the ANZBMS Council has approved a plan to develop National Guidelines for the management of familial hypophosphatemic rickets in adults, an area that has not received much attention in the past. Given the new focus on the clinical management of the large number of rare and genetic disorders, this initiative should be seen the forerunner of guidelines for other such disorders for example osteogenesis imperfecta.

The current agenda for the Working Party is:

•Develop diagnostic criteria for adult hypophosphatemic bone disorders especially adult XLH

•To develop a framework for management guidelines of adult hypophosphatemic bone disorders XLH including transition to adult care

•Develop a program to survey the prevalence of adult hypophosphatemic bone disorders especially adult XLH

•Work with the Australian Paediatric Registry to develop questionnaires suitable for adult participants to examine the potential of a combined paediatric adult registry.

Interestingly there are a large number of expert groups that should be involved in these diseases given its effect on many organs. These include

•Australian and New Zealand Bone and Mineral Society (ANZBMS),

•Endocrine Society of Australia,

•Australian Paediatric Endocrine Group,

•Australian New Zealand Society of Nephrology (ANZSN)

•Australian Orthopaedic Society

•Australian Rheumatology Association

•Australian Dental Association

•Australian Physiotherapy Association

•XLH Patient Network

•Human Genetic Society of Australasia

•Australian Society of Otolaryngology Head and Neck Surgery

Getting involvement of a such a large number of groups will be challenging. The advantage is that given the small number of patients involved it would be important to have an outline of an integrated management plan involving all specialists that might be involved.

We ask for expressions of interest form members to join this Working Party

3. Fragility Fracture Network (FFN)

The Committee was asked to comment on the involvement on ANZBMS in supporting the international Fragility Fracture Network (FFN). Given involvement of prominent Society clinicians and its sensible terms of reference the Committee advised it should be supported.

Richard Prince , Chair Therapeutics Committee

Opportunities

ASBMR FIRST AWARD
Due 2nd Dec 2020
https://www.asbmr.org/first-award
Open to ASBMR members - $60,000 USD

Let us know about any opportunities or job vacancies that will be of interest to ANZBMS members at newsletter@anzbms.org.au

Congratulations to our members!

President-Elect of ASBMR

2020 Australia's leading endocrinology researcher

Prof. Peter Ebeling, Monash University

Professor Peter Ebeling AO is Head of the Department of Medicine in the School of Clinical Sciences at Monash Health, Faculty of Medicine, Nursing and Health Sciences, Monash University.

Peter completed his MBBS at The University of Melbourne. During his doctoral studies with Professor Jack Martin AO, their team discovered PTHrP involved both in humoral hypercalcemia in cancer and in normal calcium metabolism. Peter then worked with Dr. Larry Riggs as a senior post-doctoral fellow at the Mayo Clinic in the USA for 3 years, and subsequently as a visiting research fellow at the Botnar Research Centre, at the University of Oxford, UK.

Peter is a Board member of International Osteoporosis Foundation, and honorary Medical Director of Osteoporosis Australia. He was President of ANZBMS (1999-2001), Director of the Australian Institute of Musculoskeletal Science (AIMSS) (2011-2014), and President of Endocrine Society of Australia (2012-14). In 2015, he was awarded Officer in the Order of Australia (AO) for his distinguished service to medicine in the field of bone health, through academic contributions and research initiatives in a range of administrative, executive and professional roles.

Peter was the Editor-in-Chief of *Bone Reports*, an Editor of *Clinical Endocrinology (Oxford),* and an editorial board member of *Osteoporosis International* and *Bone*. Peter has been an ASBMR Councillor for 7 years, where he has served as Editor-in-Chief of *JBMR Plus* and been part of 3 ASBMR Task Forces. He was also Associate Editor of *Journal of Bone and Mineral Research* from 2008 to 2012.

Peter is newly appointed President-Elect of ASBMR. He is the first President to be elected outside of North America.

In 2020, Peter also was awarded a NHMRC Leadership 3 Investigator Grant (2021-2025).He has been also beenbeen also announced as Australia's leading endocrinology researcher. Australia's leading researchers in health and medical sciences are the researchers with the highest number of citations from papers published in the last five years in the 20 top journals in their field.

International Osteoporosis Foundation (IOF) President's Award

Professor Ego Seeman, University of Melbourne

Ego Seeman is Professor of Medicine and Endocrinologist at the Department of Medicine and Endocrinology, Austin Health, University of Melbourne.

Ego has worked in the field of osteoporosis for 35 years studying the epidemiology, pathogenesis and treatment of fragility fractures. He is one of three Professorial Fellows in the Bone Health and Fractures Research Program at the Mary MacKillop Institute (Australian Catholic University), working on a collaborative research program entitled 'Closing the Gap in Fracture Risk Assessment and Management'.

Ego is a board member of the International Osteoporosis Foundation (IOF), past president of ANZBMS (2003-2005), associate editor of *Osteoporosis International,* and editor of *Progress in Osteoporosis, Bone*, and *JBMR* journals.

He has received many awards including Fred C. Bartter Award from ASBMR (2002), Austin Hospital Medical Research Foundation Distinguished Scientist Award (2008), IOF Medal of Achievement for Outstanding Investigation in Osteoporosis Research (2009), IBMS J Haddad Jr Award (2013), and Inaugural ANZBMS Career Achievement Award (2014). He was selected as a Member of the Order of Australia (2016) for his outstanding scientific contributions in the field of osteoporosis and endocrinology.

Ego has been awarded the IOF's prestigious President's Award 2020. This award (formerly known as the Pierre Delmas Award) honours six individuals from different regions who have made a significant contribution to the advancement of the work of the IOF.

Congratulations to our members!

ASBMR Most Outstanding Clinical Award

Dr Sandra Iuliano

Senior Research Fellow, University of Melbourne

Awarded for her abstract titled "Dairy Supplementation Reduces Fractures and Falls in Institutionalized Older Adults: a Cluster-Randomized Placebo-Controlled Trial"

Golden Femur to John Eisman (on behalf of ASBMR)

Professor, Garvan Institute of Medical Research
For biannual ASBMR-ECTS debate

ESCEO-IOF Young Investigator Award

Dr Ayse Zengin (left)

Senior Research Fellow, Monash University

Carrie-Anne Ng (right)

PhD candidate, Monash University

Victorian Young Tall Poppy Award

Dr Ayse Zengin

Senior Research Fellow, Monash University

The prestigious annual Young Tall Poppy Science Awards aim to recognise the achievements of Australia's outstanding young scientific researchers and communicators.

2020 John Haddad Young Investigator Award

Dr Sabashini Ramchand

Consultant Endocrinologist and Research Fellow, The University of Melbourne

This grant supports young basic and clinical scientists to attend the AIMM-ASBMR Meeting.

International Society of Bone Morphometry July 2020 Imaging Contest

Martha Blank (left)

PhD candidate, St Vincent's Institute

Check out their beautiful images here!

Dr. Dzenita Muratovic (right)

Postdoctoral researcher, The University of Adelaide

Meet our newest ANZBMS members

Behnaz Azimi-Manavi, PhD candidate

Affiliation: Deakin University, School of Medicine, IMPACT Institute

Research category: Clinical

Research interests: I am working on antipsychotic medication, schizophrenia and osteoporosis. Overall, with a psychology background, I am interested in the association between mental health and bone.

What you hope to gain from joining ANZBMS? I hope I can communicate with other members and build a network.

@behnazmanavi

Dr Jiao Jiao Li, Lecturer

Affiliation: University of Technology Sydney

Research category: Basic

Research interests: My research interest is in the field of tissue engineering and regenerative medicine. I previously worked on developing biomaterials and scaffolds for regenerating bone and cartilage, and my current focus is on modulating and using stem cells and cell-derived products as regenerative therapies for osteoarthritis.

What you hope to gain from joining ANZBMS? I wish to meet and collaborate with more people in bone and musculoskeletal research! We have a relatively smaller community compared to other areas (e.g. cancer, cardiovascular) and it is particularly important that we work together and support each other in the current times. As a new member of ANZBMS ECIC, it's also my goal to contribute to supporting EMCRs in our community.

@JiaoJiaoLi_Syd

Anoohya Gandham, PhD candidate

Affiliation: Monash University, Department of Medicine, School of Clinical Sciences at Monash Health

Research category: Clinical

Research interests: My research interests are bone and muscle health in older adults with sarcopenia and obesity. My doctoral research investigates body composition and physical function as predictors of fracture risk in obese older adults.

What you hope to gain from joining ANZBMS? I hope to build a network with other researchers in this field who pursue similar interests to me and hopefully also develop some collaboration opportunities with other scientists through conferences and meetings organised by ANZBMS.

Member publications

The overall goal of this section of the newsletter is to support and promote the research of ANZBMS members. We are so proud of all the work that our members do, and would like to increase the awareness of ANZBMS member contributions to the musculoskeletal field by featuring and including a list of publications by our members.

What's new? We will include a reference list of known ANZBMS member publications. It's quite striking to see how many amazing publications are produced by our members. Articles that are in the interest of ANZBMS members (related to musculoskeletal research) will be hot off the press and will cover new articles released online in the four months preceding the newsletter issue.

You're probably wondering how do we find all these publications? We've set up as many alerts using Google Scholar and PubMed on member names as possible. It's not perfect, so if we have missed your publication please let us know (newsletter@anzbms.org.au) and we'll include it in the next issue.

We will also continue to feature 3 to 5 articles per issue. A panel from the editorial board will guide the selection of feature articles, we aim to capture a diverse set of articles within issues and between issues, with an emphasis on articles where an ANZBMS member is first and/or last author. We would also like to thank the Research committee and the Communications committee for their input on this process.

Nethmi Abeynayake, Agnieszka Arthur and Stan Gronthos. Crosstalk between skeletal and neural tissues is critical for skeletal health. (2020) Bone. Sep 16;115645.

What is the background of this study? Several studies have demonstrated that a physical and functional communication between the bone cells and neural tissues is important in mediating the development, maintenance and repair of the skeletal system. Proper innervation is necessary for correct skeletal developmental growth and fracture repair, while skeletal pathologies such as osteoporosis are accelerated by disrupted innervation. These studies provide evidence of the crosstalk between the skeletal and neural systems that forms the neuro-osteogenic network.

What did you find and what message do you want readers to take away from your paper? We reported on a number of cell surface receptors, cytokines and associated ligands that mediate molecular interactions between the bone and neural cell populations within this neuro-osteogenic network. The specific molecular mechanisms that mediate this crosstalk are the Bone Morphogenetic Proteins, Eph/ephrin, C-X-C Motif Chemokine Ligand 12, Calcitonin Gene-related Peptide, Netrins, Neurotrophins, Slit/Robo and the Semaphorins.

What is an application of your finding? Since there is substantive evidence that the molecular mechanisms within this neuro-osteogenic network contribute to skeletal health, further research in this area could lead to an alternative approach to identify and develop novel therapeutics that target these interactions in order to treat skeletal pathologies such as osteoporosis and osteoarthritis, and improve fracture healing.

Did you face any challenges during the study? It was a challenge to find papers that had looked at the effect of manipulating particular molecular mechanisms on both the skeletal and neural system within the same study. This identified a need that is currently unmet when investigating molecular mechanisms that we do not remain solely within our field of investigation but rather explore the whole environment, especially the other systems that work cohesively within the bone. This would broaden our understanding of the neuro-osteogenic network and in turn, skeletal health.

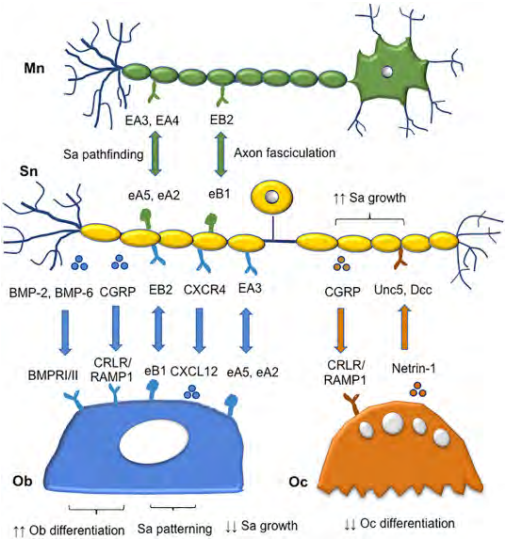


Figure 2 from Abeynayake et al.
doi: 10.1016/j.bone.2020.115645. (CC BY NC ND)

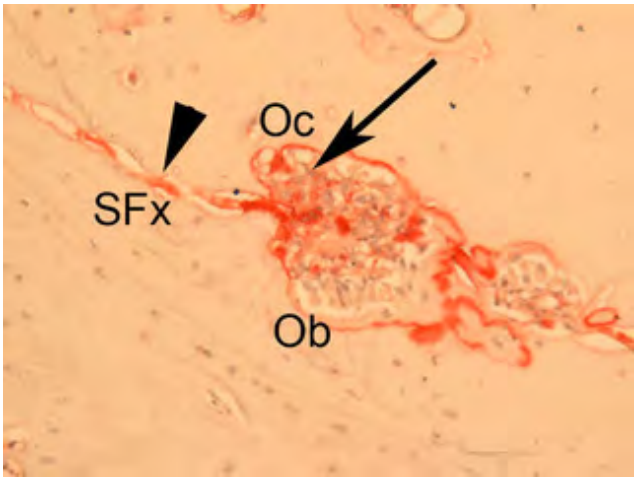
Member publications

Mahmoud Bakr, Wendy Kelly, Athena Brunt, Bradley Paterson, Helen Massa, Nigel Morrison, and Mark Forwood. Intermittent Parathyroid Hormone Accelerates Stress Fracture Healing More Effectively Following Cessation of Bisphosphonate Treatment (2020) JBMR Plus.

What is the background of this study? We had discovered that stress fractures (SFx) heal by direct remodelling. Periosteal woven bone stabilised the region, resorption excavated the SFx line, and new bone formation completed the repair (Kidd et al 2010). We had also observed thatbisphosphonate treatment depressed SFx healing (Kidd at el 2011). We knew that BPs enabled accumulation of micro damage (Mashiba et al (2000), and our new data suggested a mechanism whereby inhibition of remodelling by BPs, contributed to the aetiology of atypical femoral fractures (AFF). The ulnar loading model in rats offered an opportunity to test therapeutic targets to improve healing of SFx and AFF, including the potential for PTH to accelerate healing by activating remodelling. We hypothesized that intermittent PTH (iPTH) treatment would accelerate SFx healing, even in the presence of BP treatment.

What did you find and what message do you want readers to take away from your paper? We pretreated animals with BP, then initiated SFx in the ulna. Then BP treatment was either continued with concurrent iPTH treatment (2 weeks), or stopped and PTH treatment initiated. Healing was examined at 2 and 6 weeks to examine the resorption and formation phases of healing, respectively. A short-duration iPTH treatment effectively increased remodeling of SFx following BP treatment, but the remodelling activation was greater when BP was ceased at the time of iPTH initiation. The take home message is not to confuse this work with treatment of osteoporosis per se, and that we rejected our hypothesis that iPTH would accelerate remodelling activation even in the presence of concurrent BP treatment.

What is an application of your finding? Prospective human studies demonstrate that iPTH activates remodelling following BP treatments (eg Chiang et al 2013) and can improve AFF healing, though it's not universal outcome (Ramchand et al,. 2016). If the activation is stronger when BP is ceased, a sequential therapy protocol might produce a greater synergistic clinical outcome than ongoing monotherapy.



This image shows a basic multicellular unit (BMU) initiated to remodel the SFx. SFx is upwards to the left, osteoclasts (Oc) are stained in red (TRAP) towards the resorption front and osteoblasts and bone formation can be seen to the lower right. Of interest, osteoclastic cells are seen entering the SFx space; and the reversal line also retains some TRAP stain, indicating secondary remodelling.

The suggestion here is to reconsider Frosts (1979) ADFR concept (Activate- Depress- Free- Repeat) in which remodelling is activated by a short period of iPTH; it is then depressed during the resorption period by an antiresorptive to limit bone loss but allow ongoing formation; a drug- free period then proceeds for the duration of a typical formation period, before repeating the cycle. It's a difficult hypothesis to test in a clinical trial.

Did you face any challenges during the study? In such a large study, the biggest challenge is creating a reliable SFx, without it progressing to Fx. SFx are created in ~10,000- 20,000 cycles of ulnar loading. Our team monitor the displacement of the bone during that time and when it increases by 10%, we stop the loading. This typically results in a SFx. This requires close attention over long periods of time so that we don't miss that point. Thanks to our team's diligence, very few were missed.

Member publications

Jason Talevski, Kerrie Sanders, Ljoudmila Busija, Alison Beauchamp, Gustavo Duque, Fredrik Borgström, John Kanis, Axel Svedbom, Catherine Connaughton, Amanda Stuart, Sharon Brennan-Olsen. ***Health Service Use and Quality of Life Recovery 12- months Following Major Osteoporotic Fracture: Latent Class Analyses of the International Costs and Utilities Related to Osteoporotic Fractures Study (ICUROS). 2020. JBMR. doi:*** **10.1002/jbmr.4181**

What is the background of this study? Post-fracture care pathways have been expanding globally over the last decade and have been shown to enhance recovery of basic activities of daily living, decrease re-fracture rates and improve health- related quality of life (QoL) in hip fracture patients. However, there is limited knowledge is available on which healthcare and community services, major components of care pathways, can improve the long-term health of older people following a major osteoporotic fracture (MOF), specifically in non- hip MOF patients. The aim of this study was to identify combinations of healthcare and community service use associated with the recovery of QoL 12-months post-MOF, using data from the International Costs and Utilities Related to Osteoporotic fractures Study (ICUROS) – a multinational observational study (Australia, Austria, Estonia, France, Italy, Lithuania, Mexico, Russia, Spain, UK).

What did you find and what message you want readers to take away from your paper? We identified several multifaceted care pathways that are associated with improved QoL recovery 12- months post-MOF across individual countries.The combination of health services that was associated with increased odds of QoL recovery generally included hospital presentations without admission; outpatient clinic visits; allied health visits (e.g. physiotherapy, occupational therapy); vitamin D/calcium supplementation; and non- opioid analgesic use. Understanding country-specific health care pathways that influence greater recovery of QoL could improve post-fracture care on a global scale, particularly use of health services that are uncommon in some countries and routine in others.

What is an application of your finding? This study demonstrates that there are high probabilities of having different QoL responses among different health services combinations following MOFs. Incorporating our findings into existing clinical practice may result in care pathways that optimize QoL recovery for patients with a MOF.

The above image demonstrates all countries involved in the ICUROS.

Did you face any challenges during the study? The greatest challenge was managing the international data from the ICUROS. Health service use data substantially differed between countries given the geographic variation in healthcare system structure; and free text variables were challenging to aggregate as they were sometimes provided in a different language. The data cleaning and formatting for Stata software took many months and was extremely time consuming. The other challenge was learning to undertake the latent class analyses. This was achieved with a lot of reading, YouTube tutorials, and of course, the much- appreciated statistician. All in all, it was very satisfying once it was all done!

Thao Ho- Le, H. T. T Tran, Jackie R Center, John A Eisman, Hung T Nguyen, Tuan V Nguyen. ***Assessing the clinical utility of genetic profiling in fracture risk prediction: a decision curve analysis.*** **2020. Osteoporosis International.**

doi: 10.1007/s00198-020-05403-2

What is the background of this study? Multiple genetic variants have been found to be associated with bone mineral density (BMD), but their effect sizes were modest. We have created a polygenic risk score called "Osteogenomic Profile" from the BMD- associated genetic variants. This Osteogenomic Profile has been shown to enhance fracture risk prediction over and above that of the Garvan Fracture Risk Calculator.

Traditionally, the usefulness of a new marker is evaluated in terms of discrimination (eg area under the receiver's operating characteristic curve) and calibration (eg agreement between observed and predicted risk). However, neither discrimination nor calibration informs us about the clinical decision making. A clinical decision has consequences of false positive and false negative. In this paper, we use an approach called Decision Curve Analysis (DCA) for qualifying the clinical usefulness of the Osteogenomic Profile. In essence, DCA aims to search for a risk threshold (eg probability of fracture) to group individuals into 'positive' (for intervention) or 'negative' (not for intervention), and to weight false positive and false negative classifications. Net benefit is broadly defined as the difference between true positive and false positive, with a weighting factor.In the context of treatment, false positive can be thought of as the harm of unncessary treatment, and false negative as the harm of over-treatment. Thus, DCA allows risk threshold to vary to examine whether a new marker is superior to an established one at a certain range of risk thresholds. In our case, the new marker is the Osteogenomic Profile, and the established one is the Garvan Fracture Risk Calculator.

What did you find and what message you want readers to take away from your paper? We found that the Osteogenomic Profile is clinically more useful than a model with non- BMD clinical risk factors; however, in the presence of BMD, the Osteogenomic Profile modestly improves the net clinical benefit. We also found that the 10- year fracture risk threshold of 15% or greater yields the best net benefit.

At 20% risk threshold, the Osteogenomic Profile could help avoid 1 additional treatment per 81 women or 1 per 24 men compared with the Garvan Fracture Risk Calculator model.

What is an application of your finding? Our results imply that Osteogenetic Profiling can be used in place of BMD for the prediction of fracture in asymptomatic individuals. We consider that our finding provides a risk threshold for selecting patients for treatment. However, the cost-benefit of such a selection should be evaluated.

Did you face any challenges during the study? Since the decision curve analysis is relatively new and somewhat abstract, I have difficulty with explaining this idea and results to my colleagues in lab meetings and conferences.

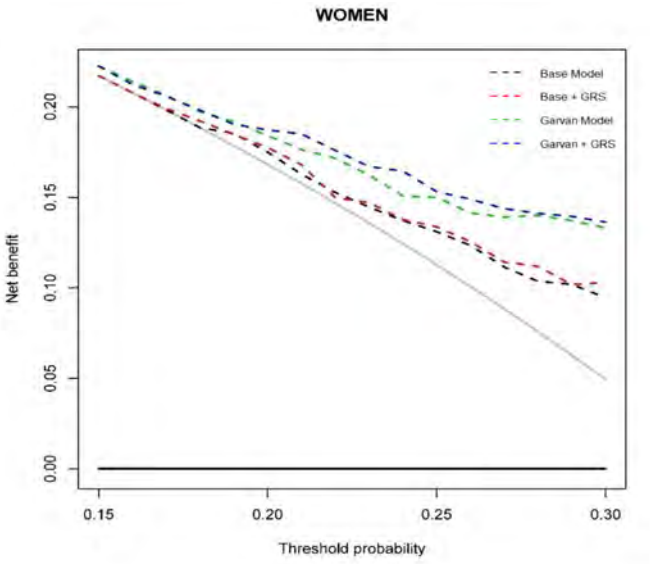


Figure: Net benefit curves for women. Decision curve analysis of the effect of predictive models of 10-yr fracture risk for osteoporosis treatment. Net benefit is plotted against various treatment thresholds. Decision curves for each model are shown in different colours: The "treating no-one" strategy would clearly bring no net benefit at any level of risk, accounting for the horizontal black line. The "treating all" strategy would have the potential for the greatest benefit at lower risk thresholds where the aim is to try and avoid treating people unnecessarily, with lower potential benefit at high risk thresholds when the majority of people would require treatment, thus accounting for the negative slope of the grey line. Model with clinical risk factor only (CRF, dashed black), Model II (CRF+genetic profiling or GRS, dashed red), Model III (CRF+BMD, dashed green), and Model IV (CRF+BMD+GRS, dashed blue).

Member publications

Dominic Thewlis, Andrew Waters, Lucian B. Solomon, Egon Perilli

"Investigating in vivo knee volumetric bone mineral density and walking gait mechanics in healthy people"

2020. BONE
https://doi.org/10.1016/j.bone.2020.115662

1. What is the background of this study?

Subchondral bone, a shock-absorber of the joint, plays an important role in the pathogenesis of knee osteoarthritis (OA). Recently, we and others found significant relationships between knee mechanics and the distribution of subchondral bone of the tibial plateau in people with end-stage knee OA undergoing knee replacement. However, in our studies the bone volume fraction was quantified *ex vivo* using micro computed tomography (µCT) and therefore, this approach remains limited to cross-sectional studies of surgically excised bone. To bridge the gap to a potentially diagnostic approach, we must look at *in vivo* methods for examining the bone distribution in the knee, such as volumetric bone mineral density (vBMD) using pQCT.
To date, no published research investigated the relationship between measures of vBMD from pQCT and knee joint mechanics measured *in vivo*. Importantly, prior to commencing longitudinal studies, the repeatability of this technique for quantifying sub-regional vBMD of the subchondral bone in the proximal tibia must be established. That gave the motivation to our study.

2. What did you find and what message you want readers to take away from your paper?

We found that the medial-to-lateral distribution of subchondral vBMD in the tibia of healthy participants appears to be related to, at least cross-sectionally, the gait mechanics of the knee. Joint moments, as captured from gait analysis, may play an important role in regulating the distribution of subchondral bone, although, interestingly, the relationships appear to differ compared to our previous findings in end-stage knee OA. This was the first published study to combine in vivo pQCT measurements of vBMD at the knee and gait analysis.

3. If appropriate, what is an application of your finding?

The reproducibility of the here described pQCT workflow was good to excellent. Future work will explore to use the combination of pQCT and gait analysis in longitudinal studies of healthy ageing and joint disease.

4. Did you face any challenges during the study?

No real challenge apart from funding – we did this preliminary study on our own expenses, in the hope to source grant funding for larger studies in future!

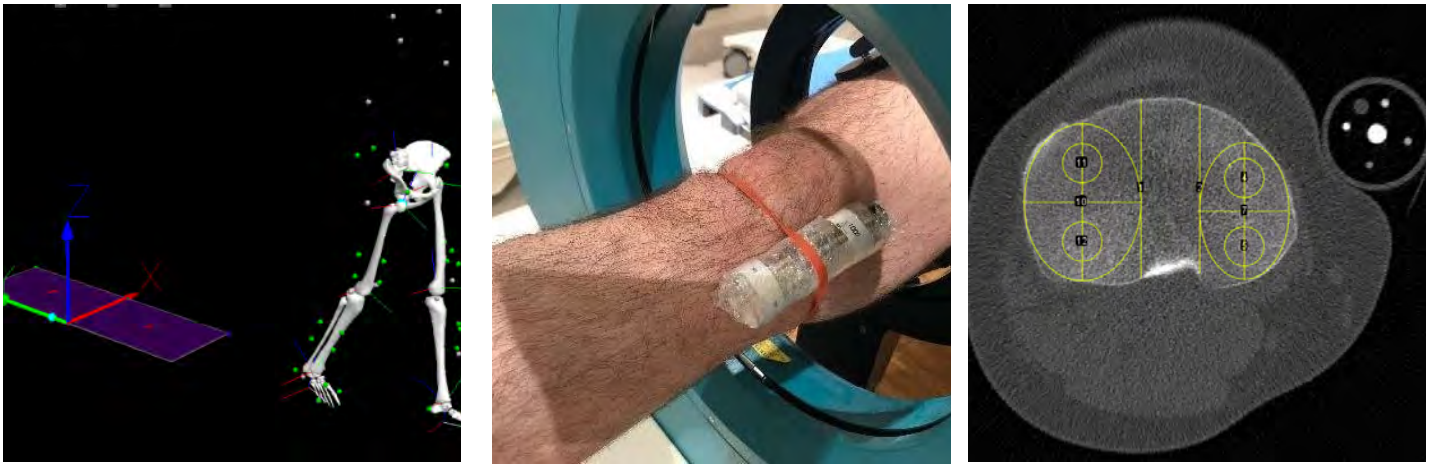


Figure: Workflow: gait analysis of participant (left); participant undergoing pQCT scan, with a density phantom attached to knee (center); pQCT image of tibial plateau, with density phantom (right).

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Calendar of Events and Webinars

ANZBMS EVENTS

ANZBMS Virtual Clinical Densitometry Course
7-8 November
More information here

AUSTRALIAN

Implications of COVID-19 on Sarcopenia & Frailty Virtual Symposium
ANZSSFR
12th November 1415 - 1700 AEDT
Registration - Before 10 November 2020
Website: https://anzssfr.org/future-meetings

Melbourne Bone Interest Group Virtual Meeting: Not "as dry as bone"
Dr Debbie Gordon, Eastern Health
Date: 24th November 1900-2000 AEDT
RSVP by 20 November 2020
esther@melbourneendocrineassociates.com.au

ADS/ADEA Annual Scientific Meeting Virtual
11th-13th November 2020
Website: http://www.diabetescongress.com.au/

INTERNATIONAL

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Details on topics and registration at:
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ECTS Webinar: Tips and tricks for histomorphometry
12 November 2020, 1900-2000 AEDT
Registration: here

ECTS Webinar: Osteocytes
Registration: here
11 December 2020 0200 -0300 AEDT

The Primary Care Rheumatology and Musculoskeeltal Medicine Society Meeting
Vitual Meeting 12-13 November 2020
More information here

IO - ASBMR Rare Bone Disease TeleECHO
Delivered virtually the first Thursday of each month 1500 EST
More information here

OI Foundation Osteogenesis Imperfecta TeleECHO clinic series
Delivered virtually the second Wednesday of each month 1500 hours EST
More information here

Orthopaedic Research Society 2021 Annual Meeting - Abstracts Due September 28th
13th-16th February 2021 Long Beach, California
Website:
https://www.ors.org/2020annualmeeting/

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