# WFUMB 2009 Sydney Australia

## 12th World Congress of the World Federation for Ultrasound in Medicine and Biology

**August 30 – September 3, 2009**

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**Accommodate** new developments and applications of ultrasound in medicine

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**The WFUMB 2009 Congress is hosted by ASUM**

www.asum.com.au

Australasian Society for Ultrasound in Medicine (ASUM)

Promoting Excellence in Ultrasound

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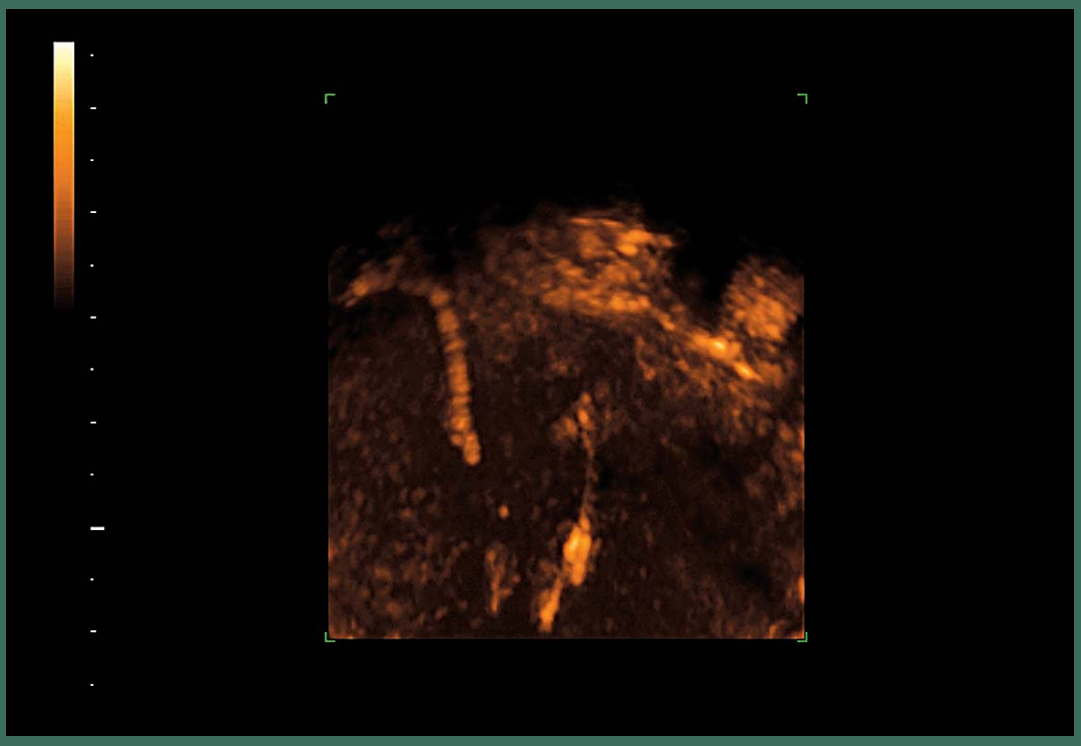
# Ultrasound Bulletin

Journal of the Australasian Society for Ultrasound in Medicine



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Australasian Society for Ultrasound in Medicine

Australasian Society for Ultrasound in Medicine

# Ultrasound Bulletin

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**Editorial contributions**
Original research, case reports, quiz cases, short articles, meeting reports and calendar information are invited and should be addressed to The Editor at the address below

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## THE EXECUTIVE



## OPINION



## DIAGNOSTIC ULTRASOUND



## CASE REPORT



## EDUCATION



## REPORTS



## NOTICES



***Cover image:*** The 3D ultrasound rendered image of the Essure device in utero demonstrates the right-sided device is in position in the tube. The left-sided device appears to be displaced medially.

# ASUM ASM 2008 Provisional Program

*This program was correct at the time of printing. The organisers reserve the right to alter the program.*

**Register online at www.asum2008.com.au**

## Nuchal Translucency Course Thursday 18th September 2008

| **The 11–14 Week Scan** | | |
|---|---|---|
| 0900–0910 | **Welcome / Introduction** | Dereck Souter |
| 0910–1000 | **Screening for Chromosomal Defects**<br>Second trimester biochemistry<br>Second trimester ultrasound<br>Fetal nuchal translucency<br>Maternal serum – hCG and PAPPA | Jon Hyett |
| 1000–1020 | **Pathophysiology of Nuchal Translucency** | Richard Davis |
| 1020–1040 | **Increased Nuchal Translucency and Normal Karyotype** | Jon Hyett |
| 1040–1100 | **Technique** | Richard Davis |
| 1100–1130 | Morning Tea | |
| 1130–12 15 | **Fetal Abnormalities at 11–14 Weeks** | Jon Hyett |
| 1215–1300 | **Multiple Pregnancy and Chorionicity** | Dereck Souter |
| 1300–1400 | Lunch | |
| 1400–1500 | **Other Markers for Down Syndrome**<br>Nasal Bone<br>Tricuspid Flow<br>Ductus Venosus<br>Facial Angle | Jon Hyett |
| 1500–1515 | **Local Experience with the Nasal Bone** | Richard Davis |
| 1515–1545 | Afternoon Tea | |
| 1545–1700 | **Exam and Process for FMF Accreditation** | Jon Hyett / Dereck Souter |

## Skills Development Workshops and Nuchal Translucency Course Thursday 18th September 2008

| | Epsom Room 1<br>Philips Healthcare | Epsom Room 2<br>GE Healthcare | Epsom Room 3<br>Toshiba | Parnell Room<br>Siemens – Medical Solutions |
|---|---|---|---|---|
| 09.00–09.45 | Applications on the Philips (brand) ultrasound machine Part 1 | The 18 week scan | Challenges and pitfalls of bvascular imaging | Scrotal ultrasound |
| 09.45–10.30 | Applications on the Philips (brand) ultrasound machine Part 2 | Fetal hearts Dr Philippe Jeanty | Carotids Prof Christian Nolsoe | Ergonomics – how to make our work environment pain free |
| 10.30–11.00 | Morning Tea | | | |
| 11.00–11.45 | Counselling – how to give bad news | Indicaton and applications of Doppler in high risk obstetrics | Doppler surveillance of endovascular treatment sites | Application on the Siemens (brand) ultrasound machine Part 1 |
| 11.45–12.30 | 3D/4D Scanning in Obstetrics (with Philips machine) | 3D/4D Scanning in Obstetrics (with GE machine) (Dr Bernard Benoit) | Abdominal transplantation – liver and kidney (Prof Andrew Holden) | Application on the Siemens (brand) ultrasound machine Part 2 |
| 12.30–13.30 | Lunch | | | |
| 13.30–14.15 | Neonatal heads (Dr David Perry) | Imaging multiple pregnancies and complications | Application on the Toshiba (brand) ultrasound machine Part 1 | Ultrasound results related to clinical examination by physios & orthopaediatic surgeons |
| 14.15–15.00 | Neonatal hips (Dr David Davies-Payne) | Fetal hearts Dr Philippe Jeanty | Application on the Toshiba (brand) ultrasound machine Part 2 | Ultrasound of the Shoulder Prof Syed Gilani |
| 15.00–15.30 | Afternoon Tea | | | |
| 15.30–16.15 | Paediatric spines (Dr David Perry) | Application on the GE (brand) ultrasound machine Part 1 | Imaging lumps and bumps including biopsy techniques Dr Rhodri Evans | Ultrasound of the knee Prof Syed Gilani |
| 16.15–17.00 | The gastrointestinal tract | Application on the GE (brand) ultrasound machine Part 2 | Neck ultrasound Dr Rhodri Evans | Image optimisation with new technologies |

## Friday 19th September

| | |
|---|---|
| 09.00–10.30 | **Session 1 Plenary** |
| | Acoustic Safety of New Ultrasound Imaging Technologies Dr Kevin Martin |
| | Ultrasound in Developing Countries Prof Syed Gilani |
| | Novel Sonographic Technique in the Diagnosis and Treatment of Liver Tumours Prof Matatoshi Kudo |
| 10.30–11.00 Morning Tea – Industry Exhibition | |
| 1.100–12.30 | **Session 2 Vascular/Intervention** |
| | US-Guided Ablations Techniques – Review and Future Aspects Prof Christian Nolsøe |
| | Extracranial Carotid Disease – Varied Presentation Prof Chander Vanjani |
| | Ultrasound in Renal Transplantation Prof Andrew Holden |
| 11.00–12.30 | **Session 2 Paediatrics** |
| | Correlation Between Antenatal and Postnatal Ultrasound Dr David Perry |
| | Use of Ultrasound in Chest Imaging and Intervention Dr David Davies-Payne |
| | Proffered Papers |
| 12.30–13.30 Lunch – Industry Exhibition | |
| 13.00–13.30 | **Sponsors Symposia – GE Healthcare** |
| 13.30–14.00 | **Sponsors Symposia – Philips Healthcare** |
| 14.00–15.30 | **Session 3 Obstetrics and Gynaecology** |
| | 3D Ultrasound in Gynaecology Dr Bernard Benoit |
| | Skeletal Anomalies Dr Philippe Jeanty |
| | New Methods of Fibroid Treatment 30 mins Dr David Rogers |
| 14.00–15.30 | **Session 3 Musculo-Skeletal Ultrasound** |
| | Ultrasound of Wrist Joint Prof Syed Gilani |
| | Sonographic Assessment of Forefoot Pain Stephen Bird |
| | Ultrasound of Knee joint Prof Syed Gilani |
| 15.30–16.00 Afternoon Tea – Industry Exhibition | |
| 16.00–17.30 | **Session 4 Breast** |
| | Comprehensive Use of Ultrasound in Breast Imaging: Screening, MR Correlation, and More Prof Liane Philpotts |
| | Breast Ultrasound in the Assessment of Calcifications Dr Jeremy Whitlock |
| | Breast Ultrasound and Biopsy: Techniques and Equipment Prof Liane Philpotts |
| 16.00–17.30 | Session 4 Paediatrics |
| | Ultrasound in Paediatric Liver Transplants Vanessa Galloway |
| | Paediatric Musculo Skeletal Ultrasound Dr Russell Metcalfe |
| | Proffered Papers 30 mins |
| 17.30–19.30 | Welcome Reception |

## Saturday 20th September

| | |
|---|---|
| 08.30–10.00 | **Session 1 Plenary** |
| | WFUMB – Past Present and Future Prof Giovanni Cerri |
| | Chest Ultrasound Prof Gebhard Mathis |
| | Understanding New Technology in Ultrasound Prof Peter Burns |
| 10.00–10.30 Morning Tea – Industry Exhibition | |
| 10.30–12.00 | **Session 2 Obstetrics and Gynaecology** |
| | The Fetal Face, How to Use 3D Ultrasound Dr Bernard Benoit |
| | How to Approach Difficult Diagnoses Dr Iryna Tsikhanenka |
| | Current Concepts in Fetal Growth Dr Lesley McCowan |
| 10.30–12.00 | **Session 2 Head and Neck / General** |
| | Thyroid Nodules – A Radiological Classification Dr Rhodri Evans |
| | Ultrasound Assessment of Acute Lower Abdominal Pain Prof Gebhard Mathis |
| | Salivary Glands – What to Look For and What Not to Miss Dr Rhodri Evans |
| 10.30–12.00 | **Session 2 PACS/IT** |
| | Osirix Dr David Davies-Payne |
| | Implementation of Osirix Dr David Rogers |
| | Use of Macromedia Director in Presentations Dr Philippe Jeanty |
| 12.00–12.30 | Annual General Meeting |
| 12.00–13.00 | Lunch – Industry Exhibition |
| 12.30–13.00 | **Sponsors Symposia – Siemens – Medical Solutions** |
| 13.00–13.30 | **Sponsors Symposia – Toshiba** |
| 13.30–15.00 | **Session 3 Fetal Heart** |
| | Cardiac Drawings Dr Iryna Tsikhanenka |
| | Normal Fetal Echo Dr Philippe Jeanty |
| 13.30–15.00 | **Session 3 Vascular/Intervention** |
| | Ultrasound Contrast in the Liver Prof Peter Burns |
| | Guidelines for the Use of Contrast Agents in Ultrasound – 2008 Update Prof Christian Nolsøe |
| | Contrast-Enhanced US with New Contrast Agent Sonazoid for Liver Tumors Prof Matatoshi Kudo |
| 13.30–15.00 | **Session 3 Breast** |
| | Histologic Controversies in Breast Biopsy Prof Liane Philpotts |
| | Understanding Physical Principles That Influence Breast Ultrasound Prof Anthony Doyle |
| | New Techniques in Breast Imaging: MR, Tomosynthesis, CAD Prof Liane Philpotts |
| 15.00–15.30 | Afternoon Tea – Industry Exhibition |
| 15.30–17.00 | **Session 4 Fetal Heart** |
| | Fetal Echo: Anomalies Dr Philippe Jeanty |
| 15.30–17.00 | Session 4 Head and Neck / General |
| | Cysts – and Their Mimics. Signs to Look for and Pitfalls to Avoid |
| | Assessment of Doppler Ultrasound System Performance Dr Kevin Martin |
| | Proffered Papers |
| 15.30–17.00 | **Session 4 Musculo-Skeletal Ultrasound** |
| | The Role of Ultrasound in Soft Tissue Masses Prof Anthony Doyle |
| | Ultrasound in Tuberculosis Prof Syed Gilani |
| | Correlation of Shoulder Ultrasound with MR Dr Philip Weeks |
| 15.30–17.00 | Poster Defence |
| 19.00–12.00 | **ASUM Gala Dinner** |

## Sunday 21st September

| | |
|---|---|
| 09.00–10.30 | **Session 1 Obstetrics and Gynaecology** |
| | Review of Nasal Bone Assessment Dr Richard Davis |
| | The Influence of Chorionicity in Twin Pregnancy Dr Emma Parry |
| | Fetal Medicine in New Zealand Prof Peter Stone |
| 09.00–10.30 | **Session 1 Vascular / Intervention** |
| | Doppler Assessment of Liver Transplants Alan Williams |
| | Ultrasound Assessment of Renal Tumours, Biopsy & Ablation Dr Brendon Buckley |
| 09.00–10.30 | DVT of Lower Limbs – Pitfalls 30 Prof Chander Vanjani, (session 1 cont'd) |
| 10.30–11.00 | Morning Tea – Industry Exhibition |
| 11.00–12.30 | **Session 2 Plenary** |
| | 10 Good Reasons For Using 3D US in Obstetric Scanning Dr Bernard Benoit |
| | Vasa Previa Dr Philippe Jeanty |
| | The Future of Ultrasound Prof Peter Burns |
| 12.30–12.35 | **Closing** |

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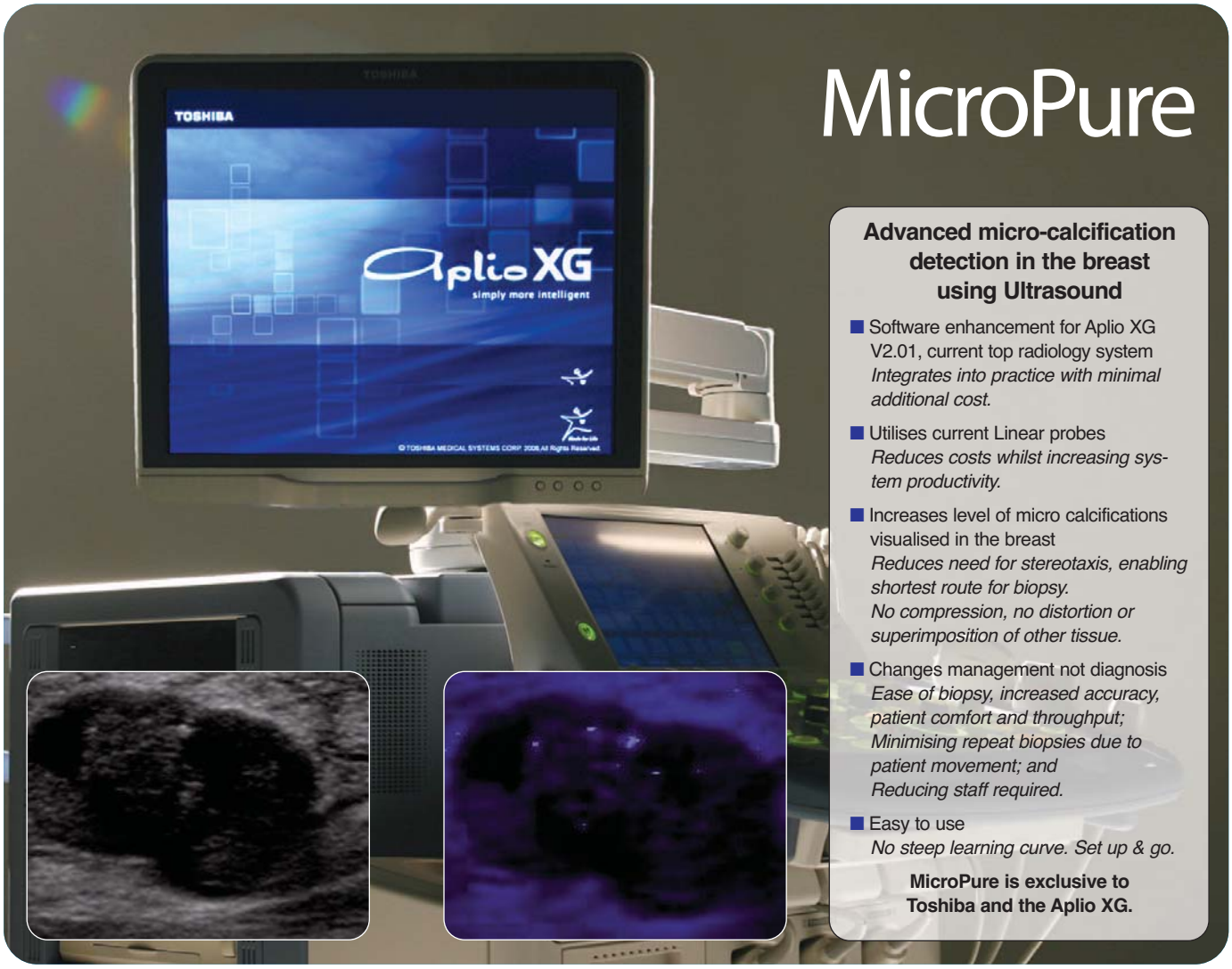


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Made for Life

# Two opinions, a ligament, a canal and a birth control device

Prof Ron Benzie

This issue presents us with an opportunity to think about the value of obstetric ultrasound as it affects perinatal outcomes.

David Ellwood suggests that, while there has been great progress in early obstetric ultrasound diagnosis, monitoring of late pregnancy fetal wellbeing has been less productive. Perhaps new technology, he thinks, will lead us to look more carefully at the placenta.

Jan Klimek presents a cogent case for a system of ongoing education and certification of neonatologists performing cardiac ultrasound. ASUM would appear to have a role in this.

Donald Neil Simmons' lucid, well-illustrated account of sonography of the sacrotuberous ligament reminds us of its important role in pelvic stability. We can benefit from his experience in musculoskeletal ultrasound with a close reading of this excellent article.

Barbara Syme's article has not only a splendid title – The canal of Nuck – three hernias and hydrocele – but informs us of the importance of lesions of this region in paediatric practice.

Finally, Frances Miceli and Brendan Mein conclude in their review that ultrasound is preferred to radiologic examination in assessing the proper placement of the Essure birth control device.

And yet another reminder – WFUMB 2009 is only 15 months away. There will be soon be a call for abstracts. ASUM members will undoubtedly be in the vanguard with submissions.

***Remember to have your say***
***Council and Branch Committee nomination forms are available with this issue of Ultrasound Bulletin***
***for more contact***
***email asum@asum.com.au tel + 61 2 9438 2078***

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Australasian Society for Ultrasound in Medicine

# Australasian Society for Ultrasound in Medicine 38th Annual Scientific Meeting

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Dr Philippe Jeanty, USA
Dr Kevin Martin, London
Prof Christian Nolsoe, Denmark
Prof Liane Philpotts, USA
Dr Iryna Tsikhanenka, Belarus


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# ASUM: Your Society

Matthew Andrews

ASUM's membership across Australia and New Zealand is drawn from multiple medical craft groups, sonographers, scientists and the ultrasound trade This broad spectrum reflects the collaborative team approach to ultrasound in Australia and New Zealand.

ASUM's motto 'excellence in ultrasound' encompasses in three simple words the charter of the Society. The ASUM Council, elected by the membership shoulders the responsibility of achieving this aim

The Council has a duty to represent the views and priorities of the membership in determining the direction of the Society. The broad categories of ASUM's functions include ultrasound education (scientific meetings, workshops, ASUM Ultrasound Bulletin), ultrasound qualifications (DMU, DDU, CCPU), standards of ultrasound practice both from the clinical and safety perspectives, ultrasound research both clinical and scientific and advocate of the important role ultrasound plays in appropriate health care services to the medical fraternity, health administrators, policy makers and payers.

While there is little or no controversy within ASUM about the range of the Society's functions, the emphasis and prioritization of services are more open to debate. As with many organisations, the success and acceptance of established templates and protocols results in their continuation, even though changes may be appropriate. ASUM Councillors perform their tasks in an honorary capacity, all having demanding full time occupations, and thus limitations on the personal time and resources they can contribute. They therefore aim to achieve ASUM's goals in the most efficient manner possible. A well established and successful organisation, such as ASUM has been, thus provides a comfortable road map on which to continue. The challenge for ASUM, despite this comfort zone, is to constantly review its performance to ensure it meets its charter and the needs of all its members.

Recently ASUM Council members informally discussed issues of the directions of the Society. These included;

- Is ASUM heading in the right direction and is its emphasis and perspective appropriate?;
- How is ASUM perceived by the membership and potential membership?;
- How are the ASUM Council and Executive perceived by the membership?;
- Is the ASUM Secretariat performing appropriately and is it adequately resourced?;
- Does ASUM have an appropriate balance/emphasis between local and overseas issues?; and
- Is ASUM's membership growth and membership profile appropriate?

The Council has given deep consideration to these broad and very general points and while overall satisfied with ASUM's current position (which is not surprising as the Council is to a significant degree responsible for it), Council members are acutely aware there is no room for complacency. Accurate answers to these questions cannot and should not be made by the Council alone and are dependent on significant engagement and feedback from the ultrasound community, principally from the membership but also from non-members. It is also important to note that this list of issues is by no means complete.

I therefore urge all members to seriously consider the issues regarding the Society and thus the practice of ultrasound in Australia and New Zealand. It is vital that ASUM receive feedback from its very diverse range of members. Comments of any kind, no matter how seemingly trivial or profound would all be welcomed by the Council and administrative staff. I strongly encourage ASUM members to engage Councillors who, after all, are your elected representatives. An even better approach is for members to consider standing for Council to maximise their input. I can vouch that not only does Council membership provide a direct avenue to influence the ultrasound practice and policy in Australasia, but is immensely satisfying on a personal level as one of ASUM's great strengths is its broad-based collegiate, cooperative and very friendly approach.

## Upcoming ASUM Meetings

Early Pregnancy & Gynaecological Scanning Foundation Theoretical Courses 2008
Sydney, Australia 18th–19th October 2008, Melbourne, Australia 25th–26th October 2008
Go to www.asum.com.au for more details

ASUM 38th Annual Scientific Meeting 2008
Auckland, New Zealand 18th–21st September 2008
Go to www.asum.com.au for more details

ASUM WA Branch Translabial Ultrasound Workshop 2008
Perth, WA, Australia 29th November 2008
Go to www.asum.com.au for more details

World Federation for Ultrasound in Medicine and Biology 2009
Sydney, Australia 30th August–3rd September 2009
Go to www.asum.com.au for more details

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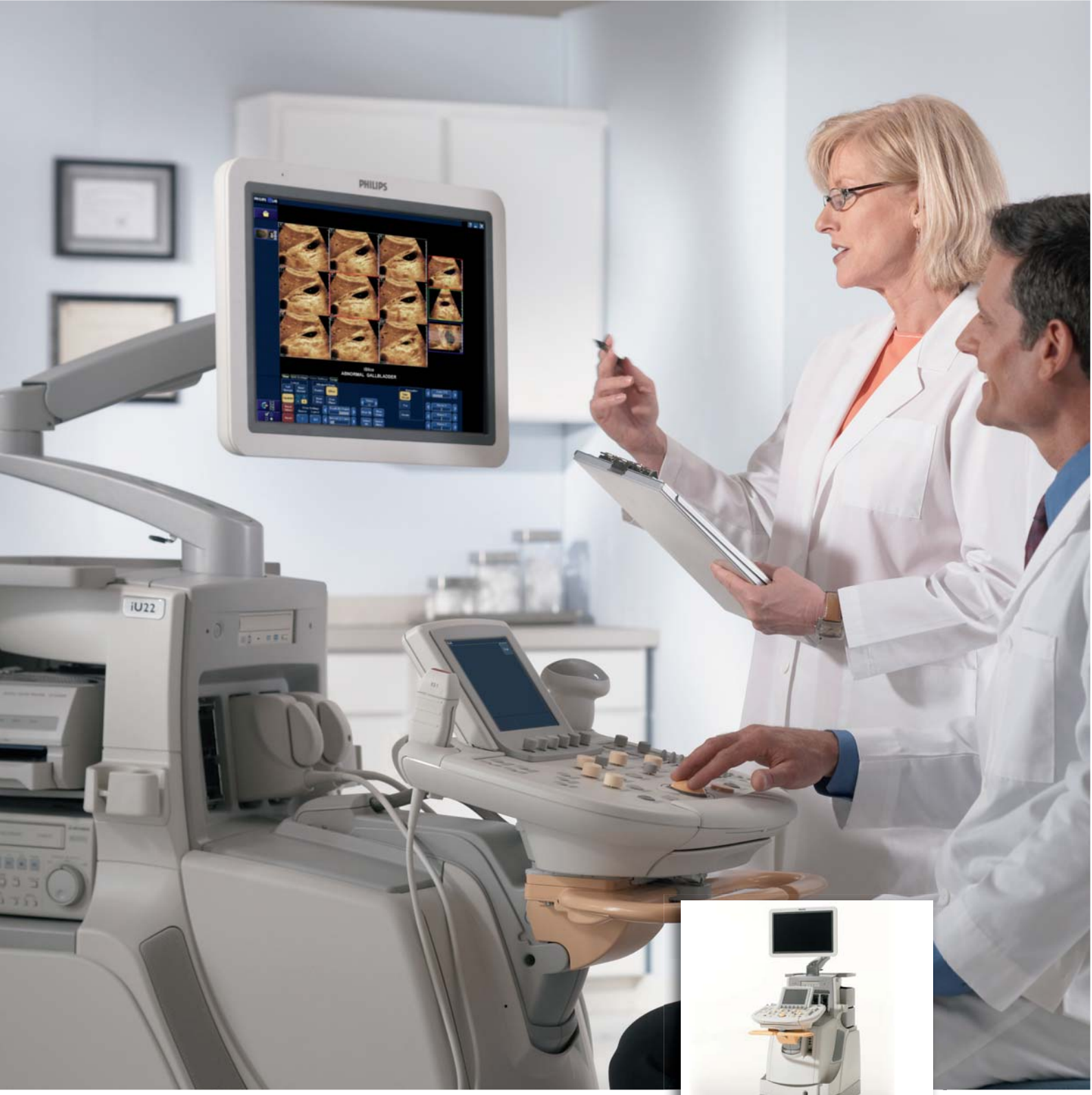


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# CEO's message

Dr Caroline Hong

My last message in February 2008 seems like a distant memory. So much has happened as we get closer to our most ambitious project, the WFUMB 2009 World Congress, incorporating the 39th Annual Scientific Meeting of the Australasian Society for Ultrasound in Medicine.

In the midst of all this, we have just finished a successful Multidisciplinary Workshop in Sydney attracting nearly 500 people over five days, some of whom attended the DMU and DDU Examination Preparation Courses and the Nuchal Translucency Course. Special thanks go to everyone who contributed to this success.

The ASUM Head office staff members have been busy with multiple projects. We are living in a very exciting time in the ultrasound world. Much of this is driven by the emerging trends in ultrasound as well as the emerging markets in Asia and Europe.

We were delighted to hear that Dr Glenn McNally has been awarded Honorary Fellow status by the American Institute of Ultrasound in Medicine (AIUM). We send congratulations on this prestigious appointment for Glenn. Many of you know Glenn as the Past President of ASUM from 2002 to 2004, and he has remained an active and strong advocate for ultrasound issues and ASUM.

## Ultrasound trends ahead

In the 30th April 2008 issue of *Health Imaging News*, it was reported that *'advancements in obstetrics and gynaecology ultrasound, hand-carried ultrasound as well as other smaller market segments, such as urology and surgical ultrasound, are driving the European ultrasound market which is expected to climb to $1.4 billion in 2014, according to a new Frost and Sullivan report'*.

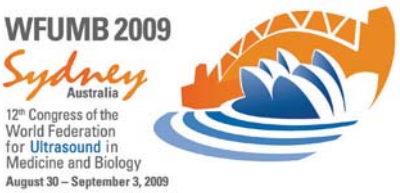
In one of my earlier messages, I briefly mentioned the new market research study from Kalorama Information. It predicted that the world market for medical ultrasound systems is expected to continue with its healthy, rapid growth from $3.97 billion in 2006 to more than $4.5 billion by 2010. This will also be helped by the annual growth in the Asian market. In Australia, we are also seeing an increase in ultrasound Medicare schedule items, consistent with the increasing recognition of ultrasound technology as a valuable and popular medical diagnostic and procedural tool.

Predicted growth in Europe, Asia and Australia all will mean an increase in activity for everyone involved in ultrasound and particularly, an increasing demand for education and training. ASUM continues to be recognised as the peak body setting its policies and statements to ensure the highest standards of practice in medical ultrasound.

## WFUMB 2009 World Congress

By the time you receive this *Ultrasound Bulletin*, we will be only about 15 months away from WFUMB 2009 World Congress in Sydney. If you have not been following the progress and all the work that has been going on, please log in to www.wfumb2009.com for regular updates.

We are grateful to the new group of volunteers who are now working with Keith Henderson as Scientific Program Convenors to create an excellent, relevant cutting edge program. This is definitely a congress not to be missed. We are also grateful for the support of our



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four Major Sponsors, namely Toshiba, GE Healthcare, Medison and Philips. Furthermore, we are also grateful for the ongoing support from the DSRD, SCVB and Diagnostica.

We see great opportunities for ASUM to showcase all the latest in technology from all over the world at the WFUMB 2009 World Congress in Sydney. It will be held over five days from Saturday 30th August to Thursday 3rd September 2009 at the Sydney Convention and Exhibition Centre in the beautiful Darling Harbour precinct. Some useful sites about Sydney can be found at www.scvb.com.au, www.scec.com.au, www.sydney.com, www.sydneytourism.com and www.australia.com

The Scientific Program Convenor and Coordinator numbers have expanded. These valuable volunteers are essential in designing a great program. They are already making connections worldwide and working with Keith Henderson, ASUM Education Manager, who has been delegated to lead, facilitate and coordinate a first class program to suit everyone. There will be joint programs with IBUS and WINFOCUS which will appeal to many new delegates at the Congress. Visit www.wfumb2009.com now to see what has been achieved to date. We will soon have the call for abstracts and registrations online.

ASUM will soon be embarking on an active marketing strategy to promote and publicise this event to the world so as to encourage and facilitate participation from as many international delegates as possible in this information and technology packed event.

I call on all members and friends of ASUM whenever they are speaking at local or international congresses or meetings, to consider using our promotional and Sydney PowerPoint slides to help spread the word about WFUMB. We need to encourage potential delegates to submit an abstract or poster, to exhibit, or to plan ahead to attend WFUMB to exchange ideas and information or to do business. WFUMB will be a world class networking opportunity.

Soon, we will be opening the bookings of exhibition space to potential exhibitors from around the world. For enquiries about sponsorship and exhibition, please contact email sponsorhip@icms.com.au or carolinehong@asum.com.au.

## Membership renewals due 30th June 2008

Members should have received their membership subscription notices in the mail. You will notice the new look with a membership card attached for your convenience. The cards are to be used for accessing member benefits online or to get discounts available to ASUM members. The rates have been kept minimal and affordable to encourage as many people as possible to join the Society. ASUM can only grow and be strong with the support of its members. Your individual efforts and role in encouraging and signing up a new member is always appreciated. For every new member that you introduce to the society and who subsequently joins, please contact ASUM for a free thank you gift, email details to asum@asum.com.au. If you renew your membership online before 30th June 2008, you will go into the draw for a bottle of wine.

## Expressions of interest for Committees for 2008/2009

Included in this Bulletin is a call for expressions of interest from our members to volunteer their time and expertise to our committees. ASUM is always keen to see new faces in the membership of these committees. If you have never been involved before but are keen to participate, please send in your Curriculum Vitae and areas of interest. Although places may be limited, we are always keen to welcome new faces and new ideas and will call on our members ad hoc from time to time on particular issues. If you are interested, please send in your forms before 30th June 2008 to the ASUM office.

## Nominations for ASUM Council 2008/2009

This year, several councillors will retire and some will be eligible for renomination. Only Full and Financial members can be nominated and they have to be proposed and seconded by Full and Financial members in their category of membership. The ASUM Council consists of seven medical members and five sonographer members, and who generally meet four times a year, usually coinciding with an ASUM meeting or workshop in different cities. The dates are generally notified in advance so that plans can be made to attend the Council meetings. Once elected, the Councillor is registered as a company director of ASUM, which is registered under Company Law with ASIC, and is required by law to fulfil the legal duties and responsibilities of a company director. More information can be obtained from the CEO, who is also the company secretary by emailing carolinehong@asum.com.au

## Nominations for Branch Committee 2008/2009

Branch Committee nominations are also open for 2008/2009. The local engagement and local involvement of ASUM members at Branch and Subbranch level is crucial to the growth and future of the Society. We encourage you to get involved in any way that you can and volunteer to join the local branch committee.

Branch activities vary in different areas, with some more active than others at different times in the year.

There are several courses that will be running in various cities and branch participation will be greatly encouraged.

The Early Pregnancy and Gynaecological courses are being organised jointly with Assoc Prof George Condous for Sydney and Melbourne in October 2008.

Other meetings have been planned for Perth, Brisbane and Hobart with prominent speakers including, Dr Peter Dietz, Stephen Bird, Robyn Tantau, Dr Cheryl Bass and Dr Monica Pahuja later in the year. Look out for details in the ASUM Calendar on the ASUM website and in the email broadcasts that we send to members periodically.

## Register for ASUM 2008 Auckland 18th–21st September 2008

Online registration is now open on www.asum2008.com.au. The program, keynote speakers and topics are all listed on the website. Members are advised to register early to qualify for a discounted early bird rate.

The Convenors, Dr David Rogers and Dr David Davies-Payne and their team of committee members have worked very hard to produce an excellent program. The venue of the meeting is Skycity Auckland Convention Centre, which is a purpose built convention centre. We are confident that the meeting will run successfully at this


Left Prof Michael Bennett, left, with Prof Alan Cameron at MDW 2008; right Keith Henderson, Nancy Leung, Caroline Hong and Alya Almenahi.

beautiful venue. Auckland is a popular destination. It is New Zealand's biggest city and close to breathtaking scenery, beaches, holiday islands and great food and wine. You can go to http://www.newzealand.com to help you plan an itinerary, while in New Zealand attending the ASUM 2008 Annual Scientific Meeting, so that you can enjoy the beauty of Auckland city and other parts of New Zealand.

## ASUM's top qualifications DDU, DMU, CCPU and DMU (Asia)

### Diploma in Diagnostic Ultrasound (DDU)

Access to the online DDU Tutorial is available to current, registered candidates only. Your application must be approved and processed before admission to this site is gained. Candidates are advised to remember to complete each section in its entirety before moving onto the next.

The number of DDU candidates continues to rise with the DDU Part I attracting a total of 41 candidates and the DDU Part II a total of 17 candidates. The written portions for both the Part I and the Part II will be held on Monday 12th May 2008 in Auckland, Melbourne, Adelaide and Sydney. The Part II Viva for all specialties excluding cardiology and vascular will be held in Sydney on Saturday 21st June 2008. Part II cardiology candidates will sit their Viva examination in Melbourne on Thursday 19th June 2008 and Part II vascular candidates will sit their Viva examination in Sydney on Thursday 19th June 2008.

Candidates can apply to sit for the DDU examination only if they are current ASUM Medical Members in a specialist practice or currently enrolled in a specialist training program and are either an Australian or New Zealand residents.

The 2009 DDU examination dates will be published in the DDU Handbook in August this year, a copy of which may be downloaded from our website. With the exception of cardiology candidates, we will be alternating the sitting of the viva examination between Melbourne and Sydney.

### Diploma of Medical Ultrasonography (DMU)

This year, ASUM published a professional DMU brochure detailing the key points of considering DMU to enhance the career options in ultrasound arena. The DMU study process, the modularisation of the examination as well as some recent changes to the DMU, such as new study learning guidelines for DMU candidates, are outlined in the brochure. It also details the positive changes the DMU Board has made to the DMU exam process.

ASUM introduced the new comprehensive set of learning guidelines based on recommended textbooks for enrolled DMU Part I candidates as well as for enrolled DMU Part II candidates. The Learning Guides are designed to assist candidates in their self-directed study and as an aid for the candidate to structure their individual study program and learning goals. Each Learning Guide includes learning objectives for the particular topic area, suggested activities to assist study and learning, and an annotated bibliography to guide the candidate to the most appropriate resources that may be useful in meeting the learning objectives.

A special Part II Oral Examination was conducted during DMU Preparation Course this year for those who were unsuccessful in the Oral examination last year and was offered to the Part II candidates as well. It is the first time the DMU Board of Examiners has organised an early oral examination, providing the candidates the opportunity to have minimal pressure and better preparation for other examinations.

This year, the numbers sitting the DMU are comparable to previous years. In total, 150 candidates have applied to sit the DMU examinations. Ninety-five candidates are sitting Part I and 55 candidates have applied for the Part II Examinations. The Written Examinations for all Part I and Part II candidates will be offered in 12 major locations throughout Australia and New Zealand on Saturday 26th July 2008. The Part II Practical Examinations will be held at individual practices throughout New Zealand and Australia in August. The Oral Examinations will be conducted on 13th and 14th September 2008 in Sydney, Auckland and Melbourne.

Candidates must be current members of ASUM to apply to sit the DMU examination and they also have to be an Australian or New Zealand resident. In addition to that, they must have at

Australasian Society for Ultrasound in Medicine

**Promoting Excellence in Ultrasound**

# ASUM WA BRANCH TRANSLABIAL ULTRASOUND WORKSHOP 2008

## Associate Professor Hans Peter Dietz

**29th November 2008**

**Health Department of Western Australia**

**For more information go to: www.asum.com.au/open/meet_WA2008.pdf**
**or email us at: education@asum.com.au**

**Convenor**
**Michelle Pedretti**

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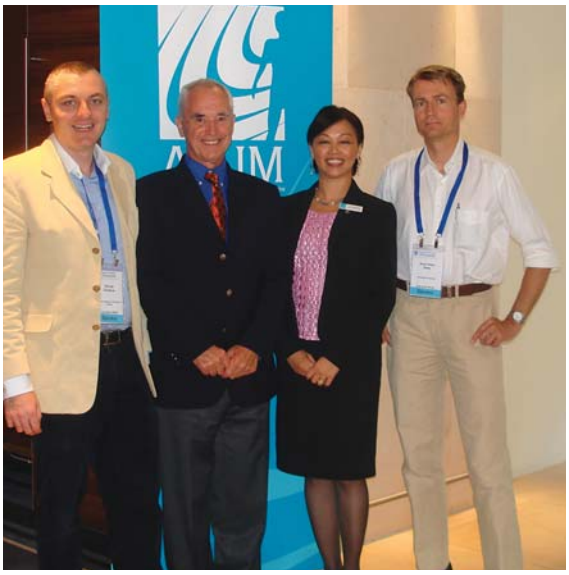
**ASUM Chief Executive Officer**
**Dr Caroline Hong**

**ASUM Education Officer**
**Mr Keith Henderson**

Left Delegates at the MDW 2008 in Sydney; right Assoc Prof George Condous, Prof Ron Benzie, Dr Caroline Hong and Assoc Prof Hans Peter Dietz.

least two years sonography experience and are required to submit to ASUM 2000 ultrasound scans to be eligible for DMU Part II Practical Examination.

This year again the DMU Board of Examiners has planned to implement a grading system for every candidate (Pass, Credit, Distinction or Fail) in Part 1 Examinations and Part II Written Examination. For Oral and Practical Examinations, only a Pass or Fail result will be given.

ASUM welcomes any feedback from candidates and members about the DMU information on the website, the brochure and examination process and our services to the candidates. Please email asum@asum.com.au if you have any comments.

### Certificate in Clinician Performed Ultrasound (CCPU)

The Certificate in Clinician Performed Ultrasound is awarded by the Council of the Australasian Society for Ultrasound in Medicine (ASUM), on the recommendation of the Certification Board, to appropriately qualified medical graduates of good standing.

The CCPU has been rapidly expanding. New and improved functions on the website mean current and future ASUM members will be able to obtain quicker access to forms, online physics resources and online registrations to all ASUM CCPU courses available.

ASUM is currently holding an obstetrics and gynaecology course in Sydney on Saturday, 5th July 2008. This is an opportunity for all ASUM members who are currently completing the CCPU to join an outstanding course where acknowledged faculty speakers will be present.

There is also another CCPU course aimed for senior registrars, fellows and neonatal consultants who are keen to learn more about bedside ultrasound. This short course will enable participants to appreciate the knowledge and skills required to perform bedside ultrasound studies. It is scheduled for Friday, 8th August 2008 and Saturday, 9th August 2008 in Sydney, split between the RNSH and ASUM training rooms. A brochure has been produced and will be circulated to all directors of the neonatal unit.

With the constant growth in the CCPU, ASUM welcomes Dr Jon Skinner to the Neonatal committee. Dr Jon Skinner from New Zealand is a Neonatal cardiologist representative. With his involvement, the committee will be able to strengthen with better and improved ideas.

The Emergency FAST/AAA course was run in Melbourne on 15th March 2008 at the Epworth hospital. We are grateful to Dr Justin Bowra for his contribution to the course and the assistance of Jane Fonda and Michelle Cox.

We are pleased to announce that another two institutions that run emergency courses have now been accredited for the CCPU basic module. These institutions include Ultrasound Training Solutions (UTS) in Victoria and the Australian School of Medical Imagining (ASMI) in NSW.

The CCPU Certification Board held a meeting on 29th March 2008 and awarded eight people the CCPU, one person from the emergency speciality, three people from obstetrics and gynaecology and four people from the neonatal speciality. We congratulate Dr Kylie Baker (emergency), Prof Nick Evans (neonatal), Dr Andrew Gill (neonatal), Dr Martin Kluckow (neonatal), Dr David Knight (neonatal), Dr Bernard Brenner (obstetrics and gynaecology), Dr Meiri Robertson (obstetrics and gynaecology) and Dr Talat Uppal (obstetrics and gynaecology).

As you know, this year has shown to be one of growth for the CCPU, with registrations averaging two new enrolments into the program each week. This growth shows potential and invites possibilities for additional specialities. An example of this can be seen with the introduction of critical care as the latest speciality for which a CCPU module being constructed at the moment.

### Beijing 2008 Olympics and ultrasound research

At the last ASUM 2007 Annual Scientific Meeting, which was held in Cairns, one of ASUM's long-term corporate supporters, GE Healthcare invited World champion swimmer, Samantha Riley to give an inspirational speech at the Gala Dinner. GE chose this event to announce to the ultrasound community that GE is a major sponsor of the Beijing 2008 Olympics Games.

Recently, it was also announced *'that the U.S. Olympic Committee (USOC) and General Electric, in preparation for the Beijing 2008 Olympic Games, have developed two research programs aimed at demonstrating that*




Faculty Dinner; speakers and guests at the MDW 2008 in Sydney.

*health monitoring and early intervention leads to injury prevention and enhanced health and sports performances for athletes.'*

The first program is a cardiac clinical research study with top US Olympic athletes and hopefuls on the US Men's Rowing and USA Weightlifting teams while the second initiative will monitor the musculoskeletal health of athletes competing for USA Weightlifting, USA Boxing, USA Wrestling and the US Women's National Soccer Team, according to GE.

The two studies are continuations from research programs at the Torino 2006 Olympic Winter Games.

*'Every day an Olympic athlete spends in rehab is a day lost in training, making earlier injury diagnosis and real-time recovery monitoring crucial for elite performance,'* said Michael Reed, MD, US Olympic Committee Medical Director, Performance Services Division. *'It is increasingly important that as a National Olympic Committee, we have the most innovative tools to help predict, diagnose, treat and monitor sports injuries earlier to ensure a quick return to play.'*

## MDW 2008

The ASUM Multidisciplinary Workshops attracted close to 500 people over five days. Other courses such as the DDU and DMU preparation courses, and the Nuchal Translucency courses were conducted concurrently.

ASUM thank the Convenors, Dr Glenn McNally, Dr Sue Campbell Westerway and Mrs Jenney Kidd for their hard work in making this event a success. We also thank all the speakers, workshop presenters, helpers and coordinators for the program. Most importantly we thank Toshiba, GE Healthcare, Siemens and Philips for providing the machines and support for the popular interactive workshops.

## Update on ASUM International Programs

- Dr Yisha Tong, vascular radiologist from Austin Hospital in Melbourne, has been selected to represent ASUM as a guest lecturer at the KSUM (Korea) 2008 annual conference in May 2008. More will be reported in a future Ultrasound Bulletin. The ASUM connection with KSUM has been going on since the year 2001. In the year 2002, I applied on behalf of ASUM to the Australia Korea Foundation for a grant to sponsor Prof Choi as an invited speaker at the ASUM 2002 Annual Scientific Meeting at the Gold Coast. There have been many friendly exchanges of speakers at both societies meetings since.
- Dr Wendy Hadden, breast surgeon from New Zealand, has been selected to represent ASUM as a guest lecturer at the ISUM 2008 meeting in Jakarta in November 2008. The ASUM connection with ISUM also has been going on since the year 2002 when Dr Daniel Makes was first invited to the ASUM MDW at the Gold Coast. Later Dr Taufik

Jamaan received a scholarship for two weeks placement in Sydney.

- Prof Ron Benzie recently represented the ASUM President as the CADUCEUS speaker at the DUDS (Denmark) conference in Copenhagen in April this year.

Later this year we welcome back Dr Christian Nolsøe as the Presidential exchange speaker at the ASUM 2008 Auckland meeting. We have just had Prof Torben Lorentzen from Denmark speak at our ASUM 2007 Cairns meeting. Dr Akram Dakhil from Denmark has just finished his scholarship placement at Dr Neil Simmons' practice in Adelaide in January 2008 and Robert Ziegenbein completed his CADUCEUS scholarship placement program last year. The CADUCEUS program is active and lively with many more opportunities for collaboration.

There are many more other international stories involving ASUM members in a global ultrasound world. This is certainly one of the many of the satisfying aspects of my role as CEO in raising the image and profile of ASUM, and in facilitating the global and international connections and cooperation with ultrasound societies on projects such as these.

## ASUM – a learning organisation

At a professional and personal level, as your society's CEO, I have kept myself up to date on issues and have networked locally and worldwide. Professionally, I am on the National Board and the Vice President of the Australian Society for Association Executives (AuSAE). I have attended association CEO symposiums, seminars and discussion groups. I have been actively involved professionally in my own association executives' circle for some years now and was recently appointed as the Sydney ambassador for the SCVB.

While I actively urge all our ASUM members to update, learn, network and attend our many ASUM meetings and workshops, members should also be aware that the ASUM Head Office is a learning organisation and supports ongoing professional development in its staff. Keith Henderson, Education Manager is also being supported in his MBA program and our staff members undergo training and continuing education throughout the year.

## ASUM Courses – mark these in your diary and register early

**17th May 2008 CCPU Basic O&G** – Sydney ASUM Office

**June–July 2008 DMU Physics Revision Weekend** – Sydney ASUM Office

**5thth July 2008 CCPU Basic O&G Course: Introduction of O & G Scanning** – Sydney ASUM Office

**5th July 2008 CCPU Advanced O&G Course: Pelvic Pathology** – Sydney ASUM Office

**8th–9th August 2008 CCPU Neonatology Workshop** – Sydney RNSH and ASUM Office

**18th–21st September 2008 ASUM Annual Scientific Meeting 2008** – Auckland New Zealand www.asum2008.com.au

**18th–19th October 2008 Early Pregnancy and Gynaecological Scanning Foundation theoretical Courses 2008** – Sydney Nepean Hospital

**25th–26th October 2008 Early Pregnancy and Gynaecological Scanning Foundation theoretical Courses 2008** – Melbourne Epworth Hospital

**29th November 2008 ASUM Translabial Ultrasound Workshop Peter Dietz** – Royal Perth Hospital

30th August to 3rd September **2009 WFUMB 2009 Sydney World Congress to be hosted by ASUM** – Sydney Australia www.wfumb2009.com

**Dr Caroline Hong**
**Chief Executive Officer**
**carolinehong@asum.com.au**

## Solomon Islands ASUM member seeks help

A letter has been received from an ASUM Member, Dr Aaron Oritaimae, seeking help in supplying him with a portable ultrasound machine for his work in the rural areas of Solomon Islands. If anyone can help, please reply to ASUM CEO email carolinehong@asum.com.au and to aoritaimae@solomon.com.sb.

Dear Dr Caroline Hong,

I am writing from the Solomon Islands. I am writing on behalf of our Hospital, which is the only Public referral Hospital.

Our population is around half a million and we have a unique geography because of our scattered Islands.

We have many rheumatic heart disease patients who need cardiac surgery. We are fortunate to have assistance from The St Vincents Hospital, who have been performing cardiac surgery on our patients for many years now. We do the assessment ourselves and send the patients to Sydney for surgery.

Despite this, we still have a lot of cases here that will need interventions urgently.

Our plan is to tour the rural hospitals and do assessment work there, where the majority of our patients are. We would like to come up with a list of recently assessed patients then, later during the year or early next year, invite a cardiac team to come to the Solomons and perform cardiac surgery here.

In order to do the assessment in the rural areas, we need a portable ultrasound machine.

We are asking for your help to find us a portable system that we can use for at least 3–4 months to do the above task.

**Please Contact**
**Aaron Oritaimae**
**Head of Radiolgy**
**National Referral Hospital**
**Honiara**
**Solomon Islands**
**tel +677 23600 Ext. 251**
**Email aoritaimae@solomon.com.sb**

OPINION

# Obstetric ultrasound – should we go back to the future?

*David Ellwood, Professor of Obstetrics and Gynaecology and Deputy Dean, School of Clinical Medicine, The Australian National University Medical School, The Canberra Hospital, Canberra ACT 2606, Australia. Correspondence to David Ellwood. Email David.Ellwood@act.gov.au*

It is now 25 years since I first laid my hands on an ultrasound machine. I must admit to having had an instant fascination with the ability to see the fetus at all stages of pregnancy and (perhaps) improve my insight into fetal wellbeing. Undoubtedly, this attraction has been responsible for moulding my career and ensuring an ongoing involvement in clinical practice, teaching and research.

Back in those days, I don't think any of us could really have foreseen the massive technological improvements that would follow on from the early days of real-time, gray-scale imaging. Nor could we have guessed at the wide range of clinical applications that would be found for this wonderful, non-invasive technology; but what does the future hold? I have heard a few grumblings during my travels, both nationally and internationally, that 'the technology is now well ahead of our ability to use it clinically', implying that we have wonderful machines which are not really delivering in terms of improved clinical outcomes. Is this really true and if so, why is it so?

It's worth considering that, in the early days of obstetric ultrasound, the focus was not so much on fetal abnormality detection, but more on using routine ultrasound to date and assess fetal growth – the so-called 'two-step' approach. It was expected that this would greatly improve pregnancy outcomes by better detection of fetal growth restriction. Unfortunately, this improved outcome was not realised, and improvements in technology and technique really focussed attention on detection of early pregnancy fetal abnormality.

Measures of maternal and perinatal morbidity and mortality show, at least in developed countries, that we may have reached a plateau from which it will be difficult to achieve further gains in outcomes. This is certainly the case for maternal and perinatal mortality, but it is more difficult to conclude that the same is true for morbidity until we have robust and completely ascertained clinical indicators that truly measure morbidity.

Ultrasound has, without doubt, contributed to these improvements in outcome. Early pregnancy detection of fetal aneuploidy with combined screening must rank as one of the most significant gains in prenatal diagnosis and this clearly has an impact later in pregnancy if the overall burden of chromosomal abnormalities is reduced. The improved technology of our machines must also be partly responsible for our improved ability to detect structural anomalies in the second trimester, although better training and continuing education have also been vital. With respect to later pregnancy, I think we have gained much in our understanding of the changes that predate preterm birth with cervical ultrasound, although we are still to show that this use of ultrasound really changes outcomes. The use of Doppler to interrogate the maternal and fetal circulations in high-risk pregnancy has been invaluable, but has not really found a place in routine pregnancy care.

So what are the new frontiers for obstetric ultrasound? Where should we be placing our efforts if we want to improve outcomes further? Undoubtedly, any increase in routine applications that add to the current cost will be closely scrutinised by those who provide the funding. Nevertheless, I can think of three areas of adverse pregnancy outcome which are worthy of our attention, although I am sure there are others. Can we apply ultrasound to these in a cost-effective way that leads to better outcomes?

The first of these problems is late pregnancy fetal wellbeing, reflected most severely in unexplained stillbirth at term. Although the actual rate of unexplained stillbirth of 1–2 per 1000 is relatively low, this is one of the most devastating outcomes of pregnancy, and one in which little impact has been made over the last two to three decades. Indeed, it is now one of the leading diagnoses given in cases of stillbirth. Although this goes against the existing evidence (much of which was produced more than 15–20 years ago), I do wonder if we should revisit the use of routine late pregnancy ultrasound, looking specifically at more subtle markers of fetal growth restriction, including placental morphology. Audits of 'unexplained' late stillbirths do show that fetal growth restriction and/or placental dysfunction are common features that are often undetected clinically. If we are so good at detecting fetal anomalies with routine ultrasound, why are we apparently unable to detect poor fetal and placental health in late pregnancy? I suspect that we don't know what we should be looking for and my hunch is that the placenta has a lot more to tell us. Simple measures such as placental thickness, and descriptions of placental morphology are rarely used in any third trimester scan. Most reports simply tell us that the placenta is anterior or posterior and clear of the internal

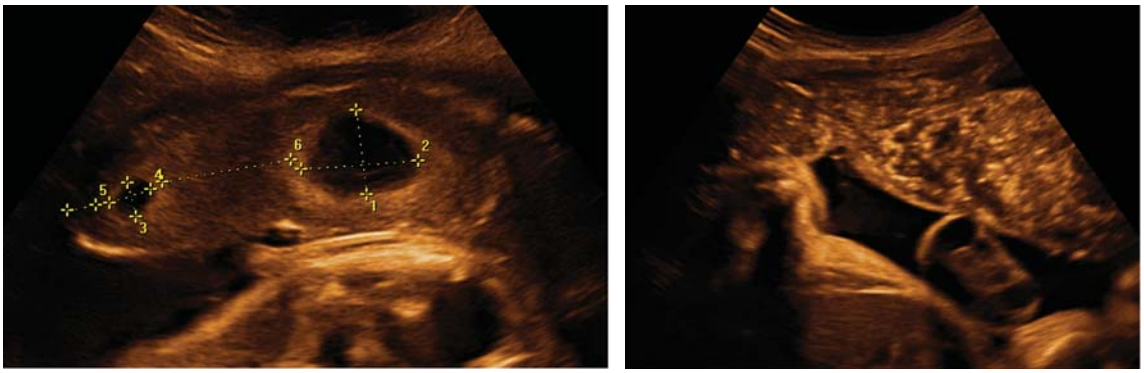


**Fig. 1:** Abnormal placental images in the third trimester showing hypoechoic spaces (left) and increased echogenicity (right).

os. It's now nearly 30 years since Peter Grannum first talked about placental grading[1], but it is interesting to speculate about the application of new ultrasound technology to the conundrum of placental dysfunction in late pregnancy. It really is time for some large, prospective studies of placental appearances in late pregnancy, trying to match this with placental histopathology and perinatal outcomes (Fig. 1).

The second area that is gaining increasing clinical importance, mainly due to the debate about rising caesarean section rates, is the ability to use ultrasound to predict performance in labour. As a practising obstetrician, I can say categorically that the ability to identify women who are very likely to need an emergency caesarean section due to labour dystocia would be a major advance. Much of the morbidity associated with caesarean section relates to the emergency nature of the operation (particularly after a long labour) and converting a proportion of emergency caesareans to elective procedures would have to be a good thing. This could have the spin-off of also reducing the risk of fetal asphyxia in labour, as well as the maternal problems associated with prolonged labour inductions such as postpartum haemorrhage.

The added bonus of possibly improving longer-term health outcomes for women, in terms of pelvic floor dysfunction, cannot be discounted. The reverse of this, whereby ultrasound might predict those women who have a very high chance of an uncomplicated vaginal birth, is also very important as this may reduce the number of women requesting caesarean section for non-medical reasons. Such techniques as measurement of the levator hiatus[2], and the use of cervical ultrasound to do a more accurate Bishop's Score to predict labour outcome[3], are showing some promise in this area and this kind of research should be supported to see if this translates into clinical practice.

Putting together these first two applications of ultrasound leads to the intriguing conclusion that the future may be in the 37–40 week scan as a routine, at least for primigravid women. The exact timing of this scan could be determined by clinical features such as fetal size, engagement and maternal blood pressure. We have been through the era of the 18–20 week scan, the overall value of which has been eroded to an extent by first trimester combined screening. The advocates of the 22–24 week scan as a way of predicting preterm birth and preeclampsia/fetal growth restriction have still to show that this kind of screening test has a major impact on pregnancy outcome (Fig. 2). Undoubtedly we can predict, but unless we can prevent, the

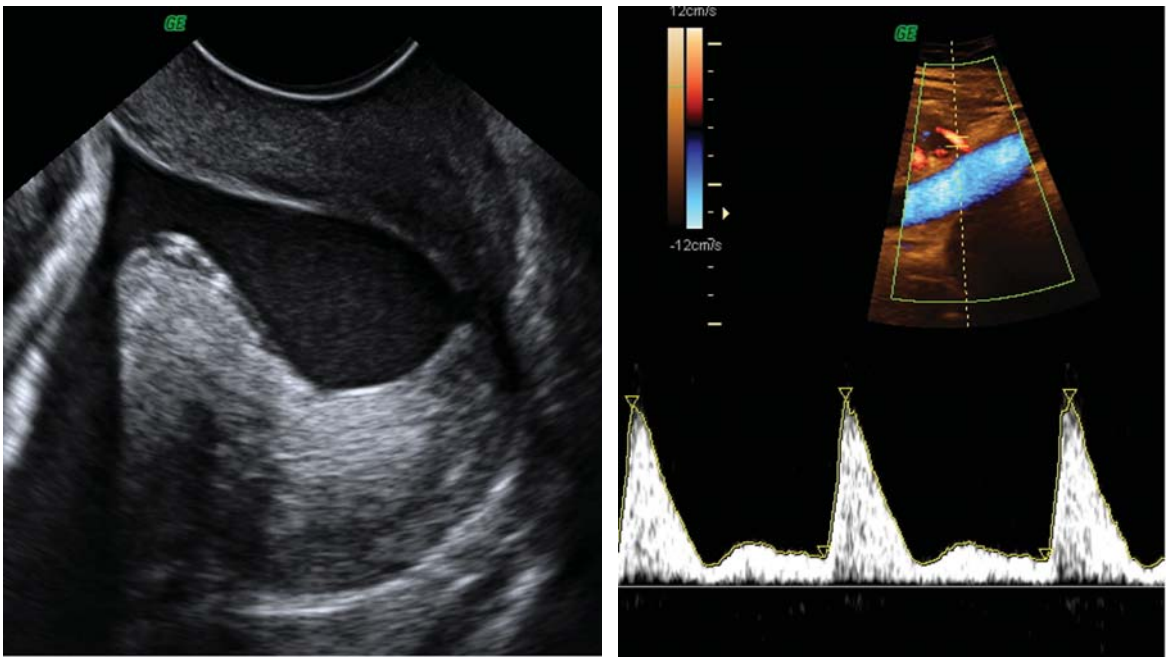



**Fig. 2:** The 22–24 scan was intended to be a good predictor of adverse pregnancy outcome by screening for abnormal cervical change (left) and increased uterine artery resistance (right).

value is diminished. There have been attempts to combine the functions of these two scans into a single one at 22 weeks, but in some states and territories this compromise is thwarted by restrictions on late termination (>20 weeks) meaning that two routine scans would need to be done at 18 and 24 weeks to maximise the value. If we are to move to three routine scans in pregnancy, it is hard to escape the conclusion that there needs to be a comparison made between the value of the 22–24 week scan as a predictor of adverse outcome, and one done much later in pregnancy. They would clearly be looking for different things and the clinical responses to abnormal findings would be very different. Interestingly, there has been a call for a four scan protocol with two scans being done in the third trimester at 30–34 weeks and again at 36–38 weeks[4]. A 37–40 week scan which looks at both fetus and placenta, as well as assessing suitability for normal or operative birth, should be the most cost-effective approach. It would also have the spin-off of ensuring that there would be virtually no undiagnosed breeches in labour, given that the clinical skills for dealing with this are going to become more and more limited.

My third choice may surprise some as it is not commonly considered to be an area of clinical practice in which ultrasound has a major role. Worldwide, postpartum haemorrhage (PPH) is the leading cause of maternal mortality, as well as morbidity for women with excessive blood loss who take a long time to recover physically. It does appear that rates in Australia and New Zealand are increasing, although the reasons for this are not well understood.

How can ultrasound help? One obvious answer is that using ultrasound to better triage women into those who can safely undergo IOL and those who should be steered towards elective caesarean section may help with primary prevention as one important risk factor for PPH is the long, induced labour leading to assisted vaginal birth.

But it is inevitable that PPH will still occur as an unexpected outcome and how this is managed will determine the outcome for women. Obstetricians know that the age-old adage that an empty, well-contracted uterus does not bleed is absolutely true. So why then do we continue to manage this problem blindly, only resorting to uterine exploration in theatre when we can't stop the bleeding with pharmacological methods? The early use of ultrasound to image the uterus and identify those who should be managed surgically would have to lead to reduced blood loss and overall a safer form of clinical management. Of course, this requires the person on the spot, the obstetrician or registrar, to have the skills to use ultrasound in this way. The whole area of labour ward ultrasound was recently reviewed, and the extent of the applications may be surprising for those who are unfamiliar with this area[5]. Recently, I was involved in a survey of all teaching hospitals in Australia (Bunting and Ellwood 2007, unpublished observations) and not surprisingly, all centres had access to ultrasound in the labour ward, but virtually none had any protocols, accreditation or audit in place. The potential value of this application of obstetric ultrasound, strongly suggests to me that specific training and clinical governance in this area is vital. Once again, it is interesting for me to reflect that in my early days of O&G training, the ultrasound machine was frequently seen in the labour ward, yet it is an application that still needs formal acceptance (Fig. 3).

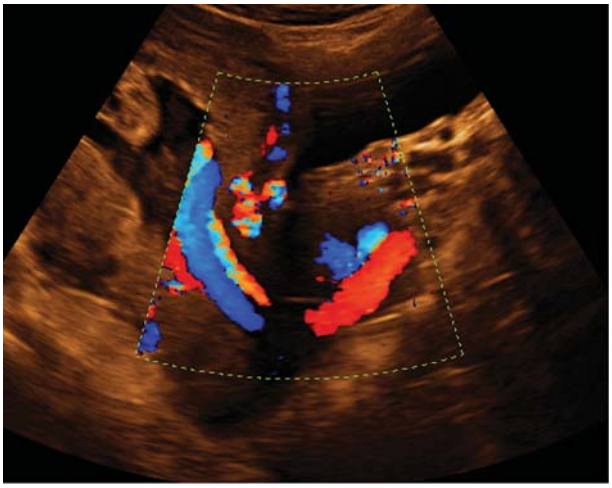


**Fig. 3:** Labour ward ultrasound showing a cord prolapse at 26 weeks gestation.

The ethics of obstetric ultrasound practice have always interested me. I do believe that every woman should have access to the right scan, done at the right time, done by the right person. While many aspects of routine ultrasound done in the first and second trimesters do not dictate that an obstetrician needs to have primary input to the scan, I believe that late third trimester scanning and labour ward ultrasound would have to be enhanced by the presence of someone who is skilled in obstetric decision-making. The inevitable conclusion for me is that all obstetricians should be skilled sonologists, particularly in these two important areas. A study in the USA suggests that their residency programs may be achieving this, even though only 20% of the residents said they would practice ultrasound[6]. The RANZCOG is still concerned that trainees are not getting enough access to high-quality training in O&G ultrasound. I firmly believe that ASUM has a role to play in this and recent steps to introduce the CCPU are welcomed. We should rise above turf-wars, and should accept that some scans need to be done by those who can interpret the findings immediately and make clinical decisions.

As I look back on my career to date, I have this feeling that we have been responsible for a massive explosion of technology and a burgeoning use of ultrasound in obstetric practice, but perhaps we have lost the focus that should be on maximising our efforts to improve outcomes for women and their babies. I think it is time to go back to basics and carefully examine those areas of adverse pregnancy outcome

where we have a real chance to make a measurable difference. The use of obstetric ultrasound in the future should be driven by the need to demonstrate improved pregnancy outcomes. This may mean going 'back to the future' and exploring the use of routine late pregnancy ultrasound. As there is a limited budget for obstetric ultrasound, this may mean a degree of re-focussing, and perhaps even abandoning some of the traditional uses of ultrasound in pregnancy in favour of newer applications with a better chance of improving outcomes.

## Acknowledgement

I am grateful to Dr Meiri Robertson for supplying the images and for her helpful criticism of the text of this article.

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OPINION

# Cardiac ultrasound as performed by the neonatologist

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## Introduction

Right now, our world is mind-blowingly exciting. Most of us have a home computer, and a mobile phone with an increasing-resolution-inbuilt digital camera and a fancy ring-tone is now pretty much standard. Some even have a Blackberry with constant email on the go, and many of our kids are experts at home digital video editing. Our ultrasound machines have enjoyed similar rapid technological advances in the last decade: current clinical ultrasound platforms are venturing into 4D technology and modes for assessing tissue function which may well be standard in all future machines. Whether all (or any) of these features prove to be clinically useful remains to be seen.

One great advance in terms of the use of ultrasound in clinical practice has been the increased availability of this tool to clinicians. Many practitioners will remember the awe in which the early ultrasonographer was held, whereas it would not be considered unusual today for a registrar to confirm, using ultrasound, the fullness of a bladder prior to attempting a suprapubic aspiration, the presentation of a fetus, or the presence of abdominal ascites. In the field of neonatal echocardiography, Jon Skinner wrote in 1998[1] of echocardiography now being 'an essential part of adequate management of the critically ill newborn'. That is clearly the case today, with most western neonatal intensive care units having access to echocardiography.

## Debate: who should be doing neonatal cardiac ultrasounds?

There has been much debate, some of this published, regarding the question of who should be allowed to perform neonatal echocardiography.

It has been suggested that neonatologists wishing to perform echocardiography first embark on a cardiology fellowship, and this may well need to be considered for incorporation into future neonatologist training programs. It is certainly true that a good knowledge of anatomy is vital to being able to perform any form of ultrasonography; in the field of neonatal echocardiography there is the need for additional understanding of both embryology as well as the physiological changes that occur perinatally and the effects of these in the subsequent days to weeks.

Moreover, one needs to understand the possible impact that the clinical scenario (e.g. persistent pulmonary hypertension, artificial surfactant, etc.) may have on the ultrasonographic examination. Most currently practicing echocardiographers would agree that neonatal echocardiography is a skill that cannot be learned overnight, and that it is vital to spend time in a centre where an experienced echocardiographer can directly teach, supervise and review scans on a regular basis over a period of months or even years.

There has been much interest in the number of cases that have been missed or misdiagnosed by neonatal cardiac ultrasonographers (not necessarily neonatologists) other than a paediatric cardiologist[2]. It is important to note that a neonatal cardiac ultrasound assessment is distinctly different to a formal paediatric echocadiogram and neonatologists will be the first to admit to this. In our NICU, we try to document a scan as a 'cardiac ultrasound as performed by a neonatologist' as opposed to an 'echocardiogram', the latter implying that the scan was formally performed by a paediatric cardiologist. Some sort of differentiation has been suggested[3,4] so as to assign the appropriate weight to such a scan and thus avoid confusion for other caregivers. The term 'functional echocardiography' has also been suggested[5].

So, what is it exactly that neonatologists do when they perform a cardiac ultrasound scan? There are three aspects to this.

The most common reason for a neonatologist performing a cardiac ultrasound is to assess the cardiac physiology of the infant at a particular time point. This is a dynamic finding and related to the infant's age, degree of prematurity, clinical condition, etc. and will thus change over minutes, hours or days. Such an assessment is clearly interpreted in conjunction with the infant's history and clinical parameters and is useful for clinical decisions regarding intravascular volume, use of inotropes, etc. Such an assessment is unlikely to encroach on the field of the paediatric cardiologist. One suggested model is that a paediatric cardiologist perform a single early structural echocardiogram in every sick neonate to exclude congenital cardiac disease, so that any subsequent cardiac functional ultrasound assessments by the neonatologist, and decisions based on these, would be considered safe.

Most neonatologists would be happy with this model, but in today's world this is not always

practical or possible due to the limited availability of the paediatric cardiologist. In performing early functional ultrasound assessments, the neonatologist may well identify a possible congenital cardiac anomaly earlier than would normally be suspected purely on clinical grounds, and thus refer such patients for an earlier and appropriate assessment by a paediatric cardiologist.

The second reason for performing a cardiac ultrasound may be as a screen for life-threatening congenital cardiac anomalies. This is the controversial area on which paediatric cardiologists may not agree. The need for such ultrasounds is based largely on a supply-demand issue: in paediatric referral hospitals, with easy access to paediatric cardiologists around the clock, there may be resistance from both the neonatologists as well as the paediatric cardiologists regarding anyone other than the paediatric cardiologist performing such ultrasounds. However, this is very different in remote areas with no or limited access to a paediatric cardiologist. We know that to transport a sick neonate does affect its outcome negatively, so management should be local where possible. In this case, a local ultrasonographer needs to be able to perform a cardiac ultrasound assessment that may help exclude a life-threatening congenital cardiac condition and thus avoid an unnecessary transfer. A neonatologist is ideally situated for such a responsibility. Currently, this system may be supported by reassuring reports stating no significant, at least not life-threatening, differences in findings on cardiac ultrasound scan as performed by a group of neonatologists when compared to those of paediatric cardiologists[6]. Such an ultrasound scan may well be further supported by communication with a remote paediatric cardiology service, either via the telephone, through picture transfer via email or in some areas via a direct, sometimes even live video telemedicine link.

This 'team approach' model appears to be the norm in most NICUs in Australia and New Zealand, with a close communication and co-operation between the neonatologist and the paediatric cardiologist[7].

The suggestion has been made that paediatric cardiologists should encourage, support and supervise neonatologists in learning echocardiography[1]. In Australasia, this suggestion has been actioned. From personal experience in Melbourne, Christchurch and Sydney, neonatologists have always had terrific support, ongoing education and feedback from the local paediatric cardiologists. Regarding resources and training for neonatologists wishing to perform neonatal cardiac ultrasound scans, there are a number of resources available and that includes the book *Neonatal Echocardiography*[8], educational CDs[9] and published support[4]. Clinical support, including supervision and/or review of scans, usually occurs locally as per arrangements between the neonatologist and paediatric cardiologist, and formal courses on neonatal and/or paediatric echocardiography have been regularly run by the paediatric cardiology team in Auckland.

No-one would doubt the tremendous contribution, through research, to our current understanding of neonatal physiology, and this would be a third reason for the neonatologist performing a cadiac ultrasound scan. The neonatal circulation and its relationship with intraventricular haemorrhage[10] and/or subsequent neurodevelopmental outcome has and will continue to be an important research question. It is primarily the neonatologist that has made most of these contributions to date and rightfully so: it is he/she at the baby's cotside. With advances in medicine and co-existent research, our understanding of this physiology improves. One good example is the rapid decrease in intra-pulmonary pressures secondary to surfactant administration in a preterm baby, with a resultant 'aortic steal' evident within hours or even minutes after birth. It is no wonder that there has been a shift in screening for, and management of, the patent ductus arteriosus from the earlier 3–5 days' age to current assessments and subsequent treatment at or even before 12 hours' age[11].

## Quality assurance and the CCPU

There is no doubt that there needs to be some form of maintenance of the standard of neonatal cardiac ultrasound that is to be practiced, whether it be by radiographer, sonographer, paediatric cardiologist, neonatologist, technician or whoever else may be asked to perform these ultrasounds. The Cardiac Society of Australia and New Zealand does offer guidelines for paediatric cardiologists in standards of practice in paediatric echocardiography[12] and these may be useful as a guideline for future training and quality assurance programs for neonatal cardiac ultrasonographers.

To achieve and maintain competency in a particular area of ultrasonography would need some form of assessment and supervision by a regulating body, be that through a separate body such as the Australasian Society for Ultrasound in Medicine (ASUM), or directly through the College of Physicians.

In Australasia, special qualifications in ultrasonography have previously been overseen by ASUM and have in the form of the Diploma in Diagnostic Ultrasound (DDU) and the Diploma in Medical Ultrasound (DMU). The examinations for these touch on all areas of medical ultrasound. It is only recently that there has been a drive in Australasia to accredit clinicians that use ultrasound in their specific clinical field with a qualification specific for their area of expertise. With the relevant colleges not catering for this, ASUM has addressed the need for area specific ultrasound qualifications with the relatively new Certificate in Clinician Performed Ultrasound (CCPU)[13], which is currently available in the fields of emergency medicine, surgery and obstetrics and gynaecology.

To qualify for a CCPU, a candidate needs to be registered and practicing in the relevant field, fulfil a number of requirements which include submitting a formal structured logbook, passing a practical examination and satisfying ongoing practice and education requirements.

Whatever the process and the requirements, it is clear that such a process would potentially standardise the education and expertise in each area, plus oversee continuing education and maintenance of skills. Neonatologists would welcome such a process, as would any committed clinician.

To create a system such as the CCPU in a specific area of clinical practice will pose many challenges, as experienced by the areas that have formally accepted the CCPU. The first step would be to create an examination board, which would ideally be voted in through a college process, or failing that, they may well need to be self-appointed. The second step would be to assess, through pre-defined, documented and transparent set criteria, the abilities, qualifications and experience of neonatologists currently using ultrasound, with a view to offering to these the CCPU if they satisfy such criteria. There are numerous neonatologists currently applying the use of ultrasound in their clinical practice, with training being mostly self-directed. For a self-appointed board of examiners to state that any neonatologist currently using ultrasonography does not have adequate skills would be unfair as the practicing neonatologist may well be better skilled than the board members themselves. Finally, there will need to be a process of formally educating and training their colleagues and registrars in order that they themselves can also achieve the CCPU. Currently, there is a self-appointed board set up for co-ordinating the neonatal CCPU process, this board is currently in the process of setting up requirements for such a neonatal CCPU.

Most importantly, as ASUM is a separate body to the colleges, it will be important that the speciality as a whole accepts and supports the process and implementation of the CCPU.

## Summary

In summary, we have witnessed a very exciting time in the development of the use of neonatal cardiac ultrasound, and there is a very exciting path ahead in terms of assuring the quality of such a skill where practiced in Australasia.

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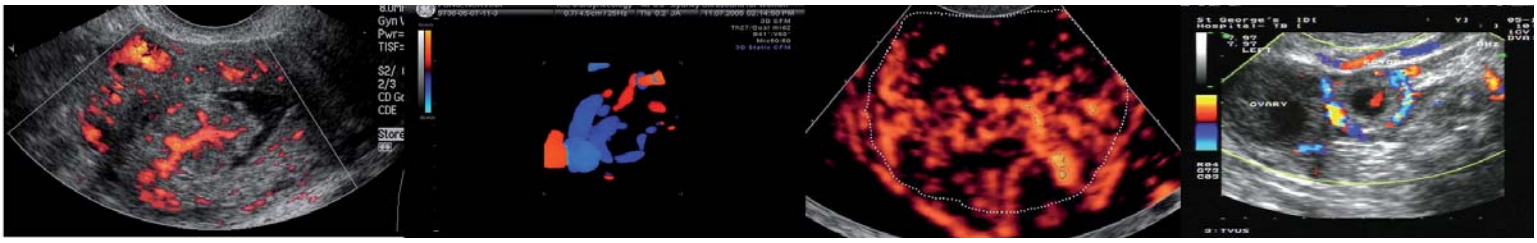
## Editor's Note

The challenges of modern medicine have seen the increasing use of ultrasound as an imaging modality at the bedside. Its use is enabling clinicians from a number of specialty disciplines to perform scans enabling prompt triage of patients for treatment.

In response to this, ASUM established the Certificate in Clinician Performed Ultrasound (CCPU) in a number of disciplines, to facilitate teaching and common standards of practice, and is currently launching the CCPU (Neonatal). Each specialty CCPU has a panel of clinicians which has responsibility for consulting within the discipline to establish a curriculum based on current best practice. These curriculum documents are published as Syllabus Statements online at www.asum.com.au/ccpu.htm. Feedback relating to these documents is welcomed. These curriculum documents are intended to guide providers as to the minimum training requirements in each area.

The clinicians on the panels work with ASUM and their relevant colleges and societies to ensure that the entire program integrates with clinical teaching and Fellowship requirements. Initially the panels are appointed by ASUM as representative of their specialist area. ASUM does not regard the members of the CCPU panels as necessarily 'more expert' than their colleagues. However it is pertinent to note that three of the six members of the CCPU (Neonatal) panel are cited as 'references' in Dr Klimek's article.

Dr Klimek is right to note the importance of the process being inclusive of those currently practicing. A priority task for each panel is to develop mechanisms by which the proficiency of others working in the area can be recognised through advanced standing and recognition of prior learning. For the CCPU (Neonatal), this procedure is in its final developmental stages and will be published online at www.asum.com.au/ccpu.htm. Suggested changes to this document are welcomed.



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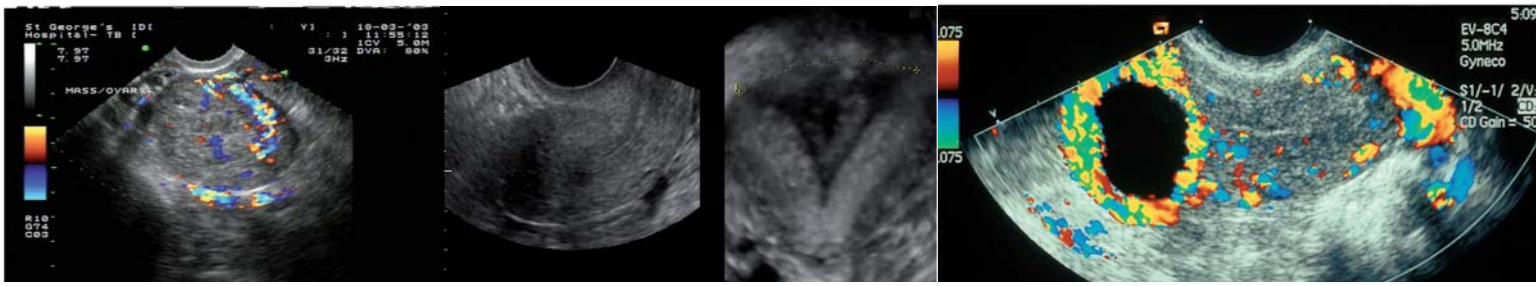

# Sonography of the sacrotuberous ligament

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**Abstract**

The sacrotuberous ligament (STL) is a little known ligament and very little imaging of this structure has been performed in the past. The ligament has a broad attachment to the sacrum, sacroiliac joint and the posterior iliac spine. It narrows as it passes towards the ischium, spiralling slightly. Its superficial fibres are in continuity with the biceps femoris and thus link the sacrum to the hamstrings. Gluteus maximus attaches to the posterior aspect of the ligament as may piriformis, superior and inferior gemellus and obturator internus. There is a variable membranous reflection of the distal ligament (the falciform ligament) that runs along the ischial ramus towards the obturator fascia and with which it may fuse. The ligament helps to stabilise the pelvis and lock the sacroiliac joint by pulling the iliac bones towards the sacrum, thus preventing tilting of the sacrum. The pudendal nerve lies immediately anterior to the ligament. Entrapment of the nerve can cause a large number of clinical complaints, including chronic perineal pain and faecal incontinence. Ultrasound guided injection of cortisone and local anaesthetic through the distal ligament may relieve symptoms and is thus also a useful clinical test. The ligament may be irritated at its junction with the hamstrings, resulting in localised pain and swelling of the ligament. Ultrasound guided injection can be easily performed. Avulsion of the ischial tuberosity epiphysis in mid to late teenage athletes can have some major consequences in later life. The role of the ligament will be examined.

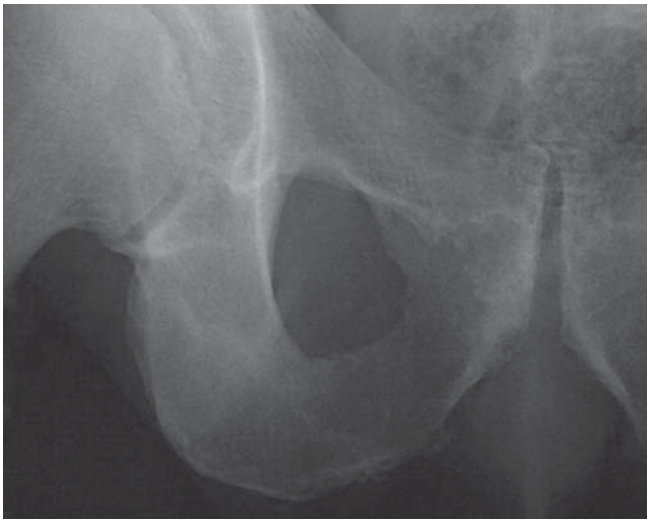

**Fig. 1:** Calcification of the distal STL, pointing proximally and medially.

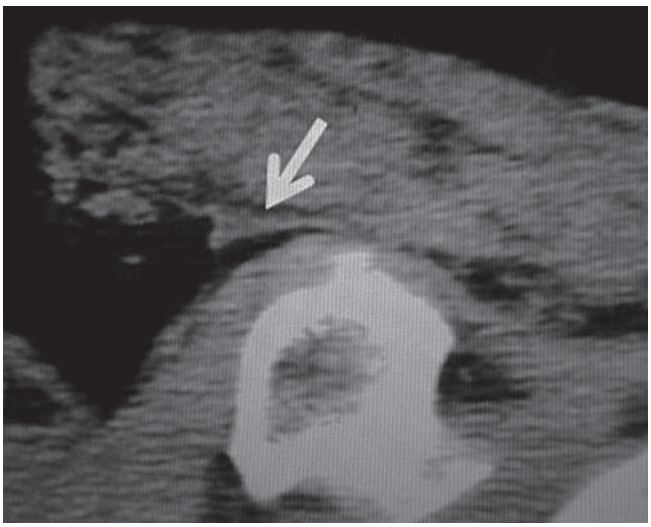

**Fig. 2:** Axial CT scan showing triangular STL [arrow] in cross section.

## Introduction

Review of the radiological literature will find very few references to the sacrotuberous ligament (STL). The ligament is occasionally calcified on plain x-ray (Fig. 1), but is otherwise not seen on plain radiographs.

Both CT scanning (Fig. 2) and MR scanning (Fig. 3) demonstrate the ligament, usually obliquely. Dedicated scanning planes parallel to the ligament are not usually performed due to a lack of understanding of the importance of this ligament.

Ultrasound is an ideal modality to examine the STL. The ligament can be easily identified and virtually its entire structure examined sonographically. To achieve a clinically relevant examination of the ligament, however, it is necessary to know the anatomy of the ligament, including its variations.

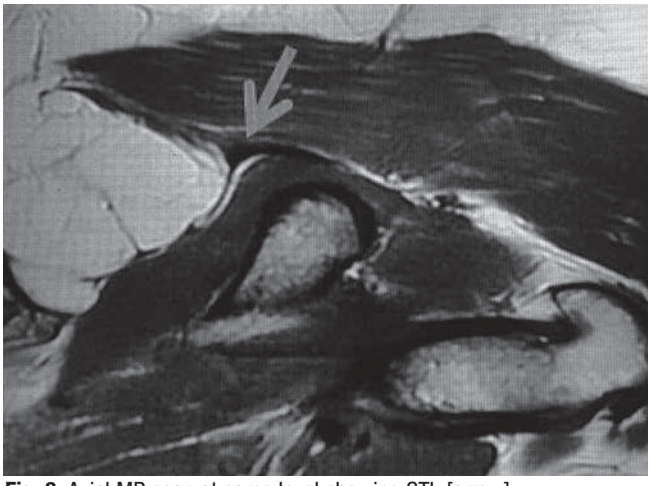

**Fig. 3:** Axial MR scan at same level showing STL [arrow].

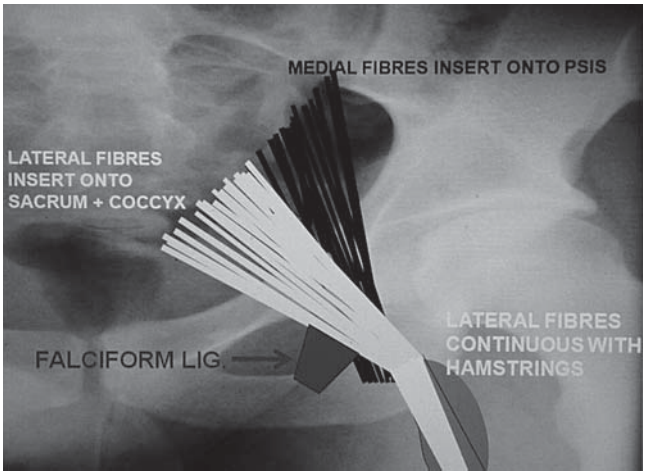


**Fig. 4:** Arrangement of fibres in STL.

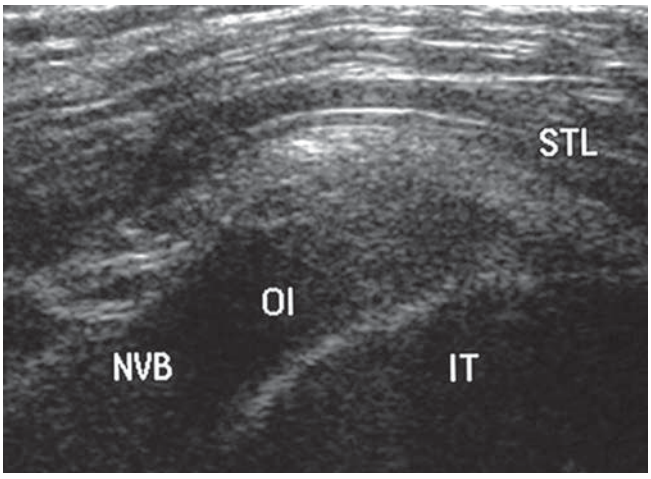


**Fig. 5:** Transverse ultrasound scan of STL at same level as Fig. 6. [OI = obturator internus, NVB = pudendal neurovascular bundle, IT = ischial tuberosity].

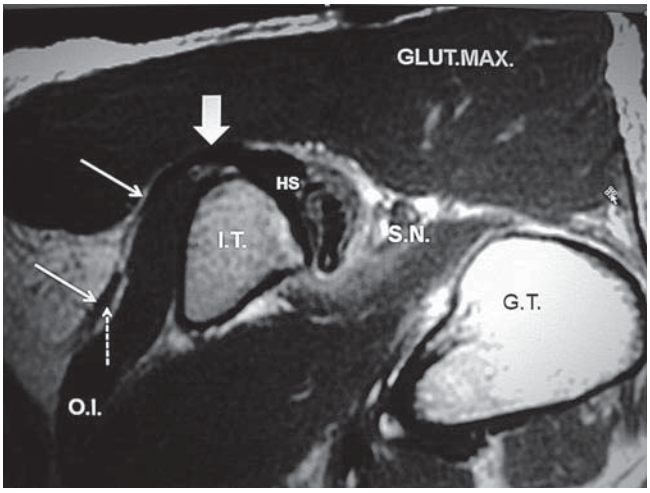


**Fig. 6:** MR image at same level as Fig. 5. Long arrows indicate falciform ligament, dotted arrow the pudendal NVB.

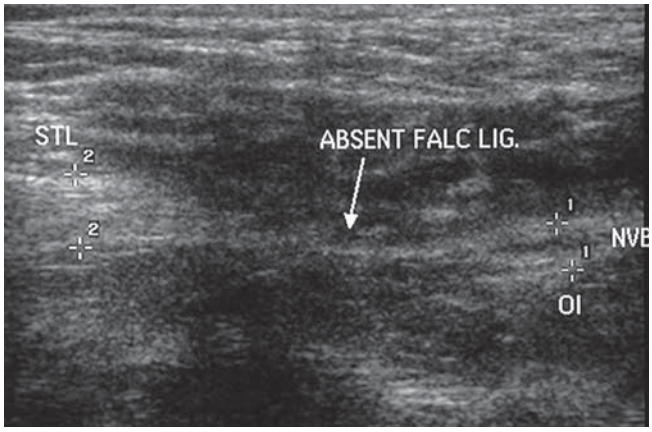


**Fig. 7:** Transverse ultrasound scan showing absent falciform ligament.

## Anatomy

The STL has a broad attachment to the sacrum, sacroiliac joint and posterior iliac bone. It narrows as it passes to the ischium, spiralling slightly. The fibres arising from the more cranial aspect of the proximal end of the ligament (the sacroiliac joint and proximal sacrum) pass obliquely downwards and insert onto the medial aspect of the ischial tuberosity (Fig. 4). The fibres arising from the more cephalad aspect of the sacrum pass more obliquely and laterally, superficial to the more cephalad fibres and insert onto the more lateral aspect of the ischial tuberosity. Loukas, Louis, Hallner, *et al.*[1] quote a mean length of the ligament of 86 mm and a mean thickness of 4 mm. The proximal end of the ligament has a mean width of 76 mm, the middle part a mean of 35 mm and the distal width a mean of 58 mm. A ligament which is wider at the proximal end narrows the sciatic foramen.

Of the specimens examined by Loukas, *et al.* 87% also had a membranous, non-ligamentous portion of the STL, the falciform process, which extended towards the ischioanal fossa to a variable degree. The authors quote three types of falciform ligament. Type 1 (69%) shows a process extending towards and along the ischial ramus and terminating at the obturator fascia (Figs. 5, 6). Type 2 (18%) is longer, the process extending along the ischial ramus, fusing with the obturator fascia and then continuing to the ischioanal fossa. In Type 3 (13%) there is no ligament (Fig. 7).

The attachment of the ligament to the ischium has at least two main variations. The more medial part of the ligament (arising from the more cephalad part of the sacrum and SI joint) fuses with the ischial tuberosity itself. The more caudal fibres (inserting onto the more lateral aspect of the ischial tuberosity) continue with the superficial fibres of the hamstrings, especially biceps femoris. In some cases the deeper fibres of the lateral part of the distal STL attach completely to the ischial tuberosity apart from the very superficial fibres (Fig. 8). In others, however, these lateral fibres continue 100% into the hamstrings and have no communication at all with the ischial tuberosity (Fig. 9). Van Wingerden, Vleeming, Snijders, *et al.*[2] refer to these variations as 'totally fixed' and 'partially fixed' respectively (Fig.10). In these authors' study, four out of ten ligaments had the totally fixed pattern and six had the partially fixed pattern.

The gluteus maximus muscle attaches partly to the posterior surface of the ligament as may piriformis, superior and inferior gemellus and obturator internus, all of which are external hip rotators. Contraction of these various muscles, therefore, increases tension on the ligament.

The ligament has a very intimate relationship to the pudendal nerve (Fig. 11). This nerve is the main sensory supply to the external genitalia and perineum. It arises from

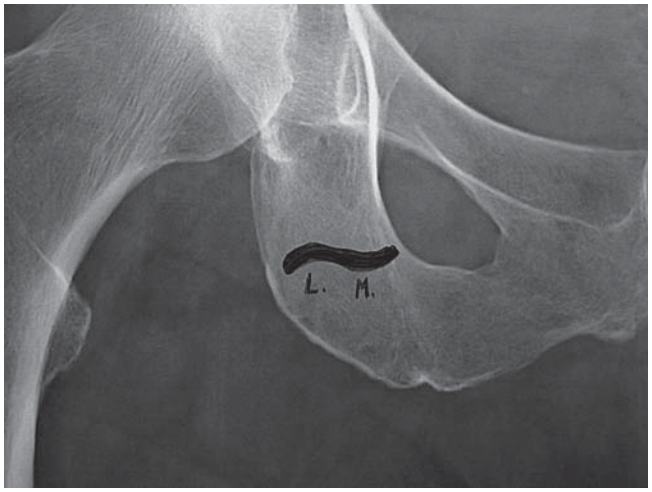


**Fig. 8:** Attachments of medial [M] and lateral [L] parts of 'totally fixed' STL to ischial tuberosity.

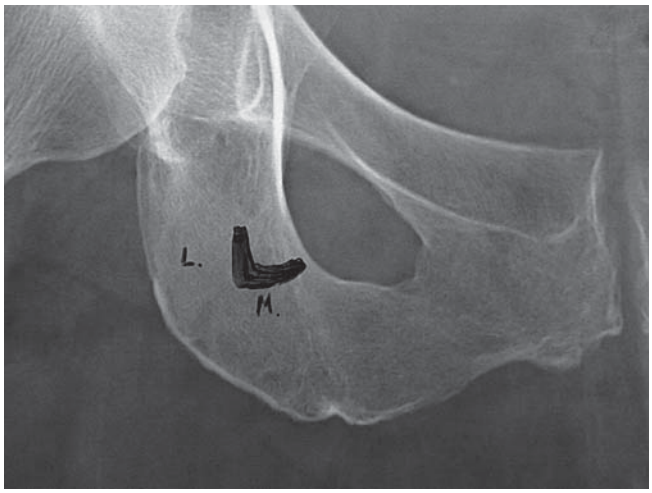


**Fig. 9:** Attachments of medial [M] and lateral [L] parts of 'partially fixed' STL to ischial tuberosity.

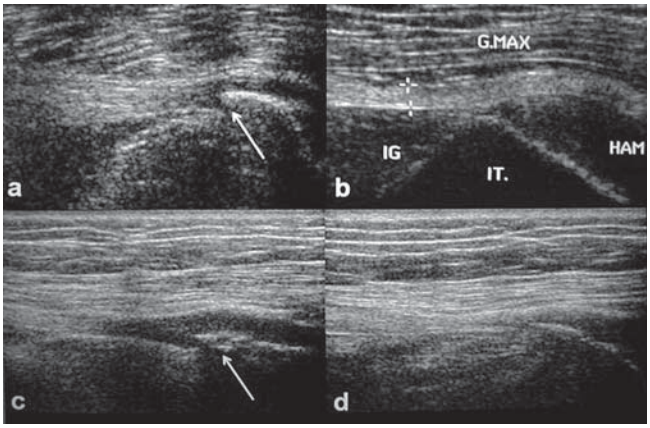


**Fig. 10:** Longitudinal ultrasound scan of 'totally fixed' (a) and 'partially fixed' STL (b) at ischial tuberosity [IT]. 'Totally fixed' STL attachment with avulsion (c) and normal other side (d).

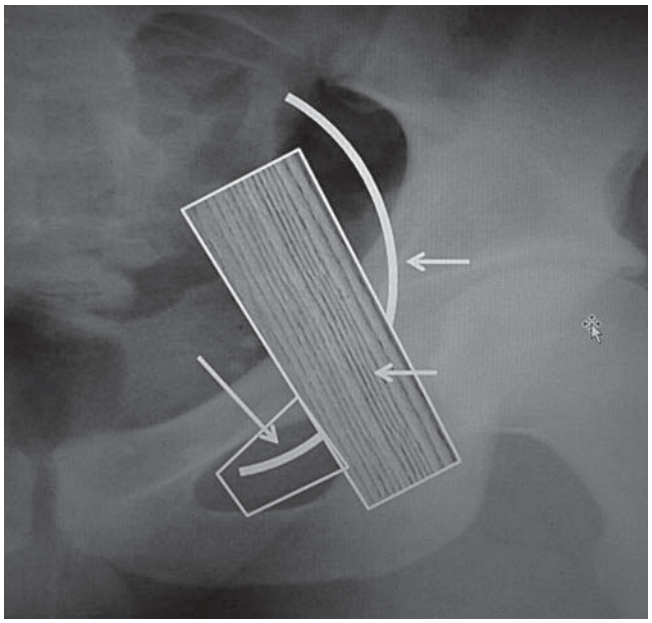

**Fig.11:** Relationship of ligamentous and membranous parts of STL to pudendal nerve [arrows].

S2, S3 and S4. The nerve passes through the lower part of the greater sciatic foramen, accompanied by the internal pudendal artery and venous complex. The neurovascular complex passes around the sacrospinous ligament close to its attachment to the ischial spine. At this point it is just lateral to the more proximal part of the STL. The complex then passes immediately anterior to the mid to distal part of the ligament and heads towards the perineum immediately deep to the obturator fascia and falciform ligament (Figs. 5, 6).

### Function

The STL stabilises the pelvis by pulling the sacroiliac joints together and by preventing rotation of the lower sacrum/coccyx. Depending on the degree of continuity with the biceps femoris, tension from the hamstrings, through the STL may also affect the degree of the stability of the pelvis. The muscles which attach to the ligament may also alter the dynamics.

### Technique

The STL is a relatively broad, echogenic structure that is easily identified in the buttock. The best way of finding the ligament is, with the patient prone, to locate the ischial tuberosity just proximal to the buttock crease. Palpating the tuberosity enables one to place the transducer in the sagittal plane on the more medial part of the tuberosity. Angle it slightly medially towards the sacrum. The ligament is usually identified as a broad, linear, echogenic structure running immediately deep to the gluteus maximus muscle and superficial to the external hip rotators (Figs. 12, 13). The more medial part of the tuberosity attachment of the ligament can be seen to merge with the ischial tuberosity itself. As one slides the transducer laterally, parallel to the ligament, either the fully fixed or partly fixed pattern is observed. In the fully fixed pattern, the ligament remains attached to the ischial tuberosity, apart from a very few superficial fibres which continue with the hamstrings. In the partly fixed pattern, the ligament continues completely into the proximal hamstrings. The sciatic nerve, which has a similar size and texture to the STL, lies on the lateral aspect of the hamstring origin and further from the skin surface. For example, if the ischial tuberosity is regarded as a clock face, the right tuberosity, when viewed from below, has the STL in the 11 to 12 o'clock position and the sciatic nerve in the three o'clock position. The two structures run reasonably parallel to each other, but on

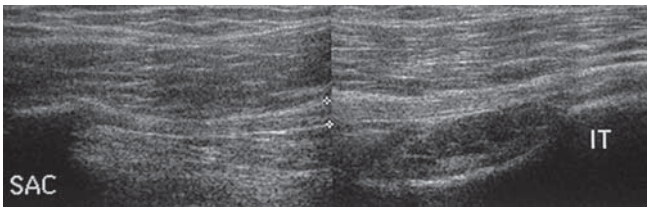


**Fig.12:** Composite longitudinal ultrasound scan of STL from sacrum [SAC.] to ischial tuberosity [IT]. Note 'partially fixed' appearance at ischial tuberosity.

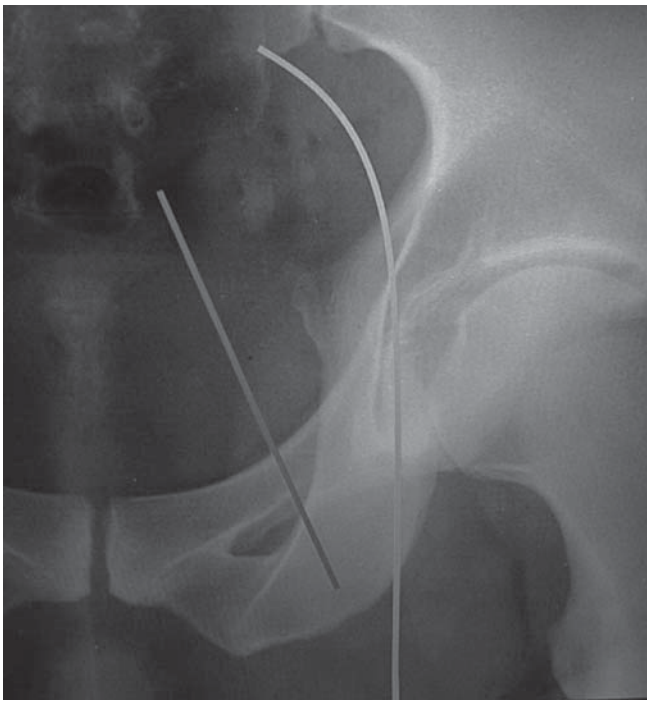

**Fig. 14:** Relationship of STL [straight line] to sciatic nerve [curved line].

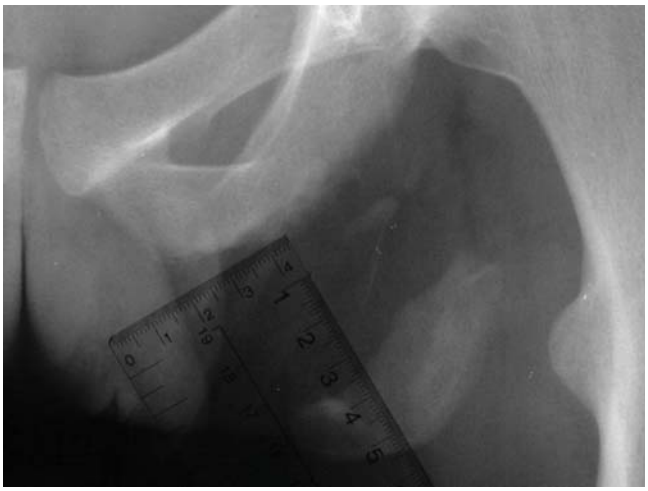

**Fig. 17:** Avulsion of ischial tuberosity epiphysis with gap of 3.5 cm.

different levels and separated by 2 cm to 3 cm. If an echogenic structure is identified in the buttock and its nature is unclear, follow it distally. The STL will approach the ischial tuberosity surface and the sciatic nerve will approach the tuberosity from its lateral aspect and well away from its surface (Fig. 14).

The normal STL is uniformly echogenic. The pudendal neurovascular bundle can be identified on its more lateral aspect, just distal to the piriformis muscle. The bundle then can be traced distally and medially deep to the STL, between the ligament and the external hip rotators. The falciform ligament can be

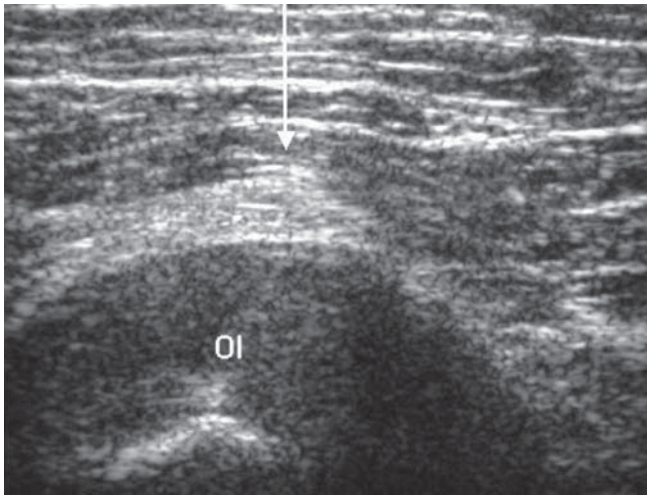


**Fig. 13:** Transverse ultrasound scan of STL [arrow] at level of obturator internus [OI].

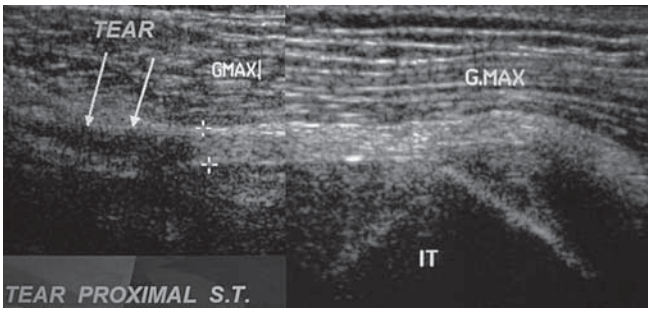


**Fig. 15:** Longitudinal ultrasound scan of STL showing proximal tear/ strain. Note 'partially fixed' attachment to ischial tuberosity [IT].

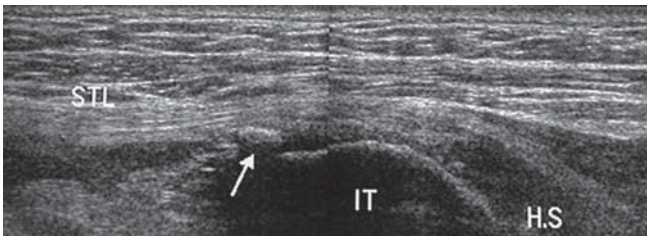


**Fig. 16:** Fragmented spur [arrow] at STL attachment to ischial tuberosity [IT]. Note continuity of STL with hamstrings [HS].

identified (when present) as an echogenic band lying on the surface of the obturator internus muscle. The neurovascular bundle can be traced between the band and the obturator internus.

**Pathology**

Like any ligament, the STL is subject to strain. This can occur along any part of the ligament, but changes are more commonly seen proximally (Fig. 15) and at the ischial tuberosity insertion. A strain is demonstrated as a relatively sonolucent zone within the normally echogenic ligament. There is focal tenderness over the area. Bony spurs and osteophytes can develop at the ischial tuberosity attachment of the ligament (Fig. 16). The position of these spurs depends on whether the ligament has a partial or fully fixed attachment to the ischial tuberosity. The spurs can fragment and can be demonstrated as irregular pieces of bone within a swollen ligament (Fig. 10 c, d). Once again, the patient is focally very tender in this area. Ultrasound guided injections of the abnormal parts of the ligament are easily made and usually result in marked improvement in symptoms. Prominent spurs arising from the attachment of the STL and hamstrings

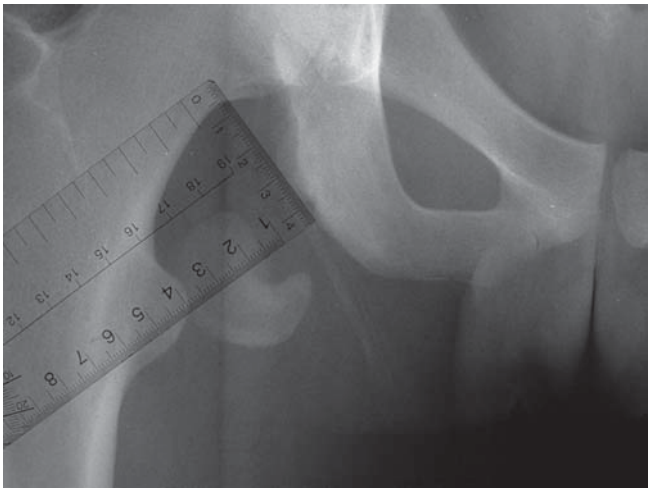

**Fig. 18:** Avulsion of other ischial tuberosity epiphysis with gap of 1.8 cm.

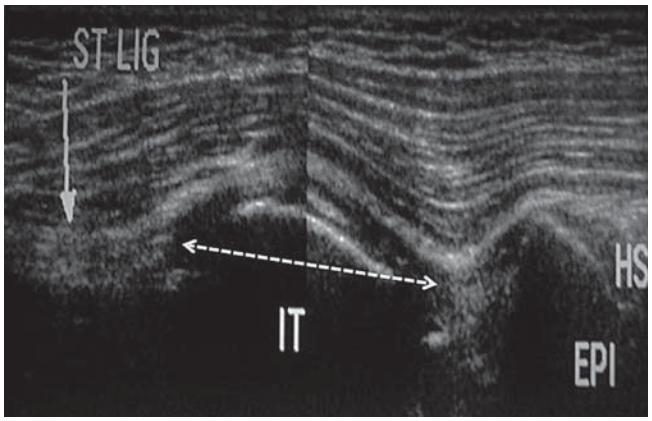


**Fig.19:** Longitudinal ultrasound scan of patient seen in Fig. 17. Dotted arrow shows ends of torn STL. Hamstrings [HS] attach to avulsed epiphysis [EPI].

**Fig. 20:** Minor displacement of right ischial tuberosity epiphysis. Normal epiphysis on left.

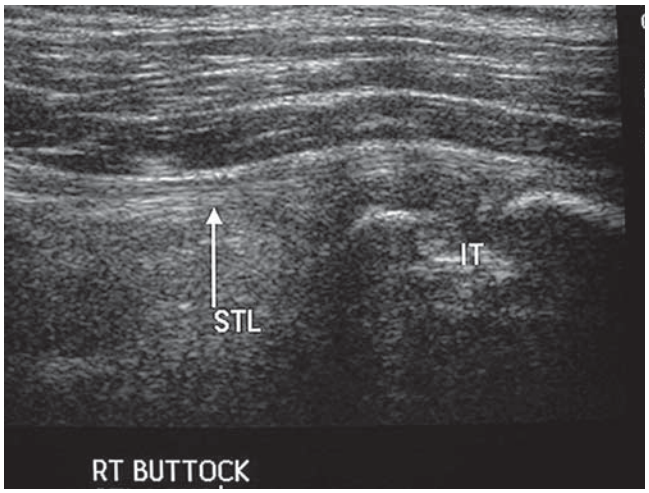


**Fig. 21:** Longitudinal ultrasound scan of right ischial tuberosity of patient seen in Fig. 20 showing subtle gap between epiphysis and ischial tuberosity.

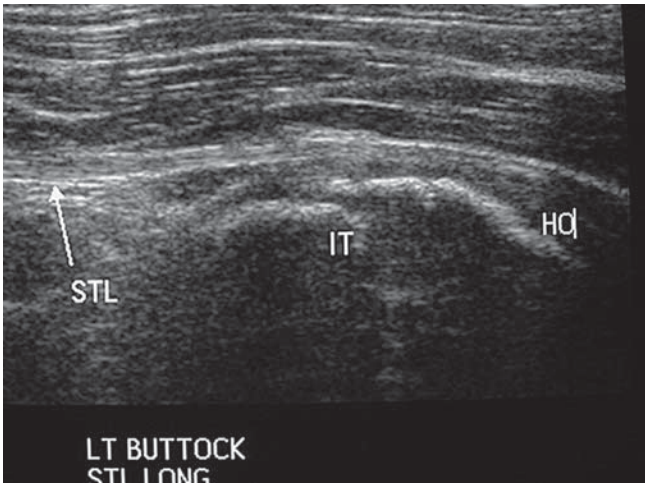


**Fig. 22:** Longitudinal scan of normal left epiphysis in same patient. HO = hamstring origin.

to the ischial tuberosity can cause irritation of the overlying ischial tuberosity bursa, which may also be prominent. The bursa can also be injected under ultrasound control.

### Pudendal nerve entrapment

As has been discussed earlier, the pudendal nerve has an intimate relationship to the STL. In patients with symptoms strongly suggestive of pudendal nerve entrapment, injection of any or all of the potential sites of entrapment can be made under ultrasound control. CT guided injections of the perineural space of the pudendal nerve have been described. A study by Hough, Wittenberg, Pawlina, *et al.*[3], found that CT guided injections around the pudendal nerve were safe, with no serious complications. Of these authors' patients 65% had a 'distinct short term response' (unpublished data).

### Tuberosity avulsions

In teenage athletes, avulsion of the ischial tuberosity epiphysis (the hamstring attachment) can occur[5]. The orthopaedic literature suggests that if there is a gap of more than 2 cm between the avulsed bony fragment (seen on x-ray) and the rest of the tuberosity, operative intervention (screwing back) may be required. In the author's experience, a more sensitive way of assessing the seriousness of an injury is to scan the sacrotuberous/biceps complex. In avulsions of the ischial tuberosity epiphysis in which the sacrotuberous ligament (which runs across the epithysial plate) is torn (Fig. 19), there is no 'anchor' preventing the epiphysis and the attached hamstring from migrating further distally. If there is a shift of the epiphysis (Fig. 20), but the overlying STL remains intact (Figs. 21, 22), then there is such an anchor and, provided that no further strain occurs, one would expect

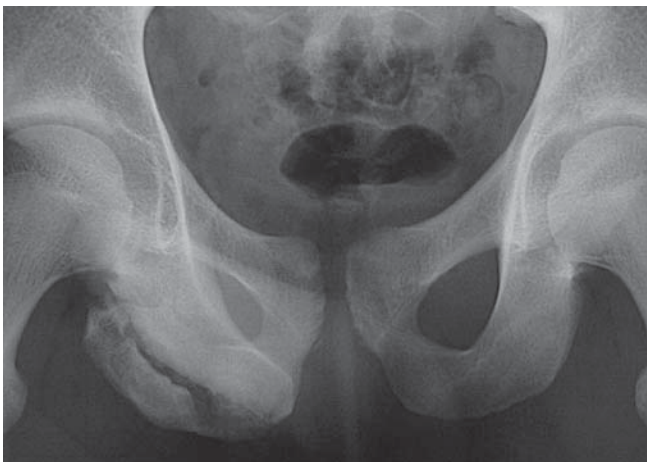

**Fig. 23:** Enlarged ischial tuberosity epiphysis following previous hamstring origin avulsion.

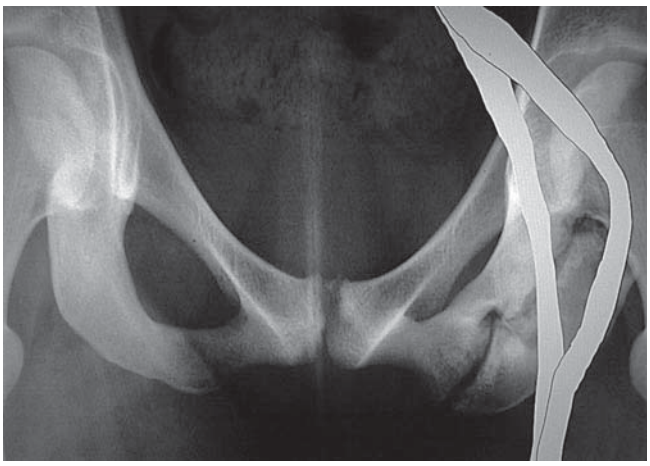

**Fig. 24:** Another case showing usual position of sciatic nerve [left line] and final position [right line].

re-attachment of the epithysis and the hamstring origin to the ischium. One of the consequences of untreated complete avulsion of the ischial tuberosity epithysis is the development of a very large ossific body in the region of the hamstring origin (Fig. 23), formed as a result of attempted union of the avulsed fragment and the rest of the ischium. Such a large bone displaces the sciatic nerve laterally (Fig. 24) and stretches it. In addition to the sciatic type symptoms which can occur at a very young age in such a patient, there is also the discomfort of having one buttock substantially larger and firmer than the other, resulting in an unusual sitting position and, hence, probable long term consequences to the spine. It therefore would seem appropriate to determine whether the STL is torn as part of the injury. If so, it seems logical to reattach the avulsed epithysis to the rest of the ischium surgically.

## Conclusion

The sacrotuberous ligament is easily seen sonographically. It may cause buttock pain by lesions of the ligament itself or by pressure on the adjacent pudendal nerve. The ligament has an important role in stabilising the immature hamstring origin. The ligament helps maintain pelvic stability. Assessment of the STL should be part of any buttock examination.

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# Imaging of the Essure permanent birth control device: a review

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**Abstract**

***Objective***: To evaluate the diagnostic ability of 2D and 3D transvaginal ultrasound with or without hysterosalpingocontrastsonography (HyCoSy) to assess the placement and function of the Essure permanent birth control device compared to radiography. ***Materials and methods***: Review of the current literature and our experience with this procedure. ***Conclusion***: 2D and 3D transvaginal ultrasound with or without HyCoSy is a suitable method to assess this device and appears to be preferable to radiography.

## Introduction

Surgical sterilisation is the most common method of permanent female contraception used worldwide. Although currently most cases are performed as a transabdominal laparoscopic procedure, the transcervical route is now providing more options. The transcervical route for permanent contraception was first attempted more than 150 years ago when chemical cautery was used to induce sclerosis resulting in occlusion of the fallopian tubes. The use of different chemicals through the years has resulted in varying degrees of unreliability as well as mortality and morbidity. Mechanical methods involving the placement of various devices into the tube and thermal methods using electrosurgery have also been attempted transcervically and met with unsatisfactory results. In addition, there has been limited ability to assess the placement and effectiveness of these methods[1].

The Essure permanent birth control device, originally known as STOP (Selective Tubal Occlusion Procedure), was developed in the 1990s[2]. It is the first hysteroscopically placed permanent female birth control device to meet the approval of the US Food and Drug Administration (FDA)[2]. It has also been endorsed by the Therapeutic Goods Administration in Australia[3]. However, a hysterosalpingogram (HSG) performed after a three-month interval is currently the only FDA approved method to assess tubal patency or occlusion following the insertion of the device[4]. In our experience 2D and 3D transvaginal ultrasound with or without hysterosalpingocontrastsonography (HyCoSy) has provided comparable imaging of the position and effectiveness of the device.

## Materials and methods

The Essure device (Fig. 1) is made of an inner coil of stainless steel and an outer coil of nickel titanium alloy. The inner coil is surrounded by white polyethylene terephthalate Dacron fibres[4,5]. Under hysteroscopic guidance both coils are inserted into the proximal fallopian tubes. The outer coil expands from a diameter of 0.8 mm to 2 mm to anchor the device in the tube. If correctly placed, three to eight coils of the outer coil's 4 cm length will be visualised spanning the uterotubal junction from within the uterine cavity[4,6]. The Dacron fibres stimulate benign local tissue growth within the tubal lumen over a three-month period which is intended to result in permanent tubal occlusion as well as aid in device retention[5].

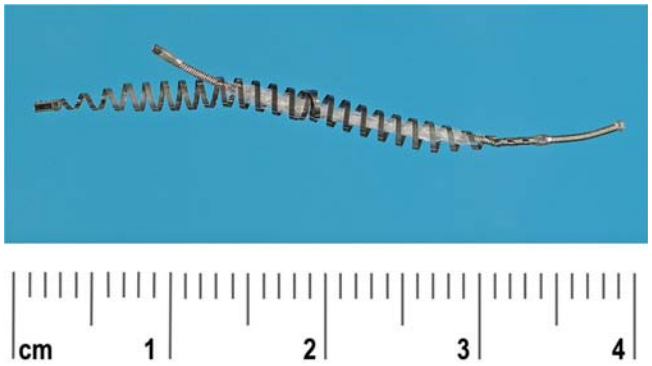


**Fig. 1** The Essure device.

The hysteroscopic insertion of the Essure microinsert is usually performed in an outpatient setting. Due to the expense of the inserts, both ostia should be visualised and appear normal hysteroscopically before the packaging is opened. Mild pain relief and antispasmodic medication may be used if necessary. The outpatient setting eliminates the risks and complications associated with general anesthetic and abdominal surgery as well as offering a faster recovery period with most women returning to regular activities the following day.

The patient is advised to use alternative methods of contraception for three months after the insertion[5,6]. The Essure protocol then advises that a plain film radiograph be done to assess correct placement[7]. This will also ensure that the devices are in the pelvis and have not been expelled. In order to assess tubal occlusion, FDA guidelines advise that this is followed by an HSG. If occlusion is confirmed the patient is advised that she can rely on the device as a sole method of birth control.

A retrospective review of our records found 16 patients from July 2004 to February 2007 who were examined three months post procedure. Transabdominal and transvaginal ultrasound by 2D and 3D was performed using GE Voluson 730 ultrasound equipment (Kretztechnik, GE Medical Systems, Zipf, Austria). The devices were easily identified by ultrasound in all 16 patients as linear echogenic coiled structures.

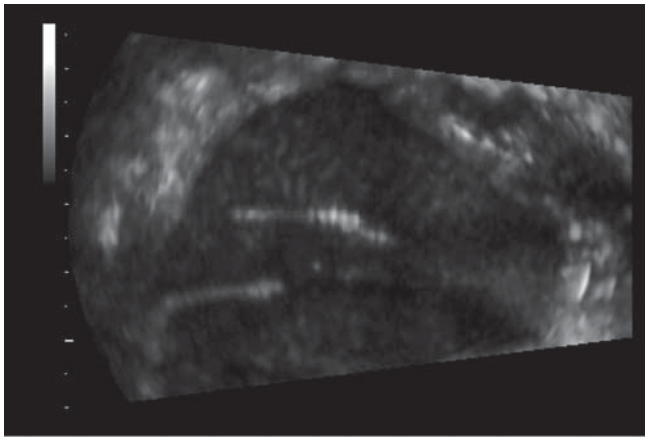

**Fig. 2:** A linear echogenic coiled structure in the right cornual region.

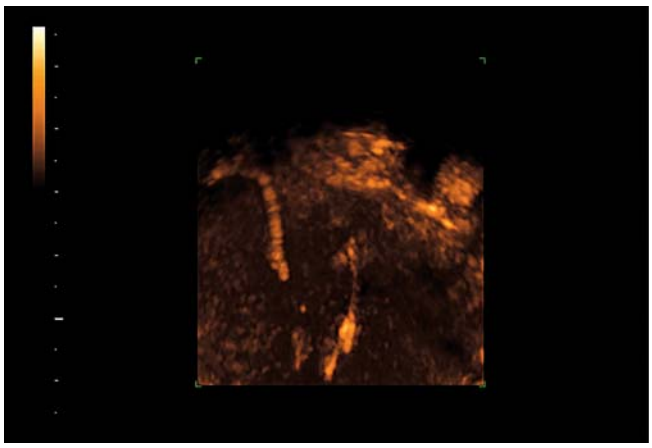

**Fig. 3:** 3D rendered image.

**Fig. 4:** Left tubal patency demonstrated by contrast flow.

**Fig. 5:** No contrast medium flow noted beyond Essure devices.

## Results

One of the patients presented for a gynaecologic ultrasound by 2D and 3D three months after insertion of the Essure devices. This demonstrated a linear echogenic coiled structure in the right cornual region (Fig. 2). Its appearance and position was compatible with a correctly placed right sided Essure device. On the left the device appeared closer to the midline and it could not be confidently stated that this was in the correct position even when viewed on 3D rendered images (Fig. 3). The patient had an HSG performed as a result of this finding. Contrast was seen to flow along the left fallopian tube and into the peritoneal cavity demonstrating left tubal patency (Fig. 4). No flow was seen through the right fallopian tube. This confirmed the ultrasound finding. This patient proceeded to have a Mirena IUCD inserted. Five patients were referred directly for HyCoSy. The echogenic devices were noted bilaterally in the region of the cornu on all five patients prior to the procedure. The contrast medium Levovist was inserted into the uterine cavity. No flow of the Levovist was noted beyond the devices or into the peritoneal cavity (Fig. 5). This confirmed bilateral tubal occlusion in all five patients.

The remaining 10 patients had transvaginal 2D and 3D imaging alone to assess the position of the devices. The scans showed correct placement of the devices in the proximal tubes. These patients and their physicians were confident with this result by ultrasound and did not proceed to any further testing.

## Discussion

In our experience, transvaginal ultrasound by 2D and 3D correctly demonstrated the position of the Essure devices in all of our patients. HyCoSy was also able to confirm tubal occlusion in five (83%) of the six patients who had testing for patency. In the sixth patient HSG was used to assess tubal occlusion. This was performed due to uncertainty regarding the position of the left sided device. At that time the procedure was new to our institution and there was uncertainty regarding the ability of HyCoSy to be used for this purpose. In the remaining ten patients imaging was performed by transvaginal 2D and 3D ultrasound. The scans showed correct placement of the devices in the proximal tubes. Testing for tubal patency by either HSG or HyCoSy is expensive, inconvenient and uncomfortable. Given the fact that there are no routine exams performed to confirm the effectiveness of laparoscopic tubal sterilisation it was felt that ultrasound imaging alone was adequate confirmation of the ability of the Essure devices to provide permanent contraception. These patients and their physicians were satisfied with this information and did not proceed to any further testing.

The obvious advantage of ultrasound over radiography is the lack of ionizing radiation. When the coils have been placed or migrated more distally in the tube they may be more difficult to image by ultrasound. If the devices cannot be imaged by transvaginal 2D or 3D ultrasound a plain film radiograph may be performed to ensure that they have not been expelled. The devices may be seen to be symmetrical and appear to be correctly placed on plain x- ray and this is currently the common practice at the three-month check up[5]. However an x-ray alone cannot determine if the devices are in the fallopian tubes, the uterine cavity or even if they have perforated the pelvic organs and are in the peritoneal cavity. In comparison, ultrasound can easily demonstrate the relationship of the devices to the tubes with more accuracy.

While HSG is currently the only FDA approved method to assess tubal patency or occlusion this procedure also involves ionizing radiation. Our review shows that HyCoSy can assess tubal patency as effectively as HSG without radiation.

## Conclusion

Transvaginal 2D and 3D ultrasound with or without HyCoSy is a suitable method to assess the Essure permanent birth control device. While plain film radiography alone can show the presence or absence of the devices in the pelvis, transvaginal ultrasound can better demonstrate the relationship of the devices to the tubes and the intended correct position. HSG and HyCoSy are both capable of confirming tubal occlusion.

HSG exposes the patient to ionizing radiation although globally it remains the gold standard for post insertion tubal patency assessment due to the FDA approval.

However, in current practice in Australia, the use of HSG is only recommended in cases of difficult or uncertain placement of the devices[8]. HyCoSy does not involve ionizing radiation and is as effective as HSG in assessing tubal patency.

There have been over 100 000 Essure devices successfully inserted worldwide. There are three reported cases of post procedure pregnancy in the literature. This is a failure rate of 0.003%. The patient must be properly counselled regarding the surgical irreversibility of this procedure leaving IVF as the only option for future pregnancies should she change her mind[2]. The coil ends spanning the uterotubal junction may also hinder IVF attempts or future procedures such as endometrial ablation.

However, we recently had a case of a successful IVF pregnancy six years after Essure insertion. This patient G2 P1 is 19w 2d and the Essure devices are seen bilaterally in-situ along with the normally grown fetus (Fig. 6).

There are no post procedure exams performed to assess the effectiveness of laparoscopic sterilisation. Therefore, given the financial constraints of most health care systems and as confidence grows, it is possible that 2D and 3D transvaginal ultrasound alone will be seen as a preferable method to assess the effectiveness of the Essure devices compared to radiography. However, if an exam for tubal patency is desired, as in cases of difficult or uncertain placement of the devices, it appears that HyCoSy is a suitable method and may be preferable to HSG.

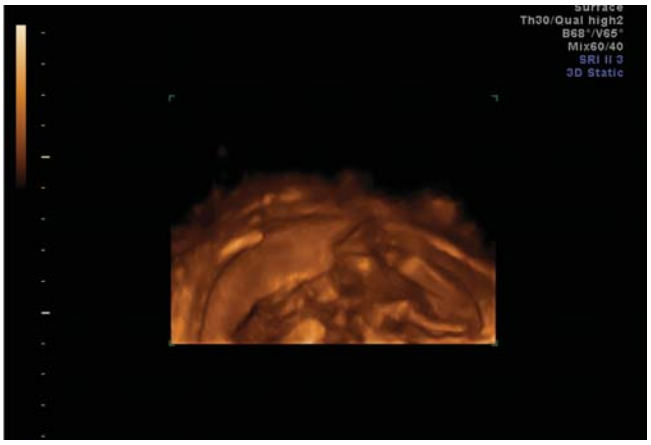


**Fig. 6:** Essure devices seen bilaterally in-situ with normally grown fetus.

## Acknowledgements

The author gratefully acknowledges the kind assistance of the staff and patients of the Christopher Kohlenberg Department of Perinatal Ultrasound, Penrith Ultrasound for Women, the Audio Visual Department of Nepean Hospital and in particular Prof Ron Benzie, Dr Harley Roberts and Dr Barbara Krupa.

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# The Canal of Nuck – three hernias and a hydrocele

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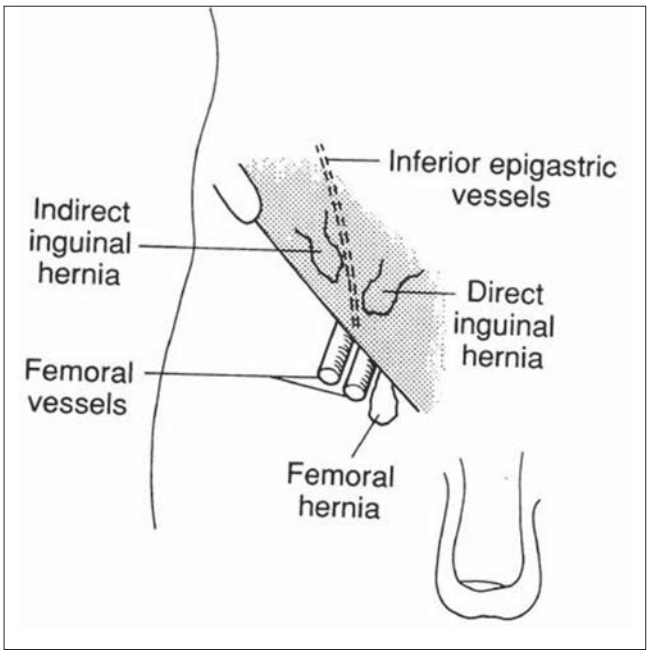


**Fig. 1.**

## Introduction

When a female infant presents with a palpable, tense swelling in the groin, there can be many causes. Two uncommon causes are ovarian herniation, and hydrocele in the Canal of Nuck. The Canal of Nuck is the portion of the processus vaginalis within the inguinal canal in females. The processus vaginalis normally undergoes obliteration during the first year of life. If obliteration fails, abdominal contents can herniate down the canal, or a cyst can form.

Ovarian and tubal herniation in groin hernias is rare and generally found in the pediatric population, the majority being indirect inguinal hernias. Hydroceles are also a rare occurrence. Accurate and fast preoperative diagnosis is needed, and ultrasound is the ideal modality to accomplish this[1].

Four cases are presented – all are paediatric patients seen at Auckland's Starship Hospital within the last four years. There are three cases of ovarian herniation in infants and one case of a hydrocele. Normal and abnormal ultrasound images will be presented.

### Embryology

Inguinal canals develop in both sexes. They form pathways for the testes to descend from their intraabdominal position through the anterior abdominal wall into the scrotum. As the mesonephros degenerates, a ligament – the gubernaculum descends on each side of the abdomen from the inferior pole of the gonad.

The gubernaculum passes down through the abdomen wall at the site of the future inguinal canal, and attaches

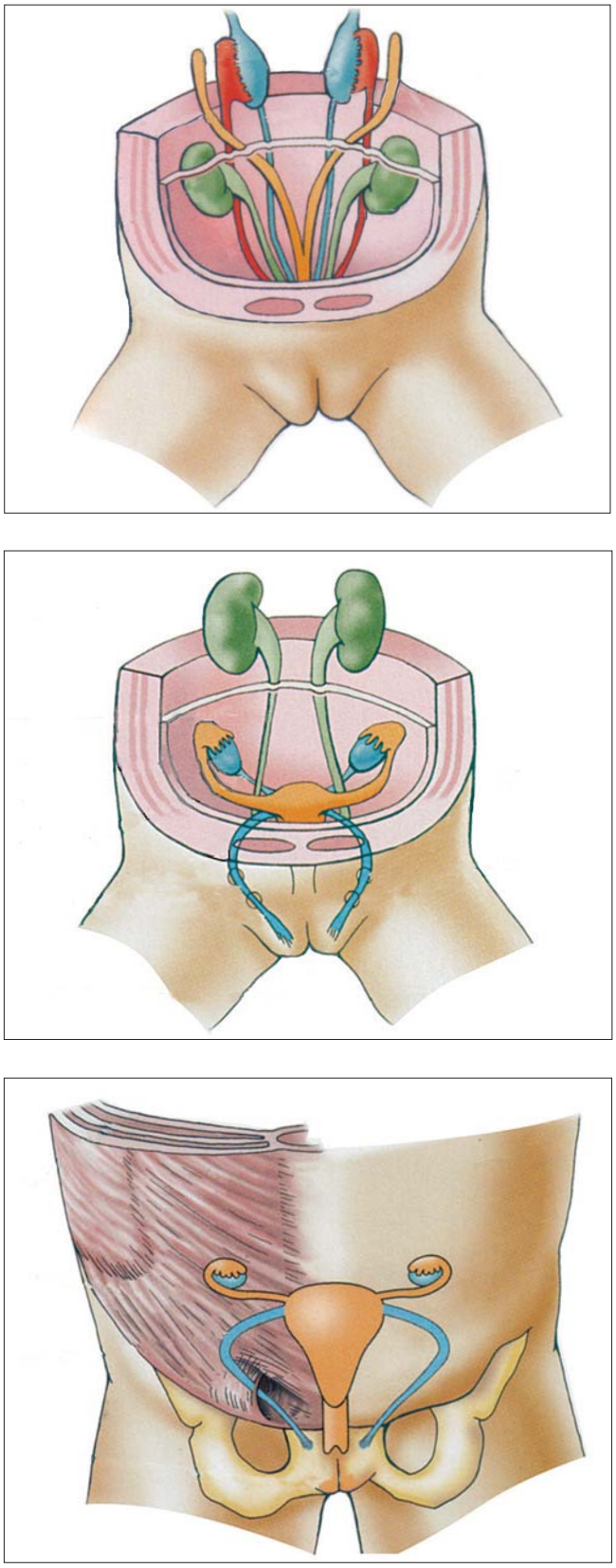

**Fig. 2:** Formation of the inguinal canal in females[3].

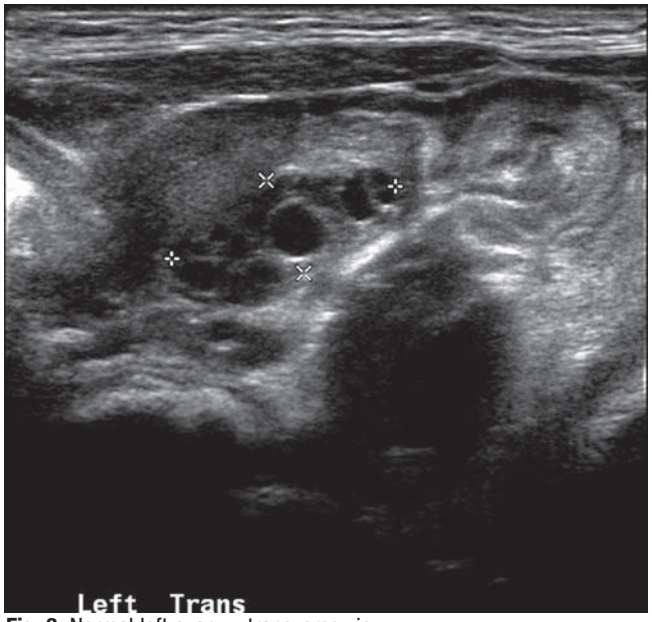

**Fig. 3:** Normal left ovary – transverse view.

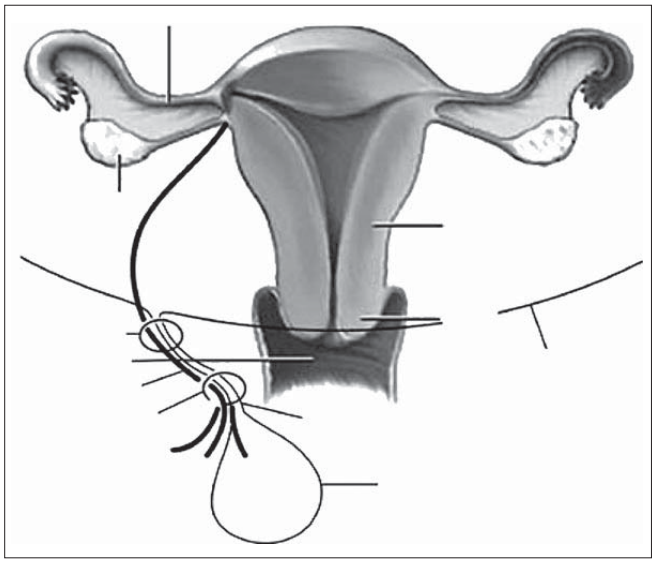
**Fig. 4:** Canal of Nuck, and Nuck's cyst[9].

caudally to the internal surface of the labioscrotal swellings that are the future halves of the scrotum or labium majora.

The ovaries descend from the posterior abdomen wall to the pelvis. The cranial part of the gubernaculum becomes the ovarian ligament, (between the ovary and the uterus) and the caudal part becomes the round ligament (between the uterus and the labium majora). An evagination of peritoneum – the processus vaginalis develops ventral to the gubernaculum and herniates through the abdominal wall along the path of the gubernaculum. The portion of processus vaginalis found in the inguinal canal in females is the Canal of Nuck[2] (Fig. 2).

The processus vaginalis carries extensions of the layers of the abdominal wall before it, which form the walls of the inguinal canal. The openings produced by this process are called the deep and superficial inguinal rings.

There are two types of groin hernia;

- Direct (rare) – through the posterior wall of the inguinal canal with the inferior epigastric vessels lying superior and lateral to the sac.
- Indirect (common) – the hernial sac traverses the internal ring, with the inferior epigastric vessels lying inferior and medial to the sac[2,3] (Fig. 1).

### Ovarian herniation

#### The ovary

Neonatal ovaries can be found anywhere between the lower pole of the kidneys and the true pelvis, and ovarian volume in children up to six years is usually less than or equal to 1 cubic cm. Ovarian volume is often increased in newborn girls possibly due to residual maternal hormones. Volume is somewhat less during the second year of life. The ovarian architecture is heterogeneous with small cysts; with larger cysts frequently seen in girls in their first year of life. The ovary has a dual blood supply, from the uterine artery and ovarian artery[4] (Fig. 3).

## Discussion

After surveying the literature, it appears that over 70 per cent of irreducible hernias in children, are in infants under one year of age, with a slightly higher percentage of girls. In

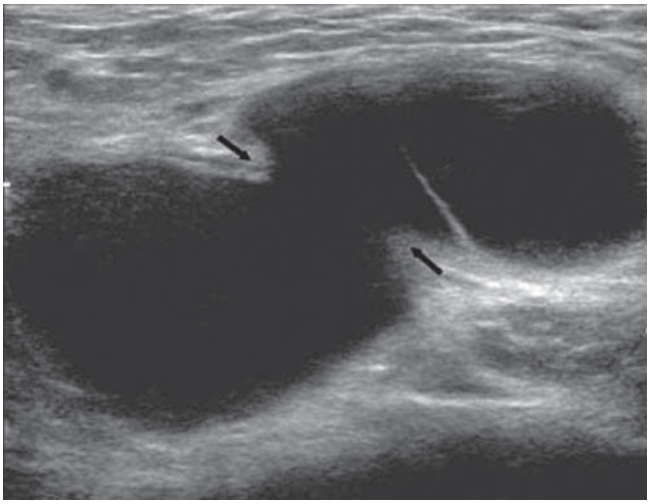
**Fig. 5:** Example of Canal of Nuck hydrocele[9].

boys a loop of herniating intestine can compress the testicular vessels, it has been assumed that this occurs in girls, but from the literature it appears more likely to be torsion of the ovary and tube while it is in the hernial sac. Merriman, *et al.* studied 11 cases of ovarian torsion – with herniated ovaries – none had bowel loops trapped in the hernia sacs[5].

Ovarian herniation can occur in premature infants, as the Canal of Nuck is still patent. A study in 1975 found more females than males, possibly due to the similarity of embryologic development of the inguinal region in both sexes at this specific time of gestation. The hernias were often bilateral and occurred in 30% of premature infants[1].

Groin hernias can have varied sac content: bowel, inflamed appendix, vermiform appendix, fallopian tube, bladder, uterus and ovaries. Adnexal herniation can be associated with congenital abnormalities, so the adnexa and kidneys are also scanned at our hospital. Rarely, a groin lump can be a testis in a child with testicular feminisation syndrome[6].

Ovaries trapped in inguinal hernias undergo torsion far more commonly than ovaries and tubes in the normal pelvic position, increasing the chances of infarction. Torsion can

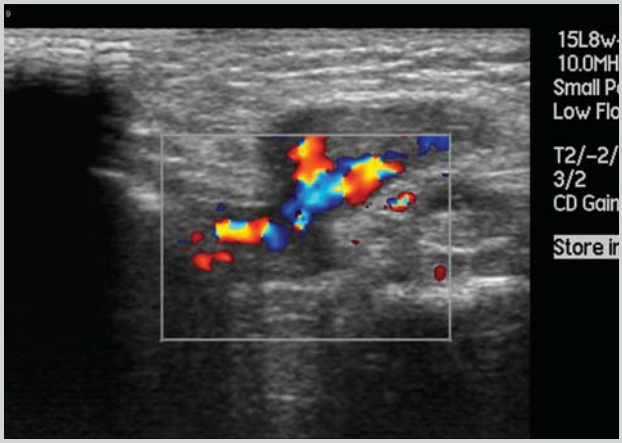


**Fig. 6:** Sagittal left groin.

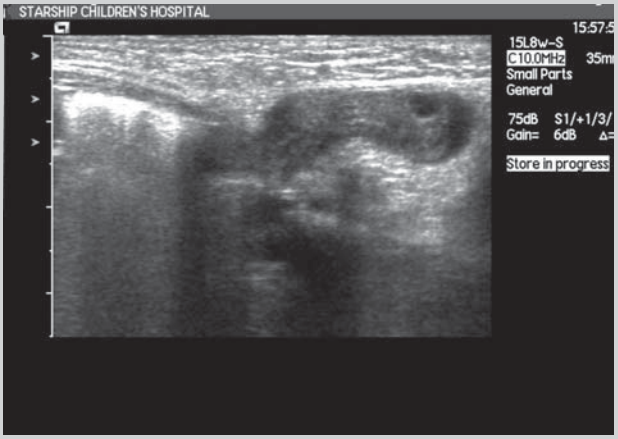


**Fig. 7:** Sagittal left groin.

### Case report 1

A one month old female infant arrived at Starship Children's hospital with a sudden onset of left groin swelling and a palpable lump.

This structure was identified on ultrasound as an ovoid structure, seen to be anterior to the symphysis pubis, measuring 2.3 x 0.7 x 1.2 cm, with vessels passing through the inguinal canal. The structure was seen to have follicles and to look like a normal ovary.

The right groin appeared normal, and a left ovary was not seen in the pelvis.

Surgical results were inguinal herniotomy and left ovary returned to the peritoneal cavity.

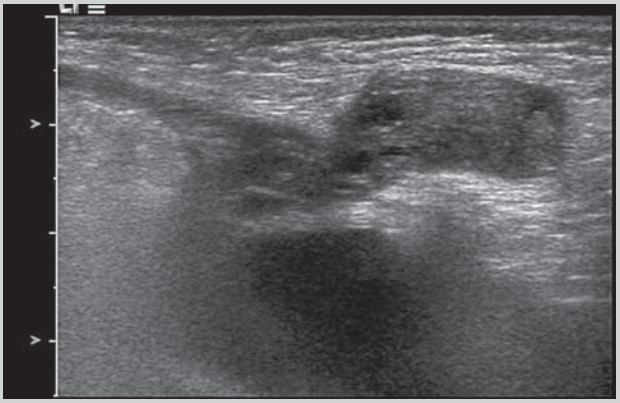

**Fig. 8.**

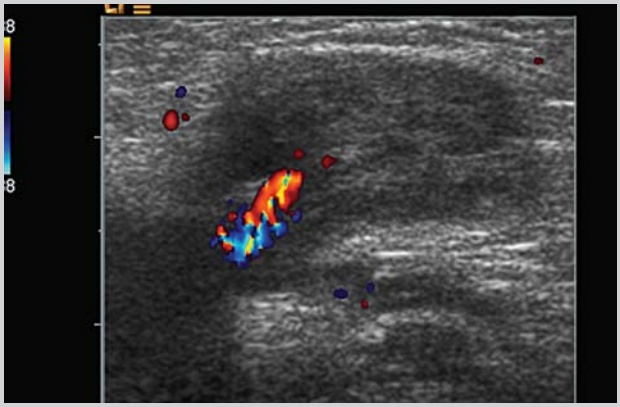

**Fig. 9.**

### Case report 2

A female infant aged six weeks presented to Starship Hospital with a swelling in the left groin.

On ultrasound an ovoid structure measuring 1.9 x 1.1 x 1.5 cm was seen, it contained a number of small cysts, and had the appearance of an ovary. Part of the structure extended into the inguinal canal, and blood flow was present. No left ovary was seen in the pelvis. The right ovary was seen. The uterus was deviated to the left of the bladder.

Surgical results were inguinal herniotomy and left ovary returned to the peritoneal cavity.

occur at any time after the diagnosis of hernia[1]. In a study by Huang, *et al*. it was found that when the ovary is herniated completely, only the fallopian tube is attached to the ligament in the sac. The ovary and its vessels do not adhere to the sac itself[7]. It has also been suggested that the ligament that runs along the hernia sac may be the suspensory ligament of the ovary, and not the round ligament[8].

### Hydrocele in the Canal of Nuck

This lesion was first described by the 17th century Dutch anatomist Anton Nuck van Leiden. The canal or diverticulum results from the persistence of an evagination or finger-like protrusion of parietal peritoneum that normally accompanies the round ligament of the uterus through the inguinal canal to insert into the labium majorus. The canal forms around the sixth month of gestation (Fig . 4).

There are two aetiologies suggested to explain a hydrocele in the Canal of Nuck. If the canal does not obliterate during the first year of life, the space can fill with fluid, or an indirect inguinal hernia can occur[9].

Another theory is the inclusion of embryonic mesenchymal mesothelial elements or remnants during the development of the round ligament. Cysts of the mesothelial investment of the round ligament are lined with a single layer of flat cuboid cells that have the appearance of mesothelial cells. The round ligament cyst and the canal of Nuck cyst have the same appearance[10] (Fig. 5).

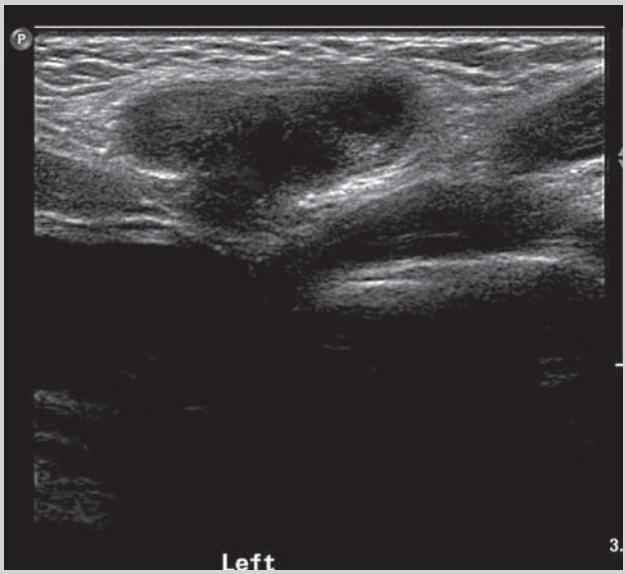


**Fig. 10:** Sagittal, left groin.

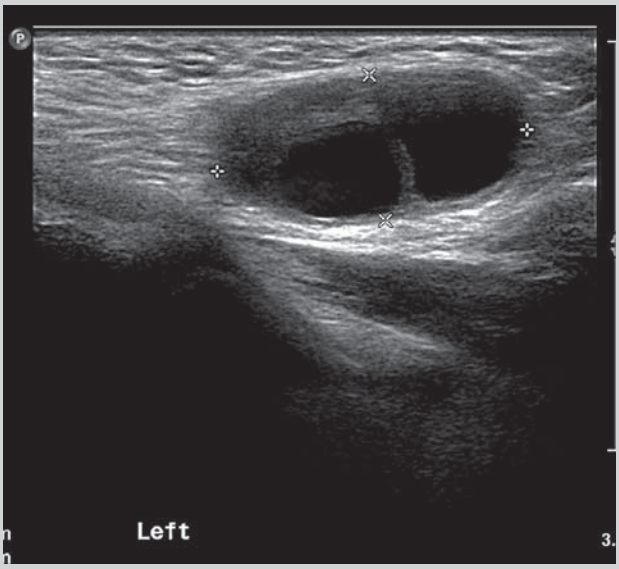


**Fig. 11:** Sagittal left groin.

### Case report 3

A 10-month-old female presented to Starship Hospital with a sudden onset of left groin swelling. Anterior to the symphysis pubis and medial to the femoral vessels was an ovoid mass, measuring 2.1 x 1.0 cm, cystic in appearance, with a vascular pedicle extending towards the inguinal canal. On surveying the pelvis, a right ovary was seen, but no left ovary.

The mass had the appearance of an ovary. Surgical results were inguinal herniotomy and left ovary returned to the peritoneal cavity.


**Fig. 12:** Sagittal left.


**Fig. 13:** Sagittal left.

### Case report 4

A left adnexal mass was seen on an antenatal scan, measuring 2.9 x 2.x 2.3 cm. A one-week post-natal ultrasound was performed and a normal uterus and both ovaries were seen.

A small hydrocele in the canal of Nuck was seen. The hydrocele could be compressed and the sac collapsed.

### Result

The patient was rescanned three months later to check for resolution of the cyst. The cyst had resolved.

### Symptoms

- A lump in the groin/labial region, sometimes painful or tender
- tense to palpation;
- irreducible;
- patient is otherwise well; and
- unrelated to menstrual cycle

### Sonographic appearances

Khanna, *et al.* describe a dumbbell shaped cyst with an internal septum, but the cyst can be anechoic and sausage shaped, or as described by Park, *et al.*, comma shaped with a beak. The cyst is compressible with no internal echoes, increased through transmission, 2–3 cm in length, and not vascular. No peristalsis is seen in the mass[9].

### Differential diagnoses

Causes of fluid collections/cyst like structures in the Canal of Nuck:

- free intraperitoneal fluid due to inflammation, trauma or impairment of lymphatic drainage;
- a VP shunt that migrated into the canal;
- meconium hydrocele;
- endometriosis;

- herniation of ovary;
- lymphomas; and
- herniation of bowel loops[9]

## Conclusion

Ectopic ovaries and hydroceles in the Canal of Nuck are uncommon. Ultrasound scanning of neonates and paediatric patients is routine and sonographers may encounter these pathologies. Ovarian herniation is a surgical emergency, due to the risks of torsion of the ovary. Hydroceles are not so urgent.

Today, imaging is more readily available and ultrasound is the modality of choice. It is fast, inexpensive, available, does not use ionising radiation, and is said to be 100% accurate in diagnosing inguinal hernias and in diagnosing sac content[7]. Because there is the possibility of a congenital defect. Both ovaries and kidneys should also be identified.

In the case of a hydrocele, the cyst can be drained under ultrasound guidance, but may reoccur. Surgical removal is preferable.

MRI imaging is also an option, but dynamic real time ultrasound is far superior and should be considered for all female cases of inguinal hernia with a palpable mass.

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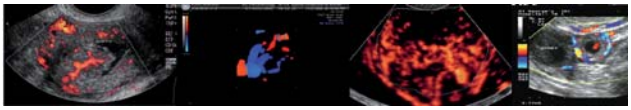
# ASUM extends a warm welcome to you at upcoming ASUM Meetings



Australasian Society for Ultrasound in Medicine

Promoting Excellence in Ultrasound

## The Early Pregnancy and Gynaecological Scanning Foundation Theoretical Courses 20

Sydney
Nepean Hospital
Saturday 18th – Sunday 19th October 2008

Melbourne
Epworth Hospital
Saturday 25th – Sunday 26th October 2008

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## Upcoming ASUM Meetings

Early Pregnancy & Gynaecological Scanning Foundation Theoretical Courses 2008
Sydney Australia 18th–19th October 2008, Melbourne Australia 25th–26th October 2008
Go to www.asum.com.au for more details

ASUM 38th Annual Scientific Meeting 2008
Auckland, New Zealand 18th–21st September 2008
Go to www.asum.com.au for more details

ASUM WA Branch Translabial Ultrasound Workshop 2008
Perth, WA, Australia 29th November 2008
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World Federation for Ultrasound in Medicine and Biology 2009
Sydney, Australia 30th August–3rd September 2009
Go to www.asum.com.au for more details

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# Book reviews

**Focus Cardiac Ultrasound Study (DVD multimedia curriculum)**
ICCU Imaging
Cost $A 700

Educational books on echocardiographic education are now numerous. Such books are orientated towards general echocardiography training and assist trainees from multiple medical specialty backgrounds. The FOCUS multimedia curriculum is much more than a book. It goes well beyond adjunct training, attempting to provide the trainees with a training manual in addition to bridging the conceptual gap between what is written on the page and applying the ultrasound transducer in the real life situation.

Although there are two volumes in the overall curriculum, only Volume One is currently available for review. Volume One includes six DVDs with eight hours of tuition, a 59-page colour illustrated pocket book and a training curriculum directed at critical care physicians. FOCUS stands for Focus Cardiac Ultrasound Study and the accompanying material clearly outlines that it is oriented towards clinicians who wish to use ultrasound in day-to-day bedside management, particularly in intensive care patients.

The graphics on the DVDs are very sophisticated, utilising 3D animation and high quality clips. The results are very impressive and to my knowledge there is nothing similar readily available, particularly for the critical care physician. Volume One concentrates on the ultrasound echocardiographic basics and instrumentation in which the basic principles of 2D echo, colour Doppler, M-Mode and Harmonic imaging are dealt with in a very comprehensible way. The second component includes the anatomy, views and orientation of transthoracic echocardiography using the classical parasternal, apical and subcostal approaches.

This is a superb teaching device and is highly recommended for any critical care clinician seeking to use echocardiography both for patient diagnosis and management. The second volume, available in the near future, will deal with ventricular function, haemodynamics, assessment of pericardial space and tamponade and assessment of fluid status and fluid responsiveness.

The recommended price is in the order of $A700. While that might seem a somewhat heavy price tag, it is important to note that a training guide, this is second to none. Strongly recommended.

**Prof A McLean**
**Director Intensive Care Medicine**
**Director Cardiovascular**
**Ultrasound Laboratory**
**Nepean Hospital Sydney**

## Improving your working life – MABEL survey to be sent to every doctor in Australia

Are you happy working in medicine and with your work/life balance? Are you happy but worried about future changes in health care that may impact on the way you practise medicine and on the quality of care you provide? Are you unhappy, stressed or have low morale from working as a doctor?

MABEL (Medicine in Australia: Balancing Employment and Life) is a major new national longitudinal survey of doctors that aims to make a difference. Funded by the NHMRC and conducted by researchers at the University of Melbourne and Monash University, invite letters for the first wave are being sent to all doctors in Australia during May and June. The results from extensive piloting, the responses from which will be included in the first wave, are promising. The responses are broadly representative of age, gender, RRMA and doctor type, and some further refinements to the questionnaires have been made. Please fill out our survey even if you are happy working as a doctor, as well as if you think things could be improved.

MABEL will be a major national resource used to improve the working lives of doctors. MABEL has now been formally endorsed by most specialist medical colleges, postgraduate medical education councils, state medical boards, medical societies and rural health and medical organisations. See our website www.mabel.org.au for details.

# CADUCEUS – two weeks in Denmark

*Robert Ziegenbein*

Helping trainee sonographer Tina with her supervisor Camilla as the patient in the vascular surgery unit at Rigshospitalet.

With the assistance of the CADUCEUS scholarship, I was able to visit three hospitals in Denmark during my two-week stay. Each department I visited had a different focus in the use of ultrasound, ranging from general ultrasound imaging to specialised musculoskeletal and vascular scanning.

An early morning train from Hannover took me from northern Germany to the town of Vejle (Vy-al) in western Denmark. Vejle is a port city at the end of the Vejle Fjord and is the main city in the county (amtskommune) of Vejle in the east of Jutland.

My host, Kalle og Stovgard met me in the foyer of a substantial regional hospital of about 500 beds and took me on a tour of the radiology department which was equipped with two CTs, two MRIs and two ultrasound machines as well as general x-ray. This department performs about 90 000 examinations per year.

Kalle introduced me to the staff in the department and in particular to Assoc Prof Soren Rafaelsen.

I spent the afternoon scanning with Kalle and discussing a range of issues regarding ultrasound technique and pathology.

As the days were still quite long, Tina took us on a tour of the surrounding countryside and to Jelling where the Jelling stones and mounds represent a significant part of Danish history. The Jelling stones were carved by King Harald Blatand for his father Gorm and mother Thyra. These carvings represent the earliest form of writing in Denmark and the mounds are thought to be ancient burial sites.

After the tour, we returned to the home of Assoc Prof Rafaelsen and discussed issues of education and accreditation of sonographers. The department staff had a strong interest in sonographer training and accreditation and we discussed some of the benefits and hazards that we have experienced in Australia. We were then taken to dinner at a harbour-side restaurant and were treated to a delightful meal as we watched the sun set over the fjord.

I spent most of the next day with Kalle swapping tips on various aspects of scanning and comparing the similarities and differences in the way ultrasound is utilised. In the late afternoon I explored some of the Fjord hillside before travelling to Copenhagen the next day.

I arrived in Copenhagen on a weekend that celebrates the British bombing of the city in the early 1800s during the French war. People were dressed in period costume and displays of life in the 1800s were set up at Kings Park. The navy was also on parade at the docks, with warships open for inspection. The navy band, warships and historic sailing ships congregating in the harbour made a stunning spectacle.

During my stay in Copenhagen, I spent my time between Koge Syghaus with Dr Michele Court-Payen and at the Rigshospitalet Vascular surgery Unit.

Koge is about 45 minutes by train south of Copenhagen in the Roskilde County. Koge Sygehus is located on large grounds and has an air of space and calmness which is no doubt helped by the size and open plan layout of its main reception building. The ultrasound department was also built with long, wide corridors for patient reception and waiting, with the ultrasound rooms located between the patient waiting area on one side and the reporting area on the opposite side. Dr Michele Court-Payen is a musculoskeletal expert and I hoped to gain some more understanding about knee and lower limb ultrasound. Not only did we scan knees but shoulders, elbows, wrists and hips were also on the agenda. Although this was a little out of my league as a vascular sonographer, Michele soon demonstrated anatomy and scanning technique so clearly that I felt that I could make sense of what he was trying to achieve. I certainly came home with an enthusiasm to learn more about musculoskeletal sonography.

The remainder of my time in Copenhagen was at the vascular surgery department at Rigshospitalet. This is the major hospital in Copenhagen and is located in the inner suburban region of Ostobro. This hospital has a staff of 7400 and has about 1100 beds. It deals with 60 000 admissions per year and 400 000 outpatient visits.

The vascular surgery unit is on the 11th floor of a 17-floor wing. A helicopter pad is currently under construction on its roof and the unit has

the best view in Copenhagen according to the staff.

The unit is staffed by four sonographers, who are all registered nurses. Camilla took responsibility for keeping me busy and it was nice to return to a dedicated vascular unit where most patients were assessed for surgical intervention. In addition, senior consultant surgeons and surgeons in training were always present and usually consulted the patient immediately following the scan. Having this kind of immediate feedback about the ultrasound result gives a great opportunity to learn and develop a sharp focus on the information which is most relevant clinically. I spent time scanning and exchanging ideas with Karina, Hanni and Camilla and even managed to spend a little time with the trainee sonographer, Tina.

We performed a range of tests which covered the needs of the surgical unit, including carotid artery, leg vein mapping prior to arterial bypass, aneurysm assessment and false aneurysm assessment with injection of thrombin.

In one particular case, a patient with a critically ischemic leg prompted the use of contrast to confirm the patency of the anterior tibial artery as a possible graft site. The use of contrast gave the surgical team the confidence to proceed with a femoro-tibial bypass, which I was able to observe to its completion in theatre.

Robert and Dr Michele Court-Payen discussing some images at Koge Syghaus.

Visiting all three of these hospitals was a rewarding experience for me and reminded me of the common ground we have in improving the accuracy and relevance of the diagnostic information that we obtain with ultrasound. I also found a strong enthusiasm for developing educational opportunities and advancing the role of sonography among the sonographers and doctors who work in the Danish healthcare system.

I would like to thank all of the staff at Vejle, Koge and Rigshospitalet for sharing their experiences and hospitality with me. I would also like to thank Dr Christian Nolsøe and the DSDU and Dr Caroline Hong of ASUM for helping me organise placements in each of these hospitals.

## DMU EXAMINATION DATES 2008

DMU Part I Written Examination 26th July 2008

DMU Part II Written Examination 26th July 2008

DMU Part II Oral Examination Period – September 2008

DMU Part II Practical Examination Period – August 2008

DMU Part I Supplementary Written Exam – 1st November 2008

## DMU FEES AND CHARGES 2008

### 2008 DMU Examination Fees

DMU Enrolment (once only fee) $A326.00 + GST = $A358.60

DMU Part I APP $A326.00 + GST = $A358.60

DMU Part I PHY $A326.00 + GST = $A358.60

DMU Part II Written $A540.00 + GST = $A594.00

DMU Part II Oral $A540.00 + GST = $A594.00

DMU Part II Practical $A800.00 + GST = $A880.00

### Supplementary Examinations

DMU Part I Supplementary APP $A326.00 + GST = $A358.60

DMU Part I Supplementary PHY $A326.00 + GST = $A358.60

### CCPU Recipients

The following candidates have been awarded the Certificate in Clinician Performed Ultrasound (CCPU) by the ASUM Council:
Justin Bowra, Kylie Baker, Bernard Brenner, Nick Evans, Andrew Gill, Martin Kluckow, David Knight, Meiri Robertson, Talat Uppal

### DMU Certificate Recipients

The following candidates have been awarded the Diploma of Ultrasonography (DMU) by the ASUM Council:
Farhana Jaikaran Qld DMU (General), Arusha Naidoo WA DMU (General), Lisa Ryan Vic DMU (Vascular), Sally O'Hearn NSW DMU (Vascular)

# New ASUM Members

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Rupert Sherwood Tas
Jane Thorn SA

**Associate**
Penny Lam NSW
Kristie Sweeney NSW
Cindy Thompson Vic

**Affiliate**
Adebayo Adeyemi NSW
Raya Alsuhel ACT
Poonam Charan Vic
Michelle Englund ACT
Nick Evans NSW
Simmerjyot Gill ACT
Lanziz Homar ACT
Shaylee Iles ACT
David Knight NZ
Louisa Lee Vic
Karen Leemen NSW
Rasmita Mishra ACT
Angela Rojas ACT
Bosky Shah ACT

**Trainee**
Tai Wong Vic

**November 2007**

**Associate**
Claire Flavel SA
Jane-Maree Hill NZ
Brett Stocker SA

**Affiliate**
Cem Kibar SA
Stephen Lane SA
Shiau Low ACT
Andree Salter ACT

**Trainee**
Jennifer McCourt Qld

**Corresponding**
Salma Nowell UK

**December 2007**

**Medical**
Malay Halder NSW

**Associate**
Rachel McLarty SA
Lee Lian Yeo NSW
Amy Zanker SA

**Trainee**
Moira McCann Qld
Shiva Muthukumaraswamy NZ
Rajeswari Nair Vic

**Corresponding**
Katie Mackinlay UK
Kathryn Rowles UK

**January 2008**

**Associate (33)**
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Ken Aicken Vic
Amanda Barnett Qld
Kerry Blacket Qld
Kevin Chee NZ
Anthony Cook NSW
Andre Deere NZ
Carlene Foster Vic
Jason Ghaby NSW
Leah Grant Qld
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Emily MacDonald NSW
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Anne Tran NSW
Chinkerr Truong NZ
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Angela Iles Qld
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Michele McGrady Vic
Kate Thomas NZ
Helen Walsh NA
Gavin Wooldridge NZ

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Dang Lam NSW
Clare Myers Vic
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Dina Rubinfeld Vic

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Philippa Welfare Qld

**Associate**
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Portia Holmes NSW
Belinda Humrick NSW
Lauren Hyde NZ
Katherine Keane NSW
Victoria Kepka SA
Shelley Kingston NZ
Tania Mikati SA
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Nazzli Osman NSW
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Kylie Schutt NT
Bradley Smith NSW
David Smith NSW
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Donna Stanton NZ
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Helenna Puype NSW
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**Trainee**
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Adam Gay Vic

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Irina Chernyak NSW
Anne Clark NSW
Kevin Daynes Qld
Patrick Golden WA
Svetlana Goloub Vic
Richard Hay WA
Fiona Mackintosh NSW
Austin Ng NSW
Ganu Preetam SA
Andy Yong NSW

**Associate**
Sarah Auzner NSW
Wahidah Aziz NSW
Direshni Bennett WA
Katrina Bennett NSW
Kelly Bradley Vic
Tim Bui NSW
Philip Cannon WA
Dinh Vu Cao NSW
Deborah Coglan Qld
Leanne Cole NSW
Juliane Cowie Qld
Teresa Cross SA
Belinda Cullis NSW
Lucy Dang NSW
Donna Dean Qld
Alison Evill NSW
Simon Fenn NSW
Ruth Maree Fogarty WA
Lou Fortus NSW
Anita Fox NSW
Cuc Francis NSW
Lisa Genovese Vic
Leesa Gibbs NSW
Fiona Gillen NSW
Shari Hamlyn NSW
Lisa Hanna ACT
Rajesh Harjai Qld
Kathryn Hartley NSW
Anna Heasman NSW
Melanie Heydon NSW
Rochelle Higginbottom NSW
Mandy Hutton NSW
Helen Jamieson NZ
Roger Lai NSW
Andrea Laracy NSW
Louisa Lau NSW
Kim Logan Qld
Armie Lopez NSW
Kristy McCann NSW
Jane McCory NSW
Ameen Omar NSW
Ektu Patel NSW
Catherine Wale NSW
John Wood Vic

**Affiliate**
Warwick Barnes NSW
Sean Rothwell Qld
Katherine Walker Vic

**Trainee**
Edwina Berman NSW
Tania Hingston Vic
Rebecca Zachariah Vic

**Corresponding**
Piush Gupta USA

*Changed Job?*
*Changed address?*
*Tell ASUM*
*email asum@asum.com.au*

# Adjudication of ASM prizes and awards

Due to the generosity of ASUM corporate members a range of prizes and awards are offered for proffered presentations at the 2008 Annual Scientific Meeting. Prizes and awards are for specifically designated purposes as described on the published list of prizes and awards. Adjudication of the prizes and awards is undertaken by an Adjudication Panel under the auspices of the ASUM Education Committee.

In order to conduct the adjudication of prizes and awards in the most objective and equitable way, guidelines for adjudication and scoring sheets are used by the panel. The stated purpose of the prize or award is a major factor in determining the eligibility of contributions for a particular prize or award.

For the purpose of prizes and awards, contributions to the scientific program are broadly categorised into four groups:

1 **Oral presentation of a descriptive clinical or literature review type**
These may include a case study description, the description of a new technique or a literature based review of a particular topic.

2 **Oral presentation of original research**
This type of presentation will typically describe the methodology, results and conclusions of scientifically conducted, original research.

3 **Poster presentation of a descriptive clinical or literature review type**
These may include a case study description, the description of a new technique or a literature based review of a particular topic.

4 **Poster presentation of original research**
This type of presentation will typically describe the methodology, results and conclusions of scientifically conducted, original research.

Eligibility for particular prizes and awards is based on the nature of the presentation, professional category of the presenter and other criteria as described in the relevant prize or award description. In submitting a presentation for consideration for prizes and awards, contributors are advised to read carefully the following list of prizes and awards, and their descriptors, so as to determine the eligibility of contributions for a particular award.

**Best Sonographer Research Presentation Award. Value $A2000. Sponsored by Philips Medical Systems Australasia Pty Ltd**
To be awarded for the best proffered research paper by a sonographer.

**Best Research Presentation Award. Value $A1500 Sponsored by Siemens Ltd – Medical Solutions**
To be awarded for the best proffered research paper.

**Anthony Tynan Best Clinical Presentation Award Value $A1000 Sponsored by Siemens Ltd – Medical Solutions**
To be awarded for the best clinical presentation proffered as a paper or poster.

**Best Poster Award. Value $A500 and a free registration for the presenting author to the next ASUM ASM. Sponsored by ASUM**
To be awarded for the best poster.

**Adjudication Guidelines for Oral Presentations**

**Presenter:** **Title of Presentation:**

**Category of presentation:**

☐ **Descriptive clinical** ☐ **Literature review** ☐ **Original research**

| | | POOR | | CREDITABLE | | OUTSTANDING |
|---|---|---|---|---|---|---|
| **ABSTRACT** | Correctly portrays the presentation,demonstrates the relevance of the topic and creates interest | 1 | 2 | 3 | 4 | 5 |
| **INTRODUCTION** | Acknowledges Chair and audience. Describes the contextual relevance of the topic. Aims/hypothesis/purpose clearly stated. | 1 | 2 | 3 | 4 | 5 |
| **CONTENT** | Well developed description of topic/case. | 1 | 2 | 3 | 4 | 5 |
| | Relates topic/issues to local context and conditions. | 1 | 2 | 3 | 4 | 5 |
| | Integrates own thought and refers to other work on the topic. | 2 | 4 | 6 | 8 | 10 |
| | Describes the problem/issue/technique in detail. | 2 | 4 | 6 | 8 | 10 |
| | Discussion relates to, and is supported by relevant literature. | 2 | 4 | 6 | 8 | 10 |
| | Literature is appropriate and current. | 1 | 2 | 3 | 4 | 5 |
| | Comprehensive coverage. | 1 | 2 | 3 | 4 | 5 |
| **CONCLUSION** | Summarises major points/findings. Outlines recommendations for future work. | 1 | 2 | 3 | 4 | 5 |
| **PRESENTATION** | Audiovisual well sequenced and relevant to the presentation with appropriate image quality. | 1 | 2 | 3 | 4 | 5 |
| | Presentation well sequenced. Clear and audible presentation Holds audience interest. | 1 | 2 | 3 | 4 | 5 |
| **ORIGINALITY** | Original thought is evident in the selection of the topic. | 1 | 2 | 3 | 4 | 5 |
| | The methodology is appropriate and shows evidence of originality in its design. | 2 | 4 | 6 | 8 | 10 |
| **VALUE** | The topic is relevant and beneficial to the profession. | 2 | 4 | 6 | 8 | 10 |
| IF MORE THAN 2 MINUTES OVERTIME DEDUCT 50 POINTS | | | | | SCORE | /100 |

## Adjudication Guidelines for Poster Presentations

**Presenter:** **Title of Presentation:**

**Category of presentation:**

☐ **Descriptive clinical** ☐ **Literature review** ☐ **Original research**

| | | POOR | | CREDITABLE | | OUTSTANDING |
|---|---|---|---|---|---|---|
| **ABSTRACT** | Correctly portrays the presentation, demonstrates the relevance of the topic and creates interest. | 1 | 2 | 3 | 4 | 5 |
| **INTRODUCTION** | Describes the contextual relevance of the topic. Aims / hypothesis/ purpose clearly stated. | 1 | 2 | 3 | 4 | 5 |
| **CONTENT** | Well developed description of topic / case. | 1 | 2 | 3 | 4 | 5 |
| | Relates topic/issues to local context and conditions. | 1 | 2 | 3 | 4 | 5 |
| | Integrates own thought and refers to other work on the topic. | 2 | 4 | 6 | 8 | 10 |
| | Describes the problem/issue/technique in detail. | 2 | 4 | 6 | 8 | 10 |
| | Discussion relates to, and is supported by relevant literature. | 2 | 4 | 6 | 8 | 10 |
| | Literature is appropriate and current. | 1 | 2 | 3 | 4 | 5 |
| | Comprehensive coverage. | 1 | 2 | 3 | 4 | 5 |
| **CONCLUSION** | Summarises major points / findings. Outlines recommendations for future work. | 1 | 2 | 3 | 4 | 5 |
| **DESIGN** | Logical and easy to follow. Information presented concisely. | 1 | 2 | 3 | 4 | 5 |
| | Text is eye catching and easily viewed. Important points are well illustrated. | 1 | 2 | 3 | 4 | 5 |
| **ORIGINALITY** | Original thought is evident in the selection of the topic. | 1 | 2 | 3 | 4 | 5 |
| | The methodology is appropriate and shows evidence of originality in its design. | 2 | 4 | 6 | 8 | 10 |
| **VALUE** | The topic is relevant and beneficial to the profession. | 2 | 4 | 6 | 8 | 10 |
| | | | | | SCORE | /100 |

# Calendar of ultrasound events

**2008**

**23rd–25th May 2008 81st Annual Scientific Meeting of the Japan Society of Ultrasonics in Medicine (JSUM)**
Venue Kobe Convention Centre
Chairperson Prof Shintaro Beppu (Osaka University School of Allied Health Sciences)

**22nd –26th June 2008 7th World Congress in Fetal Medicine Sorrento, Italy**
Email fmfeducation@fetalmedicine.com
For registration visit www.fetalmedicine.com

**26th July 2008 ASUM DMU Part I & Part II Written Examination Provisional**
Venue as allocated. Candidates receive individual notification
Contact DMU Coordinator
dmu@asum.com.au
ASUM PO Box 943 Crows Nest, NSW 1585, Sydney Australia
tel +61 2 9438 2078
fax +61 2 9438 3686

**8th–10th August 2008 4D Australia**
Venue Royal Brisbane and Women's Hospital, Herston QLD
Contact Alisha Howison Alisha.Howison@ge.com
tel +61 2 9846 4628

**24th–28th August 2008 18th World Congress on Ultrasound in Obstetrics and Gynaecology**
Venue Navy Pier, Chicago, United States of America
tel +44 20 7471 9955
fax +44 20 7471 9959
Contact congress@isuog.org
For registration and submission of abstracts visit www.isuog.org

**1st–6th September 2008 IBUS International Breast Ultrasound Course**
Multimodality Imaging and Interventional Techniques
Residential six day program
Venue Ferrara, Italy
Contact Administrative Secretary
convegni@unife.it
tel +39 532 762 404
fax +39 532 76 7347
www.iuss.unife.it or www.ibus.org

**18th–21st September 2008 ASUM Annual Scientific Meeting 2008**
Venue SkyCity Auckland Convention Centre, New Zealand
Contact ASUM PO Box 943 Crows Nest, NSW 1585, Sydney Australia
tel +61 2 9438 2078
fax +61 2 9438 3686
Email education@asum.com.au
Website www.asum.com.au

**18th–19th October 2008 ASUM Early Pregnancy & Gynaecological Scanning Foundation Theoretical Courses**
Venue Nepean Hospital, Kingswood, Sydney, Australia
Contact ASUM PO Box 943 Crows Nest, NSW 1585, Sydney Australia
tel +61 2 9438 2078
fax +61 2 9438 3686
Website www.asum.com.au

**25th–26th October 2008 ASUM Early Pregnancy & Gynaecological Scanning Foundation Theoretical Courses**
Venue Epworth Hospital, Richmond, Victoria, Australia
Contact ASUM PO Box 943 Crows Nest, NSW 1585, Sydney Australia
tel +61 2 9438 2078
fax +61 2 9438 3686
Website www.asum.com.au

**29th November 2008 ASUM WA Branch Translabial Ultrasound Workshop**
Venue Perth, WA
Contact ASUM PO Box 943 Crows Nest, NSW 1585, Sydney Australia
tel +61 2 9438 2078
fax +61 2 9438 3686
Email asum@asum.com.au
Website www.asum.com.au

**2009**

**30th August – 3rd September 2009**
**ASUM hosts WFUMB 2009 World Congress in Sydney Australia**
Venue Sydney Convention and Exhibition Centre
Contact Dr Caroline Hong CEO
ASUM PO Box 943 Crows Nest, NSW 1585, Sydney Australia
Website www.asum.com.au and www.wfumb2009.com

**DDU ORAL EXAMINATIONS**

The Oral Exam for Cardiology candidates only will be in MELBOURNE on Thursday 19th June 2008 and the Oral Exam for Vascular candidates only will be in SYDNEY on Thursday 19th June 2008.

The Oral Examination for Part 2 candidates (excluding Cardiology, Vascular) will be held in SYDNEY on Saturday 21st June 2008.

**RESULTS**

ALL examination results for both Part 1 and Part 2 candidates will be mailed to candidates at the same time, two weeks after the final Part 2 exams (4th July 2008).

# Corporate members

**Bambach Saddle Seat Pty Ltd**
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www.symbionhealth.com

**Toshiba Medical Division**
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ASUM invites suppliers of medical equipment, services and consumables to join the Society.
Call Dr Caroline Hong
tel +61 2 9438 2078
for intormation

# Guidelines for authors

Authors are invited to submit papers for publication in the categories described below. Final responsibility for accepting material lies with the Editor, and the right is reserved to introduce changes necessary to ensure conformity with the editorial standards of the *Ultrasound Bulletin.*

## Original research

Manuscripts will be subject to expert referee prior to acceptance for publication. Manuscripts will be accepted on the understanding that they are contributed solely to the *Ultrasound Bulletin.*

## Quiz cases

A case study presented as a quiz, involving no more than three or four images and a paragraph briefly summarising the clinical history as it was known at the time. It will pose two or three questions, and a short explanation.

## Case reports

Case reports are more substantial presentations resembling short scientific papers which illustrate new information, or a new or important aspect of established knowledge.

## Review articles

Review articles are original papers, or articles reviewing significant areas in ultrasound and will normally be illustrated with relevant images and line drawings. Unless specifically commissioned by the Editor, articles will be subject to expert referee prior to acceptance for publication.

## Forum articles

Members are invited to contribute short articles expressing their observations, opinions and ideas. Forum articles should not normally exceed 1000 words. They will not be refereed but will be subject to editorial approval.

## Calendar items

Organisers of meetings and educational events relevant to medical ultrasound are invited to submit details for publication. Each listing must contain: activity title, dates, venue, organising body and contact details including name, address, telephone and facsimile numbers (where available) and email address (where available). Notices will not usually be accepted for courses run by commercial organisations.

## Corporate news

Corporate members are invited to publish news about the company, including structural changes, staff movements and product developments. Each corporate member may submit one article of about 200 words annually. Logos, illustrations and tables cannot be published in this section.

## Format

Manuscripts should be submitted in triplicate in print and on PC formatted diskette as MS Word documents.
Images must be supplied separately and not embedded. PowerPoint presentations are not accepted.

- Font size: maximum 12 pt, minimum 10 pt
- Double spacing for all pages
- Each manuscript should have the following:

Title page, abstract, text, references, tables, legends for illustrations.

- Title page should include the:

Title of manuscript, the full names of the authors listed in order of their contribution to the work, the department or practice from which the work originated, and their position.

Corresponding author's name, contact address, contact telephone number and facsimile number (where available) for correspondence.

- Abbreviations may be used after being first written in full with abbreviation in parentheses.
- References should be cited using the Vancouver style, numbered according to the sequence of citation in the text, and listed in numerical order in the bibliography. Examples of Vancouver style:

1 In-text citation Superscript. If at the end of a sentence the number(s) should be placed before the full stop or comma.

2 Journal article Britten J, Golding RH, Cooperberg PL. Sludge balls to gall stones. *J Ultrasound Med* 1984; 3: 81–84.

3 Book: Strunk W Jr, White EB. The elements of style (3rd ed.). New York: Macmillan, 1979.

4. Book section Kriegshauser JS, Carroll BA. The urinary tract. In: Rumack CM, Wilson SR, Charboneau JW, eds. *Diagnostic Ultrasound*. St Louis, 1991: 209–260.

## Abstract

Manuscripts for feature articles and original research must include an abstract not exceeding 200 words, which describes the scope, major findings and principal conclusions. The abstract should be meaningful without reference to the main text.

## Images

Images may be submitted as hard copy (in triplicate) or in digital format. Images sent must have all personal and hospital or practice identifiers removed. Do not embed images in text. Separate images are required for publication purposes.

A figure legend must be provided for each image. Hard copy images should be presented as glossy print or original film. Any labelling should be entered on the front of the glossy print using removable labels. Send one copy of illustrations without labelling as this can be added electronically prior to publication. On the back of the print include the author's name, figure number and a directional arrow indicating the top of the print.

Digitised graphics should be supplied as JPG or TIFF files on PC formatted 3.5" diskette or CD, which must be clearly labelled with the author's name and the names of the image files.

## Copyright

Authors are required to provide assurance that they own all property rights to submitted manuscripts, and to transfer to ASUM the right to freely reproduce and distribute the manuscript.

## Address for submissions

By email to editor@asum.com.au or by mail to:
The Editor Ultrasound Bulletin
PO Box 943 Crows Nest
NSW 1585 Australia
Authors must provide current email address, telephone number and street address.

**2008 ULTRASOUND BULLETIN PUBLICATION DATES**

| | Aug 08 | Nov 08 |
|---|---|---|
| **Submission Deadline** | 30 June | 29 Sep |
| **Post Date** | 8 Aug | 14 Nov |