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Reading the minutes of the meeting in 1970 (page 39) which lead to the formation of ASUM is like looking back on an early childhood photograph. It is a stark reminder that a professional organisation, and its associated body of knowledge and technology, is like a developing and maturing individual. Dr Andrew Ngu, in his President's column, provides insights into the character of that process. The current maturity of the Society is reflected in this issue in such things as guidelines for obstetric and gynaecological scanning from the Standards of Practice Committee, chaired by Dr Cheryl Bass, and is also clearly marked by the honouring of another Life Member of the Society in Dr Mike Dadd. The very existence of this Bulletin is yet another sign of a well developed professional body.

As individuals often surprise those around them by their lifelong development and achievements, so it has been with ultrasound, with new clinical and technological developments and applications, such as in the field of urogynaecology, well reviewed by Dr Hans Peter Dietz, and in colour Doppler in superficial scanning illustrated in the article by Dr David Lisle.

The scientific maturation of the Society and its members is illustrated by reports of research such as in Mark Stieler's article on shoulder ultrasound, as well as by the Annual Scientific Meeting.This year's Annual Scientific Meeting in Auckland again promises much for all, and readers are directed to the pages in this issue relating to the meeting, including information about international faculty and prizes for proferred papers and posters.

**Robert N Gibson**
**Editor**

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# 30 Years of ASUM

On 17 March 2000, ASUM celebrated its 30th birthday. It is an appropriate time to reflect upon the past and ponder the future.

At 6 pm on 17 March 1970 at a meeting held at the Commonwealth Acoustic Laboratories at Miller's Point, ASUM was born. The meeting was attended by twelve individuals who were very interested to form a society for professionals involved in ultrasound. Amongst them were Dr George Kossoff and Dr William Garrett. At the time there were two other such societies overseas; the American Institute of Ultrasound in Medicine, and the Japan Society of Ultrasound in Medicine. The minutes of that inaugural meeting (see page 39) make very interesting reading as they contain the blue print for the aims of our Society.

On 2 May 1979 the name "Australian Society for Ultrasound in Medicine" was adopted and on 5 August 1992 it became Australasian Society for Ultrasound in Medicine. As ultrasound was a relatively new clinical tool, the objective and activities of the Society were defined mainly as dissemination of information relating to ultrasound. It was suggested that it could be done in two ways. Firstly, to advise the dates and places of the meetings of other societies holding talks of interest to members and also for meetings overseas. Secondly, to circulate a list of references of journal articles that would be of interest to members from as wide a range of journals as possible. There is no doubt that over the years ASUM has achieved this aim very well in its organisation of scientific meetings, workshops and education activities providing education updates to service providers in ultrasound in Australasia. Indeed the education activities have become the major activity of the Society.

At the meeting Dr Kossoff had the foresight to suggest that education of the "technicians who are likely to perform these ultrasounds" would become an important part of the education program. Over the years this has expanded into the education and certification of sonographers. With the development of sonography as a profession and also with some degree of discontent with the sonographer membership of ASUM, a separate organisation has been formed to serve the needs of the sonographers. It is a necessary step and hopefully, in time, the two Societies will work more closely and collaboratively to serve their members.

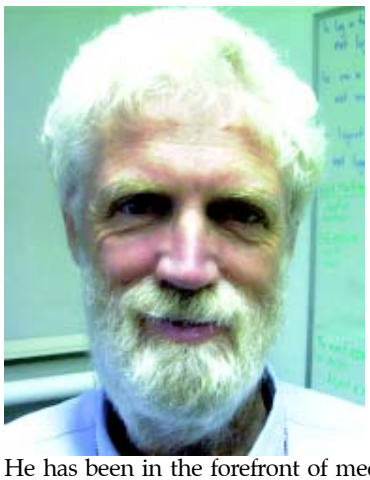
The area of medical political activities was not mentioned as an aim of the Society at this inaugural meeting in 1970. In the last few years the involvement of the Society in the medical political arena has been increasing. Often it is not possible for ASUM to present itself with a unified view as it consists of many craft groups and each craft group has special needs and peculiarities of practice. Understandably it is impossible to reach a consensus in all areas of practice and in the method of remuneration. For this reason one could argue that ASUM should not be involved in medical political activity as in doing so it often disenfranchises some craft groups. It may be better for ASUM to concentrate on education activities and the setting of standards for the practice of ultrasound rather than being involved in medical politics. Possibly the medical political work should be performed by the respective colleges to which the members of these different craft groups belong.

There were three different grades of membership defined at its inaugural meeting; professional members, technicians and commercial members. Professional and technical members paid a subscription of $5 and $2 respectively.

It was with great enthusiasm that these twelve individuals met on 17 March 1970 to put ASUM on the map, not only within Australasia, but also within the ultrasound fraternity around the world. We are indeed very grateful for their foresight in establishing ASUM.

**Andrew Ngu**
**President**

# Congratulations to Mike Dadd



Michael Dadd was elected to Life Membership at the 1999 Annual General Meeting of ASUM, on the recommendation of the Council.

Mike Dadd joined the Ultrasonic Research Section of the Commonwealth Acoustic Laboratories (later the Ultrasonic Institute) in 1966. He has been head of the Echography Section, the Tissue Characterisation Section and worked in Doppler research projects. He has been in the forefront of medical ultrasound research, in Australia and overseas, during this time with his work in grey scale development, physics, opthalmological and cardiac imaging in the 1960's and 70's. Mike built up an international reputation for his expertise in both the physics and clinical side of ultrasonic imaging. Since the Ultrasonics Institute joined CSIRO in the 1990's he has worked in computer education which has led to the CD-ROM on ultrasound physics distributed by ASUM. He is presently undertaking research into the teleradiology area for distributing ultrasound images and into human-computer interaction. He has a publication record of over 50 scientific papers and reports. He was made an Honorary Associate of the RACR in 1979 and received a Pioneer's Award from the World Federation for Ultrasound in Medicine and Biology in 1988.

Mike was a founding member of ASUM, he was a Councillor from 1970 to 1980, the inaugural Secretary (1970-1974), the Treasurer (1976) and was President for three years (1978-1980). During his presidency ASUM was sorting out its relationships with the medical colleges and the Department of Health and Mike handled this difficult political time with calmness and efficiency. This was also the formative years of the DDU and the DMU. Since then Mike has made continuous contributions to ASUM in the form of education lectures, membership of the DDU Board (1980-1986), the Education Committee (1991-1994), the DMU Board (1994-1999) and the Past Presidents Committee (1981-1999). He was the Scientific Convenor for the World Federation Meeting held in Sydney in 1985 and has worked on committees for a number of ASUM Scientific Meetings.

# Significance of fluid collections demonstrated in shoulder ultrasonography

**Mark A Stieler, Sonographer-in-charge, Clarke and Robertson Radiology, St Andrews Hospital, Ipswich Qld and Centre for Medical and Health Physics, QUT, Brisbane Qld**

*ABSTRACT*

*The purpose of this study was to correlate the presence of shoulder fluid collections with patient symptoms and other sonographic findings. Fluid collections in the subacromial-subdeltoid bursa were almost exclusively seen in symptomatic shoulders suggesting they are a pathological finding. In contrast, small fluid collections in the biceps sheath were commonly seen in asymptomatic shoulders suggesting that these small effusions may be a normal finding. Larger biceps effusions were nearly always associated with symptoms. Shoulders in which other pathology was demonstrable ultrasonically had a high incidence of biceps sheath and subacromial-subdeltoid bursa effusions, suggesting these effusions are useful markers for the presence of other pathology. Rotator cuff tears were encountered with equal frequency in symptomatic and asymptomatic shoulders but rotator cuff calcification was nearly always symptomatic.*

## INTRODUCTION

Shoulder ultrasound is now widely used in the diagnostic evaluation of the painful shoulder. Initial reports described its use in the diagnosis of rotator cuff tears (1, 2) but other conditions that have been assessed include adhesive capsulitis (3), shoulder instability (4,5), rotator cuff calcification (6), shoulder fractures (7), shoulder ganglia (8), biceps tendon disorders (9) and the impingement syndrome (10). One of the important diagnostic features in the ultrasound examination of the shoulder is the presence of abnormal fluid collections in the region of the shoulder. The two most common sites are the subacromial-subdeltoid bursa and the biceps sheath but fluid collections in other bursae in the shoulder region can also be detected. These effusions are not only important primary diagnostic signs, they may also serve as "pointers" to other pathology (11). The purpose of this study was to assess the incidence of shoulder fluid collections in symptomatic and asymptomatic shoulders and to correlate their presence with the presence of sonographically demonstrable shoulder pathology.

## METHODS

Data was collected prospectively from 134 consecutive patients presenting for shoulder ultrasound examinations at St Andrews Hospital, Ipswich. Both shoulders were examined in all patients, following a standard examination protocol (11). Shoulders were defined as asymptomatic if there were no current or past significant symptoms. Shoulders with current symptoms were classified as symptomatic. Patients who described one shoulder as being currently asymptomatic but had in the past been symptomatic were excluded from the study to avoid the introduction of possible confounding factors. Exclusions totalled 26 patients, leaving a total of 216 shoulders. Of these, 101 shoulders were asymptomatic and 115 were symptomatic. Of the symptomatic shoulders, 81 had no history of significant trauma and 34 had a history of precipitating trauma.

All ultrasound examinations were performed by an experienced musculoskeletal sonographer (MAS) who interpreted the examination in consultation with one of four radiologists. All examinations were performed using the direct contact method on an ATL HDI 3000 ultrasound system (Advanced Technology Laboratories, Bothell, WA) utilising a 5-10 MHz small parts linear array transducer.

For each shoulder, the patient's symptom status, sonographic findings and location of fluid collections in the shoulder region were recorded.

The portions of the subacromial-subdeltoid bursa overlying the subscapularis tendon were assessed with the arm in external rotation. The remaining portions of the bursa were assessed with the arm internally rotated. An effusion was considered to be present if, in any part of the bursa, there was separation of the bursal walls by a layer of fluid. The size of the effusion was measured at the site of maximum separation of the bursal walls and the bursal walls were not included in the measurement.

Biceps sheath effusions were assessed with the arm externally rotated.

The sizes of effusions detected in the subacromial-subdeltoid bursa (Figure 1) and biceps sheath (Figure 2) were graded as follows:

**Subacromial-subdeltoid bursa:**

1. No fluid seen.

2. Small effusion, defined as a maximum thickness of fluid within the subacromial-subdeltoid bursa of less than 1 mm.

3. Medium effusion, defined as a maximum thickness of fluid between 1 and 2 mm.

4. Large effusion, defined as a maximum thickness of fluid greater than 2 mm.

**Biceps sheath:**

1. No fluid seen

2. Small effusion, defined as a crescent of fluid with a diameter of less than 1 mm, surrounding less than the entire circumference of the biceps tendon.

3. Medium effusion, defined as a fluid collection with a diameter between 1 and 2mm, or any fluid collection with a diameter of less than 1 mm which surrounded the entire circumference of the biceps tendon.

4. Large effusion, defined as any fluid collection with a diameter greater than 2 mm.

The results were cross-tabulated and analysed using the SYSTAT statistical software package on an IBM compatible computer.

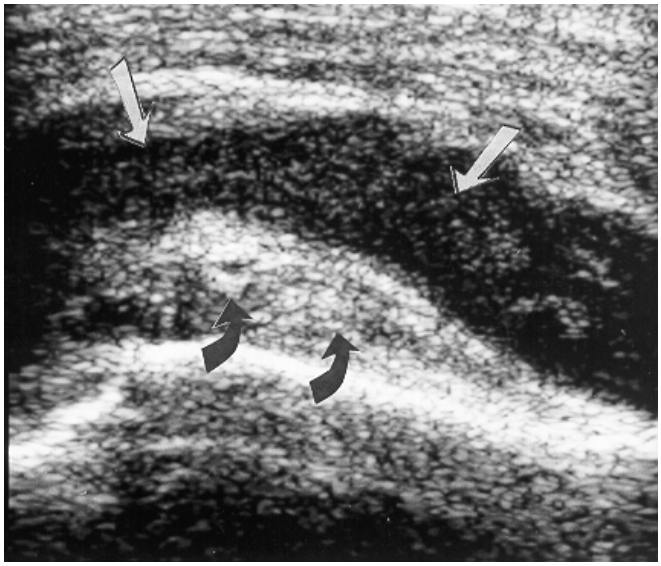


**Figure 1 Subacromial-subdeltoid bursa effusion: scan longitudinal to the supraspinatus tendon shows hypoechoic fluid (arrows), within the subacromial-subdeltoid bursa superficial to the supraspinatus tendon (black arrows).**

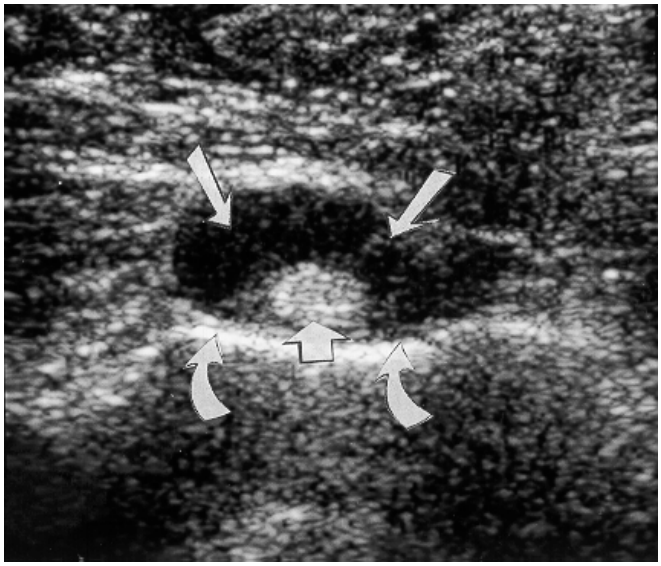


**Figure 2 Large biceps sheath effusion: scan transverse to the bicipital groove shows hypoechoic fluid (arrows) within the biceps sheath surrounding the hyperechoic biceps tendon (short arrow) which lies within the bicipital groove (curved arrows).**

## RESULTS

Table 1 shows the frequency of subacromial-subdeltoid bursa effusions in symptomatic and asymptomatic patients. Only three subacromial-subdeltoid bursa effusions were observed in asymptomatic individuals, two of these were in the 'small' category and one in the medium. In the symptomatic population, 21 subacromial-subdeltoid bursa effusions were seen, six of which were in the medium or large category. A Pearson $\chi^2$ test revealed the presence or absence of a subacromial-subdeltoid bursa effusion of any size was dependent on the symptom status (*p=0.00036).*

**Table 1: Correlation of subacromial-subdeltoid bursal effusions (rows) with symptoms (columns)**

| | Asymptomatic | Symptomatic | Total |
|---|---|---|---|
| None | 98 | 94 | 192 |
| Small | 2 | 15 | 17 |
| Medium | 1 | 5 | 6 |
| Large | 0 | 1 | 1 |
| Total | 101 | 115 | 216 |

The occurrences of biceps sheath effusions are shown in table 2. There were 21 effusions in asymptomatic patients but only two of these were medium, the remainder were in the small category. Biceps sheath effusions were seen in 42 symptomatic patients with 19 of these in the medium or large categories. A Pearson $\chi^2$ test revealed the presence or absence of a biceps sheath effusion was dependent on the symptom status (*p=0.011).*

**Table 2: Correlation of biceps sheath effusions (rows) with symptoms (columns)**

| | Asymptomatic | Symptomatic | Total |
|---|---|---|---|
| None | 80 | 73 | 153 |
| Small | 19 | 23 | 42 |
| Medium | 2 | 17 | 19 |
| Large | 0 | 2 | 2 |
| Total | 101 | 115 | 216 |

The presence or absence of subacromial-subdeltoid bursa or biceps sheath effusions was correlated with the presence or absence of sonographic pathology (tables 3 and 4). Sonographic pathology was categorised as normal, rotator cuff tear, rotator cuff calcification or other pathology. Of the rotator cuff tears, all except for one were complete thickness. In two of the complete thickness supraspinatus tendon tears, there was associated biceps tendon thinning but no biceps rupture was seen in any patient. No patient showed increased thickness or decreased echogenicity of the biceps tendon to suggest bicipital tendinitis. The 'other pathology' category included findings of impingement (defined as

buckling or hesitancy of movement of the supraspinatus tendon beneath the acromion (10,12)) - 13 cases, supraspinatus tendon tendinitis (defined as a thickened heterogeneous tendon) - 4 cases, Hill-Sachs defect (confirmed on a subsequent plain x-ray) - 1 case, thickened subacromial-subdeltoid bursa - 1 case, fractured greater tuberosity (confirmed on a subsequent plain x-ray) - 2 cases, frozen shoulder (defined as markedly reduced range of movement in a pattern not consistent with impingement (2)) - 1 case. Pearson $\chi^2$ tests performed to test the association of shoulder effusions with the presence or absence of sonographically definable pathology revealed significant dependence between these parameters for both the subacromial-subdeltoid bursa ($p=0.012$) and the biceps sheath ($p=0.008$).

**Table 3: Correlation of subacromial-subdeltoid bursal effusions (rows) with other sonographically detectable pathology (columns)**

| | Normal | Tendon tear | Calcification | Other | Total |
|---|---|---|---|---|---|
| None | 155 | 13 | 6 | 18 | 192 |
| Small | 9 | 4 | 0 | 4 | 13 |
| Medium | 4 | 1 | 1 | 0 | 6 |
| Large | 1 | 0 | 0 | 0 | 1 |
| Total | 169 | 18 | 7 | 22 | 216 |

**Table 4: Correlation of biceps sheath effusions (rows) with other sonographically detectable pathology (columns)**

| | Normal | Tendon tear | Calcification | Other | Total |
|---|---|---|---|---|---|
| None | 127 | 9 | 5 | 12 | 153 |
| Small | 29 | 6 | 1 | 6 | 42 |
| Medium | 13 | 1 | 1 | 4 | 19 |
| Large | 0 | 2 | 0 | 0 | 2 |
| Total | 169 | 18 | 7 | 22 | 216 |

In table 5, the presence of sonographic pathology is correlated with symptom status, Pearson $\chi^2$ analysis revealed significant dependence between these parameters.

**Table 5: Correlation of sonographically detectable pathology (rows) with symptom status (columns)**

| | Asymptomatic | Symptomatic | Total |
|---|---|---|---|
| Normal | 92 | 77 | 169 |
| Tendon tear | 7 | 11 | 18 |
| Calcification | 1 | 6 | 7 |
| Other | 1 | 21 | 22 |
| Total | 101 | 115 | 216 |

Abnormal fluid collections were seen outside of the biceps sheath or subacromial-subdeltoid bursa in only two shoulders. One of these effusions was located adjacent to the coracoid process, deep to the tendon of coracobrachialis in a symptomatic shoulder with sonographic evidence of impingement. This was presumed to be the bursa that sometimes exists deep to coracobrachialis (13). The other effusion was seen in the bursa between the infraspinatus tendon and the capsule (13) of an asymptomatic shoulder with no other sonographically definable abnormalities. This bursa can communicate with the shoulder joint and it is thus possible that this effusion was secondary to a joint effusion although no biceps sheath fluid was seen in this patient.

The bursa located between the subscapularis tendon and the capsule also communicates with the joint (13) and is thus a potential site for extracapsular extension of a joint effusion, however, no effusion was seen in this bursa despite the fact that the subscapularis tendon and its surrounds were carefully evaluated in all patients.

Seven of the study subjects proceeded to either open or arthroscopic surgical procedures. Five of these cases had rotator cuff tears diagnosed on ultrasound that were confirmed at surgery. One case had an intact, but calcified, rotator cuff sonographically. At arthroscopy, the rotator cuff was confirmed to be intact. One patient, in whom the rotator cuff was said to be intact on ultrasound had a "split" in the supraspinatus tendon noted at arthroscopy. However, the arthroscopy was performed eight months after the ultrasound examination and the orthopaedic surgeon who performed the arthroscopy believed it was quite possible that the tear had developed in the interim.

Of the seven patients with rotator cuff calcification, five were confirmed on plain radiographs. One patient did not have plain films performed. The remaining case had a small calcification in the subscapularis tendon that was not visible radiographically, presumably due to superimposition on the humeral head.

Of the patients with no sonographic evidence of rotator cuff calcification, eighty-six had plain radiographs. No calcifications were seen on any of these radiographs.

No patient from the study population proceeded to arthrography or magnetic resonance imaging.

## DISCUSSION

This study has shown effusions of the biceps sheath and subacromial-subdeltoid bursa are very common findings during ultrasound examination of the shoulder. In fact, these effusions were respectively seen 3.5 and 1.3 times more frequently than rotator cuff tear, the next most common finding. In view of this high incidence, it is important that their usefulness as primary diagnostic signs and as pointers to other pathology be known.

The correlation of symptom status with the presence of shoulder effusions showed that, although small subacromial-subdeltoid bursa effusions may occasionally be found in asymptomatic shoulders, most are associated with symptoms with an incidence of subacromial-subdeltoid bursa effusions in asymptomatic shoulders of only 3.0%. In fact, more rotator cuff tears were seen in asymptomatic shoulders than subacromial-subdeltoid bursa effusions

(incidence of rotator cuff tear in asymptomatic shoulders: 6.9%). From these results, it would appear reasonable to conclude that subacromial-subdeltoid bursal effusions are a pathological finding. When encountered in asymptomatic patients, these effusions should still be regarded as markers of subclinical pathology.

A study by van Holsbeeck and Strouse (14) provided a comprehensive analysis of both the normal and the pathological subacromial-subdeltoid bursa. In their description of the normal bursa, the authors state that:

"… the two opposing sides of the bursa are separated no more than 2 mm in a normal shoulder."

It should be noted, however, that van Holsbeeck and Strouse did not provide precise detail as to the measurement methodology. There is thus some ambiguity as to whether the measurement of the bursal separation includes or excludes the bursal walls.

The current study has shown that, if the bursal walls are excluded from the measurement (*ie* only the fluid layer is measured), effusions of less than 2 mm cannot be considered to be normal. Of the 23 cases showing subacromial-subdeltoid bursal fluid collections of less than 2 mm, 20 were in symptomatic shoulders. There was a statistically significant association between symptom status and the presence of a subacromial-subdeltoid bursal fluid collection of less than 2 mm ($p= 0.00039$). If these small amounts of fluid are in fact normal, fluid collections of this size would be seen equally in symptomatic and asymptomatic shoulders. As this is clearly not the case, it is concluded that *any* fluid within the subacromial-subdeltoid bursa that is demonstrable ultrasonically is a pathological finding. Additionally, if only subacromial-subdeltoid bursal effusions of greater than 2 mm were considered to be abnormal, only one shoulder in the study population of 216 would have been considered to have a pathological subacromial-subdeltoid bursal effusion.

In contrast to subacromial-subdeltoid bursa effusions, there was a high incidence of small biceps sheath effusions (Figure 3) with almost equal frequencies in asymptomatic shoulders (18.8%) and symptomatic shoulders (20%). Whilst it is possible that all of these effusions are pathological, this is unlikely given the high incidence in both categories of shoulder. An alternative hypothesis is that, in some cases, a small amount of fluid in the biceps sheath may be a normal finding. Anatomically, the synovial lining of the biceps tendon is an extension of the synovium of the shoulder joint (15), allowing the synovial fluid of the shoulder joint to circulate into the biceps sheath. The shoulder capsule is quite large and lax (13) (allowing the considerable mobility exhibited by this joint). Various movements of the shoulder cause alterations in the instantaneous volume of the capsule, which may displace fluid to other recesses of the capsule. One of these potential sites is the biceps sheath and, once any fluid has accumulated there, gravitational effects would ensure it would remain there with the arm in the normal stance (ie. with the arm at the side). Middleton et al (9) in 1985 showed that the injection of 5 ml of fluid into the cadaver shoulder joint produced a noticeable crescent of fluid adjacent to the biceps tendon. With current generation equipment, an even smaller volume of fluid than this can be readily demonstrated in the biceps sheath and it is conceivable that in some circumstances even physiological amounts of fluid may be demonstrable. In contrast, larger biceps sheath effusions were seen almost exclusively in symptomatic shoulders with only a 2.0% incidence in asymptomatic shoulders compared with 17.3% in symptomatic shoulders. This indicates that these larger effusions are abnormal.

It is important to recognise that biceps sheath effusions are not always due to increased fluid within the shoulder joint and can exist in primary biceps tendon pathology (9). However, this distinction was not considered important for the purposes of this study, which were to evaluate the association of these effusions with the presence of symptoms and other sonographically demonstrable pathology.

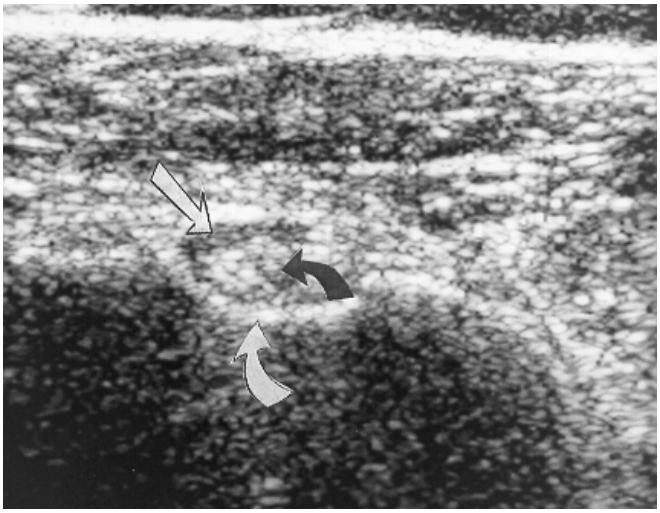


**Figure 3 Small biceps sheath effusion: scan transverse to the bicipital groove shows hypoechoic fluid (arrow) within the biceps sheath surrounding the hyperechoic biceps tendon (black arrow) which lies within the bicipital groove (curved arrow).**

Patients with sonographically definable pathology were shown to have a much higher incidence of subacromial-subdeltoid bursa or biceps sheath effusions and many of these effusions were in the "small" category. Thus, whilst the isolated finding of a small amount of fluid in the biceps sheath may be a normal finding, the presence of biceps sheath and subacromial-subdeltoid bursa effusions of any size may be "markers" of other pathology. These effusions should thus only be deemed non-pathological in asymptomatic shoulders where a diligent search has shown no associated pathology.

Approximately equal incidences of rotator cuff tears were seen in symptomatic shoulders and those with no significant symptomatic history. As rotator cuff tears are generally regarded as the end-stage of the impingement process (16), the study findings suggest the impingement process may be present in a chronic, low-grade fashion with no symptomatic rotator cuff tendinitis or subacromial-

subdeltoid bursitis and hence no significant shoulder pain. This has important ramifications for the clinical diagnosis of impingement which is largely reliant on eliciting pain with certain manoeuvres and demonstrating relief from this pain upon subacromial injection of a local anaesthetic agent (17).

The presence of calcification within the rotator cuff tendons was associated with symptoms in six out of seven patients suggesting that calcific tendinitis in most cases produces discernible symptoms.

Of the 22 shoulders with "other" pathology, only one was asymptomatic, suggesting that these conditions are generally associated with symptoms.

A limitation of the study was that confirmation of the sonographic findings by surgery was not possible in a significant percentage of cases. However, to have only included patients who proceeded to surgery would have introduced a significant bias in that it is generally the case that only those patients with more severe levels of shoulder pain and/or dysfunction proceed to surgery. The purpose of this study was to compare symptoms with sonographic findings for *all* levels of symptomatology.

**CONCLUSION**

Whilst previous studies have addressed the significance of fluid collections around the shoulder (14,18,19,20), this is the first such study to correlate the presence and size of these collections with patient symptoms and other sonographically detectable pathology. Hollister et al (18) assessed the association between subacromial-subdeltoid bursal and biceps sheath effusions and rotator cuff tear detected at surgery but this study did not address other likely sonographic findings associated with these entities and the investigators did not attempt to quantify the size of the effusions. The current study has confirmed that small biceps effusions may be encountered in normal individuals but has also shown that even small subacromial-subdeltoid bursal effusions are almost exclusively associated with symptoms, and are hence likely to be pathological. Of particular importance, the study findings suggest that taking 2 mm bursal separation as the upper limit of normal would result in significant under-diagnosis of pathological subacromial-subdeltoid bursal effusions.

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# Ultrasound imaging in urogynaecology: A review

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*ABSTRACT*

*Perineal ultrasound is fast becoming the new imaging standard in urogynaecology. It is noninvasive, quick and patient- friendly, and the necessary equipment is available in every imaging department. The position and mobility of the bladder neck, pelvic floor activity and uterovaginal prolapse can all be quantified. Colour Doppler imaging allows the documentation of incontinence. Future developments will include 3D assessment of the pelvic floor, hopefully enhancing our understanding of pelvic functional anatomy and the effects of incontinence and prolapse-correcting surgery.*

## INTRODUCTION

Ultrasound imaging is in the process of supplanting radiological techniques in the assessment of female urinary incontinence and prolapse. This has been a slow development that is by no means complete. In countries where gynaecologists regard sonography as part of their routine clinical evaluation, this shift towards ultrasound as the diagnostic method of choice has been somewhat faster. However, for a long time the focus in incontinence diagnostics was so firmly on urodynamic parameters obtained by filling/voiding cystometry and urethral pressure profilometry that imaging data ceased to be of relevance to many clinicians. The increasing availability of diagnostic ultrasound has now resulted in a noticeable shift back towards imaging.

## HISTORY

Contrast X-ray techniques have been used in the diagnosis of lower urinary tract abnormalities since the late 1920s (1,2). In the 1950s and 1960s the technique was standardised for use in incontinence diagnostics and the most common diagnostic criteria were described and categorised (3,4,5). Contrast radiographic techniques were also used to document prolapse of the vagina and rectum (6); however, the complexity of the technique precluded widespread use.

Perineal ultrasound dates back to the mid 1970s when French investigators used the method to image the cervix (7). The development of transvaginal ultrasound is more widely known, with the first serious attempts undertaken in Austria (8) in the late 1960s. Transabdominal (9,10), perineal (11,12), transrectal (13) and transvaginal ultrasound (14) were all investigated for their usefulness in incontinence diagnostics. Due to its noninvasive nature, ready availability and the absence of distortion, perineal (or translabial) ultrasound is currently used most widely. It will therefore be the focus of this review.

A midsagittal view is obtained by placing a transducer (usually a 3.5- 7 MHz curved array) on the perineum (Figure 1). Parting the labia may improve image quality. The resulting image includes the symphysis anteriorly, the urethra and bladder neck, the vagina, cervix, rectum and anal canal. The cul de sac can also be visualised. Parasagittal or transverse views may yield additional information but have not been investigated so far.

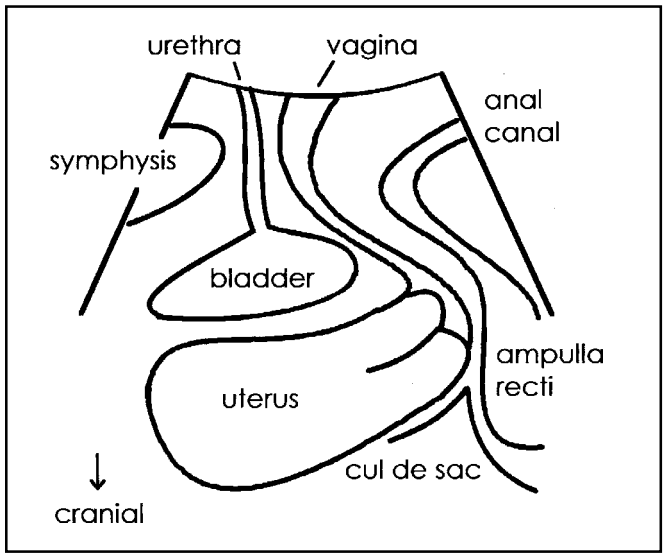



**Figure 1 Field of vision for translabial/ perineal ultrasound (schematic drawing). The orientation is midsagittal.**

Perineal imaging of the lower urinary tract yields information equivalent or superior to the lateral urethrocystogram (Figure 2), or fluoroscopic imaging. Comparative studies have repeatedly shown good correlations between radiological and ultrasound data (15-20), with only the occasional dissenting voice (21). Current and future uses of the method will be discussed in the next paragraphs.

## CURRENT USES

### 1. Position and mobility of bladder neck and proximal urethra

Bladder neck position and mobility can reliably be assessed by perineal ultrasound. Points of reference are the central axis of the symphysis pubis (22) or its inferoposterior margin (15). Imaging can be undertaken supine or erect, and with a

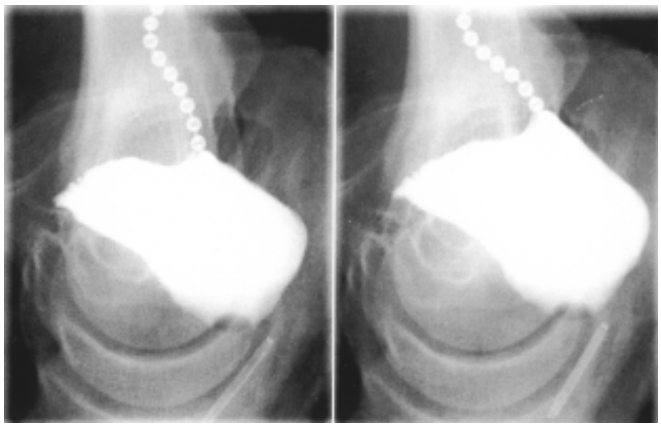
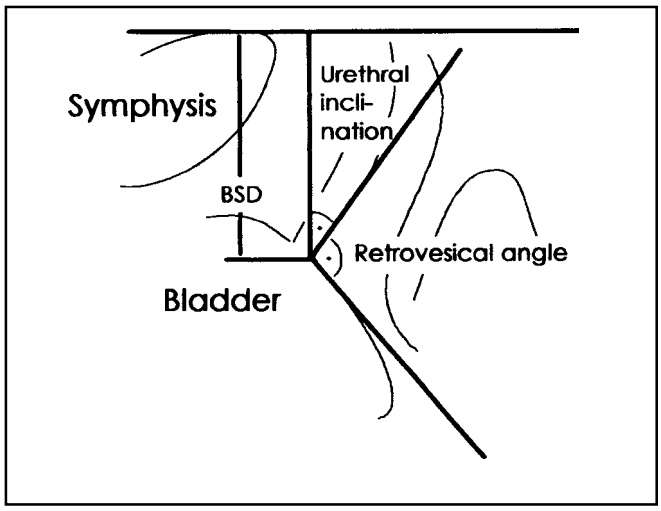


**Figure 2 Lateral urethrocystogram with bead chain outlining the urethra. The images are rotated by 180 degrees to allow comparison with standard translabial ultrasound views. Image on left is at rest, on right during valsalva manoeuvre.**

**Figure 3 Perineal ultrasound image (above) and line drawing (below), illustrating some of the measured parameters (distance between bladder neck and symphysis pubis (BSD), urethral inclination and retrovesical angle).**




full or empty bladder. The full bladder is less mobile than the empty organ (23) and may prevent the full development of pelvic organ prolapse. In the standing position, the bladder is situated lower at rest but descends about as far as in the supine patient on valsalva (24).

Measurements are generally performed at rest and on valsalva manoeuvre (Figure 4). The difference between these measurements yields a numerical value for bladder neck descent (normal <2 cm in the supine patient with empty bladder). The proximal urethra may be seen to rotate in a postero-inferior direction. The extent of rotation can be measured by comparing the angle of inclination between the proximal urethra and any other fixed axis (Figure 3). Some investigators also measure the retrovesical angle, between proximal urethra and trigone, (Figure 3). Of all those ultrasound parameters of hypermobility, bladder neck descent probably has the strongest association (own unpublished data) with Genuine Stress Incontinence (GSI).

In patients with stress incontinence, but also in asymptomatic women (25), funnelling of the internal urethral meatus may be observed on valsalva (Figure 5) and sometimes also at rest. Funnelling is often associated with leakage and occasionally weak grayscale echoes may be observed in the proximal urethra, suggesting urine flow and therefore incontinence. However, funnelling may also be observed in urge incontinence and cannot be used to prove GSI. Funnelling to mid-urethra has been shown to be associated with poor urethral closure pressures (26).

Classifications developed for the evaluation of radiological imaging (27) can be used with ultrasound data; however, this approach is not generally accepted. The commonest finding in cases of bladder neck hypermobility is the so-called rotational descent of the internal meatus, *ie* the proximal urethra and trigone rotate in a postero-inferior direction. Usually the retrovesical angle opens to up to 160-180 degrees from a normal value of 90-120 degrees, and such change in the retrovesical angle is often associated with funnelling. A cystocele with intact retrovesical angle is frequently seen in continent prolapse patients (Figure 6). Acute urethral kinking in such cases can lead to voiding dysfunction (worsened by straining) and urinary retention. Occult stress incontinence may be unmasked once a successful prolapse repair prevents further kinking.

**2. Levator activity**

Perineal ultrasound has been used for the quantification of pelvic floor contractions, both in women with stress incontinence and continent controls (28), as well as before and after childbirth (29). An antero-superior shift of pelvic organs imaged in a sagittal midline orientation is taken as evidence of a levator contraction. The resulting displacement of the internal urethral meatus is measured relative to the infero-posterior symphyseal margin (Figure 7). In this way pelvic floor activity is assessed at the bladder neck where its effect as part of the continence mechanism is most likely to be relevant (30). It can also be utilised for pelvic floor muscle exercise teaching and provide visual biofeedback (31).

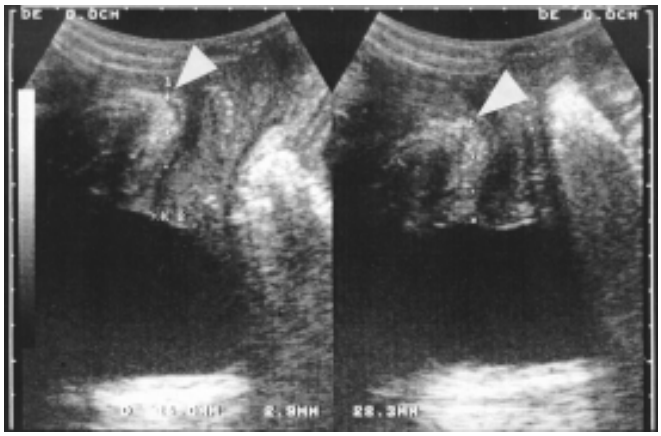


**Figure 4** Measurement of bladder neck position at rest (left) and on valsalva manoeuvre (right). The point of reference is the inferoposterior margin of the symphysis pubis (arrow).

**Figure 5** A typical finding in a patient with stress incontinence and anterior vaginal wall descent (cystourethrocele Grade I): posteroinferior rotation of the urethra, opening of the retrovesical angle and funnelling of the proximal urethra (arrow).

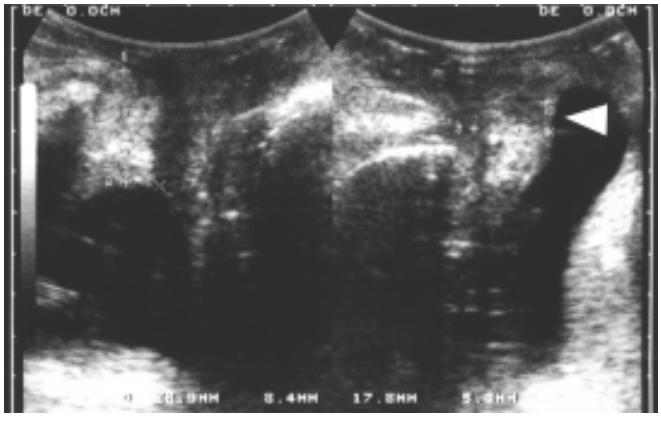


**Figure 6** A cystocele with intact retrovesical angle. Note the absence of funnelling (arrow).

**Figure 7** Quantification of a pelvic floor muscle contraction. The resulting displacement of the internal urethral meatus (arrow) in an anterosuperior direction is measured relative to the inferoposterior symphyseal margin.

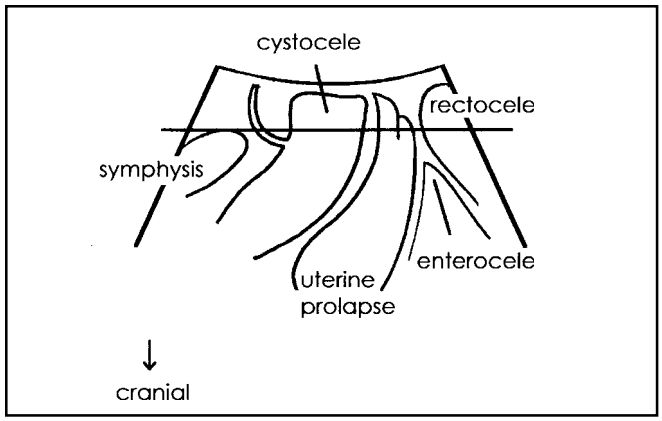



**Figure 8** Ultrasound quantification of uterovaginal prolapse. The inferior margin of the symphysis pubis serves as a line of reference against which the maximal descent of bladder, uterus, cul de sac and rectal ampulla on valsalva manoeuvre can be measured.

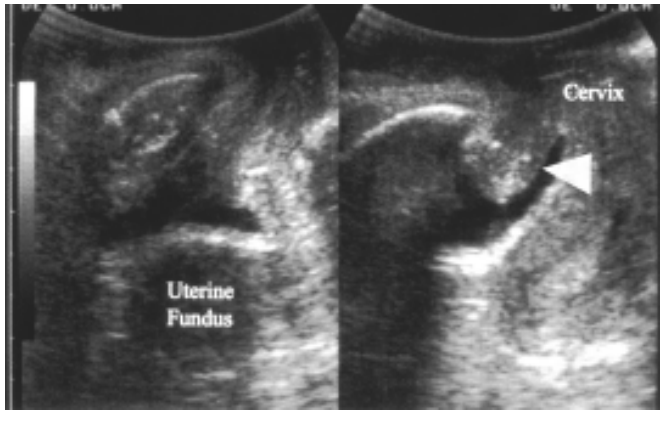



**Figure 9** First degree uterine descent in a patient after Burch colposuspension. The latter is evident as a ridge-like deformation of the trigone (arrow), posterior to the internal urethral meatus. Image on left is at rest, right on valsalva.

**3. Prolapse quantification**

Translabial ultrasound can demonstrate uterovaginal prolapse (32, 33). The inferior margin of the symphysis pubis serves as a line of reference against which the maximal descent of bladder, uterus, cul de sac and rectal ampulla on valsalva manoeuvre can be measured (Figure 8). In a recent study ultrasound findings were compared to clinical staging and the results of a standardised assessment according to criteria developed by the International Continence Society (34), with good correlations shown for the anterior and central compartments (35). Figure 9 shows a first-degree uterine prolapse after Burch colposuspension. Disadvantages of the method include incomplete imaging of cervix and vault with large rectoceles and the possible underestimation of severe prolapse due to transducer pressure. Advantages are the fixed point of reference and the ability to distinguish rectocele (Figure 10) from enterocele (Figure 11). Occasionally, apparent anterior vaginal wall prolapse will turn out to be due to a urethral diverticulum (Figure 12).

The main use of this technique may prove to be for outcome assessment after prolapse and incontinence surgery, a field that is poorly developed at the moment. The elevation and distortion of the bladder neck arising from a colposuspension is easily documented (Figure. 9). Fascial and synthetic material slings are visible posterior to the trigone or the urethra, and bulking agents such as Macroplastique show up anterior, lateral and posterior to the proximal urethra.

**4. Documentation of Stress Incontinence:**
**a. Contrast media**

The main disadvantage of B– Mode ultrasound imaging in urogynaecology has been the fact that actual leakage is difficult to detect. Funnelling, *ie* opening of the proximal urethra, is easily observed on translabial or transvaginal imaging; however, funnelling also occurs in asymptomatic women and cannot be taken as proof of GSI (36). One solution to this problem is to use ultrasound contrast media, *eg* microbubbles such as Echovist® Schering(37). Such preparations are injected into the bladder before imaging, filling the region of the bladder neck. This technique outlines the bladder neck very clearly (38) but involves considerable expense and catheterisation.

Contrast media for intravesical use could potentially be much simpler in composition and preparation than echogenic fluids designed for intravascular or tubal use. One approach may be the development of solid particle suspensions which could be infused with standard cystometry (39).

**b. Colour Doppler**

In a recently published study (40, 41), colour Doppler ultrasound was used to demonstrate urine leakage through the urethra on valsalva manoeuvre or coughing. The method yields satisfactory results with or without indwelling catheter. Agreement between colour Doppler and fluoroscopy was very high in a controlled group with indwelling catheters and identical bladder volumes. Both velocity (CDV, Figure 13) and energy mapping (CDE, Figure 14) were able to document leakage. CDV was slightly more likely to show a positive result, probably due to its better motion discrimination. This results in less flash artifact and better orientation, particularly on coughing. As a result of this recent development, the routine sonographic documentation of GSI during urodynamic testing has become feasible. Whether this is in fact desired will depend on the clinician and his/ her preferences.

**5. Paravaginal defect imaging**

Transabdominal ultrasound has been used to show lateral defects in the endopelvic fascia, also termed "paravaginal" defects (42). However, the method has not been conclusively validated, and a recent study (43) showed poor correlation with clinically observed defects. There may be several factors limiting the predictive value of transabdominal ultrasound in the identification of paravaginal defects: the poor definition of an optimal scanning plane, the influence of uterine prolapse or a full rectum, and finally the inability to observe the effect of a valsalva manoeuvre (which would dislodge the transducer) by transabdominal imaging. Standard perineal ultrasound has not yet been evaluated for this purpose.

**6. 3D Imaging**

Transvaginal imaging has been used to obtain 3D data on the urethra (44) and for paraurethral structures (45), as well as for operative planning in paediatric colorectal surgery (46). Some investigators have utilised side- firing rectal transducers for this purpose. Standard front-firing transducers however can be employed for the assessment of anal sphincter injury (47). As regards urethral imaging, urethral sphincter volume has been correlated with symptoms and urodynamic parameters such as the maximum urethral closure pressure.

Over the last 2 years there have been attempts at 3D imaging of pelvic floor organs using fast MRI techniques (48). Information obtained in such a way will probably not be used in clinical practice for some years to come. However, ultrasound 3D imaging is steadily becoming more user-friendly and widespread. The author has had the opportunity to use a new software-based 3D technique (3-scape, Siemens Medical Systems, Issaquah, Washington, USA) for 3D imaging of pelvic floor organs (Figure 15). In theory, resolutions close to those of MRI should be possible, and fast acquisition times of a few seconds should allow a degree of dynamic imaging.

**OUTLOOK**

Perineal or translabial ultrasound is in the process of becoming the new imaging standard in urogynaecology. There are several factors that are contributing to its increasing acceptance, the most important being the availability of suitable equipment. Recent developments such as the assessment of levator activity and prolapse, but also the use of colour Doppler to document urine leakage, enhance the clinical usefulness of the method. It is to be hoped that increasing standardisation of parameters will make it easier for clinicians and researchers to compare data. The convenience with which pre- and post-treatment imaging data can now be obtained will simplify outcome studies after prolapse and incontinence surgery. Ultrasound imaging may be able to significantly enhance our understanding of the different mechanisms by which conservative methods, colposuspension or urethropexy operations, slings and (most recently) the tension-free vaginal tape achieve, or fail to achieve, continence.

Finally, while 3D techniques may not find their way into clinical practice in the near future, they will continue to enhance our understanding of the anatomical defects involved in the causation of female urinary incontinence and prolapse.

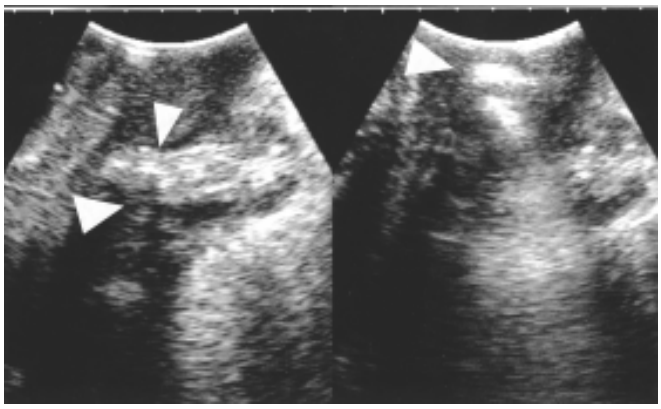


**Figure 10** First degree rectocele. The anal canal is seen to the right of both images, with the fascial defect of the rectocele clearly visible between the arrows on the left image. On valsalva (right), the prolapsing rectocele obscures all but the distal part of the anal canal.

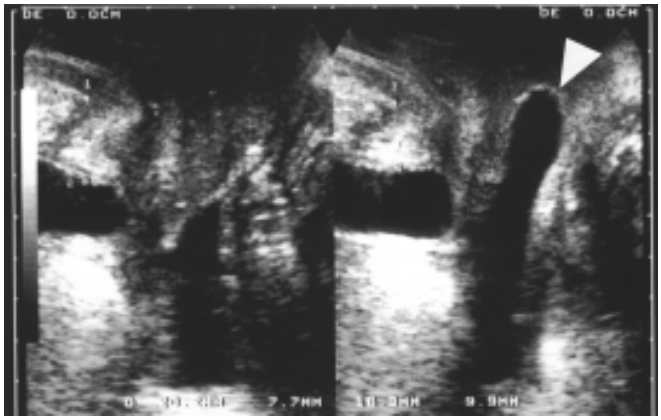


**Figure 11** Enterocele at rest (left) and on valsalva manoeuvre (right), outlined clearly by intraperitoneal fluid (arrow). Normally, the cul de sac is filled by peristalsing loops of small bowel or more homogeneous, nonperistaltic omentum or epiploic processes.

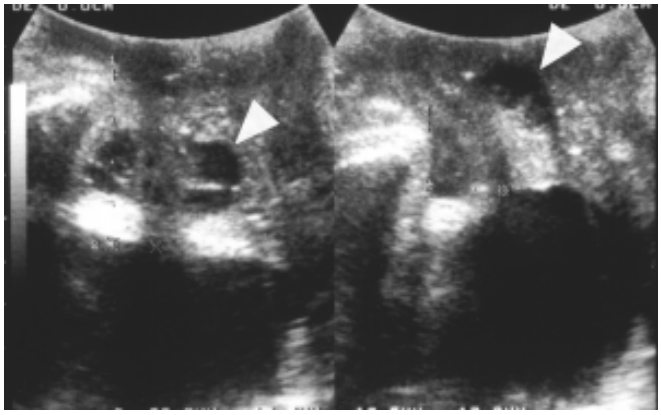


**Figure 12** Urethral diverticulum (arrows), herniating downwards and clinically simulating a cystourethrocele on valsalva manoeuvre.

**Figure 13** Colour Doppler ultrasound (CDV) demonstrating urine leakage (arrow) through the urethra on valsalva manoeuvre.

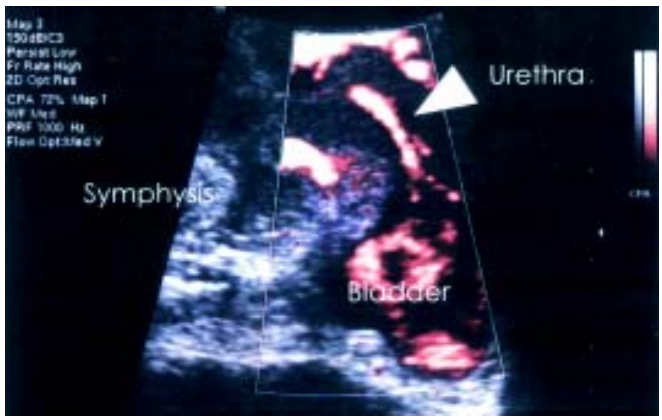



**Figure 14** CD Energy (CDE) imaging in Genuine Stress Incontinence. The Doppler signal outlines most of the proximal urethra (arrows).

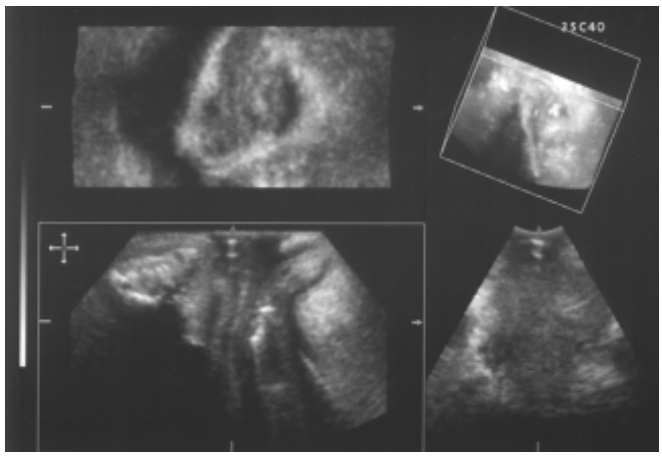


**Figure 15** 3D imaging of pelvic floor organs.

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# Colour Doppler in small parts and superficial structures

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The roles of colour Doppler imaging (CDI) may be summarised as follows:

1. Assess vascularity of an organ or tissue. Increased vascularity in inflammation; reduced or absent vascularity in ischaemia or infarction.
2. Assess vascularity of masses, including 'mapping' of blood supply.
3. Increase sensitivity of tumour detection.
4. Differentiate cyst from ectatic artery or aneurysm.
5. Identify small arteries; help to sort out difficult anatomy.
6. Help with biopsy guidance; direct needle away from large vessels and hypervascular areas.

In this article I will attempt to summarise and illustrate the various roles and uses of CDI in ultrasound (US) of the following organs and systems:

A. Thyroid gland
B. Prostate (TRUS)
C. Scrotum
D. Penis
E. Musculoskeletal system

Breast ultrasound is a large topic not addressed in this article.

## A. THYROID GLAND

### 1. Assess the vascularity of masses

US features of a benign thyroid nodule include: homogeneous contents, well defined margins, cystic components, peripheral 'egg-shell' calcification, low level of vascularity. US features of a malignant mass include: ill defined margins, fine internal calcifications, heterogeneity, high level of vascularity. Apart from obvious local invasion indicating malignancy, there is considerable overlap in appearances between benign and malignant thyroid masses. FNA is often required for diagnosis.

### 2. Assess the vascularity of the organ

An enlarged hypoechoic thyroid is seen with various forms of thyroiditis. A striking increase in vascularity on CDI is indicative of Graves' disease (Figure 1).

### 3. Help with biopsy guidance

This is probably the most important function of CDI as applied to the thyroid. The commonest cause of a 'non-diagnostic aspirate' is a heavily blood stained specimen. CDI is used pre-biopsy to map the major blood vessels in and around the mass. The needle tip is directed away from these vessels to less vascular parts of the mass giving a greater diagnostic yield, less need for repeat aspirations, and less risk of haemorrhage (Figure 2).

## B. PROSTATE (TRUS)

### 1. Differentiate cyst from ectatic artery

Cysts are commonly seen in the prostate with TRUS. The vast majority of prostatic cysts are benign in association with nodular hyperplasia (Figure 3), although rare congenital or developmental cysts may be seen (Figure 4) and cystic prostate tumours are described. Prior to biopsy it is prudent to check with CDI that any cystic structures are not ectatic blood vessels. A rich venous plexus surrounds the prostate. This may produce an irregular hypoechoic appearance to the prostate capsule. CDI quickly confirms the venous nature of this irregularity and differentiates it from early capsular invasion by a tumour (Figure 5).

### 2. Increase sensitivity of tumour detection

TRUS is not a sensitive imaging technique. The classical appearance of a prostatic malignancy is a peripheral hypoechoic mass. Unfortunately only about 30% or less of tumours are actually visualized and TRUS is best thought of as a biopsy guide. Several reports in the literature have shown that CDI may improve sensitivity. Certainly a small percentage of tumours are seen as localised areas of increased vascularity without an underlying hypoechoic mass (Figure 6).

### 3. Help with biopsy guidance

CDI helps with biopsy guidance in two ways. Firstly, the needle may be directed to suspicious areas of increased vascularity. Secondly, large arteries and veins may be avoided.

## C. SCROTUM

### 1. Assess vascularity of the organ

Colour Doppler is invaluable in assessment of the acute scrotum. Increased vascularity is a prominent feature of epididymo-orchitis (Figure 7). More importantly, absent vascularity is diagnostic of testicular torsion. It should be emphasised that torsion is a surgical emergency requiring immediate exploration; CDI is used only for cases where there is significant clinical doubt.

**2. Assess vascularity of masses**

The most common application of this role in the scrotum is to confirm a varicocele (Figure 8). Otherwise, CDI does not help in differentiating benign from malignant masses. The majority of intratesticular masses are malignant regardless of CDI appearances.

**D. PENIS**

**Identify small arteries**

The Doppler cavernosogram has become an important noninvasive investigation for impotence. CDI is a useful adjunct for rapid identification of the cavernosal arteries, prior to and following injection of prostaglandin.

**E. MUSCULOSKELETAL SYSTEM**

**1. Identify small arteries and clarify difficult anatomy**

US of the groin to exclude small hernias is an increasingly common examination, particularly in the sporting population. Several vascular markers are important in working out the anatomy. The lateral end of the inguinal canal, the deep inguinal ring, lies just lateral to the insertion of the inferior epigastric artery and vein into the femoral artery and vein (Figure 9). The testicular artery runs in the spermatic cord, which in turn lies in the inguinal canal (Figure 10). CDI helps with rapid identification of these vessels. Identification of the anatomy in this difficult region allows the diagnosis and classification of small hernias (Figure 11).

CDI is also helpful in assessing the relationship of small arteries to masses e.g. a ganglion lying near the radial or ulnar artery (Figure 12).

**2. Differentiate cysts from ectatic arteries or aneurysms**

**3. Assess vascularity of masses**

Benign tumours tend to be well defined with low vascularity; malignant masses tend to be ill defined with higher vascularity. There is however considerable overlap in appearances, although some common benign masses such as lipoma and neuroma are usually confidently diagnosed with musculoskeletal US. Examples where CDI is very helpful include peripheral vascular malformations (Figure 13) and glomus tumours of the hand (Figure 14).

**4. Assess vascularity of tissue**

Several reports in the literature have pointed to the role of CDI in highlighting localised areas of tissue inflammation. Possible applications include more accurate diagnosis of focal tenosynovitis and better delineation of inflamed synovium in rheumatoid arthritis (Figure 15).

**5. Help with biopsy guidance; direct needle away from large vessels and hypervascular areas.**

**FIGURES 1 A and B GRAVES' DISEASE**

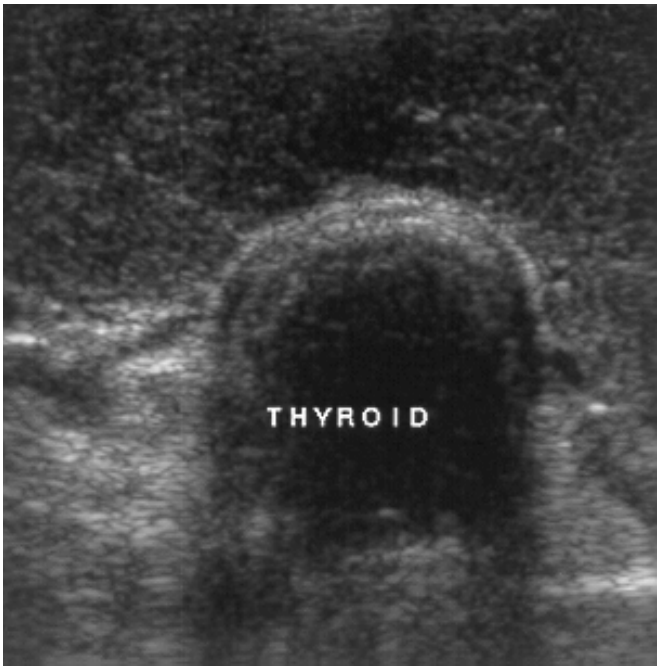


**Figure 1A The thyroid is diffusely enlarged and has a hypoechoic texture.**

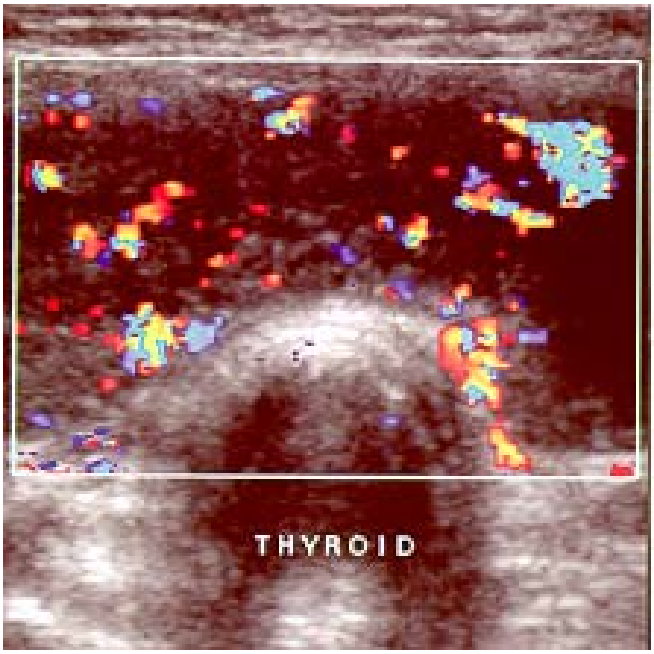


**Figure 1B CDI shows a marked increase in vascularity throughout the thyroid indicating active Graves' disease.**

**FIGURE 2 BIOPSY GUIDANCE: THYROID**

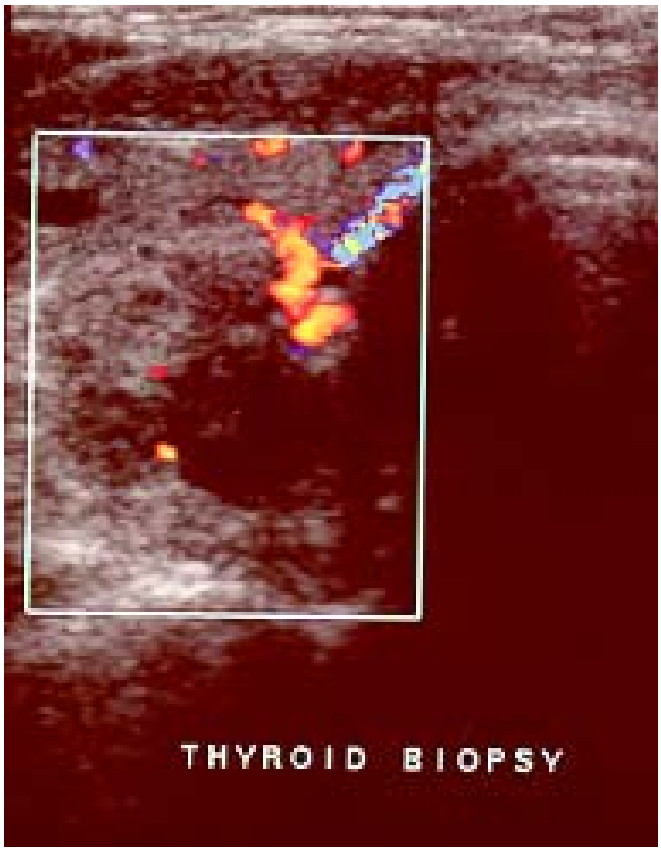


**Figure 2 FNA is to be performed on a hypoechoic mass in the right lobe of the thyroid. CDI shows a relatively hypervascular area medially. The needle tip is directed into the more hypovascular area giving a greater diagnostic yield, plus reduced risk of haemorrhage.**

**FIGURE 3 TRUS: BENIGN CYSTS**

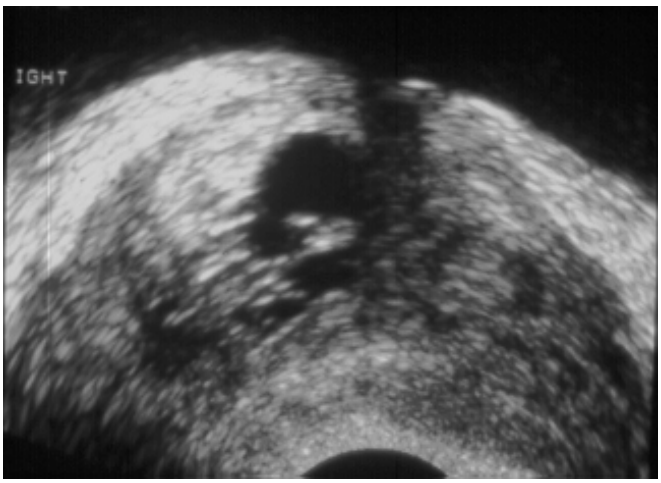


**Figure 3 Multiple simple cysts are seen in the central prostate in association with nodular hyperplasia. These cysts are very commonly seen with TRUS and are of no clinical significance.**

**FIGURES 4A AND B EJACULATORY DUCT CYST**

TRUS was performed in this case for assessment of a man with dysuria and perineal pain. Ejaculatory duct cyst is a rare entity due to obstruction to an ejaculatory duct. Signs on TRUS include a central prostatic cyst, which may contain calculi or calcifications accompanied by dilatation of the ipsilateral seminal vesicle.

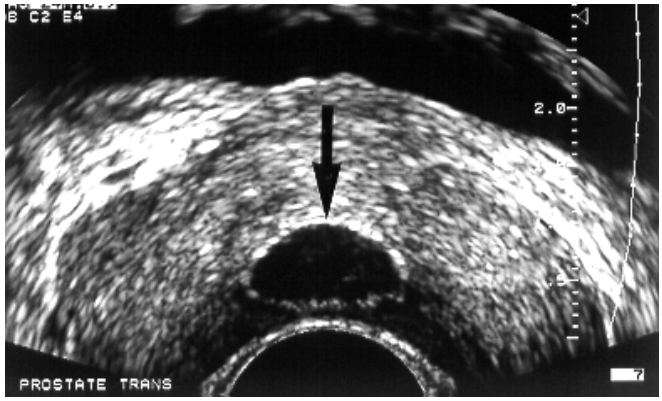


**Figure 4A There is a central intraprostatic cyst with peripheral calcifications (arrow). CDI confirms the nonvascular nature of this lesion.**

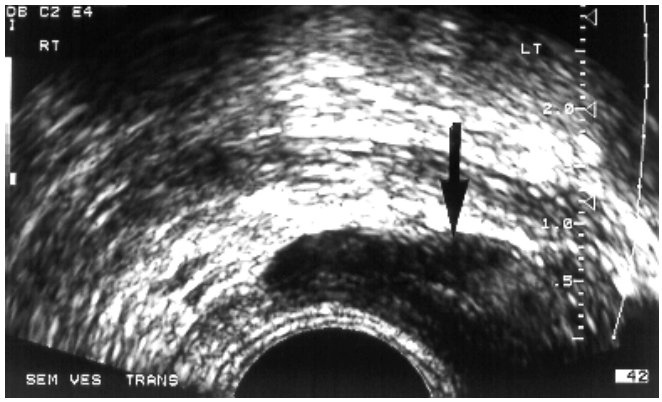


**Figure 4B There is unilateral cystic dilatation of the left seminal vesicle (arrow).**

**FIGURE 5 NORMAL PROSTATE VASULARITY**

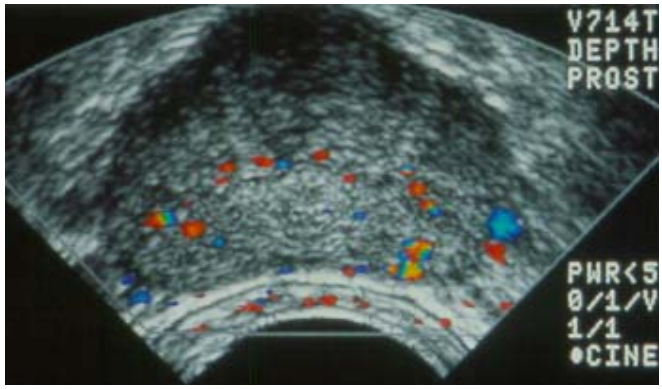


**Figure 5 TRUS with CDI shows normal symmetrical distribution of small blood vessels throughout the prostate as well as some small capsular veins.**

**FIGURE 6 PROSTATE CARCINOMA**

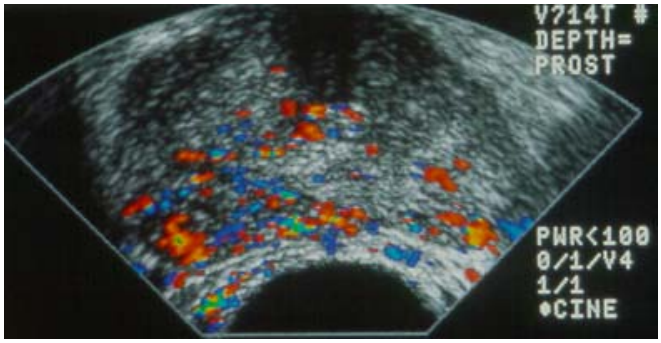


**Figure 6 There is a localised area of increased vascularity in the posterior right peripheral zone of the prostate. Biopsy of this region revealed adenocarcinoma.**

**FIGURE 7 ACUTE EPIDIDYMITIS**

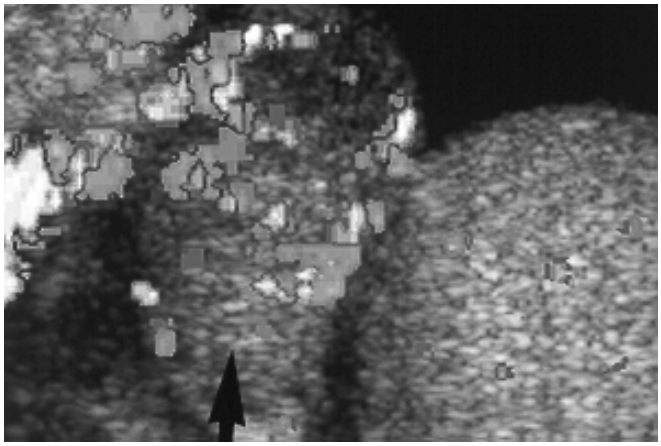

**Figure 7 The epididymis is swollen and hypoechoic, with hyperaemia seen with CDI. An associated hydrocele is also noted. It is important to always use CDI in cases of acute scrotum despite what may be obvious changes of swelling and reduced echogenicity. so as not to overlook torsion,**

**FIGURE 8 VARICOCELE**

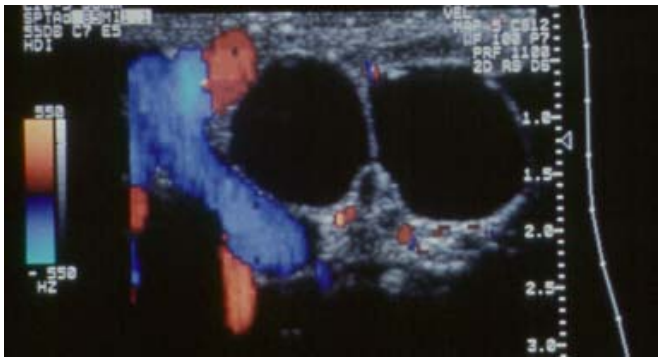

**Figure 8 US showed a collection of cystic structures in relation to the left epididymis. CDI shows 2 simple epididymal cysts plus a varicocele. Idiopathic varicocele most commonly occurs on the left, is easily compressible, and is usually noted in younger patients (15 to 25). Suspicion of neoplastic venous obstruction is raised where the varicocele is right sided, noncompressible, or appears after the age of 40.**

**FIGURE 9 INGUINAL CANAL ANATOMY**

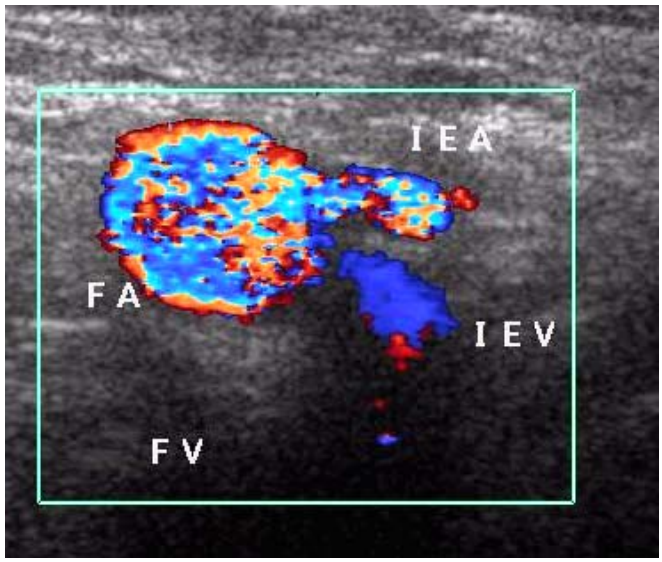


**Figure 9 CDI helps with the rapid identification of the inferior epigastric artery and vein. The junction of the femoral artery and vein with the inferior epigastric artery and vein is well seen. The deep inguinal ring lies just lateral to this point.**

**FIGURE 10 INGUINAL CANAL ANATOMY**

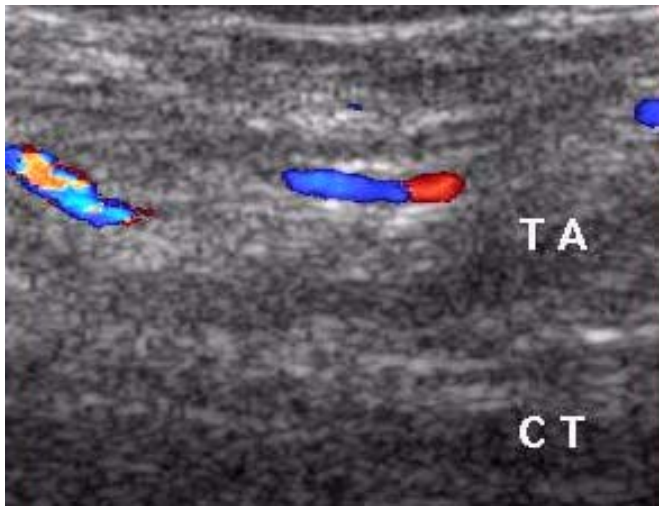


**Figure 10 Once the region of the deep inguinal ring is identified, the probe is turned into an oblique plane angling downwards and medially towards the pubic tubercle. CDI shows the testicular artery (TA) confirming that the probe lies along the line of the inguinal canal. The conjoint tendon (CT) forms the posterior wall of the inguinal canal.**

**FIGURE 11 INDIRECT INGUINAL HERNIA**

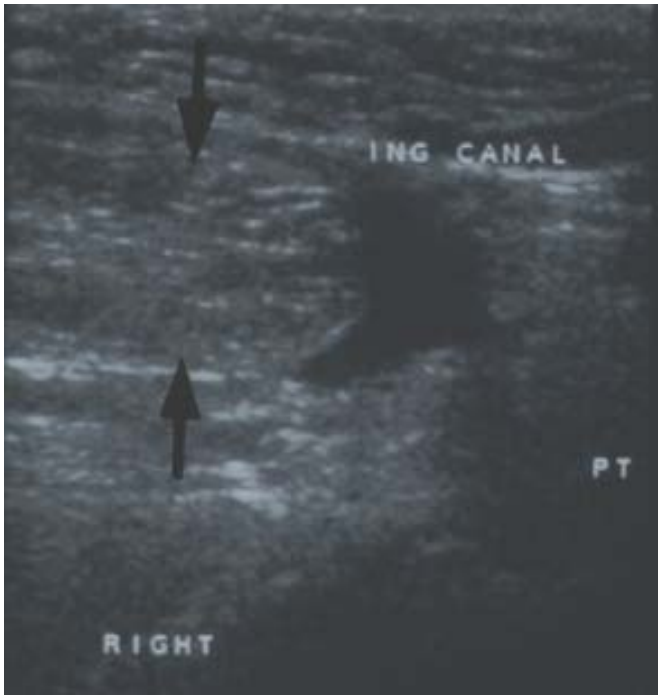


**Figure 11 An indirect inguinal hernia is seen as a lobulated fatty mass (arrows) projecting through the deep inguinal ring ie. *lateral* to the inferior epigastric artery and vein. With valsalva there is longitudinal 'glide' of the mass down the inguinal canal as well as 'ballooning' of the dimensions of the canal itself. The conjoint tendon is intact and inserts into the pubic tubercle.**

**Direct inguinal hernias enter the inguinal canal medial to the inferior epigastric vessels through a defect in the conjoint tendon.**

**FIGURE 12 WRIST GANGLION**

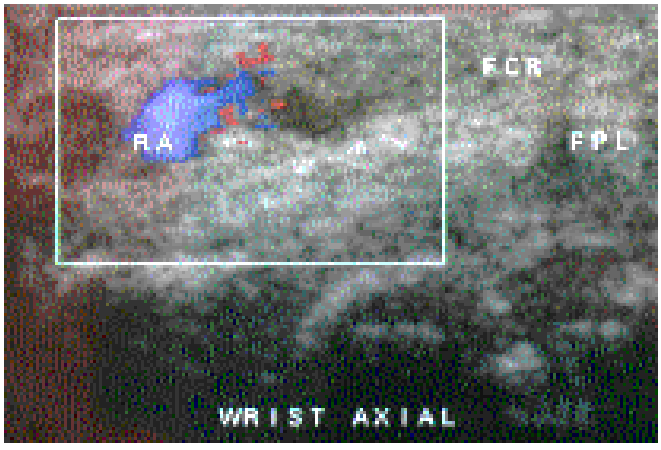


**Figure 12 There is a 3 mm diameter cyst lying just between the radial artery (RA) and the flexor carpi radialis tendon (FCR). Note also the more deeply positioned flexor pollicis longus tendon (FPL). This is a very common site for ganglion of the volar aspect of the wrist, another common site being medially near the ulnar artery and nerve (Guyon's canal).**

**FIGURES 13A AND 13B**
**ARTERIOVENOUS MALFORMATION**

The patient complained of a tender swelling on the palm overlying the thenar eminence.

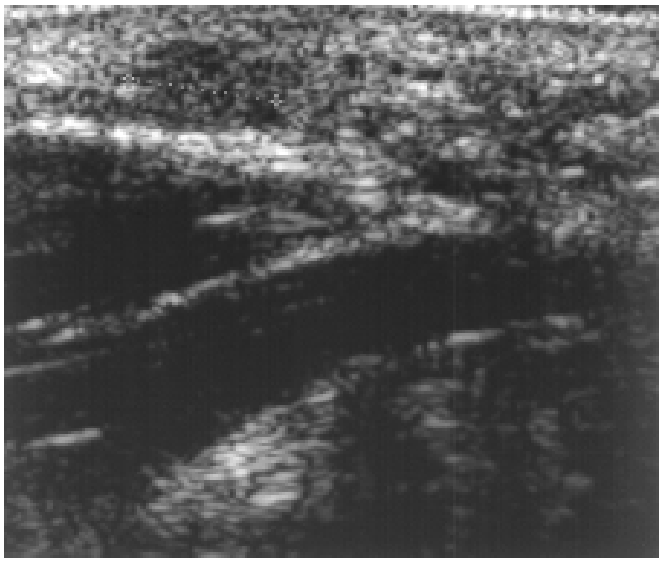

**Figure 13A US shows a vague hypoechoic swelling in the superficial subcutaneous layer overlying the muscles of the thenar eminence.**

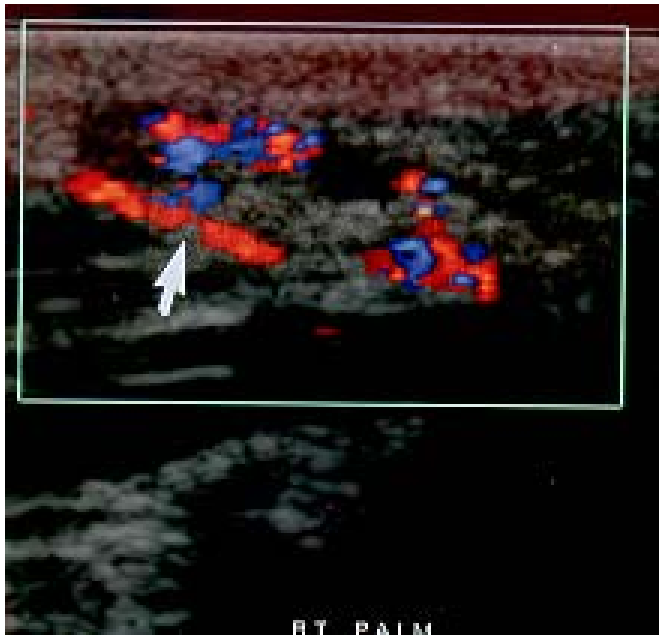

**Figure 13B CDI shows a vascular mass with a prominent feeding artery on the surface of the opponens pollicis muscle.**

**FIGURE 14 GLOMUS TUMOUR**

Glomus tumour is a small painful vascular tumour found usually in the distal pulp of the fingers. A common site is beneath the fingernail with erosion of the underlying distal phalanx. These tumours are exquisitely tender which may make examination difficult.

The examination was performed in this case through a small standoff applied to the surface of the fingernail. US shows a small hypoechoic mass with smooth erosion of the surface of the distal phalanx. CDI shows the markedly vascular nature of this tumour.

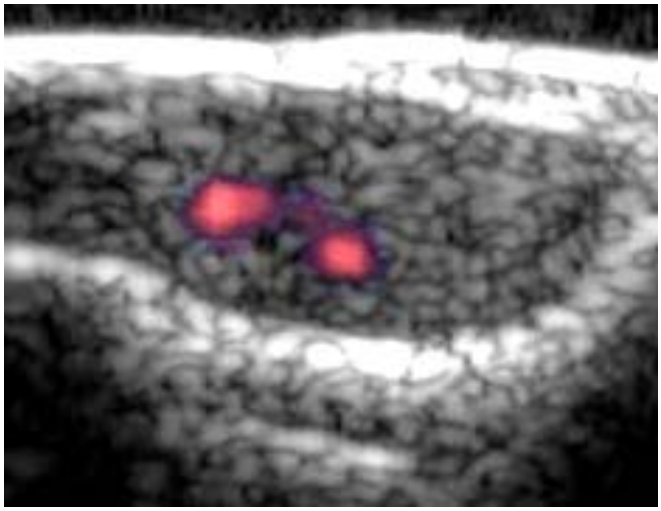

**Figure 14**

**FIGURES 15A AND 15B TENOSYNOVITIS**

An elderly male presented with painful swelling of both wrists and clinical evidence of median nerve compression. Ultrasound showed gross fluid and soft tissue distension of the flexor tendon sheaths. CDI revealed the vascular nature of this soft tissue in keeping with inflamed synovium. The tendon sheaths were excised with good symptomatic relief. The patient was subsequently diagnosed as having rheumatoid arthritis.

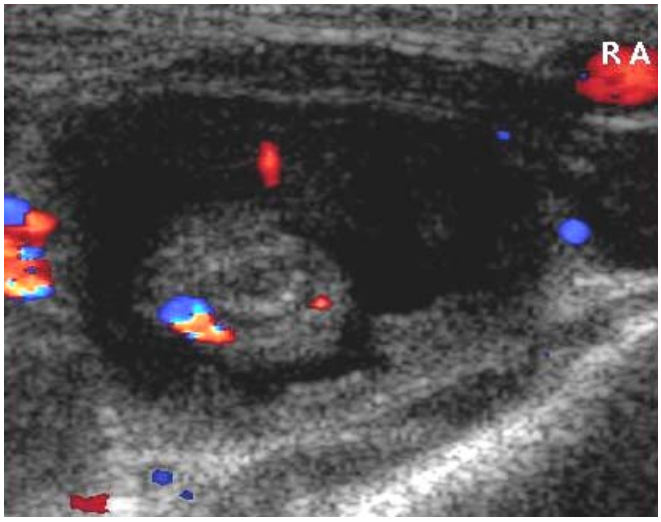


**Figure 15A**

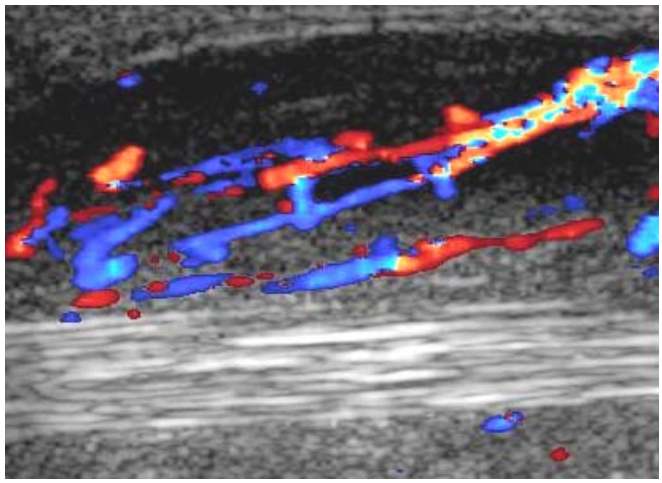

**Figure 15B**

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# Detailed sonographic assessment of the medial calf

**Stephen Bird, MIR DMU, DMU (Vascular) AMS, Benson Radiology, SA**

Ultrasound examinations to exclude the presence of lower limb deep venous thrombosis (DVT) are very commonly performed procedures. Many patients present for postoperative screening or for unilateral painless leg swelling, and these are quite appropriate clinical symptoms suggestive of DVT. There is also a subgroup of patients, who present with a clinical history suggestive of alternative pathology, in particular, a history of medial calf pain. In these patients I would advocate a five-minute extension of the standard DVT exclusion examination to assess the possible presence of a variety of alternative pathologies.

## DETAILED VENOUS ASSESSMENT

Before the alternative musculoskeletal pathologies are considered it must be emphasised that the primary role of the examination is to exclude a venous cause of medial calf pain. The veins that lie in close proximity to the medial calf are:

- Popliteal vein
- Tibio-peroneal trunk
- Posterior tibial veins
- Medial gastrocnemius veins
- Soleal sinuses
- Short saphenous vein
- Long saphenous vein
- Superficial varicose veins

In every case it is most important to diligently assess all of these veins for the presence of thrombosis; the soleal sinuses in particular are a common primary site for what may become extensive DVT. If the clinical history is typical of a musculoskeletal injury the possibility of a concurrent DVT should be taken seriously as muscle trauma may act as the predisposing factor in the formation of DVT. Medial gastrocnemius DVT and superficial thrombophlebitis are particularly painful abnormalities resulting in medial calf pain.

Care must be taken when examining medial calf veins as medial gastrocnemius and soleal sinuses may appear as echogenic structures rather than the traditional anechoic spaces. This is due to a combination of slow flowing or stagnant venous blood, the superb ultrasound scattering properties of red blood cells, and the extended dynamic range of current generation ultrasound equipment. This makes compression testing of veins even more important as veins may appear full of echogenic material but on compression will be found to be normal (figure 1).

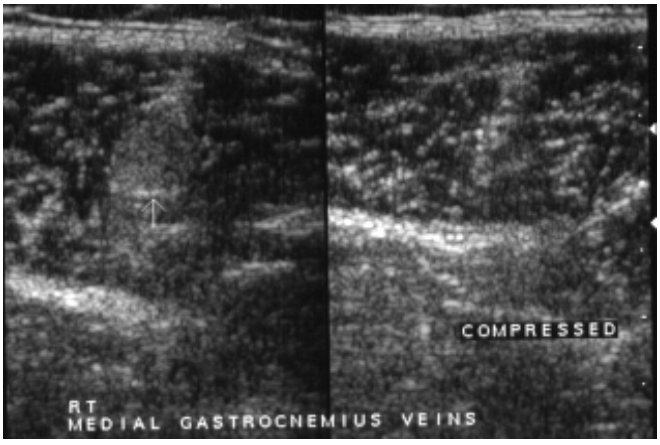


**Figure 1 Normal echogenic appearance of medial gastrocnemius vein.**

## MUSCULOSKELETAL EXTENSION TO THE DVT EXAMINATION

The presentation which would particularly lead to a brief musculoskeletal extension of the DVT examination, is the acute onset of medial calf pain, often following sports injury, work injury or other traumatic event.

A variety of musculoskeletal pathology can be diagnosed as the cause of medial calf pain using high-resolution ultrasound. The equipment should be optimised with the selection of at least a 7 MHz frequency linear array transducer, and the machine parameters should be altered to a small parts or musculoskeletal setting. These provide greater dynamic range for demonstration of subtle textural changes and multiple focal zones with high line density for greater lateral resolution.

## BAKER'S CYST

Baker's cyst is the most common medial calf pathology encountered mimicking a DVT. The most appropriate technique if possible, is to position the patient prone and scan transverse in the medial popliteal fossa. In this location it is easy to demonstrate the medial gastrocnemius muscle and the tendon of the semimembranosus muscle. Baker's cysts arise from between these two anatomical structures and when seen in the setting of acute medial calf pain, have usually ruptured either deep or superficially. With deep rupture the Baker's cyst fluid is seen to extend down the aponeurosis between the medial gastrocnemius and soleus muscles. With superficial rupture fluid is seen extending down the subcutaneous space of the medial calf, superficial to the medial gastrocnemius muscle.

**APONEUROSIS AVULSION**

Aponeurosis avulsion injuries are very common in the medial calf. The most common site of these injuries is between the medial gastrocnemius and the soleus muscle. The normal appearance of the aponeurosis is that of two thin echogenic lines separated by a thin hypoechoic line. With the foot dorsi-flexed, medial gastrocnemius muscle fibres should appear tightly adherent to the aponeurosis (figure 2).

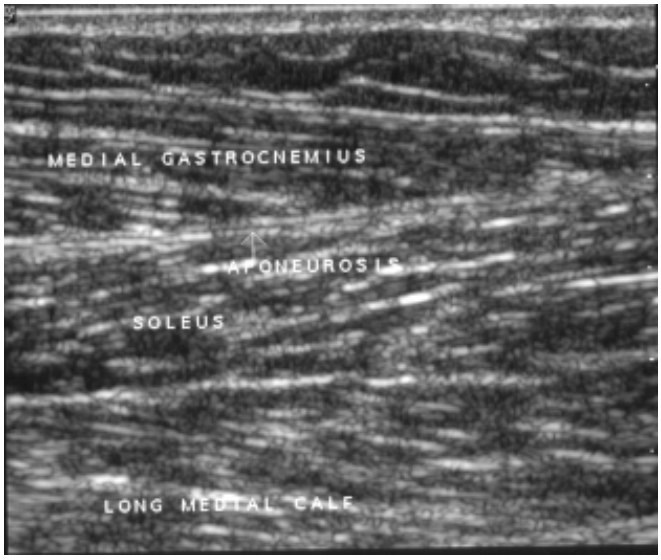


**Figure 2 Normal medial gastrocnemius soleus aponeurosis.**

In the presence of an aponeurosis avulsion the fibres will appear flaccid, resembling the curved shape of "fish hooks" as their distal ends are no longer pulled tight. The aponeurosis may also fill with fluid forming the appearance of two echogenic lines bordering a much wider hypoechoic space. These avulsion injuries are most common at the distal end of the medial gastrocnemius insertion, and direct comparison with the asymptomatic side is often useful.

Less commonly, aponeurosis avulsion may be seen deeper in the medial calf between the soleus and the flexor digitorum longus muscles. This avulsion appears as a hypoechoic widening of the aponeurosis due to traumatic fluid.

**PLANTARIS TENDON**

The plantaris tendon is an evolutionary remnant consisting of a long tendon with a small rudimentary muscle belly, and may be completely absent in some individuals. The origin of the plantaris tendon is the lateral supracondylar line of the femur, with the long tendonous portion passing postero-medially through the aponeurosis separating the medial gastrocnemius and soleus muscle bellies. Once it emerges distally from within this aponeurosis the plantaris tendon passes along the surface of the soleus muscle and inserts onto the medial calcaneus with the Achilles tendon. The normal plantaris tendon is easily identified in the longitudinal plane as a thin bundle of fibres, and in the transverse plane as a small lentiform structure passing through the aponeurosis (figure 3).

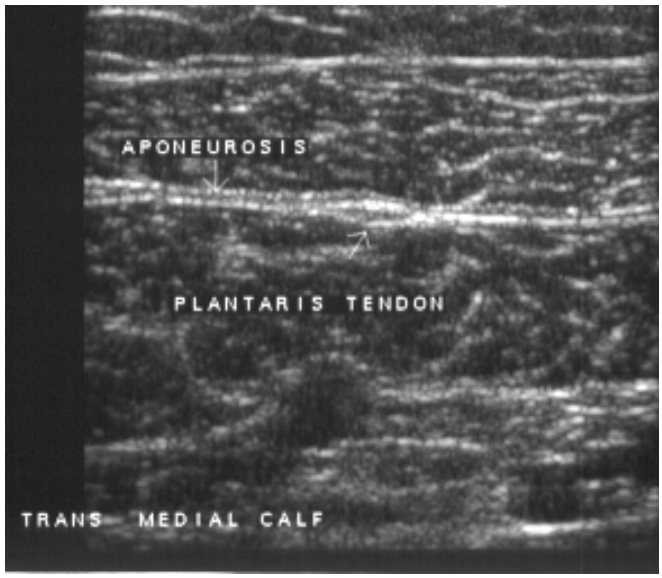


**Figure 3 Normal transverse plantaris tendon**

As with any tendon the plantaris may be subject to focal or diffuse tendonitis appearing as local or generalised swelling and decreased echotexture of the tendon. Diffuse tendonitis may be quite marked on occasions, and concurrent involvement of the Achilles tendon has been noted on several occasions (figure 4).

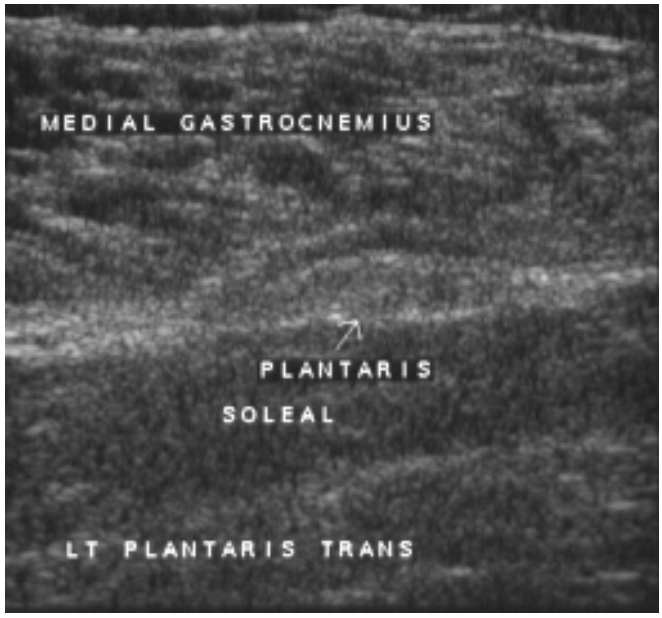


**Figure 4 Transverse diffuse plantaris tendonitis**

The plantaris tendon may also rupture completely with a characteristic clinical history of acute onset of medial calf pain often following an audible snap of the tendon. In such cases the free-floating retracted ends of the tendon may be seen suspended in a haematoma within the aponeurosis space. If a partial tear occurs, the sonographic findings will be an anechoic area within the tendon with some portion of fibres remaining intact and no tendon retraction being evident.

continued on page 32

# Ultrasound standards

**Cheryl Bass, Chair, Standards of Practice Committee**

New standards, what new standards? Yes, the ASUM Standards of Practice Committee has extensively reviewed and revised the guidelines. Well, when are they coming out? Well actually they are out, came out as A5 replacement sheets for your folders wrapped in plastic in the November issue of the *Bulletin*. Well why didn't you tell me? Well actually that's what we are trying to do but sometimes it's a case of people not seeing the signal for the noise!

In this issue we are asking you to take a moment to consider the revised Gynae and First Trimester Guidelines. These have been extensively and at times exhaustingly reviewed by a wide panel of experts and workers. They have the common issue of the transabdominal versus the transvaginal approach . This engendered less discussion than previously as all agreed that there was no question of which, in most circumstances, gave the best diagnostic information.

Colour Doppler was also a minor issue, whilst none would like to be without it and it was not considered indispensable. The Gynae guidelines produced no other controversies but not so the First Trimester Scan; read on.

The definition of fetal demise is a sensitive issue and it is particularly vital that the inexperienced or inept combined with poor equipment do not arrive at a false positive. For this reason, very conservative criteria were agreed upon. Briefly, fetal demise can be said to have occurred if, on transvaginal scanning, there is a mean sac diameter of 20 mm or a CRL of 6mm and no fetal heart beat visible after prolonged observation. These measurements allow a larger safety margin than in the previous guidelines and a reference is given for those interested in the impetus that lead to the change.

Nuchal translucency also produced huge debate . All agreed on when and how it should be done but consensus was difficult to achieve thereafter. The contentious issues addressed were; who should do it, who should counsel the patient, what to do if it hadn't been requested i.e. where a women attends for other reasons but has a CRL in the correct range.

Those involved almost exclusively in this area strongly believe that we should respect a women's right to refuse prenatal testing and therefore believe that she should be counselled accordingly before doing the measurement, whereas others felt that an abnormal nuchal translucency measurement should be treated in the same way as any other fetal anomaly. Much discussion ensued and currently the following guidelines for the performance of the nuchal lucency have been agreed on. I perceive they will need further review as our experience and the use of nuchal translucency screening increases.

# ASUM guidelines for the performance of first trimester ultrasound

**Revised OCTOBER 1999**

### INTRODUCTION AND EQUIPMENT

Studies should be performed using an abdominal and/or vaginal approach. A high frequency transducer should be used and the equipment should be operated with the lowest ultrasonic exposure settings capable of providing the necessary diagnostic information. A vaginal transducer should always be available and a transvaginal scan should be offered to the patient when it is anticipated that this would result in a more diagnostic study. The patient may choose to accept or refuse this offer, and undue pressure is inappropriate.

Reference should be made to the Guidelines for the Performance of a Gynaecological Scan regarding the facilities and preparation for such an examination.

ASUM policy on disinfection of vaginal transducers should be followed.

### HISTORY

Estimate gestation based on last menstrual period or time of conception. Document symptoms and, if possible, the result and date of any pregnancy test - Human Chorionic Gonadotrophin (HCG).

### GESTATION SAC

The gestation sac should usually be visible from 4.5 to 5 weeks using high frequency transvaginal ultrasound.

When a gestation sac like structure is seen but no live fetus demonstrated, it is important to attempt to ensure that it is not a 'pseudo gestational sac'. Look for the echogenic trophoblast rim and the yolk sac, and ensure that the fluid in the gestation sac is echo free.

If a gestation sac is not visible in the uterus of a patient believed to be pregnant, the adnexa should be carefully examined looking for an ectopic pregnancy - most ectopics can be suspected with high frequency transvaginal ultrasound.

In a patient with a positive pregnant test but either –

- no gestational sac is seen within the uterus or elsewhere in the pelvis
- an apparent sac is seen but no fetal structures (including yolk sac) or heart movements are visible

consider the following -

- pregnancy not as advanced as thought (*eg* delayed ovulation and conception in that cycle)
- ectopic pregnancy
- failed pregnancy including complete miscarriage

Interpretation of the scan may be more accurate if the result of the quantitative HCG levels is known.

There is more than one accepted laboratory standard for reporting HCG levels. The units for the local service should be taken into account when correlating sac development and HCG level. In general when the level is > 2,000 IU/1 a gestation sac should be seen in the uterus on transvaginal scanning. If no sac is visible an ectopic must be considered.

If the level is < 1,000 IU/1 then further follow up by serial HCG is appropriate and/or a repeat scan if the diagnosis is uncertain.

**GESTATIONAL AGE**

This is most accurately assessed in the first trimester. The earlier the crown rump length (CRL) is measured, the more accurate is the assessment of dates. The CRL can be measured from six weeks gestation. The composite CRL chart in the ASUM Policies and Statements folder is recommended. From eleven weeks multi-parameter assessment can be used. Biparietal diameter (BPD) is the most often used second measurement.

**FETAL HEART MOVEMENTS**

With a high resolution vaginal transducer, fetal heart movements are often visible from six weeks (*ie* CRL = 2mm), but may not be seen until CRL = 3-4 mm. (See paragraph on pregnancy failure.)

**FETAL NUMBER**

The diagnosis of a multiple pregnancy requires the visualisation of multiple sacs prior to 6 weeks and subsequently visualisation of multiple embryos.

The first trimester is the optimum time to determine chorionicity of the fetuses. The chorionicity of the fetuses should be stated in the report. The presence of separate sacs and the thickness of the intervening membrane and the shape of its junction with the placenta should be assessed.

Be aware that early in the first trimester an intervening amnion may not be visible in diamniotic, monochorionic twins. Later in the first trimester the number of placentas can be evaluated.

**PREGNANCY FAILURE**

An experienced operator using high quality transvaginal equipment may diagnose pregnancy failure under either or both of the following circumstances:

1. When no live fetus is visible in a gestation sac and the mean sac diameter is 2.0 cm or greater

2. When there is a visible fetus with a CRL of 6 mm or more but no fetal heart movements can be demonstrated. The area of the fetal heart should be observed for a prolonged period of at least 30 seconds to ensure that there is no cardiac activity.

In situations where pregnancy failure is suspected by an operator who either does not have extensive experience in making the diagnosis or does not have access to high quality equipment or if there is any doubt about the viability of the fetus, a second opinion or a review scan in one week should be recommended in the report (1).

**FETAL STRUCTURE**

The following list of gestational ages at which various fetal structures may be visualised is not intended to provide a complete list of what should be examined. However, using high resolution equipment (often only with a vaginal transducer) the following structures can commonly be seen:

| | |
|---|---|
| 9 weeks | Head, trunk and limbs |
| 10 weeks | Some ossification of long bones, jaw and skull |
| 11 weeks | Stomach, spine, ossified cranium, four chamber heart |
| 12 weeks | Mid gut herniation no longer present, kidneys, bladder |

**NUCHAL TRANSLUCENCY**

The nuchal translucency measurement is a test to assess the risk of chromosomal abnormality, in particular of trisomy 21. The measurement may also be abnormal in other fetal anomalies for example congenital heart disease.

This study should be performed by adequately trained staff according to strict protocol. The outcomes of the test should be audited regularly. The recommendations of the British College of Obstetrics and Gynaecology should be noted(2).

It may be performed between the gestational ages of 10 weeks and 4 days and 14 weeks (CRL 38 mm – 85 mm). A measurement greater than 2.5 - 3 mm is usually considered to be abnormal but must be correlated with gestational age. Reference values have been provided by Nicolaides (3).

The nuchal translucency measurement may be performed at the request of the referring medical practitioner. Where it is not specifically requested, it may be measured providing the patient does not specifically reject prenatal testing for potential fetal abnormality. Due consideration should be given as to how and who is going to counsel the patient prior to the performance of a nuchal translucency scan.

Each practice should develop a written protocol on the procedure to be followed when the measurement is abnormal. This protocol should include guidelines for the immediate care of the patient and how the referring doctor will be informed. Usually the referring doctor should be notified so that appropriate counselling may be given and the patient can be referred to a specialised unit where formal risk assessment and counselling process can be undertaken.

**Method of measurement**

1. The nuchal translucency should be measured on a sagittal midline scan through the fetus.
2. The fetus should be in neutral position and occupy at least 75% of the image.
3. The amnion should be seen separate to the fetal skin line.
4. Calipers should be positioned to measure the maximum diameter of the fluid at the back of the neck.

**OVARIES, UTERUS AND ADNEXA**

Each ovary should be examined. The corpus luteum can vary greatly in appearance during the first (and early second) trimester of pregnancy. Sonographic appearances include a solid, rounded target like lesion or a predominantly cystic structure. Peripheral vascularity is usually detectable. The size of a corpus luteum is also variable, commonly measuring up to 3 cm.

Larger or unusual masses should be assessed as in the non-pregnant woman.

The uterus should be examined for evidence of fibroids or uterine developmental defects. The uterine position should also be noted (anteverted, axial, retroverted).

The adnexa should be examined for coexistent ectopics and free fluid.

### References

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# ASUM guidelines for the performance of a gynaecological scan

**Revised OCTOBER 1999**

**HISTORY**

An appreciation of the clinical history can be very important in reaching a diagnosis. Necessary clinical details include the presenting symptoms, the age of the patient, her parity, menstrual history and last menstrual period (LMP), any previous gynaecological surgery, any current hormonal treatment and results of any available hormonal tests for pregnancy. Careful note should be taken of any recorded clinical findings.

**FACILITIES AND PREPARATION**

Changing facilities which ensure privacy should be available and the patient should be appropriately draped during the examination.

The procedure should be fully explained before scanning is commenced, including the possibility of a vaginal scan where applicable. Written explanation in various languages may be helpful in multicultural areas where an interpreter is not readily available. When a vaginal scan is offered the patient may choose to accept or refuse this method of scanning. Undue pressure placed on the patient is inappropriate.

ASUM Guidelines for Disinfection of Transvaginal Transducers should be followed.

Each practice needs to develop a strict protocol and code of conduct for performing gynaecological ultrasounds.

**EQUIPMENT**

High quality high frequency vaginal and abdominal transducers should be available when an examination of the female pelvis is undertaken. The availability of colour Doppler is advisable.

**SCANNING**

Transabdominal and transvaginal evaluation are complementary and both should be considered. In most situations, it is recommended that an abdominal approach is employed first but the clearest images of the pelvic organs are usually obtained using the transvaginal route. Therefore a transvaginal scan should be offered in most circumstances. In certain circumstances a transvaginal scan may not be appropriate. The reason for not performing a transvaginal scan should be stated in the report.

A transperineal or transrectal examination may be appropriate if an abdominal scan cannot provide the necessary information and a transvaginal scan is inappropriate. Transperineal and transrectal scanning requires suitable experience.

**PELVIC ORGANS**

**Uterus** - size, shape, position, mobility
- endometrium - thickness, classification
- endometrial cavity - texture, vascularity, intracavity masses and if present their mobility.
- myometrium - echotexture, masses (size, number, echotexture, vascularity, position, particularly in relation to the endometrial cavity)
- serosal surface - any masses as above

**Ovaries** - positive identification of both ovaries
- size, echotexture
- follicles, cysts, solid masses
- mobility and tenderness

**Adnexa** - masses, characteristics
- free fluid

**Kidneys** - position, exclude hydronephrosis

**EVALUATION OF MASSES**

- site of origin, relationship to uterus and ovaries
- dimensions
- borders (well defined, irregular, poorly defined, thick walled)
- cystic, solid, mixed, loculated or septated
- contents of cysts
- echogenicity and architecture of solid areas
- vascularity
- mobility

# Book review

## Textbook of Fetal Ultrasound

**Editors:** **Richard Jaffe and The-Hung Bui**
**Publisher:** **Parthenon**
**Year:** **1999**
**ISBN** **1-85070-017-6**
**Price:** **$A122.25**

This brightly coloured book of 327 pages is a concise overview of the place of fetal ultrasound, with the bonus of strong clinical comment. There are 35 contributors, predominantly from America, Israel and South Africa. In 20 chapters, there is densely packed information backed up by an extensive, current bibliography. The concise format allows for breadth of topic cover, but often precludes more detailed discussion.

With so many authors the pitch of each chapter is inevitably varied. The chapter on fetal echocardiography gives the best approach to this field that I have seen. There are ample, well structured, diagrams. There is a one page flow chart for evaluating abnormal views, which the authors recommend hang beside each machine. The chart deserves to be widely reproduced.

The chapters on growth restriction and macrosomia were excellent reviews of clinical problems. They address the obstetrician's perspective, rather than tired discussions of biometry, and give additional ultrasound measures to sort these high-risk patients. They also discuss current shortfalls.

The first chapter on physics suffers from omissions of harmonics and safety. A solid chapter on invasive procedures was clearly written prior to publication of two major studies on early amniocentesis. Rather than a rewrite of this page, a disappointing shortcut of a closing ten line 'update' paragraph was taken. I found the five pages devoted to CTG and contraction stress testing to be an extravagance in a chapter on ultrasound fetal assessment that did not discuss middle cerebral or uterine artery Doppler.

Aside from the four pages of colour images, the quality of ultrasound images was surprisingly poor, giving a photocopier-like result. This is not, however, the focus of this book. Overall it provides a very good readable, current review at modest price. It is not a first text, but one to extend a departmental or personal library. The clinical pitch is relevant to radiologist and obstetrician alike.

**Jacqueline Oldham MBBS FRACOG DDU**

Toshiba (Guilia Franco) Poster (Clinical or Technical Research) Second Prize ASUM '99

# The cervix in pregnancy

**Dr Meegan Gun MBBS, FRANZCR, Department of Radiology, North Western Adelaide Health Service, The Queen Elizabeth Hospital Campus, Woodville South, SA**

## INTRODUCTION

Sonographic evaluation of the cervix has been performed for almost two decades (1). It may be performed transabdominally (TA), transvaginally (TV) or transperineal (TP). Each has its advantages and disadvantages.

## TRANSABDOMINAL

**Advantages**
Easy to Perform

**Disadvantages**
Bladder distension required
- patient discomfort
- ↑ cervical length
- obscure dilatation

Presenting part obscure cervix
Maternal habitus may limit visualisation
Lowest resolution

## TRANSVAGINAL

- TV Probe
- 8-4 MHz
- Covered

**Advantages**
Patient comfort
Maternal habitus irrelevant
More accurate and reproducible than TA

**Disadvantages**
Limited Field of View (FOV)
Operator dependent
Can exert pressure on cervix
- ↑ length
- ↓ funnelling

Potential damage to membranes including risk of infections (contraindicated in PROM)

## TRANSPERINEAL

- Curved 5-2 MHz
- Covered

**Advantages**
Comfortable, empty bladder
Easy to perform erect
No pressure on cervix
Effective 3rd trimester
Valuable in PROM

**Disadvantages**
Shadowing from bowel gas/bones
Limited FOV

The traditional belief that the cervix is a dichotomous organ, *ie* competent or incompetent, has recently been challenged and it has been suggested that development of cervical incompetence is a dynamic process (2). The length of the cervix should be thought of as a continuum and that various degrees of incompetence exist which when provoked may lead to increased risk of preterm labour.

It would also seem that there is a continuum between incompetence and preterm labour. Preterm labour may be preceded by shortening and funnelling of the cervix and incompetence may not be clinically silent. Easy and accurate examination of the cervix of normal patients and those at risk should help identify patients requiring intervention and lead to a decline in perinatal morbidity and mortality.

## EXAMINATION

### The Normal Patient

Up to one-third of patients with cervical incompetence are nulliparous and thus have no risk factors. These patients will be generally examined at 18 weeks. As these will be TA, the patients should be examined as soon as the patient lies on the table to maximise the potential for detecting any abnormalities. If suspicious a TP scan with empty bladder should be performed.

### The "At Risk" Patient

**Initial Examination**
Transperineal/Transvaginal

- Image at or/before gestational age of previous loss
- Image cervix more than once
- Observe continuously over few minutes

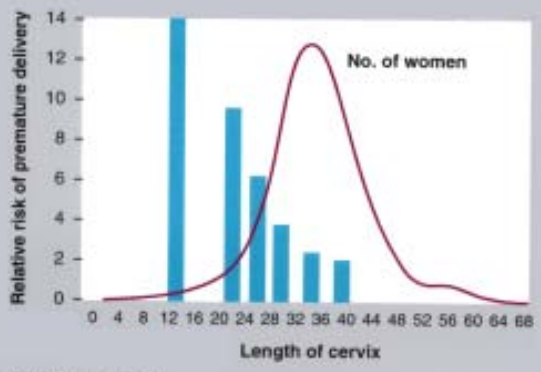
**Functional examination (at initial scan and subsequent scans)**
Transperineal

- Erect position – standing is thought not to alter a normal cervix but in patients with 33% or more shortening to be correlated with preterm delivery. (8)
- Transfundal pressure – moderate to firm pressure to the fundus toward the pelvis. A positive response being appearance of funnelling, ↑ funnel size or cervical shortening. (9)

**Follow-up examination**
2 weekly unless symptoms or appearance change

## CERVICAL LENGTH

- Gaussian distribution with mean length > 30mm in normal population. [1]
- Same multiparous as nulliparous.
- Multiple pregnancy generally shorter than singleton. [4]
- 0.25mm corresponds to 10 percentile and is probably the cut off for normal for TV scan.
- High risk patient significantly shorter than controls at same gestational age. [5]
- Inverse relationship between length and risk of preterm labour.
- Longer TV compared with TP imaging. [6]




*From Iams, et al.*

## TRANSPERINEAL

Cervical length supine

Cervical length erect

Supine with bulging membranes

Erect with bulging membranes

Allows visualisation of internal and external os [1].

Scanning in both the supine and erect position is comfortable for the patient and easy to perform.

## DILATATION

Dilatation of the cervical canal begins at internal os and extends towards the external os. This can range from minimal dilatation – 'funnelling' to opening of the full length with bulging of membranes through the external os. There are no standards on measurements but the presence of funnelling has been noted to have a correlation with increased risk of premature delivery [1].

It is often very difficult to determine the exact site of the internal os. Presence or absence of funnelling should be noted.

Early funnelling (TA)

Early funnelling (TV)

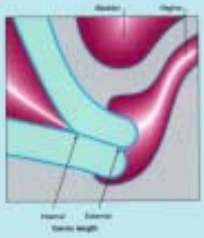
Hourglass membranes (TA)

Open cervix (TP)

## TRANSABDOMINAL

Full bladder

Post micturition

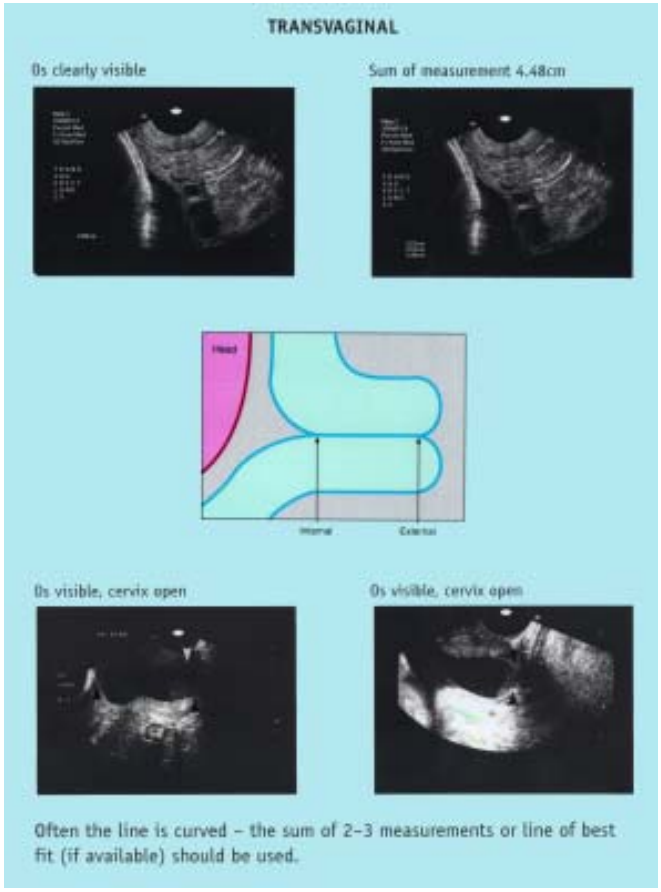


Full bladder

Post micturition

The internal and external os are well visualised. Cervical length defined as distance between internal and external os.

Bladder distension can dramatically alter the length.




## CONCLUSIONS AND RECOMMENDATIONS

Ultrasound examination of the cervix can identify patients at risk for preterm delivery by recognition of cervical abnormalities. The best method and examination protocol, however, still is undecided. Clearly, transabdominal scanning is not accurate. From our experience, transperineal scanning may be accurate, more efficient and comfortable for the patient. Accurate values for TP scanning have not been developed and this is perhaps the next step in the evolution of cervical scanning. This must include normal cervical length, both supine and erect, and functional examination of those patients at risk.

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Assessment of medial calf (continued from page 23)

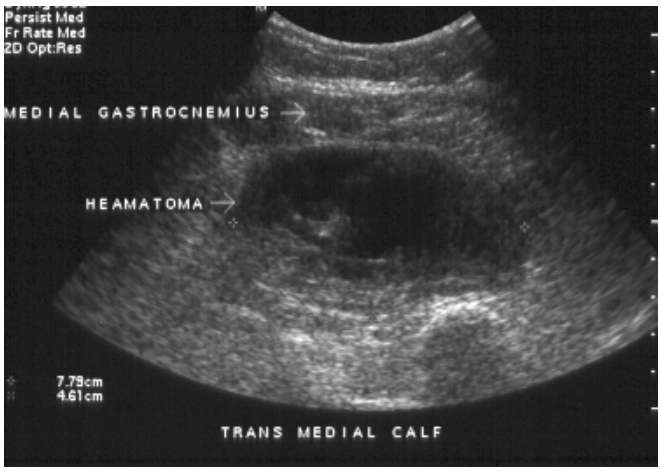


**Figure 5 Transverse large medial calf haematoma from plantaris rupture.**

With all plantaris pathology the clinical presentation and point tenderness will lead to the site of the sonographically demonstrable abnormality, and the duration of symptoms will in part answer any doubt as to the acute or chronic nature of the abnormality.

The clinical importance of this brief extension to the standard DVT examination is best demonstrated by cases of patients in anticoagulated states who have received a medial calf injury resulting in very large and debilitating haematomas (figure 5). Clearly if the cause of medial calf pain is musculoskeletal in nature, and DVT can be excluded with certainty, then the clinical management may be able to avoid anticoagulation.

Even if the diagnosis of an alternative cause of calf pain does not alter management, the referring clinician will be more satisfied with a report outlining the cause of the symptoms, rather than simply stating that no DVT was identified.

# ASUM 2000
# ANNUAL SCIENTIFIC MEETING PRIZES

ASUM Corporate Members again generously support the Annual Scientific Meeting prizes to be awarded at the conference dinner during ASUM 2000 in Auckland (24 - 27 August)

## POSTERS

### The Giulia Franco Poster Award
### (Clinical Research or Technical Research)

sponsored by Toshiba (Australia) Pty Ltd Medical Division
1st prize value $3000
2nd prize value $500
To be awarded for the best two *Clinical or Technical Research poster presentation*s

## POSTER OR PAPER

### Meditron Young Investigator Award
### (Clinical Sonography)

Value $500 to the individual plus $500 to the department where the work was performed
To be awarded for *First Clinical Sonography poster or paper presentation at an ASUM Annual Scientific Meeting*

## PAPERS

### Acuson Best Research Presentation Award

Value $1500
To be awarded for the best *proffered research paper*

### ATL Ultrasound
### Best Sonographers Research Presentation Award

Value $1250
To be awarded for the best *proffered research paper by a sonographer*

### Medical Applications
### Best Clinical Presentation Award

Value $1000 plus a shield
To be awarded for the *best proffered clinical presentation.*

# Adjudication of prizes and awards at the ASUM Annual Scientific Meeting

## Information for presenters and contributors to the scientific program

Due to the generosity of ASUM Corporate Members a range of prizes and awards are offered for proffered presentations at the 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. The Adjudication Panel is normally chaired by the Chairman of the Education Committee and has, as its members, persons selected by the Chairman, in consultation with others as required. Selection of panel members is based on considerations including professional expertise, geographical location to ensure a balance of representation, a balance of sonologist, sonographer and scientist members, and willingness to participate.

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, usually as agreed to in consultation with the sponsoring Corporate Member, is a major factor in determining the eligibilty of contributions for a particular prize or award.

For the purpose of prizes and awards, contributions to the scientific program are broadly categorised into 4 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 the list of prizes and awards, and their descriptors, carefully.

## Adjudication Guidelines

The following lists the components of a presentation that are considered by the adjudicators during assessment. The categories and suggested weighting of each component are guides only and may be modified as appropriate by the adjudicators.

**1) Oral presentation of a descriptive clinical or literature review type**

Suggested weighting

**Introduction** **5%**
Acknowledges Chair and audience
Sets the scene, why topic was chosen
Aims/ hypothesis/purpose clearly stated

**Content** **50%**
Describes the problem/issue/technique in detail
Discussion relates to, and is supported by relevant literature
Literature is appropriate and current
Comprehensive coverage
Relates topic/ issues to local context/ conditions

**Conclusion** **5%**
Summary of discussion/major points
Outlines recommendations for future work

**Presentation** **10%**
Clear and audible
Systematic structure, references cited appropriately
Slides well sequenced, relate to verbal text and easily viewed
Well timed

**Originality/ Value of topic** **30%**
The topic shows an originality of approach
The topic is relevant and beneficial to the profession

**2) Oral presentation of original research**

Suggested Weighting

**Introduction** **5%**
Acknowledges Chair and audience
Sets scene - refers to literature and work already done in the field
States aims/hypothesis clearly

**Methodology** **10%**
Describes the materials and methods used
Describes study design

Describes sampling methods
States any variables

**Results** **20%**
Presented clearly and concisely
Appropriate use of statistics
Results are valid

**Discussion** **20%**
Outlines limitations of study
Original thought/analysis of results is evident
Relates to, and is supported, by relevant literature

**Conclusion** **5%**
Summary of findings
Outlines any recommendations for future work/ action

**Originality/ Value of research** **30%**
The topic displays an originality of topic/ approach
The research is relevant and beneficial to the profession

**Presentation** **10%**
Clear and audible
Systematic structure, references cited appropriately
Slides well sequenced, relate to verbal text and easily viewed
Well timed

**3) Poster presentation of a descriptive clinical or literature review type**

Suggested Weighting

**Introduction** **5%**
Sets scene - refers to literature and work already done in the field
Indicates why topic was chosen
States aim clearly

**Content** **50%**
Describes the problem/issue/case in detail
Approach to problem/ issue/ technique is valid
Discussion relates to, and is supported by, current literature
Original thoughts on topic are evident

**Conclusion** **5%**
Presents summary of findings
Outlines any recommendations for future research/ action

**Design** **10%**
Logical, easy to follow
Information presented concisely, references cited appropriately
Text eye catching and easily viewed
Important points well illustrated

**Originality/ Value of topic** **30%**
The topic displays originality of topic/ approach
The research is relevant and beneficial to the profession

**4) Poster presentation of original research**

Suggested Weighting

**Introduction** **5%**
Sets scene - refers to literature and work already done in the field
Indicates why topic was chosen
States aim/ hypothesis clearly

**Content** **50%**
Methods clearly outlined
Results clearly presented with appropriate and valid use of statistics
Outlines limitations of study method
Original thought/ analysis of results is evident
Discussion relates to, and is supported by, relevant literature

**Conclusion** **5%**
Presents summary of findings
Outlines any recommendations for future research/ action

**Design** **10%**
Logical, easy to follow
Information presented concisely, references cited appropriately
Text eye catching and easily viewed
Important points well illustrated

**Originality/ Value of topic** **30%**
The topic displays originality of topic/ approach
The research is relevant and beneficial to the profession

# Marsha M Neumyer BS RVT

Marsha M Neumyer BS RVT, is an assistant professor of surgery at Penn State's College of Medicine and Technical Director of the vascular studies section of the Department of Surgery at University Hospital, The Milton S Hershey Medical Center in Hershey, Pennsylvania. She is recognised internationally as an educator and for her contributions to the field of noninvasive vascular technology.

Ms Neumyer is a past president of the Society of Vascular Technology and serves as a founding member of the Intersocietal Commission for Accreditation of Vascular Laboratories (ICAVL). She is a Fellow of the American Institute of Ultrasound in Medicine and serves as a representative of the Society of Diagnostic Medical Sonographers to the ICAVL board of directors.

She has published over 50 juried manuscripts, 17 book chapters, and 12 educational videotapes on vascular diagnostic techniques. She is the coeditor of the textbook, *The Vascular Laboratory: Current Issues and Clinical Developments*, and co-author of the texts, *Techniques of Abdominal Vascular Imaging* and *The Physician's Interactive Vascular Interpretation Tutorial* to be published by Davies Publications in 2000. Her editorial responsibilities include the *Video Journal of Color Flow Imaging*, *The Journal of Vascular Technology*, and *Vascular Ultrasound Today*.

# Professor David O Cosgrove

David O Cosgrove is Professor of Clinical Ultrasound at Hammersmith Hospital in London

His work includes advancing the clinical role of "radiological" (*ie* non-obstetric) ultrasound; furthering understanding of the basic mechanisms of the ultrasound image-forming process and of Doppler; and applications of microbubble echo-enhancing ("contrast") agents for ultrasound.

The first is exemplified by several first reports of clinically significant ultrasound findings, e.g. the features of biliary tree dilatation, pneumobilia, h=E6mangiomas, abdominal tumours of various types, thyroid diseases, fatty changes in the liver, the use of Doppler in breast diagnosis and transit time analysis of microbubbles in tumours.

The second has resulted in a series of reports on the mechanisms of ultrasound appearances (e.g. artefacts, such as transdiaphragmatic echoes) and on exploring novel means to extract hitherto unavailable information from the ultrasound signals. Generally known as "tissue characterisation", this work has been carried out in close collaboration with the Department of Physics at the Institute of Cancer Research, particularly with Dr Jeff Bamber and his colleagues. Though often ultimately disappointing from a clinical viewpoint, these studies have provided insight into the extreme complexity of the interactions between ultrasound and tissue and may yet yield practical applications (*eg* speckle reduction, induced motion analysis or elastography). Doppler studies have focused on the clinical evaluation and introduction of new techniques such as colour and power Doppler.

The recently introduced echo enhancing ("contrast") agents have become the major focus of study with the establishment of a research team to investigate this unique opportunity both from fundamental and clinical points of view. Fundamental studies include non-linear imaging and quantification of the change in echogenicity with microbubble concentration leading to functional indices and imaging. Clinical studies include phase III trials with a range of microbubble agents (especially in the liver and in tumours) and functional studies (especially in diffuse and focal liver diseases and in tumours).

# Nicholas M Fisk PhD FRCOG FRANZCOG CMFM DDU

Nicholas Fisk is Professor of Obstetrics and Gynaecology at Queen Charlotte's Hospital in London, where he heads the Centre for Fetal Care. Born and bred in Sydney, he moved to the UK in 1986 for subspecialty training in the early days of fetal medicine. After a PhD in fetal physiology, he spent a brief year back in Australia before being lured back to academic life in London. There three principle research interests evolved, the transfusional complications of monochorionic twins, fetal stem cell biology, and fetal nociception, each combining ultrasound and laboratory studies. His 250 publications cover a broad range of topics from the molecular embryology of identical twins through to universal caesarean section. The achievements of his group include the use of telemedicine for transmission of realtime ultrasound, the application of molecular tests for fetal Rh status, characterising the vascular anatomy of twin twin transfusion syndrome, and demonstrating fetal stress responses to invasive procedures. Still an ASUM member, he very much looks forward to the Auckland meeting. His lectures will cover a new Doppler test for twin twin transfusion syndrome, review novel ultrasound-guided therapies such as bipolar cord occlusion and fetal cystoscopy, and show how ultrasound can be used to study the adequacy of fetal analgesia.

# Ultrasound Update Workshop, Melbourne19-20 March

The target participants for the first "Ultrasound Update" Workshop were medical practitioners either learning ultrasound or those who wanted to improve their scanning skills. ASUM recognises that hands on scanning by sonologists can add significantly to the diagnostic capability of ultrasound and that it is increasingly difficult for sonologists to obtain this training. The intent of the workshop was to remedy this situation to some degree. Twenty-five attended the one and a half day program, with participants having radiology, obstetric and gynaecological or nuclear medicine backgrounds. There were both registrars and qualified practitioners.

The program consisted of lectures on physics and scanning techniques. Regions covered included the upper abdomen, kidneys, first and mid-trimester obstetric, carotid, venous and lower limb Doppler. These were interspersed with hands on workshop sessions where the group was split into five smaller groups. Each of these had a live scanning model and a top of the range machine supplied by various trade members with applications staff. A tutor sonographer or sonologist instructed each group. The obstetric component of the program was confined to the first day so that those interested only in obstetrics attended that day only. Their course fee was discounted.

The lectures were predominantly given by sonographers and were all of a very high standard and practically orientated. Each scanning tutorial was dedicated to the subject of the preceding lecture with all registrants having opportunity to personally scan.

The initial feedback was very positive. Some registrants suggested other areas of the body might have been included. Most felt that the program was pitched at the correct level, though at least one found it a little basic and was disappointed the level had not been made clear on the program. The balance of lectures and scanning met with approval from most registrants. A more comprehensive survey of registrants is to be made.

In view of the positive response to this workshop, ASUM plans to run it on a regular basis at varying sites. Program modification will depend on the feedback received. Workshops such as this, teaching hands-on fundamental scanning skills, are an essential component of ASUM's educational role.

On behalf of ASUM, I would like to thank all who contributed to the success of the workshop.

**Matthew Andrews**
**Convenor**

# ASUM Leaders Workshop 18-19 February

A new initiative was tested in February as a means of improving the coordination of ASUM Branches and Committees. Cries of "not another talkfest " echoed around Australia and New Zealand "haven't we had one of these before". With the strategic plan behind us, it was felt that the Society consisted of a group of committees and branches all working in isolation with little change in direction as a result of the plan. Furthermore there had not been a mechanism for sharing of ideas emanating from other groups or indeed for questioning their activities at all.

The Leaders Workshop was conceived to address this. Each of the leaders was asked to present their accomplishments for 1999 and their goals for 2000 with comment from the group welcomed. Rob Gibson chaired a session on education delivery and content while Pru Pratten and Fergus Scott chaired a discussion regarding the Society's structure and function.

A number of constructive initiatives arose from the workshop. It was felt that the scientific meetings are appreciated by the members, however, the role of the branches in education would be improved by wider use of international speakers and more regular meetings. More emphasis on rural education delivery was identified as a requirement with the internet and proliferation of sub-branches proposed as potential solutions. Probably the dominant theme in education from the meeting was mentoring. Many different approaches to the design and implementation of mentoring programs were discussed which will culminate in a preferred design after our May meeting.

Throughout the meeting there was lively discussion regarding ASUM involvement in a range of activities. Of particular interest was Stan Barnett's thorough presentation of the activities of the Safety Committee, an area in which ASUM has shown genuine leadership in Australia and New Zealand and will continue to as Stan assumes the role of President.

The most important session covered the goals for each branch and committee. In general each of the branches will be re-invigorated with activities ranging from running monthly meetings, and encouragement of sub-branches, to development of mentoring programs. Each of the committees outlined their plans for the year which, in some cases, include quite different approaches. It is hoped that each describe their plans in future editions of the *Bulletin*.

Overall, this was a constructive meeting for new initiatives and understanding how ASUM activities can be better coordinated to reduce duplication of effort. Our thanks go to those who were brave enough to participate in a new approach to getting things done. The next meeting will be held on 26 May to monitor progress.

**Luke Fay**
**Chairman, Marketing and Membership Committee**

# Australasian Sonographer Accreditation Registry

The Council of the Australasian Sonographer Accreditation Registry (ASAR) met at Sydney airport on Saturday 12 and Sunday 13 February 2000. This meeting was extended to two days due to the intensive workload involved in the process of assessment of each individual Post Graduate Diploma in Medical Ultrasound and the ASUM Diploma in Medical Ultrasound (General, Vascular, Cardiac and Obstetric)

This was a historic meeting, as for the first occasion in Australasia, each of the diagnostic medical ultrasound programs have been formally assessed and quantified by an independent body. This process will underpin the high standard of sonographer education that exists in Australasia and will in time increase the already high standard of sonography being practised.

The process of evaluation was made possible by the multidisciplinary nature of the Council of the ASAR. The academics provide valuable insight into education techniques, which lead to the desired outcomes. The professional representatives (ASUM, AIR, and ASA) emphasise the profession's concern that the clinical component of each program must be placed under close scrutiny. This unique collaboration between the profession and the education providers will lead us into the future with modern styled, well-structured sonographer education, which will maintain and elevate the standard of the next generation of Accredited Medical Sonographers.

The outcomes of the course accreditation process will be distributed via extensive correspondence in the following weeks.

The Council has also been developing the final form of our Internet home page along with substantial improvements in the mechanisms for recording Continuing Professional Development Credits.

The Council of ASAR continues to act for the interests of the Accredited Medical Sonographers of Australasia.

If you would like to join the Register and become an Accredited Medical Sonographer please contact

ASAR Secretariat, PO Box 516, Turramurra, NSW 2074, Australia.

Phone: 02 9449 1098 Fax: 02 9448 7496
Email: asar@ozemail.com.au

If you would like to discuss any aspects of the ASAR process please do not hesitate to contact the ASUM representative to ASAR Council, Stephen Bird at: Phone: 08 8297 0588
Email: sjbird@camtech.net.au

**Stephen Bird**
**ASUM Representative to ASAR**

# New Zealand branch news

Much of the focus for the New Zealand Branch this year has centred on ASUM 2000. Dr Graham Parry (Convenor) and the committee are working hard to ensure ASUM 2000 is a comprehensive, interesting and thoroughly enjoyable meeting. The invited faculty of 18 includes eminent speakers Professor Ulrich Willi (Paediatric Radiologist, Zurich, Switzerland), Professor Nick Fisk (Obstetrician and Gynaecologist, London), Professor David Cosgrove (Radiologist, London) and Marsha Neumyer (Vascular Technologist, Pennsylvania).

The New Zealand Branch is looking towards the implementation of a mentor scheme to assist New Zealand candidates studying for the DMU or DDU. Martin Necas (Hamilton) is designing a web page that can be accessed through the ASUM web site. From here mentors will be able to be emailed to assist and answer questions that are posing difficulties or need clarification. The Branch hopes to have this scheme up and running by the middle of the year.

The Branch is grateful to Schering (NZ) Ltd for undertaking the running and sponsorship of the video library for New Zealand. This is a valuable educational resource for members that is frequently utilised. To facilitate the quick turn around of videotapes it is necessary that videos be returned promptly.

I look forward to seeing many New Zealand Branch members at ASUM 2000 in August.

**Mike Heath,**
**Chairman**
**New Zealand Branch**

# Minutes of Meeting held to form the Australian Society of Ultrasound in Medicine and Biology, at Commonwealth Acoustic Laboratories, 5 Hickson Road, Miller's Point at 6.00 pm 17.3.1970

**Present:** Mr G Kossoff, Mr M Dadd, Dr H L Hughes, Mr F Blackwood, Mr P Lingard, Dr C S Sharp, Mr J Jellins, Mr D Carpenter, Dr L Rail, Mr D Robinson, Dr D Morton

Mr G Kossoff opened the meeting and expanded on the reasons for formation of a Society, as mentioned in the circular. Similar societies have been formed in other countries as follows:

American Institute of Ultrasound in Medicine - 300 members
Japan Society of Ultrasound in Medicine - 800 members
SIDUO - 300 members
Other interested people in Europe - 250

In addition, it is likely that societies will be formed in Great Britain, France, Italy, Sweden, Austria, Germany and Czechoslovakia in the near future. The inaugural meeting of the International Federation will be held in Rotterdam in 1973.

One hundred and twenty circulars advertising the present meeting were sent out and from the questionnaires in these 50 replies have been received, indicating interest in the Society, and an estimate of another 25 interested who have yet to return their questionnaire. There have been six replies in the negative.

Dr J Ryan has replied in favour of the formation of the Society and has offered the services of "Australian Radiology" for the publication of notices and papers. Mr Stanford's and Dr Dugdale's comments were also presented.

Dr Garrett reported on approaches made to him by several people while he was in Melbourne last week.

Dr Bratsbies of the Park Hospital, Melbourne, wondered whether it would be better for the Society to be part of the Society for Medical and Biological Engineering, rather than a separate organization. He cited the case of the Radiation Society, which lapsed after 10 years for lack of support. Several of those who approached Dr Garrett were disappointed not to have heard earlier about the meeting and this is a good indication that further memberships will be forthcoming.

At this stage, on a motion of Dr Hughes and Dr Sharp, Mr Kossoff was appointed Chairman of the meeting and it was agreed to follow the agenda circularised. Mr Robinson was appointed Minute Secretary.

**1. Name of Society**
After some discussion as to the merits of including the terms "Australasian" or "Australian & New Zealand" in the title of the Society, it was resolved on the motion of Dr C Sharp and Mr L Dixon that the title of the Society be "The Australian Society of Ultrasound in Medicine and Biology".

**2. Objects and Activities of the Society**
Mr Robinson suggested that a major aim be the dissemination of information. This would be done in two ways; firstly, advise of the dates and places of meetings of other societies holding talks of interest to members of our Society and also for meetings overseas; secondly, to circularise a list of reference or journal articles that would be of interest to members of the Society, from as wide a range of journals as possible. There was a general consensus that at present regular meetings not be held due to the difficulty in making time available on a regular basis. Meetings could be called as the occasion presents, such as the arrival of a visitor from interstate or overseas.

Mr Kossoff suggested that a further role should be in education in that it would appear likely that in the near future technicians would have to be trained to operate ultrasonic machines in a clinical environment and some professional guidance as to the type of training would be required. Dr Garrett suggested that another aspect would be in the organization of large meetings at an appropriate time and it was suggested that the Society should work towards holding the World Congress in 1977. It is likely that the Japanese would also like to hold the congress in this year, and therefore preparations to obtain approval would have to be made in sufficient time.

**3. Grades of Membership**
Dr Garrett suggested that the Society should match the international federation and the other affiliated bodies as closely as possible. Mr Dixon suggested that there be three grades of membership comprising professional members, technicians and commercial members. The names of these three grades to be decided after investigation by the steering committees. This resolution was carried unanimously.

**4. Steering Committee**
On the motion of Dr Hughes and Dr Sharpe, the steering committee was nominated as Mr G Kossoff, Mr D E Robinson and Dr W Garrett, with power to co-opt as required. It was resolved that minutes of the present meeting be circularised to all people who answered the questionnaire and that the first draft constitution be circularised for comment to all present at the meeting. After receipt of comments on the first draft, a second draft constitution be circularised to all interested parties and the inaugural meeting called.

**5. Fees**
After some discussion it was resolved that the fees for professional and technical members be $5 and $2 respectively and that the fees for commercial members and the question of student membership be investigated by the steering committee.

**6. Date and Place of Next Meeting**
The tentative date for the inaugural meeting of the Society is set for Monday 18th May, 1970 at 6.15 pm at the Commonwealth Acoustic Laboratories, 5 Hickson Road, Miller's Point, NSW 2000.

**D E Robinson Minute Secretary**

## Congratulations to Echocardiography Lab Prince Charles Hospital, Brisbane

On 9 February 2000, the Echocardiography Laboratory of The Prince Charles Hospital, Brisbane achieved a significant milestone when the 100,000th echocardiogram was performed. The first echocardiogram at the Prince Charles Hospital was performed on 12 September 1979. During the first year of operation 762 echocardiograms were performed.

Due to advanced technological developments in ultrasound imaging and Doppler technology, as well as the proven diagnostic value of echocardiography in the assessment of the cardiac patient, the number of echocardiograms performed at this institution has rapidly increased over the last decade. In 1999, over 9,000 echocardiograms were performed making the laboratory one of the busiest and largest in the Southern Hemisphere.

The Echocardiography Laboratory, under the direction of its Clinical Director, Associate Professor Darryl Burstow, is a world class facility and is engaged not only in the highest quality clinical work, but also extensive research and teaching.

**Margo Harkness**

## Corporate news

Toshiba Medical Systems Australia is pleased to announce two new members to the Ultrasound Business Unit. Karen Hazell has moved from Queensland to Sydney to take up a role as National Applications Specialist for Australia and New Zealand. From April Louise Archer from Perth will take on a dual role as Account Manager and Applications Specialist based in Perth. Both Karen and Louise bring many years experience as sonographers to the Toshiba Team.

Toshiba was also pleased to be a major sponsor to the ASUM/AMSIG conference and workshop held in Hobart during April. Toshiba showcased the latest additions to the PowerVision range of ultrasound systems. Included in this latest release is the Advanced MSK Package, featuring two new high frequency transducers:

7 - 15 MHz broadband, 2cm footprint transducer (TomThumb)

7 - 15 MHz broadband, 4cm footprint transducer

These transducers enhance the existing MSK package which includes the 12 - 5 MHz broadband, 6cm footprint transducer known to all as Bigfoot. All MSK transducers on Powervisions feature B/W beam steering, providing superb imaging through the adjustment of the scan angle to intersect at a plane orthogonal to tissue interfaces, thereby reducing anisotropy.

This latest Powervision release also includes features such as:

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Expanded measurements in Doppler and Obstetrics

## ASUM MAGAZINE HOLDERS

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## ASUM NSW Branch Monthly meetings 2000

Monthly meetings will be held in Sydney on 2 May, 6 June, 4 July, 2 August, 10 October and 7 November. For details see the calender listings in this *Bulletin.*

*Contact*: Jane Fonda Ph:02 9351 9185
Fax: 02 9351 9146
Email:j.fonda@cchs.usyd.edu.au

## ASUM Branch Officers

**Secretaries**

| | | |
|---|---|---|
| ACT | Ian Dalziel | fax: 02 6201 6145 |
| NSW | Jane Fonda | fax: 02 9351 9146 |
| NZ | Naomi Rasmussen | fax: 649 631 0787 |
| QLD | Roslyn Savage | fax: 07 3881 2464 |
| SA | Stephen Bird | fax: 08 8297 1802 |
| TAS | Shaun O'Regan | fax: 03 6334 3335 |
| VIC | Mark Brooks | fax: 03 9459 2817 |
| WA | Janine Horton | fax: 08 9321 2056 |

# METROPOLITAN HEALTH SERVICE BOARD

## NORTH METROPOLITAN HEALTH SERVICE

## ULTRASONOGRAPHER

Position No. OS 304

The North Metropolitan Health Service is the largest community based health service in the Perth metropolitan area providing services in the four key programme areas of Rehabilitation & Aged Care, Mental Health, Community/Public Health and Hospital Services.

QUALIFICATIONS & EXPERIENCE: Essential: Eligible for ordinary membership and accreditation by the Australian Institute of Radiography. Diploma of Medical Ultrasound (DMU) or approved equivalent. Recent experience in ultrasound procedures. Ability and willingness to participate in existing after hours emergency Radiography availability services.

DUTIES: Provides a quality organ imaging service to enable a proper diagnosis of illnesses as required by the Medical profession.

HOURS: Full-time.

SALARY: Within the range $46,890 - $53,640 pa.

LOCATION: Osborne Park Hospital, Radiology Department.

CONDITIONS OF SERVICE: In accordance with the Hospital Salaried Officers' Metropolitan Health Service Board Enterprise Agreement 1999 or the Metropolitan Health Service Board Generic Workplace Agreement (2.03).

RELOCATION EXPENSES: Subject to negotiation with successful applicant.

WRITTEN APPLICATIONS: Must be submitted using the information contained in the application kit, which may be obtained by phoning the answering service on (08) 9346 8286. For information please contact Ian Calverley, Chief Medical Imaging Technologist on (08) 9346 8151.

CLOSING DATE: 4.00pm Friday, 30 June 2000.

# Townsville General Hospital

## Imaging Units

**Townsville General Hospital** is the region's tertiary referral centre for all areas of health management. The hospital is the trauma referral centre for North Queensland and is fully supported by tertiary intensive, coronary, cardiac surgery, oncology, hyperbaric units and obstetrics and gynaecology and neonates. Most 'core' medical services are provided. A full range of clinical support facilities is available as are fully functional general and specialists outpatient facilities. Under-graduate and post-graduate education is supported. The Imaging Department is well equipped and will move to a totally new hospital in 2001.

**RADIOGRAPHER/SONOGRAPHER: Medical Imaging Unit, Townsville General Hospital, Townsville Health Service District.** (Temporary full-time 6 May, 2000 to 13 January, 2001) Salary rate: $1762.60 to $1928.10 p.f. (PO3) **VRN:** 00/04/12. **Duties/Abilities**: Provide professional, timely and relevant ultrasound images with due significance to the patients clinical condition and management. Demonstrated knowledge, proficiency and experience in a broad range of specialised ultrasound examinations. Possess communication skills and ability to liaise with radiological and medical staff, chief radiographer and radiography staff. Assist in the development of appropriate clinical protocols for the ultrasound service and ensure trainee staff comply with such departmental protocols, professional code of conduct and sector policy direction.

**SECTION SENIOR RADIOGRAPHER: Ultrasound, Medical Imaging Unit, Townsville Health Service District.** Remuneration value up to $67,089 p.a. (PO4) **VRN:** 00/04/13. **Duties/Abilities:** Organise and co-ordinate the provision of specialist ultrasound services within the Medical Imaging Departments of Townsville General Hospital and Kirwan Women's Hospital. Overview of Radiography Services at Kirwan Women's Hospital. Provide ongoing review of clinical protocols, quality assurance and utilisation of resources to optimise ultrasound service delivery and patient management. Supervise and monitor performance of staff and provide an organised training system for trainee ultrasound staff and students. Demonstrate knowledge, proficiency and experience in a broad range of ultrasound examinations.

**Enquiries: Gary Kershaw (07) 4781 9243** **Application Kit: (07) 4781 9459**

AUCKLAND RADIOLOGY GROUP

## ULTRASONOGRAPHERS

Auckland Radiology Group is currently seeking qualified sonographers to join the practice.

Auckland Radiology Group is New Zealand's largest private practice providing an extensive range of ultrasound procedures. Full time or part time work is available on a rotating roster to various rooms in the Auckland area.

Ongoing professional development is provided with competitive remuneration offered.

Apply to: Operations Manager
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Newmarket Auckland
New Zealand
Ph 09 529-4863 Fax 09-522-0083
Email samantha@akradiology.co.nz

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## ECHOCARDIOGRAPHY TECHNICIAN

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Do you want to work among a friendly team in a rapidly expanding, recently refurbished medical department, with state of the art equipment?

A new full time position is available at Whangarei Hospital as an Echocardiography Technician, Experience in cardiovascular ultrasound procedures is desirable but a technician with a cardiology, physiology or sonography background would be considered. Further training could be provided.

For further information, please contact Alan Davis, Clinical Director, Department of Medicine, telephone +64 9 430 4101, extension 7723, email: alan@nhl.co.nz

Applications close 28 May 2000.

**Official application form, job description and person specification is available from Tania Vaile, telephone +64 9 430 4101 extension 3196, email: taniav@nhl.co.nz**

**Applications should be addressed to Pauline Pausina, Secretary, Human Resources, Northland Health PO Box 742, Whangarei, New Zealand.**

**ALL APPLICATIONS MUST CLEARLY STATE THE VACANCY NUMBER.**

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95 Kareena Road
Miranda NSW 2228
Australia

# FIRST TRIMESTER SCREENING COURSES

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### Fetal Medicine Foundation, London

ASUM is holding Nuchal Translucency courses under the auspices of the Fetal Medicine Foundation in the following centres:

**Sat/Sun 3-4 June 2000 – Perth, WA**
Venue: Subiaco Clinic Conference Centre
Contact: ASUM WA Branch, PO Box 222, Joondalup 6919

**Sat 17 June 2000 – Sydney, NSW**
Venue: Novotel Brighton Beach
Contact: ASUM ph: 02 9958 7655
email: asum@asum.com.au

**Sun 18 June 2000 – Adelaide, SA**
Venue: SA Postgrad Med Educ Bldg
Laffer Rm, 68 Greenhill Rd
Wayville SA 5034
Contact: sjbird@camtech.net.au

# DMU

DMU Parts I and II Written exam - *2 September 2000*

Closing date for exemptions - *2 April 2000*

Closing date for applications - *2 June 2000*

The 2000 Handbook is now available from the DMU Coordinator : email dmu@asum.com.au, phone 02 9958 0317, fax 02 9958 8002 or by mail 2/181 High St, Willoughby NSW 2068 Australia.

The DMU information on the ASUM website is currently being updated and includes information on: the examinations Parts I and II, sample questions, case studies and examiners report.

# DDU

DDU Parts I and II written exam - *22 May 2000*

Part II oral exams Sydney - *17 June 2000*
(Cardiac exams in Melbourne on date to be advised)

DDU Closing date Part I applications - *9 Oct 2000*

DDU Part I exam - *20 Nov 2000*

For further information contact 02 9958 7655

# Videotape Lending Scheme

### Final release from ASUM 1999

*(i) The uses of ultrasound in the upper limb - the orthopaedic surgeon's point of view* (Michael Hayes) *and Interventional shoulder ultrasound* (Neil Simmons), (ii) *Imaging the child with urinary tract infection and Ultrasound of the acute abdomen in the pediatric patient* (Diane Babcock), (iii) *Fetal abdominal masses* (Tina Hayward) *and Common paediatric malignancies* (Ethna Phelan).

### 11 New Paediatric Titles

Eleven titles from two Paediatric meetings have been released. These include titles from the ASUM Paediatric Ultrasound Workshop, New Children's Hospital, Westmead, October 1999; and titles from the Fetal and Paediatric Ultrasound Seminar held in Perth in October 1999. Further titles will be released when copyright and technical issues have been resolved.

*The acute abdomen in the paediatric patient* (Lyndal Cohen), *The child with a limp* (Roger Gent), *Interventional sonography in children* (John Pereira), *Fetal Neurosonography* (Michelle Melany), *Ultrasound Assessment of the Fetal GI Tract* (Michelle Melany), *Fetal GU Tract AIUM and ACR Guidelines* (Michelle Melany), *Fetal Growth Abnormalities* (Michelle Melany), *Paediatric Cranial Ultrasound* (Ethna Phelan), *Neonatal Spine* (Ethna Phelan), *Normal Female Pelvis* (Ethna Phelan), Hip Ultrasound and Live Scanning (Ethna Phelan).

The Catalogue with an order form is inserted in this issue of the *Bulletin.*

# ASUM Obstetric Ultrasound Workshop 2000

**14 – 15 July 2000**
**The Royal Women's Hospital, Melbourne**
**Convenor: Victor Hurley**

How will ultrasound be delivered to pregnant women in the new millennium?

This workshop, featuring Dr Gregory De Vore from Salt Lake City, USA and a panel of local experts, will explore this question in the context of didactic presentations, panel discussions and live scanning sessions.

Further information and a registration brochure is included on ASUM's website at http://www.asum.com.au

Diasonics Ultra Sound Service Business

# Beresford Buttery Overseas Traineeship

Since its foundation more than a century ago, Diasonics GE has constantly been at the forefront of research and technical innovation, with Diasonics GE Medical Systems today being recognised as a world leader in the supply of diagnostic imaging systems.

It is with great pride that Diasonics GE has the opportunity to offer an annual traineeship in the field of obstetric and gynaecological ultrasound, in memory of Beresford Buttery FRACOG, DDU, COGUS who made an inestimable contribution to his profession.

The award will cover attendance at an appropriate educational program at the Thomas Jefferson Research and Education Institute in Philadelphia and will include tuition fees, economy airfare and accommodation for the duration of the course (usually 4 days).

The award will be made to applicants:

1. who seek to further develop their skills and experience in obstetric and gynaecological ultrasound
2. have as a minimum qualification Part 1 of the DDU or DMU (or equivalent) or have been awarded the DDU or DMU (or equivalent) within the last 5 years (since 31 December 1995)
3. have been a financial member of ASUM for a minimum of 12 months prior to the closing date

Applications should include:

- a *curriculum vitae*
- details of current employment
- testimonials from two referees in support of the application including contact address and telephone number
- an outline of professional goals and objectives
- an indication of benefit from award of the Traineeship

The successful applicant is asked to provide a written report on return from the course at Thomas Jefferson Research and Education Institute.

Applications addressing the criteria should be forwarded by **Friday 2 June 2000** to:

Diasonics GE Beresford Buttery Overseas Traineeship
c/- ASUM
2/181 High Street
Willoughby NSW 2068 Australia

# CHRIS KOHLENBERG TEACHING FELLOWSHIP
## Sponsored by Diasonics GE

The 2000 CHRIS KOHLENBERG Teaching Fellowship, has this year been organised for Darwin, Perth, Bunbury and additional sites in rural WA.

The Fellow for the meetings and workshops is MARK BRYANT, an experienced sonographer with North Coast Radiology who has generously granted Mark the necessary leave for this purpose.

Mark is a DMU sonographer with extensive experience in all aspects of ultrasound and a keen interest in sonographer education; he is also a practical examiner for the DMU Board of Examiners and has presented at numerous conferences, seminars and workshops. As well, he has published in the developing area of musculoskeletal ultrasound.

The planned activities will include formal presentations on *Obstetrics, Colour Doppler Physics, U/S in Emergency Situations* and/or *Musculoskeletal topics* as well as on-site workshops.

The opportunity to appreciate expertise is always welcomed, particularly by those in remote areas where such opportunities are limited.

The program will take place from 18-25 June. Details of these meetings will be available on the ASUM website http://www.asum.com.au and from Wendy Calvert Ph 02 9958 6200 education@asum.com.au

## Echocardiography Education Evenings

**GE Vingmed**
**and**
**ASUM Cardiac Education and Standards Subcommittee**
**invite you to clinical education evenings in the area of echocardiography**

Upcoming events:

July (1st week) - topic to be announced
Sydney

November (1st week) - topic to be announced
Sydney

Look for information regarding these events in your mail.

For any further information please contact:
Danika Southwell

Phone: 0410 575 031 Fax: 02 9428 2288

## Annual Scientific Meeting
## ASUM 2000 Auckland

The organising committee of ASUM 2000 invites you to attend ASUM's 30th Annual Scientific Meeting in Auckland. The exciting international faculty includes:

**Professor Ulrich Willi** (Zurich)
**Professor Nicholas Fisk** (London)
**Professor David Cosgrove** (London)
**Marsha Neumyer** (Pennsylvania)

A large Australasian faculty will also be speaking and conducting workshops.

New Zealand offers excellent conference facilities within easy reach of internationally acclaimed tourist and sporting facilities. Assistance with pre and post conference skiing and sightseeing tours is available on request.

Additional information is included on ASUM's internet site. The registration brochure is enclosed in this issue of the Bulletin and on ASUM's internet site at http://www.asum.com.au

# Ultrasound Events

**Wed 17 May 2000** ASUM Victorian Branch Ultrasound Lecture Series. Paediatric Cranial, Musculoskeletal - RCH Radiologist.*Venue:* Radiology Lecture Theatre, 2nd Floor, Royal Melbourne Hospital. *Contact*: Dr Patsy Robertson, Fax: 03 9342 8369

**Fri 19 May 2000** - 3 days ASA National Conference.*Venue:* Brisbane Convention Centre *Contact:* Conference Secretariat, PO Box 746, Turramurra, NSW 2074. Ph: 02 9449 1525; Fax: 02 9488 7496; Email: bradfld@ozemail.com.au

**Mon 22 May 2000** DDU Examinations. Part I and Part II Written Examinations.*Venue*: Various *Contact*: DDU Co-ordinator, ASUM, 2/181 High Street, Willoughby, NSW 2068. Ph:02 9958 7655; Fax: 02 9958 8002; Email: asum@asum.com.au

**Mon 22 May 2000** - 3 days. Courses and Symposia. Advanced course in fetal medicine. *Contact*: Symposium Office, Imperial College School of Medicine, Queen Charlotte's & Chelsea Hospital, Goldhawk Road, London W6 0XG UK. Ph: (0) 20 8383 3904; Fx: (0) 20 8383 8555; Email: sympreg@ic.ac.uk Website: http://www.med.ic.ac.uk/dp/dpsh

**Wed 24 May 2000** ASUM Victorian Branch Ultrasound Lecture Series. Abdominal Doppler, Intervention - Rob Gibson, *Venue:* Radiology Lecture Theatre, 2nd Floor, Royal Melbourne Hospital. *Contact*: Dr Patsy Robertson, Fax: 03 9342 8369

**Wed 31 May 2000** ASUM Victorian Branch Ultrasound Lecture Series. Workshop 2 Abdomen/Paediatrics *Venue:* Radiology Lecture Theatre, 2nd Floor, Royal Melbourne Hospital. *Contact*: Dr Patsy Robertson, Fax: 03 9342 8369

**Fri 2 Jun 2000** DMU Examinations. Closing date for Part I and Part II Applications. *Contact*: DMU Co-ordinator, ASUM, 2/181 High Street, Willoughby, NSW, 2068. Ph: 02 9958 7655; Fax: 02 9958 8002; Email: dmu@asum.com.au

**Sat/Sun 3 & 4 Jun 2000** ASUM/Fetal Medicine Foundation, London. First Trimester Screening Courses with Dr Jonathan Hyett. *Venue:* Subiaco Clinic Conference Centre. *Contact:* ASUM WA Branch, PO Box 222, Joondalup, WA, 6919

Sun 4 Jun 2000 ASUM/Fetal Medicine Foundation

**Mon 5 Jun 2000** BMUS Study Days and Workshops 2000. Transvaginal Ultrasound Study Day.*Venue*: Manchester. *Contact*: BMUS, 36 Portland Place, London WIN 3DG, UK. Ph: 020 7636 3714; Fax: 020 7323 2175; Email: secretariat@bmus.org

**Tue 6 June 2000** ASUM NSW Branch meeting. A bluecollar approach to renal artery stenosis and correlation with renal pathophysiology - Dr George Szwarc *Venue:* Conference Room 4th Floor, Bankstown Hospital, Eldridge Road, Bankstown. *Contact*: Jane Fonda, Ph: 02 9351 9185; Fax: 02 9351 9146; Email: j.fonda@cchs.usyd.edu.au

**Wed 7 Jun 2000** ASUM Victorian Branch Ultrasound Lecture Series. Thyroid and Testis - Colin Styles *Venue:* Radiology Lecture Theatre, 2nd Floor, Royal Melbourne Hospital. *Contact*: Dr Patsy Robertson, Fax: 03 9342 8369

**Thu 8 Jun 2000** ASUM ACT Branch Education Program. *Contact:* Pam Cooke, Ph: 02 6282 2888; Fax: 02 6293 1212; Email:cookefm@dynamite.com.au

**Sat 10 Jun 2000** ASUM Queensland Branch Meeting. Hamilton Island Conference. *Venue*: Hamilton Island. *Contact*: Roslyn Savage; Ph: 0417 720 875; Fax: 07 3881 2464; Email: markros@powerup.com.au

**Wed 14 Jun 2000** ASUM Victorian Branch Ultrasound Lecture Series. Prostate - Alain Lavoipierre, Eye - Opthalmology Registrar*Venue:* Radiology Lecture Theatre, 2nd Floor, Royal Melbourne Hospital. *Contact*: Dr Patsy Robertson, Fax: 03 9342 8369

**Thu 15 Jun 2000** - 3 days. 13 Congresso Nazionale Della Societa Italiana Di Ecografia Andrologica Nefrologica. *Venue:* Statione Maritima, Trieste, Italy *Contact:* The Office, Via S. Nicolo, 14, I-34121 Trieste, Italy. Ph: 39-040-368343; Fax: 39 040 368808; Email:sieun@theoffice.it

**Sat 17 June 2000** ASUM/Fetal Medicine Foundation, London. First Trimester Screening Course with Dr Jonathan Hyett. *Venue:* Novotel Brighton Beach. **Contact:** ASUM, Ph: 02 9958 7655; email: asum@asum.com.au

**Sat 17 Jun 2000** DDU Examinations. Part II Oral Examinations (except Cardiac candidates.) *Venue*: Sydney (Cardiac - Melbourne on a date to be determined). *Contact*: DDU Co-ordinator, ASUM, 2/181 High Street, Willoughby, NSW, 2068. Ph: 02 9958 7655; Fax: 02 9958 8002; Email:asum@asum.com.au

**Sun 18 Jun 2000** ASUM/Fetal Medicine Foundation, London. First Trimester Screening Course with Dr Jonathan Hyett. *Venue:* SA Postgraduate Med Educ Building, Laffer Rm, 68 Greenhill Rd, Wayville SA 5034. *Contact:* ASUM SA Branch, email: sjbird@camtech.net.au

**Sun 18 June 2000 - 8 days** Chris Kohlenberg Teaching Fellowship, Fellow: Mark Bryant. *Venue:* Darwin, Port Headland, Perth and Bunbury. *Contact:* Elvie Haluszkiewicz, Fax:0892242125;email: elvie.haluszkiewicz @rph.health. wa. gov.au

**Mon 19 Jun 2000** 5 days. Courses and Symposia. Advanced course for obstetricians and gynaecologists. *Contact*: Symposium Office, Imperial College School of Medicine, Queen Charlotte's & Chelsea Hospital, Goldhawk Road, London W6 0XG UK. Ph: (0) 20 8383 3904; Fax: (0) 20 8383 8555; Email:sympreg@ic.ac.uk Website: http://www.med.ic.ac.uk/dp/dpsh

**Wed 21 Jun 2000** ASUM Victorian Branch Ultrasound Lecture Series. Breast - Allison Rose, Examination Techniques - Janet Radford *Venue:* Radiology Lecture Theatre, 2nd Floor, Royal Melbourne Hospital. *Contact*: Dr Patsy Robertson, Fax: 03 9342 8369

**Mon 26 Jun 2000** - 3 days RANZCOG Provincial ASM *Venue*: Cairns *Contact*: RANZCOG. Ph: 03 9417 1600

**Tue 27 Jun 2000** Courses and Symposia. Caring for sexuality in health and illness (for healthcare professionals and nurses). Jointly with Association of Psychosexual Nursing. *Contact*: Symposium Office, Imperial College School of Medicine, Queen Charlotte's & Chelsea Hospital, Goldhawk Road, London W6 0XG UK. Ph: (0) 20 8383 3904; Fax: (0) 20 8383 8555; Email: sympreg@ic.ac.uk, Website: http://www.med.ic.ac.uk/dp/dpsh

**Tue 27 Jun 2000** BMUS Study Days and Workshops 2000. Study Day Ultrasound Contrast Agents.*Venue*: London. *Contact*: BMUS, 36 Portland Place, London WIN 3DG, UK. Ph: 020 7636 3714; Fax: 020 7323 2175; Email: secretariat@bmus.org

**Wed 28 Jun 2000** ASUM Victorian Branch Ultrasound Lecture Series. Musculoskeletal ultrasound - Ron Ptasnic *Venue:* Radiology Lecture Theatre, 2nd Floor, Royal Melbourne Hospital. *Contact*: Dr Patsy Robertson, Fax: 03 9342 8369

**Thu 29 Jun 2000** - 5 days IPDS 2000 - Life in the Amniotic Ocean.*Venue*: Taipei International Convention Center, Taiwan*Contact*: Secretariat: c/o K & A International Co., Ltd., PO Box 55-1143, Taipei, Taiwan. Ph: 886 2 2592 3918; Fax: 886 2 2591 9345

**Thu 29 Jun 2000** - 4 days. IV World Congress of Echocardiography and Vascular Ultrasound. *Venue*: Berlin, Germany. *Contact*: Martha Mann, Univ. of Alabama at Birmingham, Heart Station/Echo Lab SW/S102, Birmingham, AL 35233, USA. Fax: 1 205 9346747.

**Thu 29 Jun 2000** 3 days. Courses and Symposia. New horizons

in recurrent pregnancy loss. *Contact*: Symposium Office, Imperial College School of Medicine, Queen Charlotte's & Chelsea Hospital, Goldhawk Road, London W6 0XG UK. Ph: (0) 20 8383 3904; Fax: (0) 20 8383 8555; Email: sympreg@ic.ac.uk, Website: http://www.med.ic.ac.uk/dp/dpsh

**Tue 4 July 2000** ASUM NSW Branch meeting. Dr Kevin Hanel - Management of Acute Arterial Insufficiency, and Alison burnett A Vascular Topic. *Venue*: St George Hospital, Conference Room, Gray Street, Kogarah NSW 2217. *Contact*: Jane Fonda Ph: 02 9351 9185; Fax: 02 9351 9146; Email:j.fonda@cchs.usyd.edu.au

**Wed 5 Jul 2000** ASUM Victorian Branch Ultrasound Lecture Series. Shoulder - Frank Burke. *Venue:* Radiology Lecture Theatre, 2nd Floor, Royal Melbourne Hospital. *Contact*: Dr Patsy Robertson, Fax: 03 9342 8369

**Wed 5 Jul 2000** Courses and Symposia. Bereavement. *Contact*: Symposium Office, Imperial College School of Medicine, Queen Charlotte's & Chelsea Hospital, Goldhawk Road, London W6 0XG UK. Ph: (0) 20 8383 3904; Fax: (0) 20 8383 8555; Email: sympreg@ic.ac.uk Website: http://www.med.ic.ac.uk/dp/dpsh

**Thu 6 Jul 2000** 2 days. Courses and Symposia. Advances in obstetric medicine: International meeting of obstetric medicine societies (satellite to ISSHP, Paris). *Contact*: Symposium Office, Imperial College School of Medicine, Queen Charlotte's & Chelsea Hospital, Goldhawk Road, London W6 0XG UK. Ph: (0) 20 8383 3904; Fax: (0) 20 8383 8555; Email: sympreg@ic.ac.uk Website: http://www.med.ic.ac.uk/dp/dpsh

**Wed 12 Jul 2000** ASUM Victorian Branch Ultrasound Lecture Series. Peripheral Venous – Geoff Matthews. *Venue:* Radiology Lecture Theatre, 2nd Floor, Royal Melbourne Hospital. *Contact*: Dr Patsy Robertson, Fax: 03 9342 8369

**Sat 15 Jul 2000** - 2 days. ASUM Obstetric Workshop. *Venue:* Royal Women's Hospital, Melbourne *Contact*: ASUM. 2/181 High Street, Willoughby NSW 2068. Ph: 61-2-9958 7655; Fax: 61-2-9958 8002; Email: asum@asum.com.au

**Wed 19 Jul 2000** ASUM Victorian Branch Ultrasound Lecture Series. Carotid Doppler - *Venue:* Radiology Lecture Theatre, 2nd Floor, Royal Melbourne Hospital. *Contact*: Dr Patsy Robertson, Fax: 03 9342 8369

**Sat 22 Jul 2000** - 2 days. ASUM Queensland Branch Meeting. DMU Tutorials *Contact:* Roslyn Savage; Ph: 0417 720 875; Fax: 07 3881 2464; Email: markros@powerup.com.au

**Wed 26 Jul 2000** ASUM Victorian Branch Ultrasound Lecture Series. Lower Limb Arterial Doppler - Ken Myers*Venue:* Radiology Lecture Theatre, 2nd Floor, Royal Melbourne Hospital. *Contact*: Dr Patsy Robertson, Fax: 03 9342 8369**Tu e 1 August 2000** ASUM NSW Branch meeting. Bowel Blocks, Lung Lumps, Renal Riddles - Dr Brian Trudinger *Venue:* Westmead Hospital Lecture Theatre, 3 Hawkesbury Road, Westmead NSW 2145. *Contact*: Jane Fonda Ph: 02 9351 9185; Fx: 02 9351 9146; Email: j.fonda@cchs.usyd.edu.au

**Wed 2 Aug 2000** ASUM Victorian Branch Ultrasound Lecture Series. Workshop 3 - Vascular / Small Parts / Musculoskeletal *Venue:* Radiology Lecture Theatre, 2nd Floor, Royal Melbourne Hospital. *Contact*: Dr Patsy Robertson, Fax: 03 9342 8369

**Sun 6 Aug 2000** - 4 days. CSANZ Annual Scientific Meeting. *Venue*: Melbourne. *Contact*: Cardiac Society of Australia and New Zealand. 145 Macquarie Street, Sydney NSW 2000. Ph: 02 9256 5452, Fax: 02 9256 5449.

**Fri 25 Aug 2000** - 3 days ASUM 2000. *Venue*: Carlton Hotel, Auckland, New Zealand *Contact*: ASUM. 2/181 High Street, Willoughby NSW 2068. Ph: 61 2 9958 7655; Fax: 61 2 9958 8002; Email:asum@asum.com.au

**Wed 30 Aug 2000** 3 days. BMUS Study Days and Workshops 2000. Scottish Ultrasound Course. *Venue*: Glasgow *Contact*: BMUS, 36 Portland Place, London WIN 3DG, UK. Ph: 020 7636 3714; Fax: 020 7323 2175; Email: secretariat@bmus.org

**Sep 2000** Annual Meeting Diagnostic Medical Sonographers Society *Venue:* Dallas, TX, USA. *Contact:* Suzann J. Oliver, 12770 Coit Road, Suite 708, Dallas, TX 75251 1314, USA. Ph 1 972 2397367; Fax: 1 972 2397378

**Sep 2000** BMUS Study Days and Workshops 2000. Venous Ultrasound Workshop. *Venue*: London *Contact*: BMUS, 36 Portland Place, London WIN 3DG, UK. Ph: 020 7636 3714; Fax: 020 7323 2175; Email: secretariat@bmus.org

**Sat 2 Sep 2000** DMU Examinations. Part I examination. Part II written examination. *Venue:* Various *Contact*: DMU Co-ordinator, ASUM, 2/181 High Street, Willoughby, NSW, 2068. Ph: 02 9958 7655; Fax: 02 9958 8002; Email: dmu@asum.com.au

**Thu 7 Sep 2000** - 3 days 24. Dreilaendertreffen der OEGUM, DEGUM, SGUMB *Venue*: Austria Center, Vienna, Austria. *Contact*: Ultraschall 2000, c/o ECR-office, Neutorgasse 9/2A, A-1010 Vienna, Austria. Ph: 43 1 5334064; Fax: 43 1 53340649; Email: office@ecr.org

**Sun 10 Sep 2000** - 5 days. Ultrasound 2000: 1st International Ultrasound Symposium *Venue*: Gazi University, Istanbul, Turkey. *Contact*: Valor Tourism and Travel Ag., Portakalcicegi Sokak 2/7, A. Ayranci, 06690 Ankara, Turkey. Ph: 90 312 4402490/4409758; Fax: 90 312 4474610.

**Thu 14 Sep 2000** - 3 days. Annual Conference of the Diagnostic Medical Sonographers Society. *Venue*: Wyndham Anatole, Dallas, TX, USA. *Contact*: Betsy Hunt, 12770 Coit Road, Suite 708, Dallas, TX 75251 1314, USA. Ph: 1-972-2397367; Fax: 1 972 2397378.

**Oct 2000** Annual Meeting Society of Radiologists in Ultrasound. *Venue*: Chicago, IL, USA *Contact*: Suzanne Bohn, 1891 Preston White Drive, Reston, VA 20191, USA. Ph: 1 703 6488997; Fax: 1 703 2629313.

**Oct 2000** BMUS Study Days and Workshops 2000. Obstetric Ultrasound Study Day *Contact*: BMUS, 36 Portland Place, London WIN 3DG, UK. Ph: 020 7636 3714; Fax: 020 7323 2175; Email: secretariat@bmus.org

**Wed 4 Oct 2000** 10th World Congress On Ultrasound In Obstetrics and Gynaecology *Venue:* Zagreb, Croatia. *Contact:* Prof. A. Kurjak, Sveti Duh Hospital, Sveti Duh 64, HR-1000 Zagreb, Croatia. Ph 385 1 3700441; Fax: 385 1 3700438; Email: asim.kurjck@public.stve.hr

**Wed 4 Oct 2000** - 4 days. 5th Congress of the International Society of Musculoskeletal Ultrasonography (ISMUS).*Venue*: Holiday Inn, Congress Hall, Prague, Czech Republic.*Contact*: Jan Poul Assoc, Prof. MC, PhD., Univ. Children's Hospital, Cernopolni 9, 662 63 Brno. Czech Republic. Ph: 420 5 45122111; Fax: 420 5 574616; Email: jpoul@mail.muni.cz

**Sun 7 Oct 2000** 13th Congress Eur. Fed of Soc. For Ultrasound in Med. & Biology - Euroson 2001. *Venue*: International Conference Centre, Edinburgh, UK *Contact*: Mrs Gianna Stanford, Gen. Sec. EFSUMB, Carpenters Court, 4a Lewes Road, Bromley, Kent BR1 2RN, UK. Ph: 44 181 4028973; Fax: 44 181 4029344; Email: efsumb@CompuServe.com

**Mon 9 Oct** 2000 DDU Examinations. Closing date for Part I Applications.*Contact*: DDU Co-ordinator, ASUM, 2/181 High Street, Willoughby, NSW, 2068. Ph: 02 9958 7655; Fax: 02 9958 8002; Email: asum@asum.com.au

**Tue 10 October** 2000 ASUM NSW Branch meeting. Cardiac and Mammography Topics *Venue:* Nepean Hospital, Great

Western Hwy, Kingswood NSW 2747. *Contact*: Jane Fonda, Ph: 02 9351 9185; Fax: 02 9351 9146; Email: j.fonda@cchs.usyd.edu.au

**Thu 12 Oct 2000** BMUS Study Days and Workshops 2000. Role Extension - The Way Forward *Venue*: Swansea *Contact*: BMUS, 36 Portland Place, London WIN 3DG, UK. Ph: 020 7636 3714; Fax: 020 7323 2175; Email: secretariat@bmus.org

**Sun 15 Oct 2000** - 6 days World Congress of High-Tech Medicine.*Venue:* Hanover, Germany *Contact:* Management Institute Herrenhausen GmbH, Herrenhauser Strasse 83 99, 30 419 Hanover, Germany. Web site: http://www.high-tech-med.com

**Tue 17 Oct 2000** ASUM Victorian Branch Scientific Meeting. Ultrasound of the Hand.*Contact:* Mark Brooks, Ph: 03 9496 5431; Fax: 03 9459 2817

**Tue 24 Oct 2000** ASUM Queensland Branch Meeting. *Contact:* Roslyn Savage; Ph: 0417 720 875; Fax: 07 3881 2464; Email: markros@powerup.com.au

**Sun 29 Oct 2000** ASUM Qld Branch. Head and Neck Lecture and Workshop. Anil Ahuja - Hong Kong. *Venue:* Brisbane. *Contact:* Ros Savage, Fax 07 3881 2464; email: markros@powerup.com.au

**Tue 31 Oct 2000** ASUM SA Branch Head andNeck Lecture Anil Ahuja - Hong Kong. Venue: Adelaide. Contact Steven Bird, email: sjbird@camtech.net.au

**Nov 2000** ASUM Victorian Branch Scientific Meeting. Combined ASUM/ASA case presentation night. *Contact:* Mark Brooks, Ph: 03 9496 5431; Fax: 03 9459 2817

**Tue 7 Nov 2000** ASUM NSW Branch meeting. Obstetric Ulrasound - Millenium Party. *Venue:* Royal North Shore Hospital, Pacific Hwy, St Leonards NSW 2065. *Contact*: Jane Fonda, Ph: 02 9351 9185; Fax: 02 9351 9146; Email: j.fonda@cchs.usyd.edu.au

**Sat 4 Nov 2000** ASUM ACT Branch. Head and Neck Lecture and Workshop, Dinner and Star Gazing with Anil Ahuja - Hong Kong. Venue: Canberra. Contact: Pam Cooke, Fax: 02 6281 4261; email: cookefm@dynamite.com.au

**Sun 12 Nov 2000** - 3 days - International Symposium 2000. Educating for Quality Healthcare *Venue*: Carlton Crest Hotel, Brisbane *Contact*: Mater Education Centre, Raymond Terrace, South Brisbane, 4101. Ph: 07 3840 8521; Fax: 07 3840 8344; Email: ncarring@mater.org.au; Website: www.i-web.com.au/conference2000

**Wed 15 Nov 2000** BMUS Consortium for the Accreditation of Sonographic Education (CASE). Open Forum. *Contact*: Sue Pearce, CASE Co-ordinator, c/o BMUS, 36 Portland Place, London, W1N 3DG UK. Fax: 0171 323 2175

**Tue 5 Dec 2000** - 3 days BMUS 32nd Annual Scientific Meeting and Exhibition 2000. *Venue:* Devonshire Park Centre, Eastbourne, Sussex. *Contact:* BMUS, 36 Portland Place, London WIN 3DG, UK. Ph: 020 7636 3714; Fax: 020 7323 2175; Email: secretariat@bmus.org. Website: www.bmus.org

**2001** 11th World Congress on Ultrasound in Obstetrics and Gynecology *Venue*: North America. *Contact*: Mrs S Johnson, ISUOG Secr., 3rd fl., Lanesborough Wing, St George's Hospital Medical School, Cranmer Terrace, London SW17 ORE, UK. Ph: 44-181-7252505; Fax: 44-181-7250212

**Mar 2001** AIR'2001 *Venue*: Brisbane *Contact*: AIR

**Sun 11 Mar 2001** AIUM 2001 *Venue:* Orlando, Florida *Contact:* Stephanie Reisberg, AIUM, Suite 100, 14750 Sweitzer Lane, Laurel, Maryland 20707-5906. Email: sreisberg@aium.org

# Corporate Members

**Acuson P/L** ***(Acuson)***
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# Guidelines for authors

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

**FEATURE ARTICLES**
Feature articles are original papers, or articles reviewing significant areas in ultrasound and will normally be illustrated with relevant images and line drawings. Feature articles are commissioned by the Editor who will indicate the size and scope of the article.

**FORUM ARTICLES**
Members are invited to contribute short articles expressing their observations, opinions and ideas. Forum articles should not normally exceed 1000 words in length. 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 in the *Bulletin*. Each listing must contain: activity title, dates, venue, organising body and contact details including name, address, phone number, facsimile number (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**
**Manuscripts should be submitted in triplicate in print and on PC formatted diskette as MS Word documents.**

- Font size: maximum 12, minimum 10
- Double spacing for all pages
- Each manuscript should have the following components: Title page, abstract, text, references, tables, legends for illustrations.
- Title Page should include the following:
  - ❖ 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
- Relevant 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.

**Vancouver style format should be used.**
Examples of Vancouver style:

| | |
|---|---|
| 1. In-text citation: | ....as documented in previous studies (1-3). Note: Not superscript |
| 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**

All 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. Up to 8 key words should be listed at the end of the abstract to assist in indexing.

**Images**

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

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 (eg Letraset). On the back of the print include the authors name, figure number and a directional arrow indicating the top of the print.

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

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