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EDITORIAL

Dr John Roarty

MEDICAL EXECUTIVE OFFICER

Innovations in Medical Imaging

One of the aims in the publication of the Proceedings of St Vincent's Clinic was to inform the medical community and the public generally of recent advances and the changes in the treatment of conditions for which patients attend here.

In the early stages of the planning of the Clinic it was felt that there was a strong need to emphasise preventative medicine as well as excellence in treatment of disease. Accordingly a Health Assessment Centre has been instituted for the specific attention to "well" people. The programme directed to advise people wishing to maintain a healthy lifestyle is outlined in the report of Dr Peter O'Brien and his colleagues on Page 3. A comprehensive examination is carried out to inform the client of his state of fitness. In this report a comparison of the health profiles of Australian and Japanese male executives attending the St Vincent's Clinic Health Assessment Centre is outlined.

The changing pattern of the role of radiology and medical imaging is reported on Page 6 by Dr G. Bigg-Wither. Traditionally radiology has always been associated with x-rays and images of regions of the body to assist in diagnosis of a certain condition. Now the role of radiology takes on a new and important aspect in treatment,



particularly in resistant conditions to therapy in the musculo skeletal system. The causes and management of low back pain and sciatica have notoriously been complex and difficult. Great attention in the past has been directed to the pathology of the intervertebral disc and mechanical causes of low back pain but all too little attention has been given to the apophyseal or the intervertebral facet joints. Through accurate and high resolution image intensification intra-articular injections of these joints can be a very useful adjunct to other forms of therapy but can only be performed by those expert in the knowledge of this radiology and CT scanning. The potential for affording pain relief through a simple procedure as outlined in the report is increasing.

Similarly the recent advances in the techniques of nuclear medicine have greatly assisted the detection of

pathology in the cardiovascular system and particularly coronary artery disease and the early detection of infection throughout the abdominal cavity and in the skeletal system. Dr Szeto has demonstrated the efficiency of the stannous colloid labelled Leukocyte scan in the detection of early or active bowel infection.

All doctors practising in this Clinic are acutely aware of their moral and medico-legal responsibilities towards their patients. With this in mind the third Sandra David Memorial Oration was delivered in September 1996 by the Honourable Sir Anthony Mason "Reflections On The Interface Between Law and Medicine." Sir Anthony has delivered a clear and precise account of the several issues relating to our obligations in duty of care and also the matter he raises in euthanasia.

**Dr Peter O'Brien
Ms Kate Hogan
Dr Geoffrey Benness**

Health profiles in Australian & Japanese male executives



Dr Peter O'Brien, Dr Geoffrey Benness and Ms Kate Hogan

ABSTRACT

A comparison of the health profiles of Australian and Japanese male executives attending the St Vincent's Clinic Health Assessment Centre.

Peter O'Brien, MB BS
Director
Kate Hogan, RN
Manager
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Chairman

Health Assessment Centre
St Vincent's Clinic
Darlinghurst NSW 2010

INTRODUCTION

In 1990 St Vincent's Private Hospital decided to offer a health assessment service and after reviewing overseas centres the BUPA (UK) model with modifications for Australian conditions⁽¹⁾ was introduced.

Can the cost effectiveness of this health assessment be defined? Firstly, the cost is met by the client or his employer and is not a charge on the health insurance commission or medical insurance funds. Concerning short term benefit, the patients (0.5%) receiving significant treatment for life threatening disease and the others receiving specialist advice or LMO care (7% and 3%) amount to 10% of the total. The impact of lifestyle counselling on diet, alcohol, smoking and exercise can only be defined in subsequent examinations. If there is insufficient change on later visits, then these studies will indicate a need for a different approach to lifestyle counselling. The results of a 16 year

follow up of multiphasic health checkups were encouraging with 30% reduction in deaths from pre-specified "potentially postponable" causes largely associated with colorectal cancer and hypertension⁸. Overall we are pleased with the short term findings and optimistic about the long term potential.

This report details the findings in 325 Australian and 325 Japanese consecutive age matched male executives.

METHODS

Prior to attending the Health Assessment Centre, clients complete a comprehensive questionnaire on lifestyle, family and personal health.

On arrival a fasting blood sample is taken and a urine specimen collected. A chest x-ray is obtained and Japanese clients have a barium meal. Height and weight are measured, and vision, hearing

Table 1**Clinical Findings**

		Australian (325)		Japanese (325)	
		New	Pre-existing	New	Pre-existing
Lifestyle					
Family history +	48	14			
Smoking	34	92			
Alcohol excess	4	55			
Obesity	28	1			
Exercise lack	222	214			
Stress related	3	1	5	1	
Cardiovascular					
Hypertension	12	8	12	12	
Rhythm disorder	4	2	3		
Chest pain	2		1		
Respiratory					
Asthma	1		2	3	
Alimentary					
Monilia	1		6	4	
Reflux, ulcer	1	1	4	5	
Polyp	1		1	2	
Hepatitis					
Colon cancer	1		1		
Haemorrhoids					
Urogenital					
Stone		2	1	1	
Prostate		1	1		
Testis cancer	1				
Hydrocoele			1		
Skin					
Mole	1				
Eczema			2	2	
Endocrine					
Diabetes mellitus	1	1	4	4	
Nervous					
Ataxia	2				
Eye			1	2	
Musculoskeletal					
Arthritis		7	3	2	
Gout			1	1	
Blood					
Leukaemia	1				

and respiratory function are tested. A resting electrocardiogram is also taken. A treadmill exercise electrocardiogram is performed on request at the end of the visit in the absence of significant risk factors. Patients are referred for cardiac stress testing if significant risk factors exist.

In the medical consultation the questionnaire is reviewed with the client and a full physical examination is carried out. The results of the consultation, tests and investigations are discussed. Specific advice regarding lifestyle, exercise and diet are provided. Reports are provided for the clients' local doctor (LMO). Also, if appropriate, referrals are arranged to relevant specialists. Follow-up assessments are recommended at either one or two year intervals. National Heart Foundation standards are used for defining normal values and risk factors⁽²⁾. Obesity is recorded when body

mass index (BMI) exceeds 30, hypertension when systolic pressure equals or exceeds 160 or diastolic pressure equals or exceeds 95mmHg. Total cholesterol is considered abnormal in excess of 5.5mmol/L. The upper limit for low density lipoprotein (LDL) is 3.7mmol/L and for triglycerides 2.0mmol/L respectively. St Vincent's Pathology (SydPath) recommends 35U/L as the upper limit for gamma glutamyltransferase (GGT) readings. Excess alcohol intake is taken as more than 21 standard drinks (10gms.) per week (BUPA).

The Japanese clients comprise 325 consecutive first visits grouped by age (under 34, 35-44, 45-54, over 55 years). The 325 Australian clients consists of consecutive first visits in similar age matched groups. Two Australian clients were excluded because of incomplete data and they were replaced.

RESULTS

This review is restricted to an analysis of the clinical diagnoses and the major cardiovascular risk factors.

The results of the clinical examinations are detailed in Table 1, and are separated into new and pre-existing conditions. All smokers and heavy drinkers were given appropriate advice. Obese clients were given detailed dietary advice. The importance of adequate and regular exercise was stressed. Clients with severe stress related problems were referred for stress management. Hypertensive clients were advised to seek treatment, or to recommence previous treatment. Cardiological consultation was arranged for those with rhythm disorders, significant chest pain, or an abnormal treadmill exercise electrocardiogram. Bypass surgery followed promptly in one. Asthmatic patients were advised of treatment options, and referred to their LMO or thoracic physician. The patient with oral monilia returned a positive HIV test. The Japanese clients with reflux, ulcers or gastric polyps were diagnosed on barium meal, while the colonic polyp in the Australian patient was found on rigid sigmoidoscopy and was pre-malignant. There was one active case of hepatitis B, and two carriers were found. The colon cancer (Dukes' stage A) was detected at colonoscopy in a patient with a family history of colonic polyps. The new patient with renal calculi, hypertension and extensive renal damage was referred to a nephrologist. The patient with testicular cancer (seminoma) underwent surgery. Five new patients with diabetes mellitus were diagnosed and referred for treatment. Specialist consultations for the patients with ataxia and eye conditions were arranged, and treatment was commenced for the patient with chronic lymphatic leukaemia.

The results of the testing of the Australian and Japanese executives were analysed in four age groups. The mean BMI, systolic blood pressure, diastolic blood pressure, total cholesterol and LDL measurements in each Australian age group exceeded its Japanese equivalent and these mean values increased with age. Twenty-eight Australian and one Japanese client were classified as obese, 20 Australians and 24 Japanese were hypertensive, and in 178 Australians and 144 Japanese the total

cholesterol was outside the recommended range. In 66 Australians and 50 Japanese the cholesterol measurement exceeded the previous standard of 6.5mmol/L. The LDL measurement exceeded normal range in 147 Australians and 102 Japanese. The mean triglyceride values were similar in trend and in 74 Australians and 82 Japanese the values were abnormal. The mean GGT measurements in the Japanese groups were mostly higher than the Australian equivalent. In the Australians and Japanese 71 and 126 respectively were considered abnormal, and 8 Australian and 27 Japanese exceeded 100U/L, after excluding the patients with hepatitis. The mean corpuscular volume (MCV) in these 35 clients with GGT in excess of 100U/L was $92.5 \pm 4.2\mu^3$. The difference from normal values is highly significant ($P < 0.002$). Of the 325 Australian clients, 24 were referred for specialist consultations and four needed surgery, one for coronary bypass and three for pre-malignant or malignant conditions. Of the 325 Japanese patients, 20 were referred for specialist consultations and one for surgery. Ten Australians and 11 Japanese were referred to their LMO for ongoing treatment.

An analysis of the major cardiac risk factors (raised cholesterol, smoking, or hypertension) is shown in Table 2.

DISCUSSION

Reports of clinical findings in well patients are infrequent. However, the incidence of cardiovascular risk factors in the Australian population has been reviewed^(2,3) and there is similar data for an Israeli population⁽⁴⁾.

Lifestyle issues dominate the abnormal findings in these 650 clients. A positive family history of a previous cardiac event under 60 years was present in 15% of the Australians and 4% of the Japanese. The latter finding may be qualified by poor understanding of this part of the questionnaire. The incidence of smoking was higher in the Japanese, 28% compared with 10% in the Australian executives. Excessive alcohol consumption was reported in 1% of Australians and 17% of the Japanese, and the GGT exceeded 100 U/L in 35 patients. There is considerable doubt regarding the value of GGT as a screen for alcohol abuse⁽⁵⁾. However, high values are still the best biochemical marker and monitor of excess alcohol

consumption. In the absence of an alternative explanation and excluding the three hepatitis patients, there appears to be considerable under-reporting of alcohol consumption by the clients, or poor assessment by the physicians. In addition, 9% of the Australian clients were obese. This combination of positive family history, smoking, excess alcohol consumption and obesity is a considerable cardiovascular challenge. It is hardly surprising that the analysis showed 55% and 44% of the Australians and Japanese had abnormal cholesterol values and 6% and 7% were hypertensive. Compared with National Heart Foundation data⁽²⁾ there was similarity between the Australian executives and the Australian population. BMI, blood pressure, cholesterol, and triglycerides were similar, LDL was lower, as was the prevalence of hypertension. Smoking was much less, while most executives under exercised. The Japanese executives smoked more, under exercised, had abnormal lipids and hypertension, but were not obese.

An analysis of major risk factors (Table 2) using the previous upper limit of cholesterol, 6.5mmol/L, for comparison with Australian data⁽²⁾ showed more risk factors in the Japanese. The higher incidence of smoking in the Japanese, exceeded the number with higher cholesterol values in the Australians. Apart from obesity, the Australian results have improved since the 1989 review⁽³⁾. Carel⁽⁶⁾ reviewed

pre-employment findings in 5525 Israeli males under 45 years. The mean systolic blood pressure was 127 ± 12 and the mean diastolic pressure was 72 ± 10 mmHg and 3% were hypertensive. The mean BMI was 25 ± 3 and 9% were obese. The cholesterol was elevated (>6.2 mmol/L) in 15% and 24% smoked. Compared with the under 34 and 35-44 years Australian data, the incidence of smoking in the Israelis was higher while cholesterol was higher in the Australians, otherwise the data for BMI and blood pressure were similar.

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Table 2

Incidence of Major Cardiac Risk Factors

Risk Factors	Cholesterol ≥ 6.5	Smoking	DBP ≥ 95	Total patients
Australian				
1	50	25	15	90 (28)
2	16	9	5	15 (4)
3	0	0	0	0
Total	66 (20)	34 (10)	20 (6)	105 (32)
Japanese				
1	29	71	11	111 (34)
2	20	20	12	26 (8)
3	1	1	1	1 (0.3)
Total	50 (15)	92 (28)	24 (7)	138 (42)

Numbers in brackets indicate % of total group.

Dr Grant Bigg-Wither

INTRODUCTION

Musculoskeletal procedures requiring imaging guidance are an everyday routine in our radiology practice. Mostly these procedures will involve injection of local anaesthetic plus or minus cortico-steroid into various joints of the axial and appendicular skeletons when clinical and radiological evaluation suggests that these joints are a source of chronic pain. Typically, these joints are afflicted with osteoarthritis, inflammatory arthritis and overuse type capsulitis and synovitis.

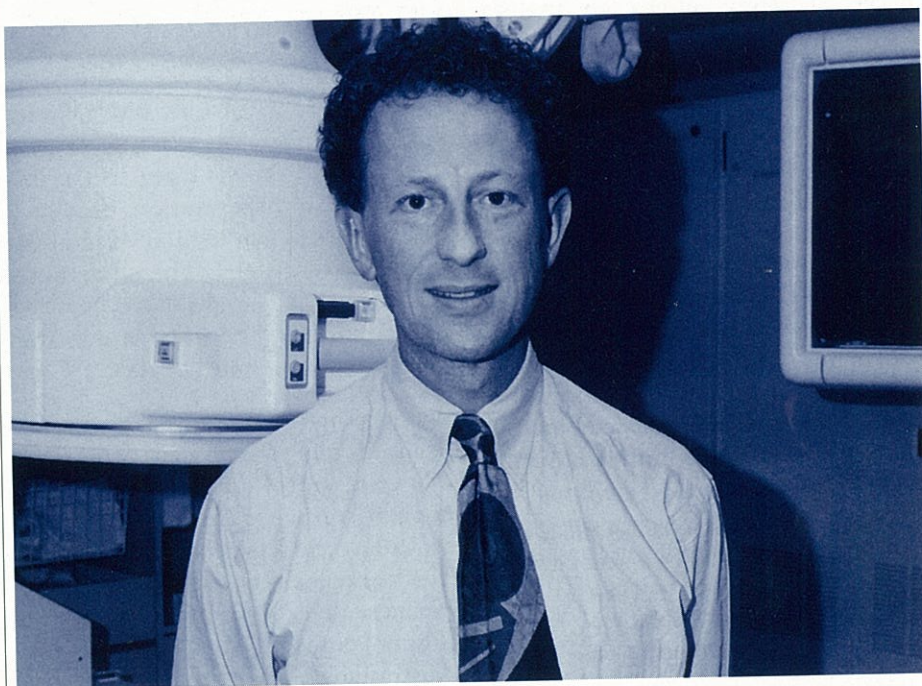
The radiologist performing these procedures must have a thorough knowledge of the often complex anatomy of these joints and any important neighbouring structures such as vessels, nerves, thecal sac and nerve root sleeves. There is a difficult learning curve for some of these procedures, e.g. cervical facet joint blocks. Cross sectional imaging such as computed tomography (CT) can clearly depict the orientation of these joints and show the relationship of any adjacent important structures, thereby simplifying and increasing the safety of many of these procedures.

We will now discuss the more commonly performed procedures including their indications, the likely clinical outcome and possible complications.

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Imaging guided procedures in musculoskeletal radiology



LUMBAR FACET (ZYGOAPOPHYSEAL) JOINT BLOCKS

The "facet syndrome" is a term that can be applied to describe chronic back pain arising from the facet joints which may radiate into the buttock or leg and so mimic sciatica. Injection of hypertonic saline into abnormal facet joints can reliably reproduce sciatic type pain. There is usually localized tenderness over the involved facet joints but the nerve root distribution of the radiating pain may not necessarily correlate with the level of the abnormal facet joint as these joints have dual innervation from both a branch of the spinal nerve at the same level as the joint and the level above.

The exact pathophysiology of the facet syndrome is uncertain but it is probably multifactorial. Most often a

degenerative type arthritis occurs in the facet joints secondary to primary disc degeneration. Increased stresses are applied to the facet joints when there is loss of the shock absorbing properties of the intervertebral disc and loss of disc height impacts the opposing surfaces of the facet joints. Osteophytic hypertrophy of the facet joints is very common and these osteophytes can impinge on two adjacent nerve roots;

- 1) as the nerve root leaves the thecal sac at the disc space level and enters its nerve root canal (lateral recess stenosis) i.e. the L5 nerve root at the L4-5 facet joint level (Fig 1), or
- 2) at the exit foramen of the nerve root canal above (foraminal stenosis) i.e. the L4 nerve root at the L4-5 facet joint level (Fig 2).

An additional mechanism for pain production could be capsular distension

which can occur with osteoarthritis. On many occasions I have aspirated a few ml of mucoid material from osteoarthritic facet joints prior to joint injection. The anteromedial aspect of the facet joint capsule is in close contact with the nerve root and the posterolateral aspect of the joint capsule is in close contact with the dorsal rami of the spinal nerve. Some studies have shown that the response to injecting saline into facet joints is not significantly different from injecting a steroid suggesting that mechanical disruption of the joint may be an important factor.

Factors taken into account when choosing the level(s) to block include local tenderness over the joint, distribution of the radiating pain and the imaging appearances of the joints. Hypertrophic degenerative facet joint arthropathy is very common in the ageing population and the imaging appearances per se do not necessarily correlate with symptoms. CT is the most accurate modality to image the facet joints. Almost all patients referred for facet joint blocks will have had a prior CT scan to exclude disc displacements compressing the nerve roots and the CT images of the facet joints are very helpful in planning joint injection. The lumbar facet joints are often curved and it can be difficult with fluoroscopy (X-ray) to be sure of the exact orientation of the posterior joint entrance. The CT scan will show the exact orientation of the posterior joint entrances and also show any areas closed by osteophytes (Fig 3). Detail with fluoroscopy can be limited in obese and/or osteopenic persons and knowing beforehand the exact approach from the CT scan can be very helpful and fluoroscopy times can often be significantly reduced.

The large majority of lumbar facet joints can be entered with a spinal needle and flexible 25 G needles are helpful in entering curved joints. Occasionally, the lumbosacral facet joints are oriented in a near coronal plane making it impossible to enter right into the joint space due to the overlying iliac crests. However, a straight approach to the inferior margin of the joint will normally enter the inferior capsular recess and this can be confirmed with injection of a contrast agent.

Prior to any injection true intra-articular position must be confirmed by

Figure 1. Axial CT scan at upper pedicle level of L5. Osteophytes from the anteromedial aspect of the right L4-5 facet joint project into the lateral recess of the right L5 nerve root canal (arrow).

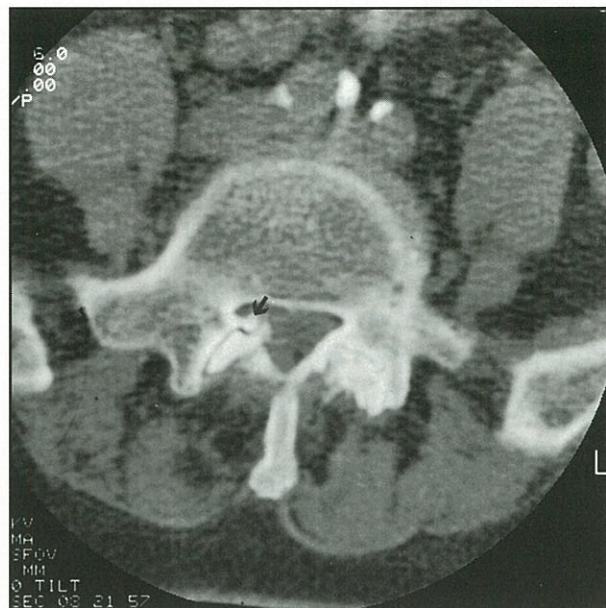
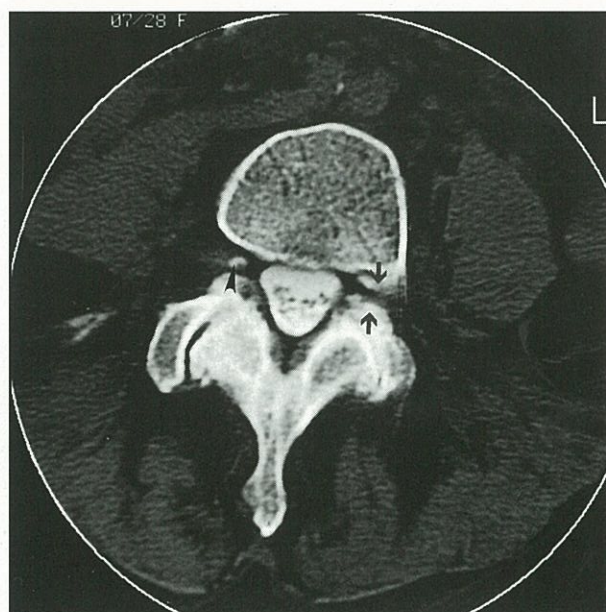


Figure 2. Axial CT scan (post-myelogram) just above the L4-5 disc space. Osteophytic enlargement of the left L4-5 facet joint narrows the exit foramen for the L4 nerve root from behind with additional osteophyte in front from the posterior vertebral body margin (arrows). The normal exiting right L4 nerve root is shown (arrowhead).



first aspirating to check that the needle is not in a CSF space and then either

- 1) rolling the patient under fluoroscopic observation to see that the needle tip always remains within the joint or
- 2) injection of a small volume of non-ionic contrast agent which will outline the S shaped joint capsule and cartilage surfaces of the joint.

The joint is then injected with a mixture of a long acting local anaesthetic (e.g. bupivacaine) and depot corticosteroid. Depo-Medol (TM) is not used due to concerns of its safety should there be inadvertent intrathecal injection.

In our practice we have performed hundreds of lumbar facet joint blocks and there has been an excellent safety record. The only complication I have

observed is a transient paraesthesia in the leg without discernible motor impairment. However, full resuscitation facilities must be available. Mild discomfort may be experienced while injecting into the joint and it is not unusual to reproduce the radiating component of the patient's pain when injecting a facet joint.

The expected clinical outcome is variable. In the large majority of cases there is immediate improvement especially of the radiating component of the pain. The full effect may take 1 to 2 weeks and a sustained benefit can be expected for 3 to 12 months. Choosing the correct joints to block is probably one of the most important determinants of outcome and evaluation by an experienced physiotherapist can be very helpful in determining the symptomatic level.

The published scientific data of the benefit of lumbar facet joint blocks shows variable results, with some studies showing no clear positive benefit. No controlled large prospective trial has yet been performed. However, clinical experience dictates that lumbar facet joint blocks can be very worthwhile.

THORACIC FACET JOINT BLOCKS

The thoracic zygoapophyseal joints are orientated in a coronal plane and so cannot be directly entered with a needle. However, the costotransverse-costovertebral facet joint complex can be entered with CT guidance. The entry point is at the posterior entrance of the costotransverse joint (Fig 4). CT is used to both plan the approach, carefully avoiding the nearby pleural space and also to confirm the intra-articular position of the needle tip. A volume of approximately 1 ml each of bupivacaine and steroid is injected into the joint complex.

In my experience there is usually immediate improvement in the radiating component of the patient's pain. Like other spinal facet joint blocks, the clinical choice of the involved level(s) is one of the most important factors determining clinical response.

CERVICAL FACET JOINT BLOCKS

The cervical segments are the second most frequently requested region for facet joint blocks. Typically, patients have chronic neck pain which may radiate to the occipital region, shoulder or arm and there are osteoarthritic changes in the facet joints which may be impinging on the adjacent nerve roots.

My preferred technique is to enter the lateral entrances of these small joints. A thin section axial CT is performed first so that the exact orientation of the joint and a suitable point of entry can be ascertained (Fig 5). The position of the vessels within the carotid sheath is noted so that they can be avoided. The C1-2 facet joint has an oblique configuration in the frontal plane and can be entered via a lateral approach in the plane of the

Figure 3. Axial CT scan at L4-5 disc level.

Degenerative facet joint disease with gas in the joints (arrows). Note the curved orientation of these joints.

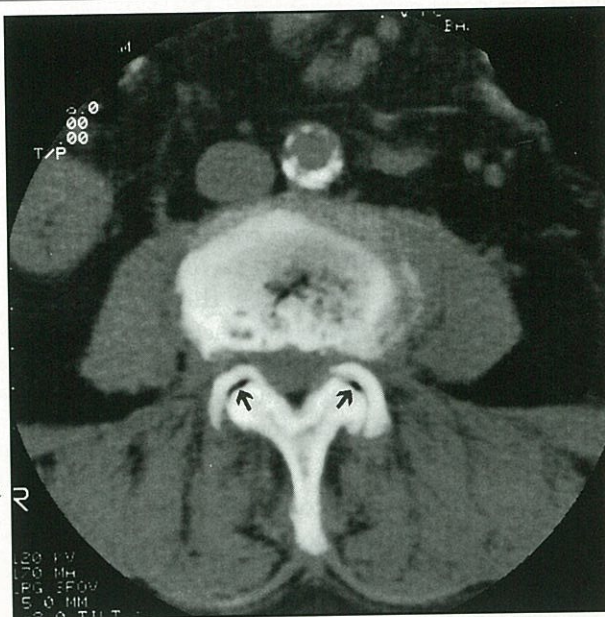
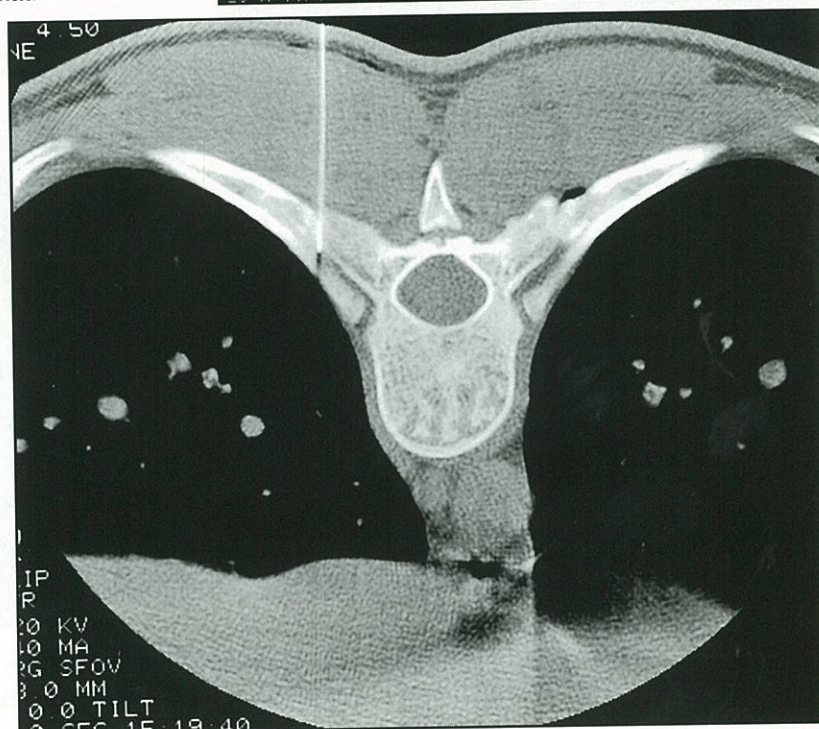


Figure 4. (below) Axial CT scan upper pedicle level of T8. A needle has entered the right costotransverse – costovertebral joint complex.



joint with biplane fluoroscopy (Fig 6). The carotid and vertebral arteries are close by and their position is noted on the CT scan so that they can be avoided.

With the patient lying on their side, fluoroscopy is then used to guide a 25 G needle into the lateral joint entrance and intra-articular position confirmed. Occasionally, the C6-7 facet joint can be difficult to enter with a lateral approach due to the overlying shoulder. Aspiration is performed to check that the needle has not entered the CSF space. Local anaesthetic is not infiltrated deeply prior to joint injection as the dural cuffs of the nerve roots can extend out beyond the nerve root canals and may have cystic dilatations increasing the risk of inadvertent injection into the

CSF. The cervical facet joints will accept a total volume of 1.0 – 1.5 ml of local anaesthetic and steroid. As in the other spinal regions, the radiating component of the pain usually abates immediately.

I have never had any complications while performing over 100 cervical facet joint blocks apart from 1 occasion of inducing a transient acute vertigo like reaction while injecting a C1-2 facet joint. Not infrequently there is some proprioceptive loss in legs immediately following the procedure which completely abates within 15 minutes or so. However, cervical facet joint blocks are a precision procedure requiring a relaxed patient who will keep perfectly still.

SACROILIAC JOINT BLOCKS

If clinical examination suggests that chronic low back which may radiate into the leg is originating from the sacroiliac joint blocking this joint maybe very helpful. Most often this is mechanical type pain which may reflect instability of the symphysis pubis – sacroiliac joint complex. Traction type osteophytes may be seen at the capsular ligament insertion on a CT scan. Less often, there is a true inflammatory arthritis where joint injection may be helpful in patients who have not responded to systemic therapy.

True intra-articular injection into the synovial portion of the joint can only be reliably achieved with CT guidance. The upper diverging portion of the joint is ligamentous without a distinct capsule, whereas the lower portion is a true synovial joint. The posterior entrance of the synovial portion of the joint is variably angled and curved and not infrequently there are areas closed by capsular osteophytes. With the patient prone, thin section axial CT scans are taken through the synovial portion of the joint to localize a suitable entry point.

A 25 G needle is then directed into the joint space and its position confirmed within an additional CT scan (Fig 6) prior to any injection. There is a tendency for the needle to be directed downwards once in the joint and the check CT scan will ensure that the needle tip has not migrated out through the inferior joint capsule where the sciatic nerve is lying. Bupivacaine and depot steroid are injected into the joint which will normally accept 3 – 4 ml.

There should be some immediate relief of symptoms if the sacroiliac joint is the source of the chronic pain. Very infrequently some of the local anaesthetic can leak out of the joint capsule and so may temporarily block the sciatic nerve. On the few occasions this has happened there has only been paraesthesia in the leg without discernible motor impairment.

The clinical response is usually very good and I have repeated the procedure in several patients who have had complete relief of their symptoms for 6 – 18 months following injection.

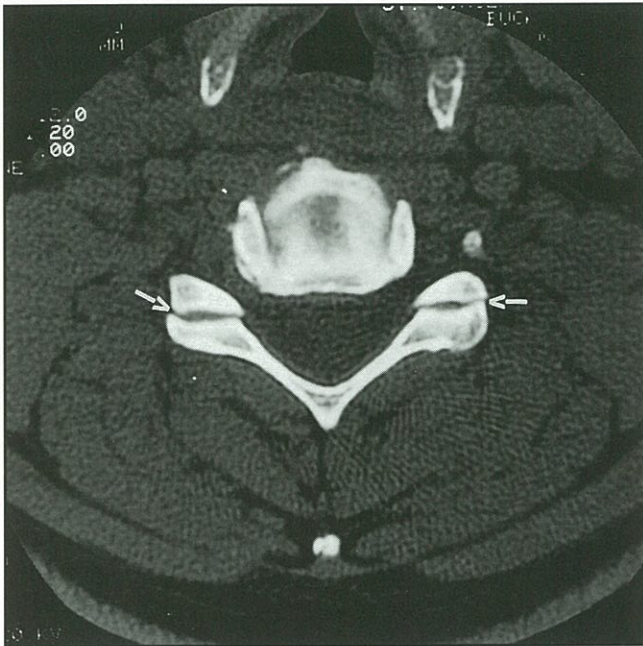


Figure 5. Axial CT scan at the C4-5 level showing the orientation of the lateral entrances of the C4-5 facet joints (arrows).

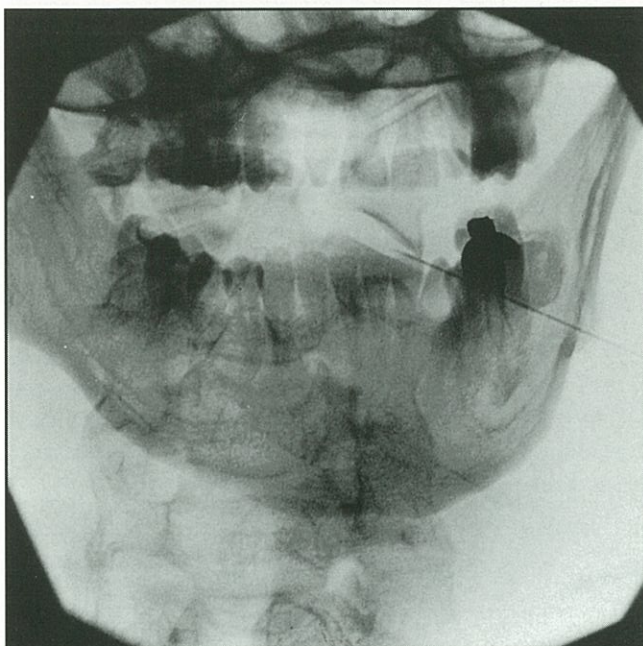


Figure 6. Frontal radiograph of the C1-2 facet joint with a needle just inside the lateral entrance of the joint.

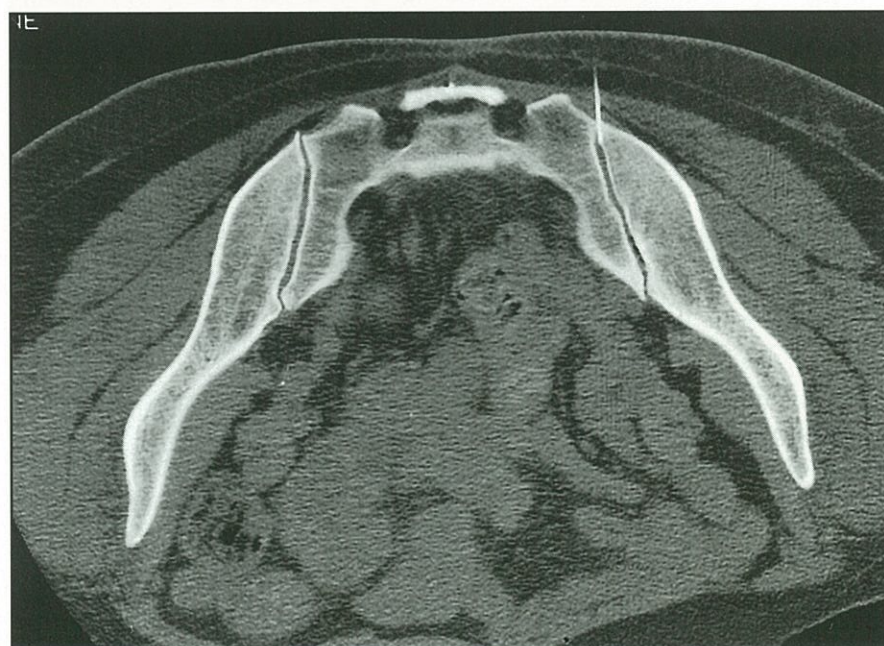


Figure 7. Axial CT scan (prone) of the synovial portion of the right sacroiliac joint with a needle introduced into the joint.

DIFFERENTIAL FOOT AND ANKLE JOINT BLOCKS

In patients with chronic ankle and foot pain it can be difficult to identify with clinical examination the exact joint that the pain originates from due to the close apposition of the various joints, and the obscuring effects of overlying inflammation and swelling. Imaging appearances of the joints do not necessarily correlate with the source of the pain and there may be no discernible radiographic abnormality in some painful joints. Selectively injecting these joints with a long acting local anaesthetic plus or minus depot steroid can be very helpful in deciding which joints should be fused when arthrodesis is being considered. Most often, the underlying pathology is post traumatic osteoarthritis and inflammatory arthritis.

Most often these joints can be easily entered with fluoroscopic guidance, but the large posterior facet of the subtalar joint can be difficult as its entrance is often curved and it may be covered by the lateral malleolus. In this case, coronal CT is performed beforehand so that a suitable entry point can be found on its lateral aspect. An arthrogram is always performed beforehand to confirm intra-articular position prior to injection (Fig 8).

The patient keeps a record of the subsequent change in pain symptoms. Additional joints may be injected at separate occasions if necessary.

EVALUATION OF JOINT REPLACEMENT IMPLANTS

Loosening of joint implants can be either mechanical (often due to wear particle disease) or infective. Radionuclide studies are not entirely specific and aspiration of the joint for microbiologic and cytologic examination can be very helpful. Most often this examination is requested when infection is to be excluded.

Using strict aseptic technique fluoroscopy can be used to guide a needle into the pseudocapsule of an implant. As contrast agents can have a bacteriocidal

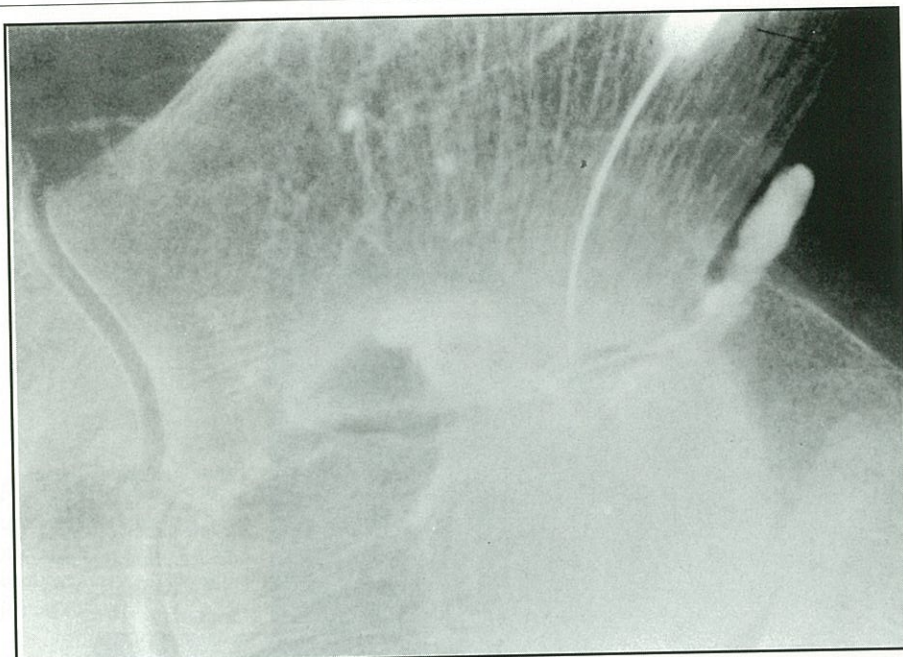


Figure 8. Arthrogram of the posterior facet of the subtalar joint (lateral view) taken prior to intra-articular injection.

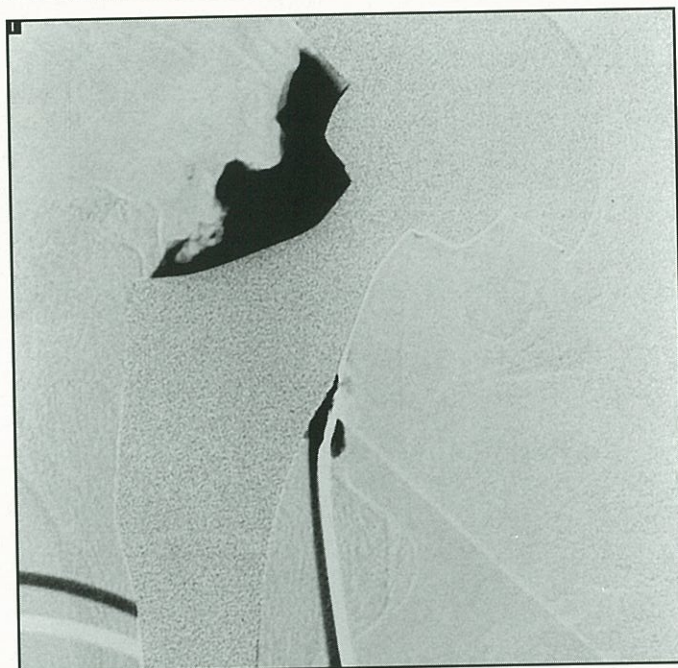


Figure 9. Digital subtraction arthrogram of a bone ingrowth hip implant. Contrast (black) outlines the pseudocapsule but there is no tracking of contrast in the bone-implant interfaces to suggest component loosening.

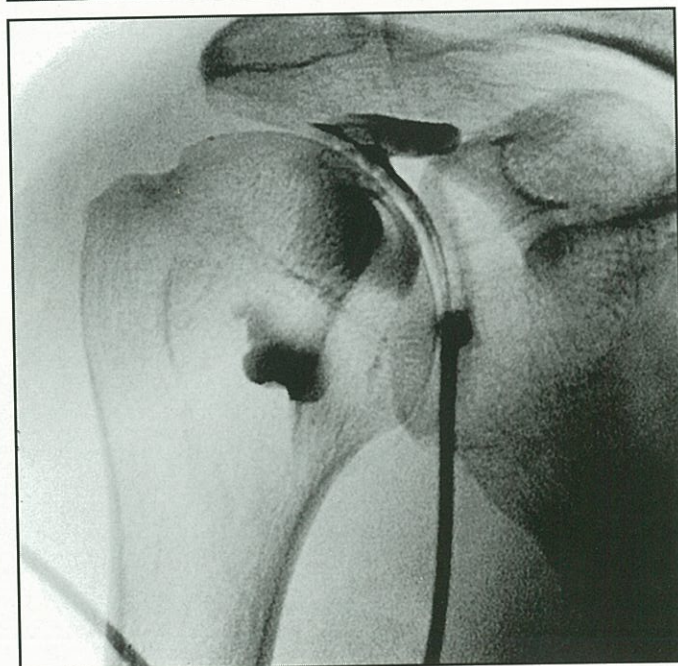


Figure 10. Arthrogram of the right shoulder shows the typical contracted joint capsule of adhesive capsulitis prior to hydrodilatation.

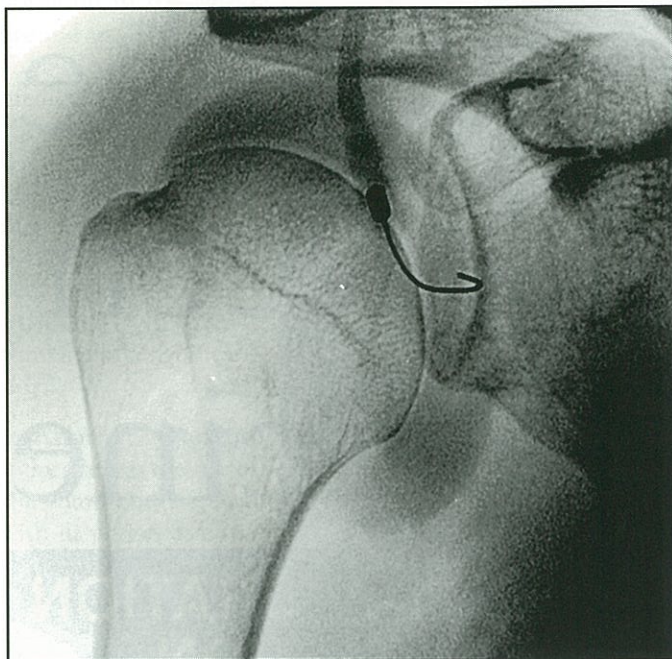


Figure 11. Arthrogram following successful hydrodilatation shows a much enlarged joint capsule.

effect they cannot be used to confirm intra-articular position prior to aspiration. Knowing when the needle is in the joint capsule is not a problem with the knee, but the hip can be more difficult. Almost always one can aspirate a small amount of fluid when the needle is placed within the joint. If aspiration is dry a small amount of sterile saline can be introduced into the joint and reaspirated. A false negative result could potentially arise if there are adhesions within the joint with walled off pockets of infection.

Following aspiration, contrast is injected into the joint to see if there is any abnormal tracking of the contrast agent into the implant-bone or cement-bone interfaces. If positive, this would constitute proof of component loosening. A subtraction arthrogram needs to be performed as the contrast agent has the same high density as metal or cement. This is achieved by utilising a digital subtraction fluoroscopy unit (Fig 9). The examination can be performed in real-time enhancing the detection of abnormal tracking of contrast.

HYDRODILATATION OF THE SHOULDER JOINT

This procedure has gained popularity in recent years for the treatment of the early stages of adhesive capsulitis. An end stage frozen shoulder maybe more suited to surgical manipulation.

Initially, an arthrogram is performed to confirm intra-articular position and this will show the characteristic contracted joint capsule of adhesive capsulitis which will admit only a small volume of contrast (Fig10). A full thickness cuff tear can be excluded and if present the dilatation is not performed as there is communication of the shoulder joint capsule with the subacromial – subdeltoid bursa. With adhesive capsulitis the capsule is often painful and local anaesthetic is introduced into the joint prior to dilatation.

Normal saline is then introduced into the joint in 10 ml amounts at a time. As contrast will be present within the joint, the enlarging joint capsule will be seen (Fig 10). Dilatation is continued to a volume of 50 – 60 ml or until capsular rupture (Fig 11). In my experience there is usually an immediate and near pain free improvement in the range of movement of the shoulder.

MISCELLANEOUS

Other joints which can be injected with local anaesthetic and steroid under imaging guidance include the small joints of the feet such as the 2nd metatarsophalangeal joint (e.g. capsulitis) and the 1st metatarsophalangeal joint (e.g. hallux rigidus). Occasionally, with painful osteoarthritis the hip joint can be injected when there

is a contraindication to surgery. CT can be used to guide a needle into the ischial bursa avoiding the nearby sciatic nerve.

CONCLUSION

The relief of chronic pain can be a rewarding experience in clinical practice. With the advent of more sophisticated imaging techniques such as CT a larger range of joints can be accurately and safely blocked by the radiologist and a good clinical response can be expected in the large majority of cases.

Reflections on the interface between Law and Medicine

**THIRD SANDRA DAVID MEMORIAL ORATION
ST VINCENT'S CLINIC FOUNDATION
13 SEPTEMBER 1996
THE HON. SIR ANTHONY MASON A.C. K.B.E.**

When I entered the legal profession almost half a century ago, who would have predicted the professional world as we know it to-day? The professions were basically confined to the traditional professions – doctors, lawyers, engineers, dentists, accountants, architects, and the profession of arms. Now everyone is a professional. The realtor describes himself as a professional, as do others with lesser claims.

In those distant days, professional people, particularly doctors and engineers, enjoyed a status and a respect which is now difficult to imagine. Even the lawyer, historically the object of suspicion and derision, was reasonably well-regarded, though much earlier Samuel Johnson once made the comment that he

"did not care to speak ill of any man, behind his back, but he believed the gentleman was an attorney."

Perhaps he thought better of the judge and the barrister.

The status and the respect accorded to professional people was the result of many factors. They included mystique, the relative scarcity of professional people, class distinction and a lower

level of general education. Scarcity is an important element in generating respect and status. That is one reason why respect for judges and professors has declined – there are now so many of them on the ground and that is true of doctors as well.

There is not much mystique about the professions these days and there is much less professional solidarity than there used to be. Everyone thinks that he is able to assess the competence of his professional adviser and with the Readers Digest and the medical and legal soap operas on TV to help him, who can say that the lay person is wrong? What is more, professional people do not hesitate to criticise fellow professionals. And, if they have legitimate grounds for criticism, who can deny them that right?

One consequence of the respect accorded to professional people in earlier times was willingness to accept professional judgment. The patient considered that the doctor knew best and was prepared to accept his judgment. The litigant left the conduct of his case in the hands of his lawyer. So when I entered the profession, I conducted cases as I thought best for the client without explaining my decisions to the client unless it became necessary to do so. No doubt the doctor took the same view of the patient and the

patient's body. This professional perspective has, of course, changed and that change has been associated with a change in the relationship between the professional and the client or patient.

More than anything else, professional practice, professional competence and remuneration – especially in law and medicine – have become the subject of on-going public debate. That was inevitable. Once government was induced or persuaded to fund medical and legal services and to impose taxes to contribute to that funding, law and medicine were bound to come under political and public scrutiny. The extension of medical and legal services to the entire community, as a matter of entitlement or expectation, brought these consequences in its train. In the result, professional competence and standards were questioned and criticised.

Neither the legal nor the medical profession managed to foresee in advance that was happening. This may seem surprising in the light of the high University entry requirements for Medicine and Law. But when you look to the narrow University curriculum, the demands upon students and upon graduates, especially in the early professional years, it is not so surprising. Immersion in one's professional discipline blinds many of us to what is

going on in the world around us. The fact is that neither the medical profession nor the legal profession were alert to the political imperatives that began to affect Medicine and Law or succeeded in influencing political thinking in a significant way.

Another baneful influence was the rise of the administrative class with its notion that the administrator is superior to the professional. The culture conflict between the administrator and the professional has been a problem for some time. I suspect that in the courts we have been more successful than you have been in the hospitals in resisting the domination of administrators. That said, professional people need to develop better administrative and management skills.

On top of all that, the professions have been beset by another development – the emergence of the litigious society – what some people call the claim and blame culture. The emergence of the litigious society, for which lawyers are largely responsible, has had a massive impact upon the professions. It has come about through the tort of negligence and its generalised duty to take reasonable care to avoid injury to the person and property of another. The generalised duty to take care reflects community standards and so it takes account of the evolving relationship between the professional person and his client.

Liability in negligence was not a cause for professional concern until recent times. That was because actions for negligence against professionals were relatively uncommon and because verdicts were not large. Among the reasons for the infrequency of actions was the difficulty of obtaining expert evidence of negligence. That has changed. Above all else, negligence on the part of doctors, lawyers, accountants,



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engineers and architects can and does result in extremely large verdicts. In turn, due to a rise in large claims made upon insurers in recent years, insurance premiums have escalated, so much so that it is said that, at any rate in the United States, in some areas of medical practice, such as obstetrics, the economic viability of practice is threatened, with a number of doctors giving up practice for economic reasons. It is also asserted that apprehensions about negligence claims have led to the practice of what is called "defensive medicine" which results in additional costs and may not be in the best interests of the patient.

At the same time, there has been a significant increase in claims brought against other professionals, especially solicitors. And I suspect that professional people do not always carry adequate insurance to cover the possibility of massive verdicts being delivered against them. Proposals to cap the liability of professionals, which would be one way of dealing with the problems – though perhaps an unfair one – was rejected by the Keating government.

So far as liability for medical negligence is concerned, the law in Australia is less favourable to doctors

than the law in England. I should explain how this has come about. In earlier times, there was a tendency to exclude from the concept of negligence matters of professional judgment. In other words, if there was a division of professional opinion about the wisdom of taking one course or another, e.g. in the treatment of a patient, it was not negligent to opt for one of the two courses. That approach is still evident in the law which is applied in England in cases of alleged medical negligence. According to the *Bolam* principle, applied in England, a doctor is not negligent if he acts in accordance with a practice accepted at the time as proper by a responsible body of medical opinion even though other doctors adopt a different practice. The law imposes a duty of care but the standard of care is a matter of medical judgment.

At the basis of the *Bolam* principle lies the recognition that, in matters of involving medical expertise, there is ample scope for genuine difference of opinion and that a practitioner is not negligent because his conclusion or procedure differs from that of other practitioner; a finding of negligence requires a finding that the defendant failed to exercise the ordinary skill of a doctor practising in the relevant field.

In Australia, it has been accepted that the standard of care to be observed by a person with some special skill or competence is that of the ordinary skilled person exercising and professing to have that special skill. But that standard is not determined solely by reference to the practice followed or supported by a responsible body of opinion in the relevant profession or trade.¹ The true position is that it is for the court to decide whether there has been a lack of reasonable care. Evidence as to the practice of professionals may materially assist the court on that question but it is not conclusive. And, in the sphere of diagnosis and treatment of a patient, the *Bolam* principle has not always been applied.² When the issue is determined by a jury and it involves a conflict of complex expert evidence, the outcome can be unsatisfactory. Indeed, strong criticism is made of the justice system on the score that judges

themselves show a lack of understanding of specialist technical issues, even issues concerning commercial and banking matters. I should make it clear that I am not to be taken as agreeing with that criticism. It is difficult to generalise about matters of that kind.

Notwithstanding reservations expressed about the *Bolam* principle, in England, it has been applied in cases of alleged negligence in providing information and advice in relation to medical treatment. In *Sidaway v Governors of Bethlem Royal Hospital*,³ it was decided that the question whether the patient should be informed about a risk inherent in treatment or an operation was to be decided primarily on the basis of expert medical evidence, though a trial judge might in some circumstances conclude that disclosure of a risk was so obviously necessary that no reasonably prudent medical practitioner could fail to make it irrespective of the existence of a body of medical opinion to the contrary. This view, the English view, is partly based on what has been called the doctor's therapeutic privilege, the opportunity given to the doctor to prove that he reasonably believed that disclosure of the risk would be damaging to the patient.

In Australia, as you will know, this view has not been accepted. In essence, in *Rogers v Whitaker*,⁴ the autonomy of the patient, that is, the right to make his own decision about his treatment was recognised and that entailed recognition of the patient's entitlement to know what risks are involved in undergoing or foregoing certain surgery or other treatment. The patient's autonomy and right to make a choice count for nothing unless he is aware of relevant risks. The question is not whether the medical practitioner's conduct accords with the practices of his profession or some part of it, but whether it conforms to the standard of reasonable care which is for the court to decide. Although Gaudron J delivered a separate judgment, I shall refer to the joint judgment as if it were the judgment of the Court. The Court said:

"Whether a medical practitioner carries out a particular form of treatment in accordance with the appropriate standard of care is a question in the resolution of which responsible professional opinion will have an

*influential, often a decisive, role to play; whether the patient has been given all the relevant information to choose between undergoing and not undergoing the treatment is a question of a different order. Generally speaking, it is not a question the answer to which depends upon medical standards or practices. Except in those cases where there is a particular danger that the provision of all relevant information will harm an unusually nervous, disturbed or volatile patient, no special medical skill is involved in disclosing the information, including the risks attending the proposed treatment."*⁵

Thus, the law recognises that a doctor has a duty to warn a patient of a material risk inherent in the proposed treatment; a risk is material if, in the circumstances of the particular case, a reasonable person in the patient's position, if warned of the risk, would be likely to attach significance to it or if the medical practitioner is or should reasonably be aware that the particular patient, if warned of the risk, would be likely to attach significance to it. The Court went on to say "this duty is subject to the therapeutic privilege".⁶

Earlier, reference had been made to the therapeutic privilege, in the context of Lord Templeman in *Sidaway* giving quite substantial scope to a doctor to decide that providing all available information to a patient would be inconsistent with the doctor's obligation to have regard to the patient's best interests.⁷ The High Court referred to the privilege, describing it as:

*"an opportunity afforded to the doctor to prove that he or she reasonably believed that the disclosure of the risk would prove damaging to a patient."*⁸

The Court pointed out that the expression "right to self-determination" is perhaps suitable to cases where the issue is whether a person has agreed to the general surgical procedure or treatment but is of little assurance in the balancing process that is involved in the determination of whether there has been a breach of the duty of disclosure.⁹

The decision in *Rogers v Whitaker* was criticised by members of the medical profession. However, *Rogers v Whitaker* places Australian law on the same footing as the law in a number of countries including the United States,

Canada, South Africa and European countries. More than that the reasoning on which the English rejection of the duty to inform is flawed and shows distinct signs of crumbling.

It may be that the attitude of the medical profession to the relationship of doctor and patient has been unduly influenced by the Hippocratic Oath. It appears to contemplate that the physician has the authority and duty to do what is best for the patient.¹⁰ But the modern view, expressed by the outstanding American judge, Benjamin Cardozo, as early as 1914, is that -

*"Every human of adult years and sound mind has a right to determine what shall be done with his own body; and a surgeon who performs an operation without his patient's consent commits an assault,..."*¹¹

The correctness of this statement is accepted in Australia, Canada, Europe and in England, where it has been applied in two decisions¹² of the highest authority since *Bolam* and *Sidaway*.

In 1993, in *Bland's Case*¹³ in England it was acknowledged that the principle of self-determination required that the patient's wishes be respected so that if an adult of sound mind unreasonably refuses to consent to treatment by which his life might be prolonged, the doctors responsible for his care must give effect to his wishes. All this means that the doctor's relationship with the patient rests on contract. The doctor's authority to deal with the patient depends upon the terms of the contract between them and, what is more, upon the patient's considered consent. Once that is recognised, as it is now in England, the patient needs to know the prospects and risks of treatment; otherwise his consent is an artificial and meaningless consent.

It is convenient now to mention another legal question of interest to the medical profession: does the patient have a right of access to patient medical records kept by the patient's doctor? In a unanimous judgment delivered recently in *Breen v Williams* (186 CLR 71), the High Court of Australia answered this question in the negative. The Court rejected arguments that the patient had a proprietary right to, or interest in, the information contained in the records, that there was an implied term in the contract between doctor and patient

creating such a right and that the doctor was under a fiduciary duty to make the records available.

In rejecting the argument that there was a fiduciary duty on the doctor, the Court declined to follow Canadian and United States authority to the effect that the fiduciary relationship between doctor and patient extends the physician's duty to include the obligation to grant access to the information the doctor uses in administering treatment.¹⁴ Australian law does not accord with the Access to Health Records Act 1990 (UK) which confers a *prima facie* right of access to health records by the individuals to whom they relate and other persons. However, there is a qualification which makes the *prima facie* right subject to an opinion held by the holder of the record when the opinion would disclose:

- (i) information likely to cause serious harm to the physical or mental health of the patient or of any other individual; or
- (ii) information relating to or provided by an individual, other than the patient, who could be identified from that information."

That Act was passed as a result of the decision of the European Court of Human Rights in *Gaskin v United Kingdom*,¹⁵ which held that refusal to allow access was a breach of a patient's right to respect for his private and family life under article 8 of the European Convention on Human Rights.

In *Breen v Williams*, the High Court rejected the view that the rise of patient autonomy over medical paternalism should lead to a right of access on the part of a patient to records kept by a doctor. But it would be a mistake to regard *Breen v Williams* as qualifying the decision in *Rogers v Whitaker*. That decision is not affected by *Breen v Williams*. It is worth repeating what Dawson and Toohey JJ said about *Rogers v Whitaker*. Their Honours said:

"[T]he decision affirmed the proposition, ... that it is a matter of judgment for the doctor to determine what the patient should know in his or her best interests. It was pointed out that in making that judgment the doctor is required to exercise reasonable skill and care and that the court would determine for itself whether that standard was observed

rather than apply the Bolam approach which placed reliance upon the opinion of a responsible body of medical practitioners. Nevertheless it was held that it is a judgment to be made by the doctor, notwithstanding that in the particular context of the revelation of the risks inherent in proposed treatment all relevant information to enable the patient to make a decision whether to undergo the treatment would ordinarily be required. In that sense the case does affirm patient autonomy. We are not able to discern that the case has anything additional to say about personal inviolability (whatever that may mean in the context). Nor does it have anything to say about medical paternalism save, perhaps, to the extent that it decides that it is for the court, not medical opinion, to determine whether the required standard of care has been observed." (186 CLR at 98-99)

You will recall that in *Rogers v Whitaker* the Court spoke of the opportunity afforded to the doctor to prove that the disclosure of the risk would be damaging to the patient. In other words, if the doctor does not disclose all the risks, it would be for him to establish his reasonable belief that disclosure would be damaging in that sense. It is only in that sense that it is a judgment to be made by the doctor. The doctor's judgment is by no means conclusive; ultimately the outcome of a dispute as to non-disclosure of all risks will rest on the existence of the doctor's reasonable belief.

MAJOR ETHICAL ISSUES

The emergence of major medical ethical issues is a phenomenon that has brought Law and Medicine closer together. I shall mention three of them. The first is the sterilisation of young females who are so intellectually impaired that they are incapable of giving valid informed consent to medical treatment and of caring for themselves and of any children they might have. Here one of the questions was: who could authorise a medical practitioner to undertake the necessary procedures when they were considered appropriate in the interests of the female? In Marion's case,¹⁶ an Australian decision, it was decided that the parents could not alone give authority to the medical

practitioner and that the leave of a court was necessary. It is for the court to decide whether, in the circumstances of the case, sterilisation is in the best interests of the child.

It is interesting to read the account in the Court's majority judgment of the difficulties of determining whether a disabled child is capable of giving consent, of circumstances in which an operation has been performed too readily, of the tendency to "medicalise" the issue and of parental and family pressures which are not infrequently the product of self-interest. There are in the joint judgment two sentences which I should quote:

*"It is hard to share the view of Cook J [a Family Court judge] ... that absolute faith in the integrity of all medical practitioners is warranted. ... [T]here are those who act with impropriety as well as those who act bona fide but within a limited frame of reference."*¹⁷

Of course, the same comment can be made about lawyers. Decisions on issues of this kind may call for consideration of a wide range of factors and advice from what the present Governor-General, in his judgment, referred to as a multi-disciplinary team.¹⁸

The second major issue that has emerged arises from the withdrawal of life support systems, an issue which was considered in the English case of *Bland* to which I referred earlier. That case decided that a doctor could withhold care and treatment from an insensate patient who had no hope of recovery but was bound to die if care and treatment was withheld. In that case, because there was a withdrawal of consent to treatment, it was unlawful for the physician to intervene, notwithstanding that the patient's refusal to accept treatment was that he would die.

The third instance, the most interesting of all, is the euthanasia debate. That became an important issue in Australia because legislation was introduced to authorise it in the Northern Territory. Although legislation withstood legal challenge, the Federal Parliament has now enacted inconsistent Federal legislation. However, euthanasia is not only an important issue in Australia; it is an important issue in many countries. In England, Dr Nigel Cox, a respected

consultant, was convicted of attempted murder of a patient in severe pain. In the Netherlands, where euthanasia has been widely practised for at least a decade, a survey has been undertaken which, it is suggested, could lend support to the notion that euthanasia is available without request. It is said that a Dutch government report supports the view that in 1990 over 1000 patients were put to death by their doctors without explicitly requesting active euthanasia.¹⁹ Whether that suggestion is accurate I cannot say. I merely repeat what has been stated in a recent publication.

Underlying the euthanasia debate are the central propositions which I mentioned earlier, the autonomy of the patient and the patient's right to self-determination. In addition, there is the conflicting principle of the sanctity or inviolability of life, a principle which has been recognised in England, the United States, Canada and Germany, even to the extent that it is acknowledged that the State has a legitimate interest in protecting it. That principle, it is said, has been compromised by the practice of active euthanasia pursued in the Netherlands.

On the other hand, in England and other jurisdictions, active euthanasia is prohibited by law. In *Bland's Case*, Lord Goff said:

"[i]t is not lawful for a doctor to administer a drug to his patient to bring about his death, even though that course is prompted by a humanitarian desire to end his suffering ... So to act is to cross the Rubicon which runs between on the one hand the care of the living patient and on the other hand euthanasia ..."²⁰

Professor Glanville Williams stated it more bluntly:

"The law does not leave the issue in the hands of doctors; it treats euthanasia as murder."²¹

Contrast what has happened in the Netherlands. Legislation provides for a defence where the patient's decision is voluntary, informed and certain, the doctor has consulted with colleagues and compiled a detailed report of the decision-making processes. This approach represents the ultimate triumph of patient autonomy and self

determination so that it prevails over the concept of the inviolability of life. The approach has been strongly criticised on philosophical, moral and practical grounds.²²

I shall mention some but not all of these grounds. There is concern about its consequences for the image of the medical profession and the impact upon the trust and confidence it can inspire. There is also concern that voluntary euthanasia will result in non-voluntary euthanasia. And there is an apprehension that legitimisation of euthanasia could mark the beginning of a moral and ethical descent into inhumanity of a kind we associate with the Nazis and Stalinist Russia. That may well be an exaggerated apprehension, though there is always the problem that the law enforcement authorities may exercise their discretion not to prosecute in cases where a prosecution should be brought. A consistent failure to exercise the discretion to prosecute can result in the adoption and acceptance of practices which are inconsistent with the law. Perhaps court leave or approval, like that required in cases of sterilisation, would be a safer course. Judges would not thank me for that suggestion because it would create an extra and distasteful burden for the courts.

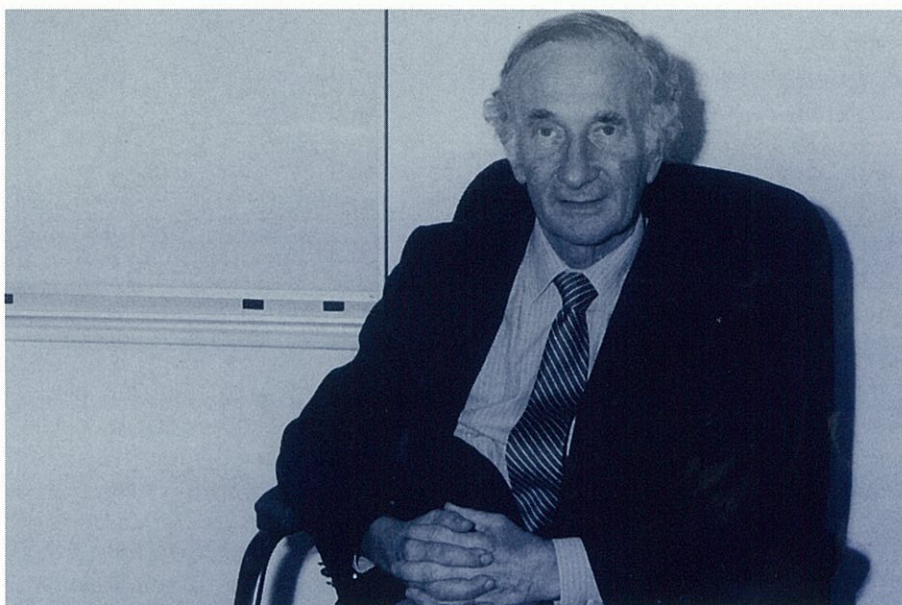
Outside Australia and the United Kingdom, which have no Bill of Rights, the outcome of a number of ethical issues will be determined by judicial interpretation of guarantees of individual rights. Just what this means can be illustrated by a recent decision of England's highest court in a case known as *Brown v The Queen*.²³ The accused were charged with murder of the victim who died as a result of sado-masochist sexual practices in which he participated and to which he consented. The accused were convicted on the ground that consent is not a defence to murder. However, the accused have taken the case to the European Court of Human Rights in Strasbourg on the ground that the common law of England as exemplified by the rejection of the defence of consent violates the right of privacy guaranteed by the European Convention on Human Rights. The United Kingdom, though it has no domestic Bill of Rights, has subscribed to that Convention. The consequence is that a British citizen can complain to the

Court at Strasbourg that his right of privacy has been violated. The point I make is simply that in those jurisdictions where there is a Bill of Rights, questions of this kind are more likely to be resolved by the courts than by the political process.

Because most advanced nations have a Bill of Rights, and because many nations, including Australia, have ratified international conventions protecting fundamental rights, the rights and obligations of medical practitioners may well be influenced by the developing international and transnational jurisprudence on human rights. On that note, which you may regard as a rather depressing note, I shall conclude.

- 1 *Florida Hotels Pty Ltd v Mayo* (1965) 113 CLR 588 at 593, 601.
- 2 See *Albrighton v Royal Prince Alfred Hospital* (1980) 2 NSWLR 542 at 562-563; *E v Australian Red Cross* (1991) 27 FCR 310 at 360.
- 3 (1985) AC 871.
- 4 (1992) 175 CLR 479.
- 5 *ibid* at 489-490.
- 6 *ibid* at 490.
- 7 (1985) AC at 904.
- 8 (1992) 175 CLR at 486.
- 9 (1992) 175 CLR at 490.
- 10 See T. Kaan, "The Physician's Duty to Warn: Autonomy, Information and the Patient" (1995) 7 *Singapore Academy of Law Journal* 23 at 29.
- 11 *Schloendorff v Society of New York Hospital* (1914) 105 NE 92.
- 12 *In re F (Mental Patient Sterilisation)* (1990) 2 AC 1 at 73; *Airedale NHS Trust v Bland* (1993) AC 789.
- 13 *ibid*.
- 14 *McInerney v MacDonald* (1992) 93 DLR (4th) 415 at 424; *Emmett v Eastern Dispensary & Casualty Hospital* (1967) 396 F 2d 931; *Cannell v Medical and Surgical Clinic* (1974) 315 NE 2d 278.
- 15 (1989) 12 EHRR 36.
- 16 (1992) 175 CLR 218.
- 17 *ibid* at 251.
- 18 *ibid* at 305.
- 19 D. Giesen, "A Comparative Legal Perspective", Ed. J. Keown, *Euthanasia Examined*, Cambridge 1995, 204; The Rummelink Report, cf. *The Independent*, 17 February 1993 at 8.
- 20 (1993) AC at 865.
- 21 Textbook of Criminal Law, 2nd ed., London 1983, 580.
- 22 D. Giesen, "A Comparative Legal Perspective", Ed. J. Keown, *Euthanasia Examined*, Cambridge 1995, 204.
- 23 (1994) 1 AC 212.

Retinoids – an advance in the treatment of skin disease



Retinoids are a vitamin A derivative and occur both naturally and as synthetic analogs.

They have multiple therapeutic effects such as inhibition of inflammation, keratinisation and cell growth. There are more than one thousand retinoids that have been synthesised and tested. There are two main group of RETINOIDS in use. ISOTRETINOIN (Accutane – Roaccutane) and ETRETINATE (Tigason) which has now been superseded by ACETRACIN (Neotigason).

ISOTRETINOIN (Roaccutane) was synthesised in 1953 and released for clinical use in the early 1980s. Its main action was to decrease the production of sebum and the size of the pilo-sebaceous glands and was initially used in the treatment of severe cystic acne (Case 1).

Since then it has been used in milder

forms of acne, seborrhoea (oiliness) rosacea, hidradenitis suppurativa and gram negative folliculitis.

ETRETINATE (Tigason) is a second generation retinoid with a half life of 120 days. This drug has been replaced by ACETRACIN (Neotigason) which has a much shorter half life and is used in the treatment of diseases of keratinisation such as pustular and erythrodermic psoriasis, Darier's disease, pityriasis rubra pilaris, severe ichthyosis, hypertrophic lupus erythematosus (Case 2) and recently neoplastic diseases such as skin malignancies in transplantation, xeroderma pigmentosa and Grolin's syndrome.

There have been many reports of the beneficial effects of low dose systemic retinoids (ACETRACIN) sometimes in combination with topical tretinoin (a natural metabolite of retinoids) for the treatment and prophylaxis of malignant skin lesions in renal and cardiac transplant patients.

Dr Brien Walder
DDM, FACD, FRACP

Dermatologist
St Vincents Clinic
Sydney

CASE ONE

A seventeen year old boy presented with severe acne involving his face and chest. His acne started four (4) years ago and over the last six (6) months had become a lot worse – painful and associated with occasional night sweats. During this time he has been taking Minocycline 50mg, b.d., followed by 100mg, b.d. over the last three (3) months, without marked improvement. His full blood count showed a leucocytosis of 14000 with neutrophilia. His ESR was markedly elevated.

Clinical examination showed numerous comedones (black-heads) associated with inflammatory nodules, sinuses, crusts and occasional deep ulcers with very little healing.

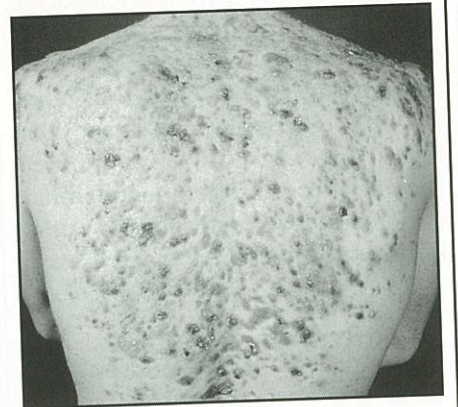
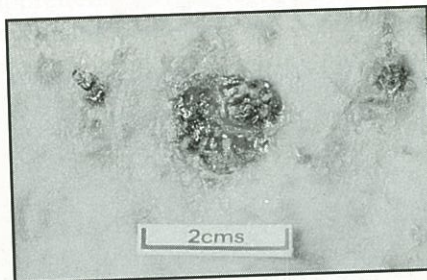
It involves the total chest and upper arms.

TREATMENT: ISOTRETINOIN (Roaccutane) 1mgm/kg for 20 weeks.

The result is an excellent one with only little scarring.

Before ISOTRETINOIN the patient with Acne Conglobata would have had persistent and severe inflammatory lesions resulting in eventual scarring.

ISOTRETINOIN has revolutionised the management.



The retinoids also have an effect in reducing the number of verrucae in transplant patients.

Recently the oral retinoids have been used with great success in acute promyelocytic leukaemia (APL).

APL comprises about 10% of acute myeloblastic leukaemia in adults. Its initial manifestation is usually bleeding with thrombocytopenia and hypofibrinogenemia.

Tretinoin (all transretinoic acid) has been most effective in the treatment of this lethal disease, following treatment the tumour cells undergo maturation as the patient undergoes remission.

The retinoids have been beneficial in the treatment of diseases of the pilo-sebaceous glands, the keratinising diseases as well as the treatment of premalignant and malignant skin diseases and acute promyelocytic leukaemia.

Topical retinoic acid has also been shown to protect against photo aging.

It increases the dermal collagen up to 80% over a period of nine (9) months. It reduces pigmentation in solar lentigo by depleting the melanin. It is effective in treating pregnancy striae and stretch marks by its effect on new collagen synthesis.

CASE TWO

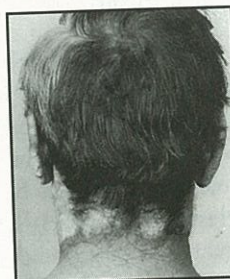
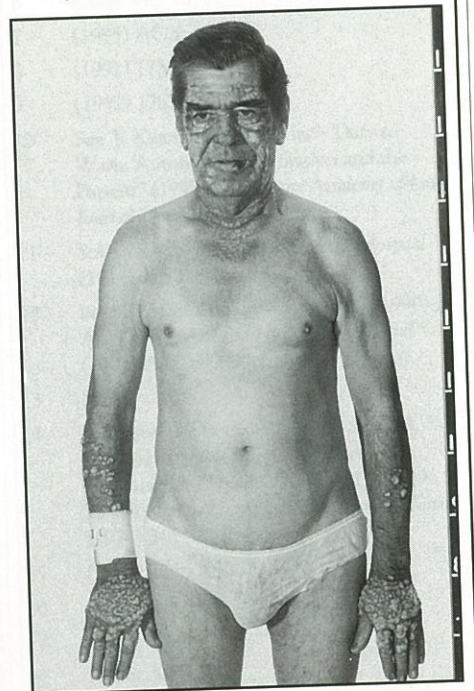
A fifty three year old golf club green keeper gave a history of solar induced keratotic lesions over the last five years and recently developed an ulcerative lesion on the left lower lip associated with well demarcated keratotic lesions on the neck, ears and face as well as dome shaped lesions on the dorsa of his hands and extensor areas of his forearms.

The lesion on his left lower lip was surgically removed and was confirmed to be a well differentiated squamous cell carcinoma (SCC) with underlying scarring. Biopsies from the forearms, face and neck showed a histology consistent with SCCs.

ANF was normal, immunofluorescence showed granular C3 and IgM at the dermo-epidermal junction and a diagnosis of hypertrophic discoid lupus erythematosus was made.

He was treated with 200mg a day of hydroxychloroquine and within three months he had complete resolution of his

hypertrophic keratotic lesions which mimicked skin neoplasias. This is a very rare condition and can be treated by hydroxychloroquine or the oral retinoid, Neotigason, which is the best treatment.





ST VINCENT'S CLINIC FOUNDATION



The Clinic Foundation continues to actively support research projects conducted by our Clinicians. The following are the research grants approved for study throughout 1997.

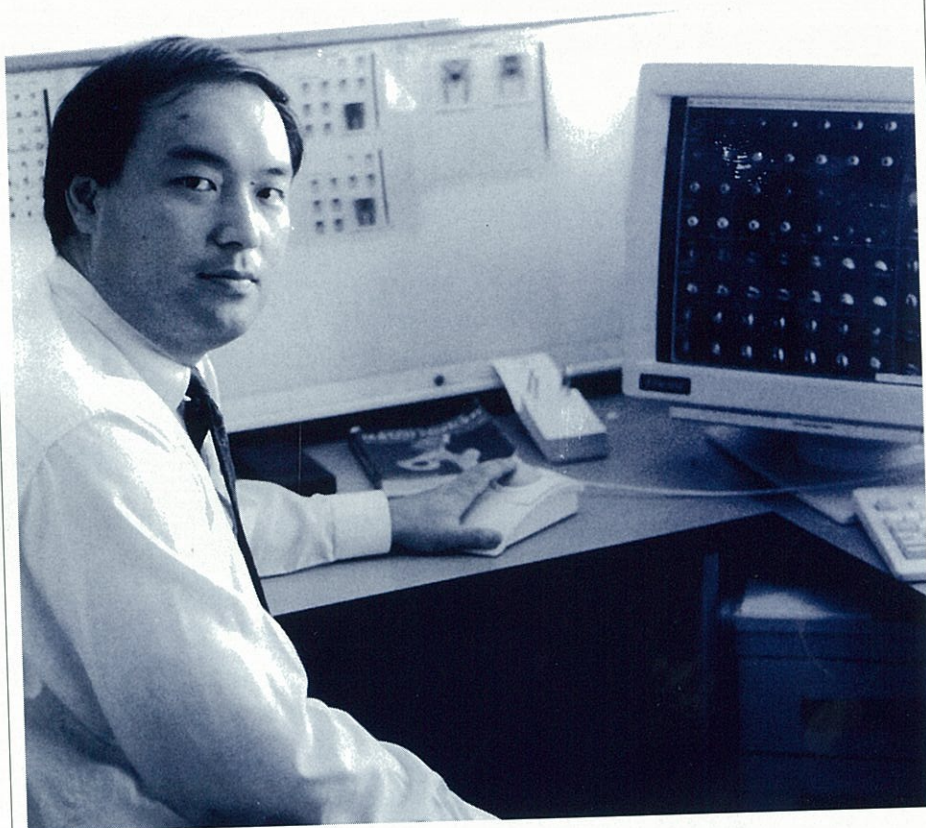
TYPE OF PROJECT	CHIEF INVESTIGATOR
1. A double blind placebo control trial using the nicotine patch in adolescent smokers	Ms R. Bittoun
2. Differential proarrhythmic actions of antidepressant drugs	A/Prof. T. Campbell
3. Direct and indirect effects of nitric oxide in the regulation of cardiac function	A/Prof. M. Feneley
4. Prognostic significance of lymphatic micrometastases in colorectal cancer as determined by K-ras mutational analysis	Dr T. O'Connor
5. Therapeutic evaluation of growth hormone and growth factors in glucocorticoid-induced protein wasting	A/Prof. K. Ho
6. A clinical trial of effectiveness of physiotherapy management of cervicogenic headache	A/Prof. G. Jull Mr P. Kelly
7. Arterial injury from atraumatic clamps	Prof. R. Lord
8. Incidence and prognostic significance of micrometastases in oesophageal adenocarcinoma	Dr R.V. Lord
9. Treatment outcomes for radiotherapy for prostate cancer at St Vincent's Campus	Dr G. Morgan
10. Expression of galanin and galanin receptors in brain and pituitary tumours	Dr J.P.R. Sheehy Dr K. Ho
11. Assessment of gender related differences in diastolic heart function and the effect of oestrogen on heart function	Dr R. Kelly

Dr Edwin Szeto

Advances in Nuclear Medicine

INTRODUCTION

Since the discovery of radioactivity by Bequerel in 1896, the use of radioactive tracers has led to a whole new approach to biology and medicine. The tracer principle, that is, the monitoring of molecules as they participate in the dynamic state of body constituents, has led to the unique ability of Nuclear Medicine procedures to examine this dynamic state as reflected in every organ of the body. In addition to new procedures, many established procedures (originally developed more than 20 years ago) are now performed with new radio-pharmaceuticals or instruments. This article will discuss some of the new advances currently available for the diagnosis and management of clinical syndromes.



TECHNETIUM-99M SESTAMIBI MYOCARDIAL PERFUSION IMAGING

Myocardial perfusion imaging with Thallium-201 has been thoroughly studied, and its utility has been well demonstrated in the literature in the following areas:

1. the detection of coronary artery disease (CAD) in patients presenting with chest pain;
2. risk stratification of patients with suspected or known CAD to determine prognosis;
3. assessment of myocardial viability in patients with left ventricular dysfunction.

More recently, imaging agents

labelled with Technetium-99 have been introduced, with Tc-99m sestamibi being now commercially available. The shorter physical half-life of Tc-99m (6 hours compared with 72 hours for Thallium-201) allows for a much higher injected dose of Tc-99m sestamibi while maintaining acceptable radiation levels. This higher injected dose, in conjunction with prolonged myocardial retention, results in a higher count density than can be obtained with Thallium-201. Higher counts result in improved image quality, and Tc-99m sestamibi generally produces higher quality images than Thallium-201, thus increasing observer certainty.

Furthermore, as a result of the high count density of Tc-99m sestamibi images and long myocardial residence time, SPECT studies can be gated to simultaneously assess left ventricular function (which cannot be satisfactorily performed with Thallium due to the poor count density). From gated SPECT

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studies, wall motion, myocardial thickening, and LVEF can be determined.

Tc-99m sestamibi has also been used in patients presenting with acute chest pain. Studies of patients (without acute or previous infarction) injected with Tc-sestamibi during pain have shown high accuracy in the detection and exclusion of angiographically significant CAD. The potential usefulness of this technique in emergency triage is obvious, and is currently being investigated at St Vincent's Campus.

Current international trials using Tc-99m sestamibi include the evaluation of the efficacy of thrombolysis in acute myocardial infarction, and the evaluation of the efficacy of revascularisation (both PTCA and CABG).

In summary, the new radiopharmaceutical Tc-99m sestamibi provides high quality images and accurate information on myocardial perfusion with the additional ability to assess left ventricular motion and function. (Figure 1)

INFECTION IMAGING

Gallium-67 citrate (Ga-67) was the only radiopharmaceutical available for detecting infection for a number of years. Unfortunately, it has several disadvantages for infection imaging including a poor target-to-background ratio, the need for repeated imaging over 24 to 72 hours before final interpretation, and normal gastrointestinal uptake that can obscure an abdominal abscess.

Because of these problems with Ga-67, radiolabelled leukocytes have recently been developed as an alternative for infection imaging. Three main methods of labelling leukocytes have evolved:

1. Indium-111 labelled leukocytes;
2. Technetium-99m HMPAO labelled leukocytes;
3. Technetium-99m stannous colloid labelled leukocytes.

All have been widely studied and have a high sensitivity in the detection of acute infection and inflammation. The disadvantages of Indium are its expense, higher radiation exposure and longer imaging time (up to 24 hours) related to its long half-life of 67 hours. The main advantage of the two Technetium methods is the short half-life of Tc-99m which results in less radiation exposure and shorter imaging time (imaging is performed at 1 and 3 hours following injection). However, HMPAO causes non-specific bowel excretion, rendering it less useful in the detection of bowel inflammation. Stannous colloid labelled leukocytes, therefore, have the highest sensitivity in the detection of inflammation in inflammatory bowel disease (Figure 2), and is the method used at St Vincent's Campus. The principal clinical indications for radiolabelled leukocytes include inflammatory bowel disease, osteomyelitis and soft tissue sepsis. The early detection of an infective process in a joint replacement by this technique is a most significant advance in management (Figure 3). In addition, antibiotics do not appear to have a significant effect on scan sensitivity.

Yet despite the success of the labelled leukocyte technique, gallium still plays an important role in the evaluation of infection, especially in the patient with pyrexia of unknown origin (PUO). A gallium scan may identify either a chronic infectious process or even a neoplasm, conditions for which leukocyte imaging is relatively insensitive. Furthermore, although leukocyte imaging is probably superior to gallium for most infections of the musculoskeletal system, this technique is of limited value in patients with suspected vertebral osteomyelitis, and sequential bone gallium imaging is a better way to diagnose this condition. Gallium imaging is also the procedure of choice for detecting opportunistic infections and lymph node abnormalities in immunocompromised patients.

ADVANCES IN ENDOCRINOLOGY

Parathyroid Imaging

The clinical need for localisation studies for hyperfunctioning parathyroid tissue has long been recognised. Unfortunately, localisation procedures have not achieved sufficient reliability to allow their use as routine studies before initial surgery and have mainly found acceptance when surgical failure or recurrence requires reexploration. The introduction of Technetium-99m sestamibi as a parathyroid imaging agent in 1989 has resulted in excellent results for localisation of abnormal parathyroid glands. Furthermore, the results of multiple comparative studies suggest that the diagnostic utility of sestamibi protocols equals or exceeds other noninvasive imaging strategies, including high-resolution ultrasound, CT and MRI. The results for localisation of parathyroid adenomas are uniformly excellent, but the exact localisation of hyperplastic parathyroid glands is not as successful. The most common causes of a false positive study are thyroid adenomas or thyroid neoplasia.

Somatostatin Receptor Imaging

Most neuroendocrine tumours seem to possess somatostatin receptors in sufficient abundance to allow successful scintigraphic imaging. Although it has only been approved for clinical use in the last two years, Indium-111-DTPA Pentetreotide (Octreoscan) has proven its success in identifying various neuroendocrine tumours (except for insulinomas) and compares favourably with other imaging modalities. The main advantages of this procedure are whole body coverage and its noninvasive nature. Furthermore, the selective uptake of this tracer by specific tumour cells has led to targeted radiotherapy for certain neuroendocrine tumours, although it has only been used in a few patients at this stage.

OTHER THERAPIES

Iodine-131 metaiodobenzylguanidine (I-131 MIBG) therapy

This therapy has recently been used in malignant pheochromocytoma, childhood neuroblastoma, paragangliomas, carcinoid tumours, and medullary carcinoma of the thyroid, with moderate success achieved in malignant pheochromocytoma and childhood neuroblastoma. In childhood neuroblastoma, better results may be achieved when MIBG therapy is used before chemotherapy. Although complete remissions have been reported, the therapy is palliative rather than curative.

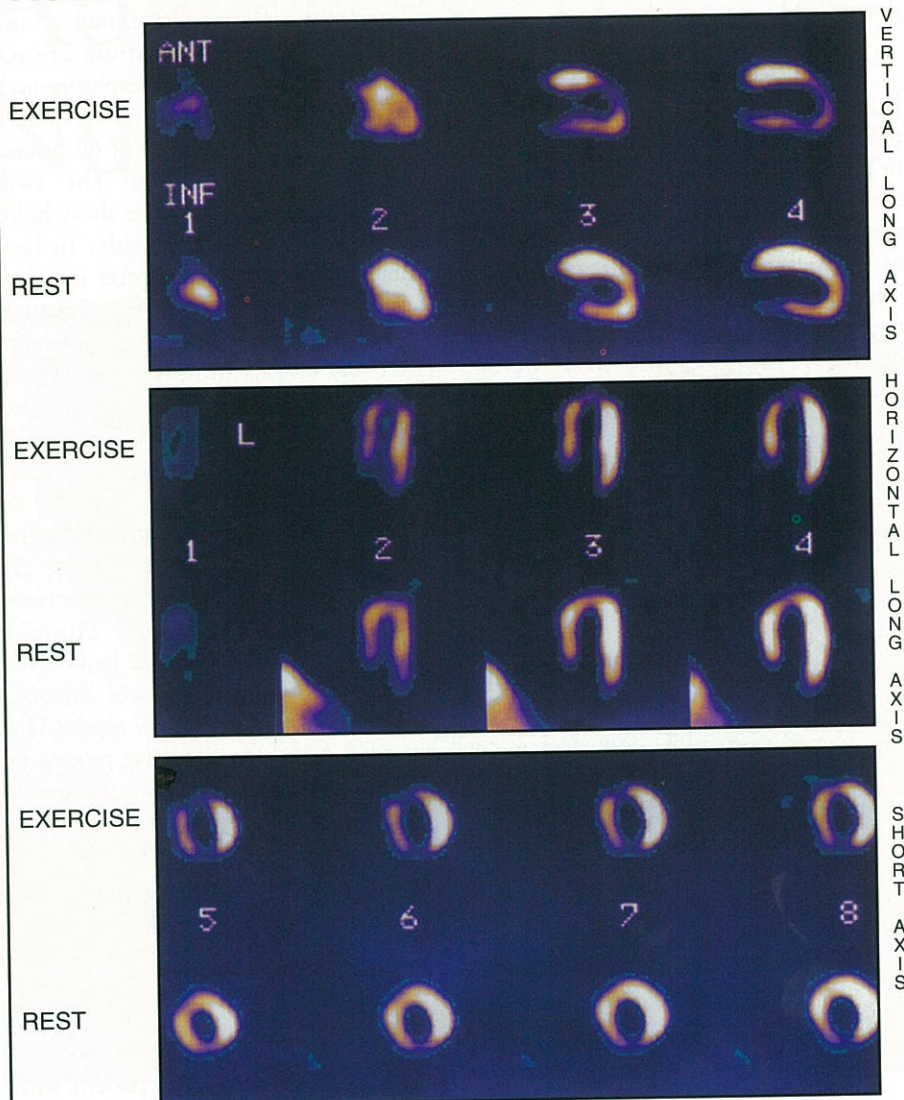
Strontium-89

The management of intractable bone pain in patients with multiple skeletal metastases is a significant clinical problem. Phosphorus-32 has been used as systemic therapy for the management of bone pain for nearly 50 years, but its significant haematological depression has placed limitations on its use. More recently, Strontium-89 and various other bone-seeking radiopharmaceuticals have been used as palliative treatment for patients with significant bone pain. The clinical responses have been excellent with acceptable haematological toxicities observed. Indeed the clinical results rival those of external beam radiation therapy, with fewer systemic and haematological side-effects. Currently in Australia, Strontium-89 is available free to patients with painful metastatic prostate cancer in bone who have failed hormonal management or radiotherapy.

FLUORINE-18 FLUORODEOXYGLUCOSE (F-18 FDG) IMAGING

Tissue oxygen delivery is reduced in vascular diseases and tumours. Agents capable of identifying cells that are viable but have reduced oxygen delivery could be extremely useful, and FDG offers some of these characteristics. FDG imaging with Positron Emission Tomography (PET) has proven utility in the evaluation of patients with cardiac, oncologic and neurologic diseases. However, PET scanners are extremely expensive and generally not available. It has recently been shown that the high energy (511 keV) photon of FDG can be

FIGURE 1



Tc-99m Sestamibi myocardial perfusion scan: the exercise images show several areas of reduced perfusion which have markedly improved perfusion in the corresponding images at rest.

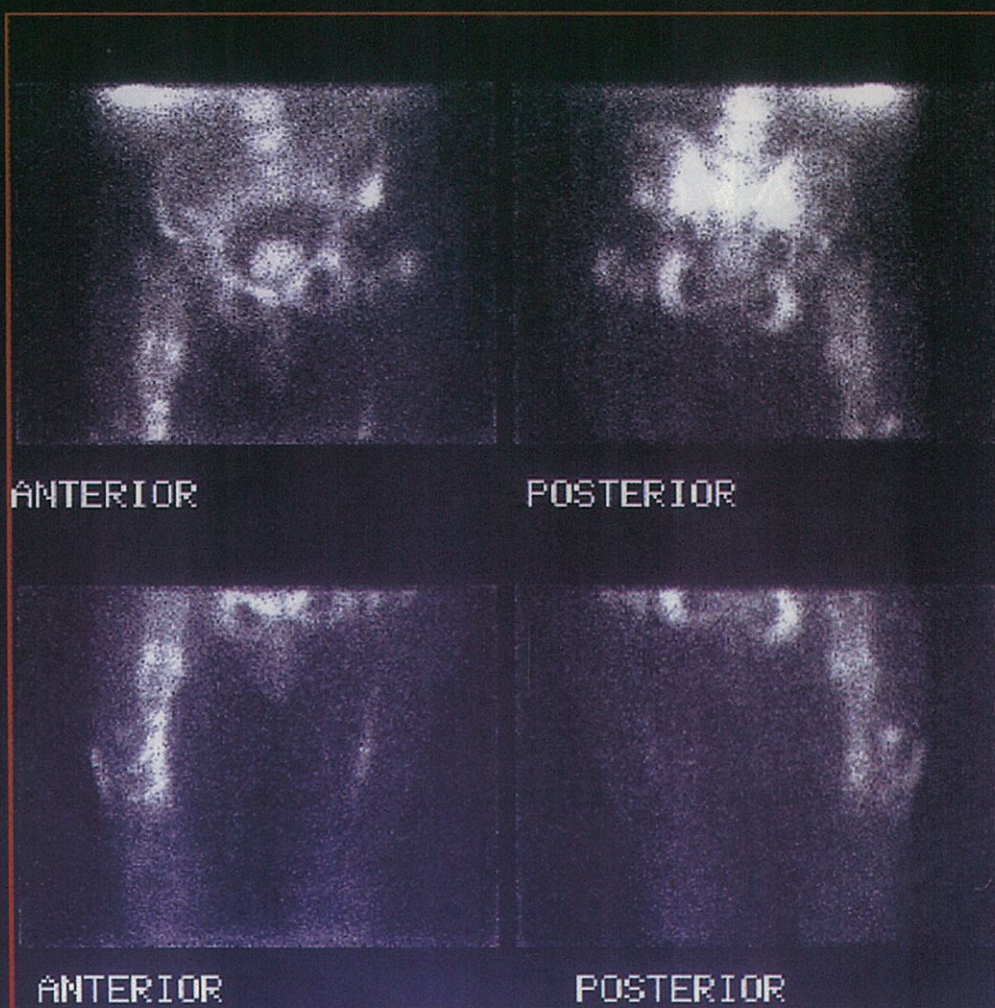
imaged by conventional gamma cameras with special modifications. Preliminary results in cardiac viability imaging and tumour detection are very promising with good agreement with FDG PET. FDG scintigraphy using a specially modified conventional gamma camera to detect myocardial viability is currently being investigated at St Vincent's Campus.

CONCLUSION

No other field of medicine has a greater ability to define disease as a problem in the chemical reactions involved in the normal function of cells and tissues of the body. As modern medicine becomes molecular in its orientation, Nuclear Medicine will be able to transfer the advances in molecular biology to the care of the sick.

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Figure 3: Stannous colloid labeled leukocyte scan: there is profuse increased uptake surrounding the right femoral prosthesis consistent with infection.

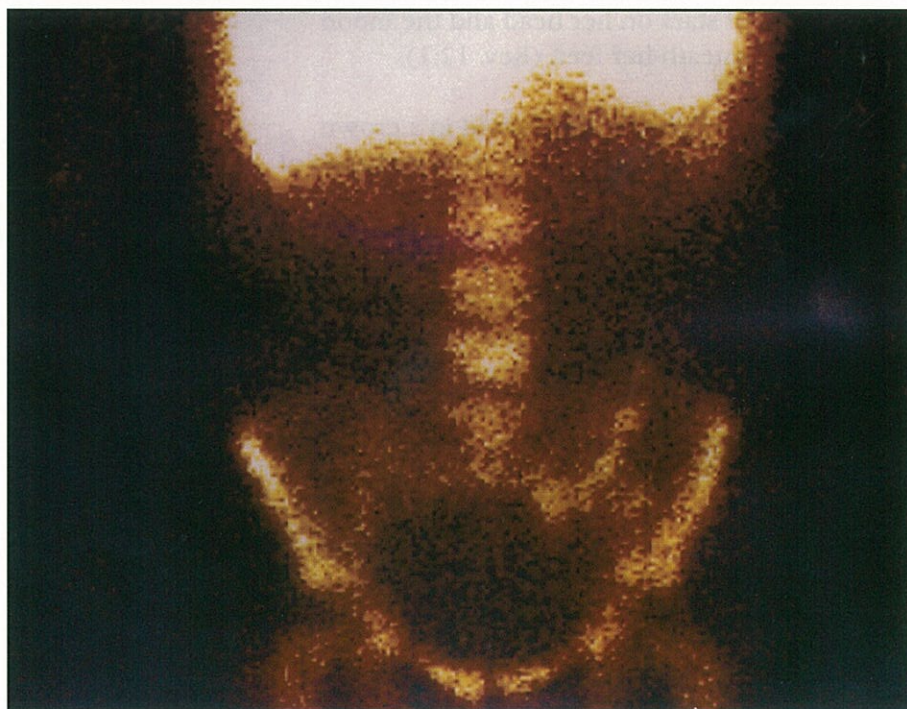


Figure 2: Stannous colloid labeled leukocyte scan showing active bowel infection/inflammation in the left iliac fossa. This patient had known Crohn's disease.



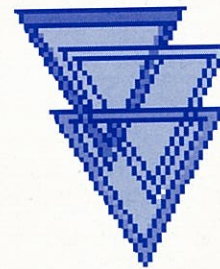
The Sisters of Charity of Australia Crest

The Crest bears the motto of the Congregation of the Sisters of Charity – “Caritas Christi Urget Nos” which means “The Love of Christ urges us on” and is a saying of St Paul (2 Cor. 5:14).

The main feature of the design is a shield on which are entwined the letters M and A, the initial letters of the words Maria Angelorum. It was under this title that Mary Queen of Angels was chosen as patroness by the founding members of the Sisters of Charity. A row of stars above the monogram and the moon below represent the figure of the Blessed Virgin as she appears in the prophetic book of Revelations – a crown of stars on her head and the moon beneath her feet. (Rev. 12:1).

Above the Crest, a cross based in a crown reminds the Sisters that it is by their imitation of Christ’s obedience to His Cross that they can hope to win the Crown of Eternal Life.

Mary Aikenhead, the founder of the Order of Sisters of Charity, wanted the direct title of Mother of God represented everywhere, so the Crest which signifies the Queenship of Mary is displayed in all our facilities.



St Vincent's Clinic Emblem

An Emblem is a distinctive symbol, depicting the aims of a specific facility or organisation. It is easily recognisable, and may be reproduced in a variety of media.

The Clinic Emblem presents the aims of the St Vincent's Clinic in a clear and symbolic form.

These aims are: patient care, medical teaching and clinical research. Each of these three aims is depicted within the Emblem by three single triangular shapes of equal size.

Since these three aims are interdependent, they form a link with each other, and this is represented in the Emblem.

There are several ways in which these three links can be put together, but there is only one way where each is binding with the other two to form a secure bond, that unites the Clinic aims together.

This Emblem offers a clear symbolic representation of the Clinic's aims, interwoven in a unique design.

The Medical staff of St Vincent's Clinic acknowledge with gratitude the creation of the Emblem by Dr Bruce Taylor.

