

## Ultrasound

Ascot Radiology has state-of-the-art ultrasound machines located at six of its branches across Auckland: Ascot Hospital, Ascot Central, AUT Millennium, Birthcare, Parnell, Highland Park and St Heliers. We believe our machines are currently the best in the world, and include all the very latest ultrasound technology. The scans are performed by a sonographer, directly supervised by a radiologist, or by a specialist radiologist or obstetrician trained in the use of ultrasound.

### WHAT IS ULTRASOUND?

**An ultrasound scan is a diagnostic imaging procedure that uses a transducer to send out sound waves at high frequency.** When the transducer is placed at certain locations and angles, the sound waves move through the skin and other body tissues to the organs and structures within. The sound waves bounce off the organs and return to the transducer. The transducer picks up the reflected waves, which are then converted by a computer into an electronic picture of the organs or tissues under study. Dolphins and bats navigate their way around using sound waves in exactly the same way as ultrasound.

Different types of body tissues affect the speed at which sound waves travel. Sound travels the fastest through bone, and moves most slowly through air. The speed at which the sound waves are returned to the transducer, as well as how much of the sound wave returns, is translated into a picture.

**Ultrasound is used to view internal organs as they function (in 'real time'),** and to assess blood flow through vessels. Ultrasound procedures are used to examine many parts of the body such as the **abdomen, breasts, female pelvis, prostate, scrotum, thyroid and parathyroid glands, and the vascular system.** During pregnancy, ultrasound is performed to evaluate the development of the fetus.

Technological advancements in the field of ultrasound allow images that can be made in a three-dimensional view and/or 'four-dimensional view'. The added fourth dimension of 4D is motion, so that it is a 3D view with movement, and these scans are predominantly used in obstetric scanning. It is used to enhance visualization of fetal abnormalities, picked up by conventional imaging, such as cleft lip, so that parents can recognize what the doctors are describing.

### WHAT ARE THE DIFFERENT TYPES OF ULTRASOUND SCANS?

**Different ultrasound techniques exist for different conditions.** Examples of some of the more common types of ultrasound examinations include the following:

- **Doppler ultrasound:** Doppler ultrasound can determine if there are any problems within the veins and arteries by measuring the speed and direction of flowing blood.
- **Vascular ultrasound:** Used to see the vascular system and its function, including detection of blood clots.
- **Abdominal ultrasound:** Used to detect any abnormalities of the abdominal organs (i.e. kidneys, liver, pancreas, gallbladder), such as gallstones or tumours.
- **Renal ultrasound:** Used to examine the kidneys and urinary tract, particularly to investigate kidney pain or blood in the urine (haematuria).
- **Obstetric ultrasound:** Used to monitor the development of the fetus and maternal wellbeing.
- **Pelvic ultrasound:** Used to scan the uterus, ovaries and/or bladder to help diagnose pelvic pain symptoms, for example.
- **Breast ultrasound:** Used to examine a mass in the breast tissue, and for surveillance in conjunction with mammography.

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- **Thyroid ultrasound:** Used to see the thyroid gland and to detect any abnormalities.
- **Scrotal ultrasound:** Used to further investigate pain and swelling in the testicles or to diagnose a testicular hernia.
- **Prostate ultrasound:** Used to examine any nodules felt during a physical examination, and as a guide during a biopsy.
- **Musculoskeletal ultrasound:** Used to examine any joint or muscle pain for conditions, such as tearing of the tendons.
- **Interventional ultrasound:** Used as a guide in minimally invasive procedures such as biopsies.

### BEFORE AN ULTRASOUND:

There is different preparation for each ultrasound depending on the type of scan you are having:

#### PELVIS, KIDNEYS, LOWER ABDOMEN, BLADDER:

- It is important to have a full bladder for this scan.
- 1 hour before your appointment, empty your bladder then drink 1 litre of water.
- Do not empty your bladder again until after your scan.

#### GALL BLADDER, UPPER ABDOMEN:

##### Morning Appointments:

- Eat a light meal the night before your appointment but do not eat any fatty food (i.e. butter, milk, eggs, cheese, fried food).
- Have nothing to eat or drink in the morning before your scan.

##### Afternoon Appointments:

- Eat a light meal the night before your appointment as above.
- On the day of the scan eat a light breakfast with no fat.
- Have nothing further to eat or drink until after your scan.

#### ABDOMEN & PELVIS:

- Follow the preparation for a gall bladder & upper abdominal scan and also have a full bladder.

#### OBSTETRIC SCANS:

- **Patients up to 8 weeks gestation:** It is important to have a full bladder for this scan. Follow the preparation for a pelvic ultrasound.
- **Patients over 8 weeks gestation:** There is no preparation required.

### DURING AN ULTRASOUND:

A clear gel is placed between the transducer and the skin to allow for smooth movement of the transducer over the skin and to eliminate air between the skin and the transducer for the best sound conduction. The transducer is moved across the skin, using different angles to obtain images of the area of interest.

### RISKS OF ULTRASOUND:

There are no confirmed adverse biological effects on patients or sonographers caused by exposure to ultrasound, but we image with the lowest power settings compatible with excellent image quality.

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