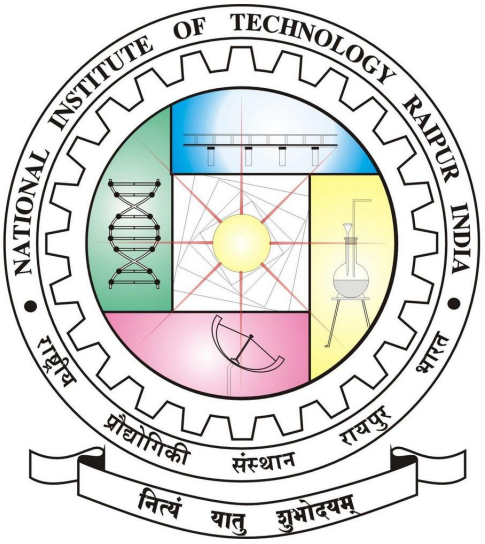

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assignment 01

Medical Devices

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1 Retinal Camera

1.1 INTRODUCTION

Retinal imaging takes a digital picture of the back of your eye. It shows the retina (where light and images hit), the optic disk (a spot on the retina that holds the optic nerve, which sends information to the brain), and blood vessels. This helps your optometrist or ophthalmologist find certain diseases and check the health of your eyes.

Doctors have long used a tool called an ophthalmoscope to look at the back of your eye. Retinal imaging allows doctors to get a much wider digital view of the retina. It doesn't replace a regular eye exam or regular dilation,, but adds another layer of precision to it.

1.2 Benefits and Drawbacks

Retinal imaging allows eye doctors to see signs of eye diseases that they couldn't see before. The test itself is painless and the results are easy for doctors to interpret. Your doctor can store the images on a computer and compare them with other scans.

Retinal imaging has its limitations. It can't detect a disease where the retina is bleeding. It also may not see problems on the outer edges of your retina.

Retinal imaging may be covered by your medical insurance (not your vision insurance) or Medicare. It depends on the terms of your policy as well as the reason you are having the test done.

1.3 How long does a retinal scan take

The entire process takes around 5 minutes. In special cases, if your optometrist suspects you have a type of macular degeneration, you may need a body-safe dye injected by IV to highlight blood vessels in your eye before the test. This can take up to 30 minutes

1.4 How accurate is a retinal scan

Retina scans are nearly impossible to fake. ... Retinas scans are about 70 times more accurate than iris scans and 20,000 times more accurate than fingerprint-based methods. However, a retina scan does require the subject to focus on a single point for the entire 15-second duration.

1.5 Are retina scans expensive

Despite their high accuracy rates, retinal scanners aren't used very widely and are relatively obscure. This is due to the fact that the retinal scanning equipment is often very sophisticated and expensive, costing anywhere from $200 to$ **4000. Furthermore, retinal scans often feel 'invasive' to people**

1.6 Why is retinal important

Your retina is an essential part of your vision as it's responsible for turning light rays into images through signals to the brain. When there's a problem with your retina due to eye disease, ocular trauma or other conditions, you run the risk of causing long-term damage to your eyesight

1.7 What is retinal imaging benefit

Retinal imaging provides detailed photographs of the retina, the inner nerve layer that lines the back of the eye, as a diagnostic tool to monitor

2 Audiometer

2.1 INTRODUCTION

An audiometer is a machine used for evaluating hearing acuity. They usually consist of an embedded hardware unit connected to a pair of headphones and a test subject feedback button, sometimes controlled by a standard PC. Such systems can also be used with bone vibrators, to test conductive hearing mechanisms.

Audiometers are standard equipment at ENT (ear, nose, throat) clinics and in audiology centers. An alternative to hardware audiometers are software audiometers, which are available in many different configurations. Screening PC-based audiometers use a standard computer. Clinical PC-based audiometers are generally more expensive than software audiometers, but are much more accurate and efficient. They are most commonly used in hospitals, audiology centers and research communities. These audiometers are also used to conduct industrial audiometric testing. Some audiometers even provide a software developer's kit that provides researchers with the capability to create their own diagnostic tests.

2.2 What are the types of audiometer?

Various audiometric techniques and procedures are used to identify the hearing ability of a person.

- Pure-tone audiometry - Speech audiometry - Suprathreshold audiometry - Self-recording audiometry - Impedance audiometry - Computer-administered (microprocessor) audiometry - Subjective audiometry - Objective audiometry.

2.3 How much does audiometer cost

An audiometer is a device used to evaluate hearing loss during an audiology test. Usually, it is an individual piece of hardware that delivers pure tones of controlled intensity to one ear at a time, to which a patient responds when they can hear the tone. Many modern devices can either be used alone or connected to a computer and integrated with hearing conservation databases. Audiometers generally cost between dollar 800 and 5000.

2.4 How Audiometry Is Performed

There are a few tests involved in audiometry. A pure tone test measures the quietest sound you can hear at different pitches. It involves using an audiometer, which is a machine that plays sounds via headphones. Your audiologist or an assistant will play a variety of sounds, such as tones and speech, at different intervals into one ear at a time, to determine your range of hearing. The audiologist will give you instructions for each sound. Most likely, they'll ask you to raise your hand when a sound becomes audible.

Another hearing test allows your audiologist to assess your ability to distinguish speech from background noise. A sound sample will be played for you and you'll be asked to repeat the words you hear. Word recognition can be helpful in diagnosing hearing loss.

A tuning fork may be used to determine how well you hear vibrations through your ears.

3 Cataract Surgical Unit

3.1 INTRODUCTION

Cataract surgery is one of the most common and most successful surgical procedures performed where complications are very rare. Even the most common complications in cataract surgery are treatable and don't have a long-term impact on the vision. In the cataract surgery, the surgeon removes the cloudy natural lens of your eye (cataract) and replaces it with an intraocular lens. The clear thin membrane, i.e., the lens capsule, which surrounds the natural lens, is kept intact during the surgery. The intraocular lens is placed within this capsular pocket.

Most cataract operations are performed under Topical Anaesthesia which is administered via eyedrops, making it needleless, painless and quick. The whole procedure requires a short stay in the hospital for around 2-3 hours. To dilate the pupil, cataract patients need to have eye drops one hour before the surgery time. The cataract operation only takes 10-15 minutes to complete. The patient is kept in the hospital recovery area for observation for up to 1 hour after the surgery. All the information is given on how to care for the eye and the use of eye drops.

After the procedure, it is advised to bring a pair of protective glasses to wear to protect your eye from the dust and glare. Someone will need to drive the patient home. An eye pad will be placed over the eye which is usually removed in an hour post surgery.

Close follow-up care is taken after surgery to ensure that if the cataract

patient has developed any postoperative complications which can be identified early to be treated effectively.

3.2 How Is Traditional Cataract Surgery Done

Phacoemulsification is the name for traditional cataract surgery. Your surgeon creates a small incision in your cornea by hand with a scalpel. They insert a small instrument through this opening. It goes behind your pupil where the eye's lens sits in a capsule. Your surgeon creates a round opening in the capsule. Then your surgeon inserts a pen-shaped probe through that opening. The probe applies sound waves (ultrasound) to break up the cloudy lens. Then the surgeon suctions out the broken-up pieces. They replace your lens with an artificial intraocular lens (IOL). The incision is self-sealing and usually does not need stitches.

3.3 Benefits of laser cataract surger

Using a laser allows the surgeon to make precise incisions in less time. It can improve accuracy and consistency. In some cases, the laser can provide more correction than traditional surgery. The laser can reduce the amount of ultrasound energy needed to soften the lens prior to removal.

However, studies do not show that laser surgery results in fewer complications. Also, studies haven't found that laser surgery provides better outcomes. Your outcome depends in large part on the skill and experience of your surgeon.

3.4 What Do You Want From Cataract Surgery

Replacing a cloudy lens and wearing glasses for some things is perfect for many people. .

4 Anaerobic Chamber

4.1 INTRODUCTION

Anaerobic chambers, also known as anaerobic glove boxes, are atmosphere control units designed to be used when working with oxygen sensitive materials, product containment needs, and/or general isolation control. These units allow researchers to easily process, culture and examine samples without exposure to atmospheric oxygen. Chambers/glove boxes are used in large clinical or research applications such as cell culture applications requiring the ability to accurately control oxygen, carbon dioxide, temperature and humidity. Choice of box may depend on application specific requirements such as temperature and humidity regulation. Options features include separate incubators, oxygen/hydrogen monitor, real time feedback system monitors, touch screen interface, and transfer airlocks.

4.2 The Role of the Anaerobic Chamber in Microbiology

The anaerobic chamber, developed more than 40 years ago for microbiologic use, has evolved with operators' needs and remains a significant tool for research and other applications worldwide. This article highlights the role of the anaerobic chamber in the clinical laboratory as well as current research using the chamber. The history and successful utilization of the tool are discussed.

the use of the anaerobic chamber has proven instrumental for anaerobic studies. "The application of new methodologies has greatly expanded the known diversity and potential of anaerobic microorganisms and processes. In particular, anaerobic techniques that permit the successful cultivation

of microorganisms on solid media have opened new avenues for the study of the physiology and metabolic potential of many new microorganisms using molecular, genomic and proteomic tools

The anaerobic chamber is being used in cutting-edge research on biomass, biofuels, and bioremediation, and in drug discovery and infectious disease identification. Due to advancements in research techniques, technicians in the clinical laboratory can now use the anaerobic chamber to evaluate the presence of disease agents in patient specimens, and sometimes to determine if the disease agent is susceptible to antibiotic treatment.

4.3 Why use an anaerobic chamber for bacterial growth

The anaerobic chamber is one of the best solutions for incubating anaerobes, i.e. bacteria that can live in the absence of oxygen and cause families of infections such as intoxications, mixed infections and gas gangrene. ... It provides ideal conditions for growing these bacteria strains.

4.4 Anaerobic Chambers Are Like Big Glove Boxes

- Anaerobic chambers are either rigid boxes or a flexible polyvinyl bag.

- Chambers have either one or two sets of gloves for single or tandem use.

- They have an airlock transfer chamber to bring items in without affecting the inside environment.

5 Vacuum Extractors

5.1 INTRODUCTION

A vacuum extraction — also called vacuum-assisted delivery — is a procedure sometimes done during the course of vaginal childbirth.

During a vacuum-assisted vaginal delivery, a health care provider applies the vacuum — a soft or rigid cup with a handle and a vacuum pump — to the baby's head to help guide the baby out of the birth canal. This is typically done during a contraction while the mother pushes.

Your health care provider might recommend vacuum extraction during the second stage of labor — when you're pushing — if labor isn't progressing or if the baby's health depends on an immediate delivery.

Although your health care provider may recommend a vacuum extraction to speed up your delivery, there are potential risks, including a risk of injury for both mother and baby. If vacuum extraction fails, a cesarean delivery (C-section) might be needed

5.2 Risks Factor

A vacuum extraction poses a risk of injury for both mother and baby.

Possible risks to you include:

- Pain in the perineum

— the tissue between your vagina and your anus — after delivery

- Lower genital tract tears

- Short-term difficulty urinating or emptying the bladder

- Short-term or long-term urinary or fecal incontinence (involuntary urination or defecation)

5.3 How you prepare

Before your health care provider considers a vacuum extraction, he or she might try other ways to encourage labor to progress. For example, he or she might adjust your anesthesia to encourage more-effective pushing. To stimulate stronger contractions, another option might be intravenous medication — typically a synthetic version of the hormone oxytocin (Pitocin). Your health care provider might also make an incision in the tissue between your vagina and anus (episiotomy) to help ease the delivery of your baby.

If vacuum extraction seems to be the best option, your health care provider will explain the risks and benefits of the procedure and ask for your consent. You might also ask about alternatives, usually a C-section

5.4 Why vacuum extraction is bad

If used improperly, vacuum extractors can cause head trauma and brain damage that can lead to cerebral palsy, intellectual and developmental disabilities (I/DD), and other disabilities. Just as every pregnancy is unique, so is the labor and delivery process.

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