

A Dissertation on

**PRE AURICULAR SINUS - A STUDY OF  
CLINICAL PRESENTATION AND  
COMPARISON OF SIMPLE SINECTOMY WITH  
SUPRA AURICULAR APPROACH TECHNIQUE**

Submitted to the

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In partial fulfilment of the requirements

For the award of the degree of

**M.S.BRANCH IV  
(OTORHINOLARYNGOLOGY)**



**GOVERNMENT STANLEY MEDICAL  
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THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY,  
CHENNAI, TAMILNADU**

**APRIL 2013**

## DECLARATION

I, **Dr. M.KAVITHA**, Solemnly declare that the dissertation, titled “**PRE AURICULAR SINUS – A STUDY OF CLINICAL PRESENTATION AND COMPARISON OF SIMPLE SINECTOMY WITH SUPRA AURICULAR APPROACH TECHNIQUE**” is a bonafide work done by me during the period of Oct. 2011 to Sept. 2012 at Government Stanley Medical College and Hospital, Chennai under the expert supervision of **PROF. DR. T. BALASUBRAMANIAN, M.S., D.L.O.**, Professor and Head, Department Of Otorhinolaryngology , Government Stanley Medical College and hospitals, Chennai.

This dissertation is submitted to The Tamil Nadu Dr. M.G.R. Medical University in partial fulfilment of the rules and regulations for the M.S. degree examinations in Otorhinolaryngology to be held in April 2013.

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## **CERTIFICATE**

This is to certify that the dissertation presented “**PRE AURICULAR SINUS- A STUDY OF CLINICAL PRESENTATION AND COMPARISON OF SIMPLE SINECTOMY WITH SUPRA AURICULAR APPROACH TECHNIQUE**” **DR.M.KAVITHA**, is an original work done in the Department of Otorhinolaryngology, Government Stanley Medical College and Hospital, Chennai in partial fulfillment of regulations of the Tamilnadu Dr. M.G.R. Medical University for the award of degree of M.S. (Otorhinolaryngology) Branch IV, under my supervision during the academic period 2010-2013.

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## INTRODUCTION

Pre auricular sinus is a common congenital abnormality of the pre auricular soft tissues. Van Heusinger first described this condition in 1864<sup>1</sup>. The estimated incidence of this condition is 0.1 – 0.8%<sup>2</sup> in the United States, 0.46%<sup>2</sup> in Hungary, 0.08% in England , 2.45% in Taiwan and 3– 11%<sup>2</sup> in Africa

Unilateral lesions are more common than bilateral .Bilateral lesions are more likely to be inherited. When inherited they show an incomplete autosomal pattern with reduced penetrance and variable expression<sup>7</sup>. Studies in China have shown chromosome 8q 11.1 –q13.3 to be site of abnormal gene which transmits pre auricular sinus.

This condition is usually asymptomatic occurs most commonly on right side<sup>14,3</sup>. It is usually present as small hole at the anterior margin of ascending limb of helix<sup>1</sup> and ,superior to the pinna . In some patients, the sinus opening is located along the posterior surface of crus helix close to the tragus or ear lobule. Very rarely, it may be seen posterior to the auricle<sup>14,25</sup>. This condition is usually identified during routine ENT examination. Pre auricular pits have been associated with a number of syndromes.

Pre auricular sinus tracts are usually very narrow. The course of the sinus tract in the pre auricular subcutaneous tissues is not constant, They may follow a tortuous course with many ramifications .In most of the cases the sinus tract get attached with the perichondrium of the helical cartilage.

Once infected the pre auricular sinus may present with cellulitis around the sinus opening which extends to the face, formation of abscess or ulcer located anterior to the pinna. Once infection occurs, the incidence of recurrent acute exacerbation is high. Recurrent infections involving the pre auricular pit should be managed by adequate surgical resection of the sinus tract completely with its ramifications. Recurrence after surgery is due to inadequate removal of the squamous epithelium from the sinus tract . Incision and drainage of abscess prior to surgery, recurrent infectious episodes can produce scars and further alter the sinus course and make the operation more difficult.

Many surgical procedures have been described to reduce the high recurrence rate after excision of pre auricular sinus .Here we compare the surgical outcome after standard sinectomy versus supra auricular approach technique<sup>5,13,24,32,34</sup> .

## **AIM OF THE STUDY**

1. To compare the surgical outcome of simple sinectomy (Standard technique) with supra auricular approach technique.
2. To find out the common location of pre auricular sinus.
3. To find out the incidence of associated syndromes.

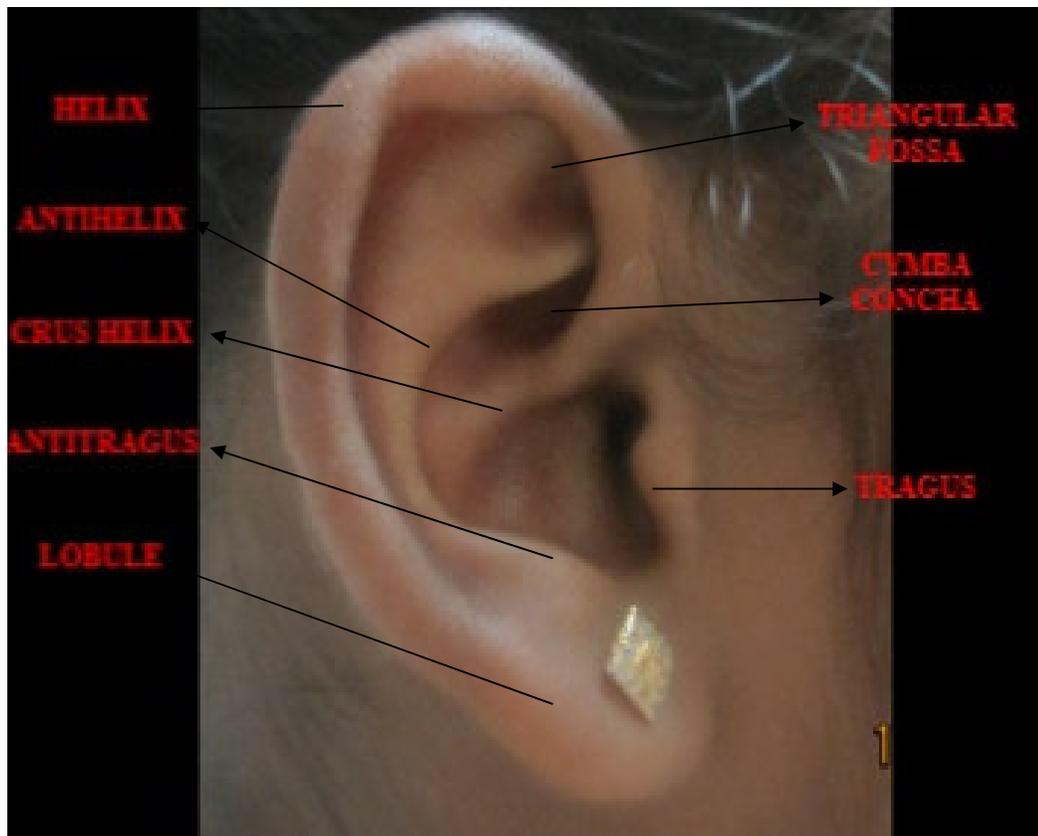
## **LITERATURE REVIEW**

### **ANATOMY OF THE EXTERNAL EAR**

Auricle projects at a variable angle from the side of the head and has some function in collecting sound. Its shape showing considerable individual variability. The contour of the pinna is determined by the configuration of its elastic cartilage frame. The skin of the lateral and medial surfaces of the pinna possesses hair, both sebaceous and sudoriferous glands. The skin is tightly bound to the perichondrium on the lateral aspect and only loosely attached to the medial. The cartilage of the pinna is an extension of the cartilage of the external auditory canal, it is invested in perichondrium and secured to the head by several ligaments and muscles. An anterior ligament stabilizes the tragus and helical root at the zygomatic process, and a posterior ligament stabilizes the concha to the mastoid.

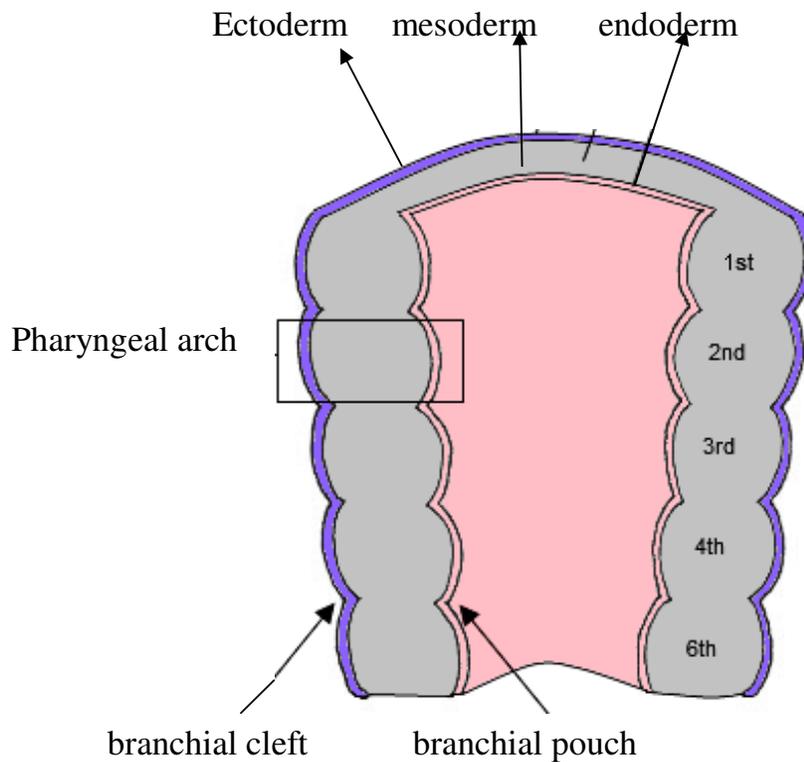
The lateral surface of the auricle has characteristic prominences and depressions. A cartilaginous protuberance at the helix is called "Darwin's tubercle" and is the vestigial remnant that corresponds with the tip of an animal's ear. Anterior to and parallel with the helix is another prominence, the anti helix. Superiorly this divides into two crura, between which is the triangular fossa. The scapoid fossa lies

above the superior of the two crura. In front of the anti helix and partly encircled by is the concha. This is divided into two portions by the descending limb of the anterior superior portion of the helix known as the crus of the helix, which rests just above the external auditory canal. The smaller superior portion is the cymba conchae. The larger inferior portion is known as the cavum conchae. Below the crus of the helix is the tragus, which is a small blunt prominence, pointing posteriorly. Opposite to the tragus at the inferior limit of anti helix is the antitragus. The intertragic notch separates the tragus from antitragus. The lobule lies below the antitragus is made up of soft fibrofatty tissue



## EMBRYOLOGY OF THE EXTERNAL EAR:

At 5 weeks of gestation the area of future face and neck of the embryo are formed from the paired branchial arches, pouches and associated vessels. They are covered externally by ectoderm which form cleft between successive arches and internally by endoderm that forms pouches between arches. Each arches has its own cranial nerve ,artery and cartilagenous element

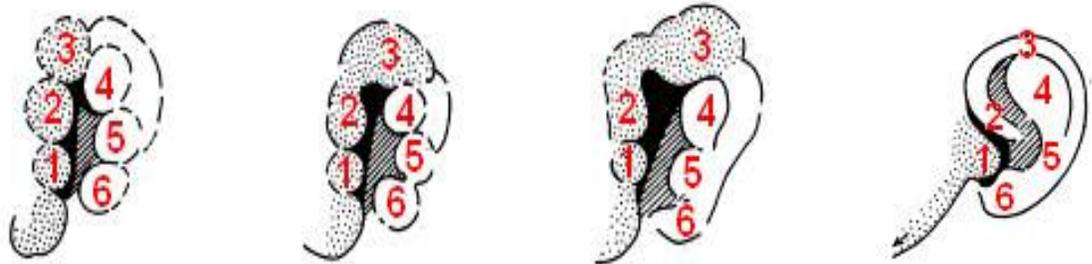


Normally, the ventral parts of the first and second arches fuse to obliterate the ventral end of the first cleft. The dorsal end of the first

cleft gives rise to the cavum conchae and the external auditory canal. The ventral end of the first branchial cleft is normally obliterated. If it persists it gives rise to persistent sinus, cyst or fistula which extends from the pre auricular region and opens into the external auditory canal. Eustachian tube and middle ear cavity develops from the first branchial pouch.

During the 6<sup>th</sup> week of gestation, the auricle begins as small buds of mesenchyme known as hillocks of his on either side of the first branchial cleft below the level of the mandible. The exact embryology each of these hillocks remains unclear.

Auricular hillocks, three from the first pharyngeal arch and three from the second pharyngeal arch surround the cleft below the level of mandible. The first hillock forms the tragus, 2<sup>nd</sup> and 3<sup>rd</sup> form the helix, the 4<sup>th</sup> and 5<sup>th</sup> form the anthihelix and 6<sup>th</sup> forms the antitragus. Additionally, the helical margin may develop separately from a skinfold caudal to hillocks 4 and 5, which then develops rapidly during weeks 8 through 12. Finally, the helix furls during the sixth month. Cartilage formation begins at week 7.



1<sup>st</sup> Hillock - Tragus

2<sup>nd</sup>&3<sup>rd</sup> Hillock - Helix

4<sup>th</sup>&5<sup>th</sup> hillock - Antihelix

6<sup>th</sup> Hillock - Antitragus

The concha develops from the ectoderm of the first pharyngeal groove. The upper portion forms the cymba concha, the middle portion forms the cavum concha, and the lowest portion forms the intertragal incisura. Malformation of the conchal bowl contributes to excessive protrusion of the pinna .

The position of the auricular complex begins at the anterior neck region. During the development of the mandible, the auricular complex moves upwards in dorsal and cephalic directions.

By the time a person is 3 years old, 85% of auricular growth is complete, and the cartilaginous growth is almost complete by age 5 years. The auricle grows rapidly in the first 3 years of life and then

grows more gradually. For boys it grows approximately up to the age of 13 and for girls upto 12 years. The average vertical dimension is 5cm in infants, whereas in adults it is 6cm. Because of these growth characteristics, any surgical intervention can be accomplished after the age of 6 years without hindering additional growth.

Knowledge of normal ear development aids understanding of the potential combinations of malformations possible in ears. This understanding helps surgeons to select appropriate surgical candidates and avoid complications during surgery. Because of the independent development of the inner ear, middle ear, and external ear, deformity of one does not necessitate deformity of another. Fortunately, inner ear structure and function are usually normal in ears with outer and middle ear abnormalities.

Persistence of remnants of the branchial apparatus gives rise to congenital anomalies in the head and neck. A persistent cleft gives rise to an external sinus, a blind ending opening onto the skin. A persistent pouch will cause an internal sinus typically opening into the pharynx. Persistence of both cleft and pouch will cause a fistula with internal and external opening.

Anomalies that cause a single opening or sinus or the persistence of a tissue remnant are more common than fistulae.

Preauricular sinus occurs anterior to the external auditory canal, usually superior to the region of the tragus. In essence, they are inclusion cysts related to fusion of the ectodermal hillocks from the first and second pharyngeal arches during formation of the external ear. By contrast, true first brachial cleft abnormalities are duplications of the membranous part of the external auditory canal, and they manifest clinically as cysts, sinuses, or fistulas.

The exact embryological basis of preauricular sinus is uncertain, various theories have been suggested for the formation of preauricular sinus

### **Theories of preauricular sinus formation<sup>2,20</sup>:-**

#### **Embryological fusion Theory:-**

This theory states that the formation of the preauricular pit is due to incomplete fusion of the six auricular hillocks of the first branchial cleft. By week 12, the hillocks have fused. When these fuse inappropriately, a preauricular sinus tract can result. All commonly accept this theory.

## **ECTODERMAL INFOLDING THEORY:-**

This theory suggests that pre auricular sinus develop from single separated ectodermal folding during auricular development .

## **INCOMPLETE CLOSURE OF DORSAL PART OF FIRST BRANCHIAL GROOVE:**

This Theory suggests that formation of fistulas of the ascending helix and pre auricular sinuses are due to defective closure of dorsal part of the first branchial groove. This theory assumes that pre auricular sinuses are branchiogenic malformation.

Pre auricular sinus is often confused with bronchial left anomalies. These bronchial cleft anomalies are related to the external auditory canal, tympanic membrane or angle of mandible where as the pre auricular sinuses are not. Pre auricular pits are present lateral, superior and posterior to the branches of the facial nerve and the parotid gland. This feature differentiates it from bronchial anomalies.

Involvement of the branches of the facial nerve is uncommon in pre auricular sinus , through surgical removal may put the facial nerve at risk.

Pre auricular sinuses can occur either in inherited or sporadic manner. In about 50% of cases, it occurs in a sporadic manner and right sided lesions are more common than left. Bilateral lesions are more likely to be inherited. Men and women were equally affected by this condition. Some studies showed a more frequent occurrence in women.

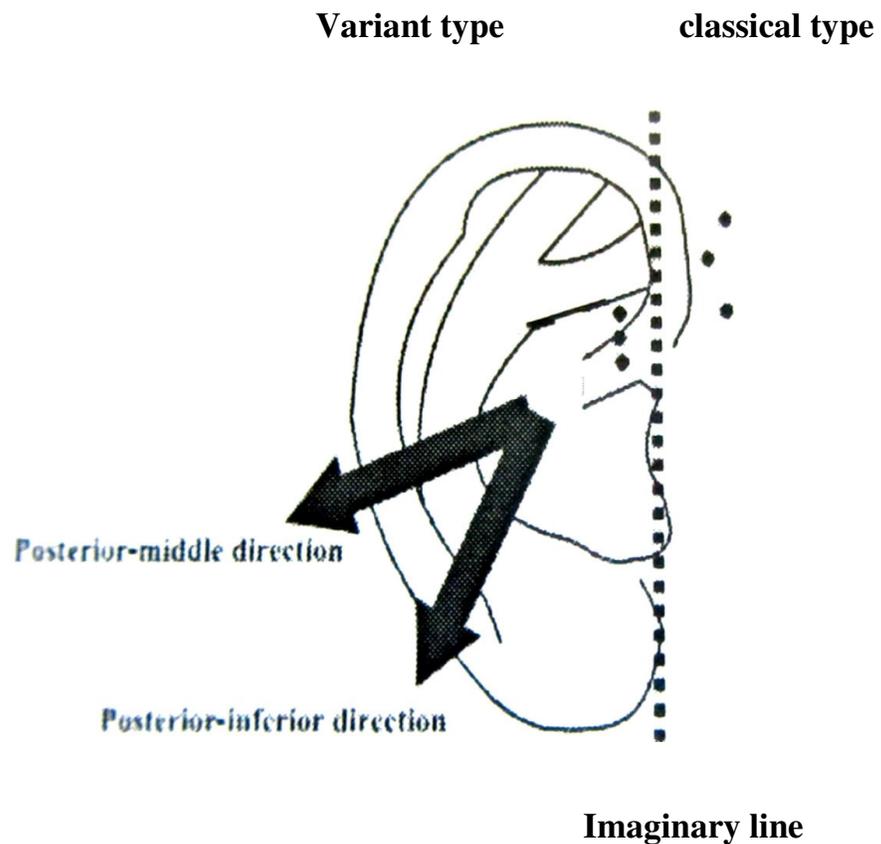
Pre auricular sinus opening is usually present at the anterior margin of ascending limb of helix . The pre auricular sinus opening has also been reported to occur along the postero superior margin of helix, the tragus or ear lobule. Variant type<sup>25,28,33,14</sup> of pre auricular sinus has also been reported in which the location of the sinus opening is posterior to the tragus. In some patients, pre auricular sinus is associated with a subcutaneous cyst in close proximity to the sinus opening.

### **PRE AURICULAR SINUS WITH CYST**



Pre auricular sinuses are classified into two types, the classical type and the variant type.

1. Classical type - in this type the sinus opening is located anterior to the imaginary line which connects the tragus to the posterior margin of the ascending limb of helix .
2. Variant type - is defined as the pre auricular sinus opening which is present posterior to the imaginary line.



## CLASSICAL TYPE



## VARIANT TYPE



The variant type further classified into three types according to the location of the sinus opening.

Type I → The opening of the sinus is present at the middle of crus helix

Type II → The opening of the sinus is present at the superior area of the crus helix

Type III → opening of the sinus is present at the cymba concha.

In the variant type, the direction of the sinus tract is towards the postero- middle or postero -inferior direction . It may present as a swelling in the post auricular area and is commonly misdiagnosed as infected dermoid, sebaceous cyst, lymphadenitis , branchial cleft cyst and subperiosteal mastoid abscess.

Pre auricular sinuses are consists of tubular structures with or without branching patterns. The walls of the sinus tract may be thin and glistening or white and thickened. The sinus tract can vary in length, with many ramification and the lumen is filled with debris. The pre auricular sinus tract is lined with stratified squamous epithelium. The connective tissue surrounding the duct may contain sweat and seabaceous glands, hair follicles.

Pre auricular sinus can be associated with ear and renal anomalies (unilateral or bilateral renal agenesis, hydronephrosis, hypoplastic kidney ,crossed ectopia ,horseshoe kidney ,pelvic and cystic kidney ,duplicated ureter ,mega ureter ,or vesico ureteric reflux) and part of many syndromes.

Patients with ear anomalies should be carefully evaluated for associated dysmorphic features including asymmetry of face, branchial cysts, colobomos of iris, eyelid and retina, choanal atresia , hypoplasia

of jaw , cardiac murmurs , anomalies of lower limb and imperforate anus.

Syndromes associated with pre auricular sinus includes

### **1. Branchio – oto – renal syndrome (BOR)**

Autosomal dominant disorder characterized by external, middle or inner ear anomalies, conductive (due to auricular malformations), sensory neural or mixed hearing impairment, pre auricular pit, renal malformations (duplex collecting system, hydronephrosis ,dysplasia, bilateral renal agenesis) lateral cervical fistulas, nasolacrimal duct stenosis . Inner ear malformation includes Mondini dysplasia, absent or underdeveloped semicircular canals and dilated cochlear aqueducts. Hearing impairment is not always present but the pre helical pits are a very prominent feature.

### **2. Branchio – Oto – Urethral syndrome**

These patients have pre auricular sinus, sensory neural hearing loss, renal anomalies like duplication of ureters or bifid renal pelvis

### **3. Branchio- otic -syndrome**

This is a variant of BOR syndrome. These patients have pre auricular sinus branchial anomalies, hearing impairment with no renal anomalies.

### **4. Branchio -oto – Costal syndrome**

These patients have branchial arch anomalies (unilateral), bilateral commissural lip, pre auricular sinus, conductive deafness and rib anomalies.

### **5. Oculo-auriculo vertebral syndrome(Goldenhar syndrome)**

This syndrome is due to defective development of first and second branchial arches. This condition is usually unilateral .Ear abnormalities are found in 65% of cases. These patients have external ear abnormalities such as pre auricular tags ,pre auricular pits , low set ears ,narrow external auditory canal, and aural atresia, epibulbar tumours , hypoplasia of maxillary ,temporal ,malar and mandibular bones.

### **6. Cat eye syndrome.**

These patients have pre auricular sinus, coloboma of iris, imperforate anus and down slanting palpebral fissures.

## **7. Waardenburg's syndrome**

Autosomal dominant syndrome usually affected first degree relatives characterized by syndromic sensory neural hearing loss and pigmentary anomalies of hair, iris and skin, dystopia canthorum (lateral displacement of inner canthus of eye). Patients with typical features of waardenburg's syndrome except the white forelock, Syndactyly, bilateral pre auricular pits, absence of 1 fourth toe on left side and dacrocystitis.

## **8. Trisomy 22**

These patients have bilateral preauricular sinus, primitive and low set ears, antimongoloid palpebral fissures, macroglossia, micrognathia, clinodactyly, cleft palate, enlarged sub lingual glands and short lower limbs

## **9. Incomplete trisomy 22**

Congenital heart defect, membranous anal atresia distal limb hypoplasia, partial cutaneous syndactyly and left pre auricular pit.

## **10. Steatocytoma multiplex**

Facial steatocytoma multiplex associated with bilateral pre auricular sinuses and pilar cyst.

There is a rare association between pre auricular sinus and some congenital syndrome .Routine renal ultrasonogram in patients with pre auricular sinus is controversial. Some literatures have reported the association between pre auricular sinus and renal malformations.

2.2% to 4.3%<sup>29</sup>. Of renal anomalies was reported in children with isolated pre auricular sinus . Leung and Robson in calgary, Canada, have recommended routine renal ultrasonogram in all children with preauricular sinus. Others do not accept their view.

Wang et al in California<sup>7</sup>, USA suggested that renal ultrasonography is indicated in patients with pre auricular sinus and one or more the following . 1) Another malformation or dysmorphic features 2) Family history of deafness. 3) An auricular or renal malformation. 4) Maternal history of gestational diabetes

Hearing loss is also associated with pre auricular sinus. No definitive studies have demonstrated that isolated pre auricular sinuses necessitate routine hearing assessment.

Routine radiographic imaging of preauricular sinus is unnecessary. Sonography <sup>18</sup>demonstrate pre auricular sinus and their relationship between the superficial temporal artery , crus helix and the tragal cartilage.

This condition is usually asymptomatic, isolated and require no treatment. It is usually noted during routine ENT examination. Sometimes it forms a cyst around the sinus opening.

However, once infected it causes facial cellulites, pain and abscess formation. chronic intermittent drainage of purulent material from the opening was noted in some patients. The most common organism<sup>14,20</sup> causing infection are staphylococcus aureus, staphylococcus epidermis and less commonly proteus, peptococcus and streptococcus. Discharge could be due to desquamating epithelial debris or infection. Once infected the pre auricular sinuses rarely become asymptomatic and often develop recurrent acute exacerbations.

This abscess is generally formed away from the pre auricular sinus opening and may be misdiagnosed as infected dermoid cysts and sabeceous cysts. A clinical study<sup>34</sup> suggests when infection develops the abscess tend to gravitate to the pre auricular subcutaneous fat layer. The possible reasons are

1. The spine of helix and the superior auricular ligament - prevent the abscess from gravitating superiorly and posteriorly.

2. The arch of the zygomatic bone - prevent the abscess from invading superiorly.
3. The trunk of the superficial temporal artery - prevent the abscess from expanding anteriorly.

**PRE AURICULAR SINUS WITH ABSCESS AWAY FROM SINUS  
OPENING**



## PRE AURICULAR SINUS WITH ABSCESS OVER THE SINUS OPENING



In the acute phase of infection, the patients must receive systemic antibiotics. If abscess is formed in the pre auricular region, it must be incised and drained. Incision and drainage would cause disruption of the sinus architecture and extensive scarring causing difficulty in complete surgical clearance of the area later. To prevent this complications Coates worth et al<sup>15</sup> have described a technique in which the pre auricular abscess can be drained with lacrimal probe.

This allows drainage to occur via the normal opening of the preauricular sinus. Conventional Incision and drainage should be performed if the abscess does not drain with lacrimal probe.

### PRE AURICULAR SINUS WITH CELLULITIS



If recurrent and persistent infection occurs, excision of the preauricular sinus is performed during the infection free period .

Many surgical procedures have been described in the literature for excision of preauricular sinus. The recurrence rate (1% - 45%)<sup>5,13,14</sup> after surgery is known to be high. Recurrence after excision is due to inadequate removal of the sinus tract and the presence of residual squamous epithelium lining the sinus.

Simple sinectomy is the standard procedure for excising pre auricular sinus . During the standard procedure an ellipse of skin surrounding the pre auricular sinus opening is excised and the individual tract is followed and dissected in toto. Recurrence rates have been reported to be high in standard procedures. High recurrence rate following standard procedures are due to incomplete removal of the sinus tract. These sinus tracts are often torturous with many ramifications. Due to the high variability of the sinus course, it is very difficult to follow the terminal ramifications during excision . Previous infectious episodes can further alter the sinus course and difficulty in delineation of the individual sinus tract resulting in higher recurrence rates.

Various adjunctive techniques have been suggested in literature for correct identification of the sinus tracts, the use of the lacrimal probe<sup>15</sup>, intra operative injection of methylene blue<sup>16</sup>, into the tract pre operative sonograms and sonographic imaging<sup>18</sup> of the sinus tract.

Lacrimal probe helps to identify the main sinus tract but not the small terminal ramification and it may cause trauma and create a false route. Intra operative injection of methylene blue into the tract to

make it more visible during dissection results in diffuse staining of the surgical field thus making correct identification of the sinus tract very difficult. In addition, the dye cannot fill the tract, if the tracts are filled with debris. Some surgeons inject the methylene blue in the orifice of the sinus tract three days prior to the surgery. The sinus orifice is then closed with purse-string sutures. This technique distends the whole tract and its branches by its own secretions stained with methylene blue, it helps to delineate the sinus tract during surgery.

Some suggest using magnification with microscope or magnifying glasses intraoperatively to minimize the recurrence rate. In 2005, Chang and Wu suggested that the use of an operating microscope can increase the effectiveness of surgery to remove remnant of the sinus tract and prevent further recurrence of a pre auricular sinus.

In 2002 Martin Granizoe *et al*<sup>16</sup> describe a combined technique includes initial fistula probing with lacrimal probe or sinus probes to find out the sinus course and followed by methylene blue injection for delineation of sinus tract, reduces the recurrence rate.

In 2009 Dickson *et al*<sup>38</sup> assesses the utility and safety of topical methylene blue in demarcating sinus tract in children.

In 2005 Baatanburg de jong <sup>10</sup> introduced a new surgical procedure which was named the 'inside out technique'. This technique was first described by Jensma. Methylene blue dye was injected through the sinus opening and the individual sinus tract is opened and followed from both outside and inside. Use of Magnification is essential to identify the sinus course. At present, this is not widely used technique.

The recurrence rate after excision of the pre auricular sinus is known to be high . This recurrence is due to inadequate excision of the sinus tract.

Various surgical modifications have been described to prevent further recurrence. In 1990 Prasad <sup>13</sup> introduced the supra auricular approach procedure for excision of pre auricular sinus. He compared the results of simple sinectomy with the supra auricular approach technique. He reported a recurrence rate of 5 % for supra auricular approach and 42% for simple sinectomy. As in simple sinectomy technique, it is not necessary to follow the individual sinus ramifications, but identification of the surgical plane is mandatory . Dissection of the tissues continued until the temporalis fascia comes into view ,which is considered as the medial limit of the dissection .

Subcutaneous tissue lateral to the temporalis fascia is removed along with the entire sinus tract. Excision of a small portion of the auricular cartilage is removed at the base of the sinus tract is very important to prevent further recurrence. Formation of larger dead space during this procedure can be obliterated by compression dressing. Placement of drain in to the dead space is necessary to prevent hematoma formation.

In 2001 Lam et al<sup>5</sup> and Mohamed E Hassan in 2007<sup>31</sup> compared these two techniques and again noted lower recurrence for the supra auricular approach (3.7% Versus 32% and 9.1% versus 33.3%). The main advantage of this procedure is that it gives better exposure and allows complete removal of the sinus tract.

Currie *et al* in 1993<sup>11</sup> conducted a retrospective review to find out the factors which decrease the recurrence rate after surgery which includes excision of the sinus tract by experienced head and neck surgeon, surgery performed under general anesthesia, the use of extended supra auricular incision, dissection down to the temporalis fascia, excision of the intact sinus tract to prevent sinus rupture and closure of wound dead space. Previous history of surgery for pre auricular sinus, identification of the sinus tract by lacrimal probe,

operating under local anaesthesia, post operative wound sepsis all increased the chances of recurrence.

Yeo *et al*<sup>14</sup> in 2006 reported that surgery performed under local anesthesia has higher recurrence rate than surgery, which performed under general anesthesia.

S.C. Bae *et al* in 2012<sup>22</sup> described a modification of the supra auricular approach called drainless minimal supra auricular approach . They shortened the supra auricular limb of the incision . The advantage of this technique is formation of less dead space and no need for drain insertion. No recurrence was noted in their study.

### **1. Prasad *et al* (1990)<sup>13</sup>**

He described a new surgical technique defined supra auricular approach. It was based upon the theory that the pre auricular sinus is almost always included in the subcutaneous tissues between the temporalis fascia which is considered as medial limit of the dissection and perichondrium of helix cartilage is the posterior limit of dissection. He compared the standard simple sinectomy technique with the supra auricular approach. They noted a recurrence rate of 5% for supra auricular approach and 42% for simple sinectomy approach.

### **2. Leung A K., Robson WK (1992)<sup>6</sup>**

They conducted a prospective study to find out the incidence of renal abnormalities associated with pre auricular sinus. 69 children were included in the study and they underwent renal ultrasonography. They found that 4.3% of children have a significant renal anomaly (one patient with BOR Syndrome). They concluded that renal abnormalities were significantly common in patients with pre auricular sinus which is higher than the 1% incidence of renal abnormalities noted in the general population. They advocated routine renal ultrasonogram screening for all patients with isolated pre auricular sinus.

### **3. Currie *et al* (1996)<sup>11</sup>**

Conducted a retrospective study over a period of eight years to find out the possible causes for recurrence after pre auricular sinus excision . Excision of the preauricular sinus was performed in 159 ears . The recurrence rate after surgery was increased in patients with previous history of excision for pre auricular sinus, the use of lacrimal probe to delineate the sinus course, post operative infection, and surgery performed under local anaesthesia . Excision of the pre auricular sinus by an experienced surgeon , using general anaesthesia during surgery , the use of the supra auricular approach to identify the correct surgical plane , removal of all vestiges of squamous epithelium lining the sinus tract, removal of entire sinus tract to avoid sinus rupture and obliteration of the dead space .

### **4. Leonard J. Paulozzi, Joseph M. Lary (1999)<sup>3</sup>**

They discussed about the lateral distribution of the external birth defects. According to them right sided defects are more frequent than left sided lesions. Differences in the lateral distribution of specific birth defects may be the result of subtle differences in morphogenesis on the right and left of the embryo brought about by left – right asymmetry prior to organogenesis.

### **5. Wang *et al* (2001)<sup>7</sup>**

They conducted a retrospective study to find out the incidence of renal abnormalities associated with external ear deformities. Renal ultrasonogram was performed in 41 children with deformities of auricle in two genetics medical centers. Renal anomalies were found in 12 patients. Out of 12 children 11 were diagnosed as multiple congenital anomaly (MCA) syndrome. They found that 33% children with multiple congenital anomaly had renal anomalies. They modified Leung's criteria for renal ultrasonogram in patients with isolated pre auricular sinus. They suggested that renal ultrasonogram should be performed in cases with isolated pre auricular pit, cup ears, or any other ear deformities accompanied by one or more of the following: 1. other malformations or dysmorphic features, 2. family history of hearing loss, 3. auricular and/or renal deformities 4. maternal history of gestational diabetes.

### **6. Lam *et al* (2001)<sup>5</sup>**

They conducted a retrospective study to compare the surgical outcome of simple sinectomy and the supra auricular approach technique for the removal of pre auricular sinus. 54 patients were operated for pre auricular sinus. The patients were divided into 2

groups. 27 patients were operated with the supra auricular approach technique and 25 with the standard simple sinectomy technique. The mean follow up period was 5.75 years .they noted a recurrence rate of 3.7% for supra auricular approach and 32% for the standard technique. They concluded that supra auricular method is the safe and effective method to prevent recurrence

#### **7. Kung el man *et al* (2002)<sup>19</sup>**

Conducted a prospective study to determine the role of renal ultrasound in newborns with isolated pre auricular tags and sinus . 17,286 infants were evaluated during 4 years period. preauricular sinus and tags were found in 6.2 per 1000 live births. 91 infants born with isolated pre auricular tags or pits were compared with 95 consecutive healthy infants. Abnormal renal ultrasonogram was noted in 2 infants (2.2%) with pre auricular tags. In control group renal abnormality was noted in 4 infants (4.2). They found that the prevalence of renal anomaly was lower in patients with external ear deformity when compared to normal individuals. They concluded that routine renal ultrasonogram is not indicated in the evaluation of patients with isolated pre auricular sinus and pre auricular skin tags .

### **7. H. Vijayendra,(2005)<sup>24</sup>**

36 cases (21 females and 15 males) were operated with supra auricular approach under local anesthesia .They found that the sinus tract was found to be attached to the auricular cartilage in all cases. In all cases the pre auricular sinus was removed along with a piece of adjoining auricular cartilage. No recurrence was noted post operatively.

### **8. Noah S. Scheinfeld M. D.et al 2005<sup>1</sup>**

They reviewed about the clinical presentation, treatment and associations of pre auricular sinus. They discussed about the location of the pre auricular sinus which is commonly present near the anterior margin of the ascending limb of the helix.right sided lesions are occurs most common. In 3 – 10% of cases pre auricular pits are associated with other conditions or a part of syndromes. They concluded that renal ultrasonogram and auditory testing should be considered if this condition associated with congenital anomalies.

### **9. S.A.Deshpande and H. Watson (2006<sup>29</sup>)**

In this article they conducted a prospective study to find out the incidence of renal abnormalities in infants with isolated minor deformities of the auricle such as , pre auricular pits and tags, and misshapen pinnae. 13136 infants were included in the study. Isolated minor auricular abnormalities was found in 94 infant. Renal ultrasonogram was performed to find out the renal abnormalities in those infants with anomaly of the auricle and the results were compared with that routine fetal screening performed during the same period. They found that there was no significant increase in the prevalence of renal abnormalities in infants with isolated ear anomalies when compared to normal. They concluded that renal ultrasonogram is not routinely advocated in infants with isolated ear abnormalities.

### **10. Yeo *et al* (2006)<sup>14</sup>**

Conducted a retrospective study of 191 patients (206 ears) to evaluate the clinical symptoms , treatment and recurrence rate after surgical excision of pre auricular sinus. They found that the common location of the pre auricular pit was noted at the anterior margin of the ascending limb of helix in 93%of cases , in 8 ears it was noted along

the posterior surface of the crus helix , superior to the auricle in 3 cases, post auricular area (2 cases) and in the ear lobule (1 case). They noted a female preponderance (84 males, 101 females) and occurs more commonly on left side.

Classic pre auricular fistulectomy done for all cases. In 71 cases, the auricular cartilage excised during the procedure. The recurrence rate after excision was 5%. No significant difference in the recurrence rate was noted in patients to whom the auricular cartilage was not removed. In addition, they have noted that the surgery performed under general anaesthesia had a lower rate of recurrence than cases that had local anaesthesia.

#### **11. Hassan M, Samir A.(2007)<sup>31</sup>**

63 children with pre auricular sinus were operated on between January 2000 and December 2004. They compare the surgical outcome after simple sinetomy with supra auricular approach technique. 30 cases were operated by simple sinectomy and 33 cases by supra auricular approach technique. They followed up the cases for 2 to 4 Years. They found that 49 cases were unilateral and 14 were bilateral. Among the unilateral 34 were left sided 15 were right sided . Renal ultrasound had done for all cases. They found that 4.7% had abnormal

results. The total recurrence rate was 20.6 % ( 13 cases). Recurrence was noted in 10 cases (33.3%) who underwent simple sinectomy procedure versus 3 cases (9.1%) in supra auricular approach. They concluded that the supra auricular approach is associated with statistically significant lower recurrence rate than standard simple technique

### **12. Choi *et al* (2007)<sup>25</sup>**

They conducted a retrospective study of 100 patients with pre auricular sinus . He classified the pre auricular sinus into classical and variant type. If the sinus opening is located anterior to the imaginary line that connects the tragus and posterior margin of ascending limb of helix known as classical type. In variant types the sinus is presents posterior to the imaginary line. Classical type of pre auricular sinus opening was noted in 90 patients .In 11 patients the sinus opening was present posterior to the imaginary line. The course of the sinus tracts in most of the variant type were directed in the postero middle direction from the sinus orifice. During surgery of the variant type it should be approached from both anterior and posterior. They noted a recurrence rate of 0% in patients with variant type of sinus.

### **13. Xing Yong *et al* (2007)<sup>37</sup>**

Conducted a survey to find out the incidence of renal anomalies in patients with auricular abnormalities. 121 individuals were found to have pre auricular sinus out of 10,734 males during the routine medical screening in the military facility at the central manpower base (Singapore) between September 2003 and March 2002. Among the 121 individuals with pre auricular sinus, bilateral lesions were noted in 33(27.3%), left sided lesions in 52 (43.0%), and right sided lesions 36 (29.7%). Audiogram and renal ultrasonogram was performed for those with pre auricular sinus. Sensory neural hearing loss was observed in 1.7% of individuals and renal abnormality in 2.6% of individuals. They concluded that anomalies of the ear and kidney were found to be rare in patients with pre auricular sinus.

### **14. Chavez Delgado ME *et al* (2008)<sup>32</sup>**

They conducted a retrospective study to describe the surgical management and post operative recurrence of pre auricular sinus. Thirty eight patients underwent surgery for pre auricular sinus. The surgical management in 25 patients operated by standard simple sinectomy and 19 patients by supra auricular approach. They found that the overall recurrence rate was 59% 52.21% recurrence rate for

standard technique and 6.8% recurrence rate for the supra auricular approach. 15.3% recurrence was noted in patients in whom a small piece of helical cartilage was excised. 84.6% recurrence was noted in patients where cartilage was not excised. They concluded that supra auricular approach with excision of helical cartilage at the site of maximum adherence has lower recurrence rate.

#### **15. Tang et al 2007<sup>17</sup>**

They reviewed the recurrence rate and factors influencing recurrence of pre auricular sinus after excision. 71 patients were included in the study out of 71. 69 patients had unilateral pre auricular sinus. 60.6 % presented with left and 36.6% right pre auricular sinus. All patients were treated with the standard procedure with injection of methylene blue and simultaneous probing was performed to delineate the sinus tracts. The overall recurrence rate was 14.1%. He concluded that surgical drainage of abscess prior to surgery, active infection at the time of surgery, and failing to identify the sinus course by dye injection or probing may cause higher recurrence rate

#### **16. Brian Dunham et al (2009)<sup>27</sup>**

Conducted a retrospective study to evaluate the histological relationship and distance between excised pre auricular sinus tract and

the auricular cartilage. 58 specimens are included in the analysis. The mean sinocartilaginous distance was <0.5mm in 50% of specimens and in nearly all cases the epithelial tract was in continuity with stromal tissue, histologically indistinguishable from the perichondrium . They concluded that routine removal of small portion of perichondrium or auricular cartilage is advisable to prevent recurrence.

**17. Georgia .Alexandra (2012)<sup>36</sup>**

They reported a case of pre auricular sinus presented as recurrent post aural abscess. The sinus opening was located slightly anterior to the inter tragic notch. During surgery injection of methylene blue in to the sinus opening filled the post auricular sinus. The entire tract is removed along with a portion of tragal cartilage

**.16. T. Tan *et al* (2005)<sup>2</sup>**

Review the current literature with respect to the aetiology of the pre auricular sinus its clinical presentation, management and association with other congenital malformation.

## **MATERIALS AND METHODS:**

- STUDY DESIGN - Prospective study.
- STUDY PLACE - Department of E.N.T  
Stanley Medical College
- STUDY PERIOD - October 2010 to September 2012
- SAMPLE SIZE - 110 patients
- FOLLOW UP PERIOD - 6 months

The study was conducted in 110 patients who attended the department of otolaryngology in Stanley medical college. The study period was from October 2010 to September 2012.

Ethical committee approval was obtained .

### **Selection Criteria:**

1. Age : 5 – 25 Years
2. Sex : Male and Female
3. All patients with pre auricular sinus (symptomatic and asymptomatic)

4. Patients with associated comorbidity , Immuno compromised status, and external ear deformity are excluded from the study.

All Patients with pre auricular sinus were included in the study. Patients with bilateral sinuses , previous history of incision and drainage , previous history of excision were also included.

These patients were subjected to detailed systemic, clinical ,head and neck examination, routine and special investigations.

These are

- 1) Complete hemogram
- 2) Renal function tests
- 3) Chest X-ray, ECG
- 4) HIV
- 5) Oto endoscopic examination
- 6) Pure tone audiogram
- 7) Ultra sound abdomen:

Ultra sound abdomen was done for those patients with pre auricular sinus and one or more of following associations.

**Wang's Criteria:**

1. Other congenital malformations or dysmorphic features
2. Family history of deafness
3. Auricular and /or renal anomalies
4. Maternal history of gestational diabetes

Out of 110 patients, 45 patients have symptomatic pre auricular sinus. Surgical excision of pre auricular sinus tract was performed in symptomatic patients.

Patients presented with acute cellulitis of pre auricular region and abscess were admitted in the ward and treated with antibiotics and analgesics. Incision and drainage was performed for patients with pre auricular abscess.

Surgery was performed during the infection free period.

These patients were classified randomly into two groups according to the surgical technique used.

Group A - standard simple sinectomy was done, for of 21 patients.

Group B -Supra auricular approach was done for 24 patients.

Written informed consent was obtained from all patients prior to the surgical procedure.

Anaesthetic fitness also obtained

## **Surgical Technique:**

### **Simple sinectomy:**

The aim of the operation is to remove all vestiges of squamous epithelium, so the tract must be dissected out meticulously and in one piece.

Under general or local anesthesia, patient in supine position with head turned to opposite side, 2% xylocaine with 1 in 2,00,000 adrenaline was infiltrated around the sinus opening and an elliptical incision was made around the sinus opening and dissection was proceed by identifying the sinus tract and it ramifications under visual or palpatory guidance. Individual branching tract is dissected and followed until every dead end is identified and excised. The sinus tract can be identified by its glistening white colour. All ramifications were meticulously dissected and excise in toto. After securing complete hemostasis the wound closed in layers. No drain was used

### **INCISION FOR SIMPLE SINECTOMY**



**DISSECTION OF THE SINUS TRACT**



**AFTER EXCISION**



### **Supra auricular approach technique:**

This surgical approach is based upon the theory that the sinus is almost, always included in the subcutaneous tissues between the temporalis fascia and perichondrium of helix cartilage.

Under general or local anesthesia, local infiltration with 2% xylocaine with 1 in 2,00,000 was infiltrated around the sinus opening and supra auricular region. patients are placed in supine position with head turned to opposite direction.

The elliptical incision was made around the sinus orifice as used for the standard technique. The same incision was extended higher upward to the pre and supra auricular temporal region. The incision is deepened until the temporalis fascia comes into view; temporalis fascia is considered as the medial and deep limit of the dissection. The dissection continues posteriorly over the cartilage of anterior helix, which is considered as the the posterior limit of the dissection. All the subcutaneous tissue superficial to the temporalis fascia is removed along the sinus tract . A small piece of the helical cartilage at the site of maximum adherence of the sinus tract was excised. Dead space is closed in layers and compression dressing is

applied. Mastoid dressing was applied for seven days. Sutures were removed on the eighth post operative day.

**Advantages:**

1. No need to follow the individual sinus tract
2. Adjuvant methods (methylene blue injection , probing of sinus tract) are not necessary for identification of sinus tract
3. This technique can be used in cases where the tissue planes are obliterated (previous history of incision and drainage, previous history of excision)
4. No cosmetic deformity

**Disadvantages**

Creation of larger dead space after excision

**SUPRA AURICULAR APPROACH - INCISION**



**DISSECTION OF TEMPORALIS FASCIA**

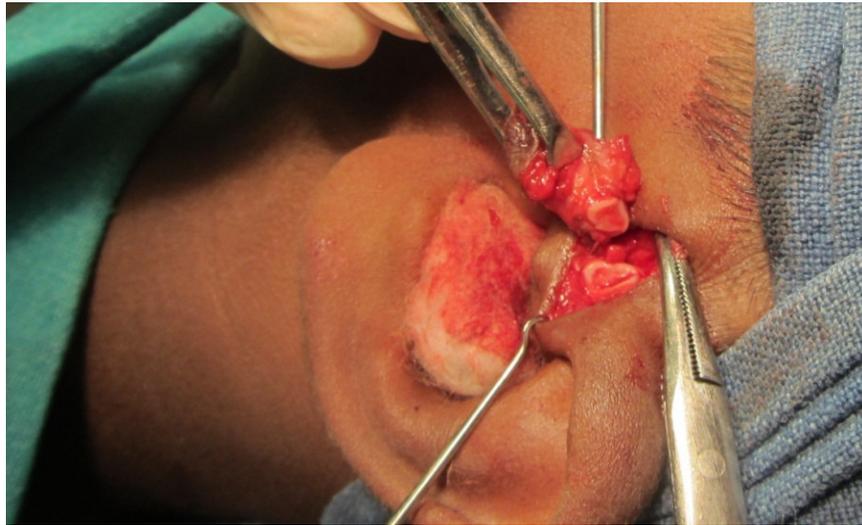


Medial limit of dissection – temporalis fascia

Posterior limit –helical cartilage

Anterior limit – superficial temporal vessels

### **EXCISION OF CARTILAGE**



### **AFTER EXCISION**



## **EIGHTH POST OPERATIVE DAY**



**Excision of a small portion of cartilage** will not produce any cosmetic deformity. To prevent hematoma formation and further infection, closure of dead space is very important. Compression dressing or insertion of drain can be used to prevent collection and post operative infection.

### **Post operative care:-**

Patients were treated with intravenous antibiotics and analgesics for 7 days. Mastoid dressing applied for 7 days. Sutures were removed and patients were discharged on 8<sup>th</sup> post operative day. Oral antibiotics prescribed for 5 days after discharge.

**Follow up:-**

All These patients were followed up for a period of 6 months. The maximum period of follow up was 22 months. Recurrence was considered if the patients present with post operative swelling, discharge and abscess formation.

Initially the patients were followed once in two weeks, there after they were followed up once in a month.

## RESULTS AND OBSERVATIONS

110 patients participated in the study between the period October 2010 to September 2012 at Stanley medical college .

Asymptomatic patients - 65

Symptomatic patients - 45

In symptomatic patients the mean age at the time of surgery was – 15.5years

The age groups of the patients were between 5 – 25 years

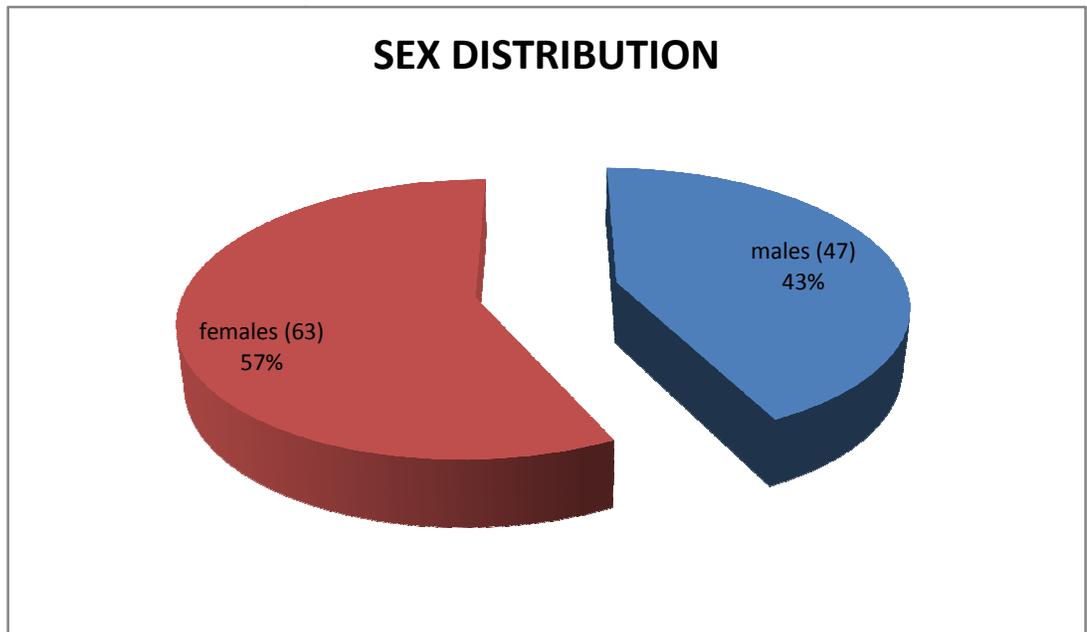
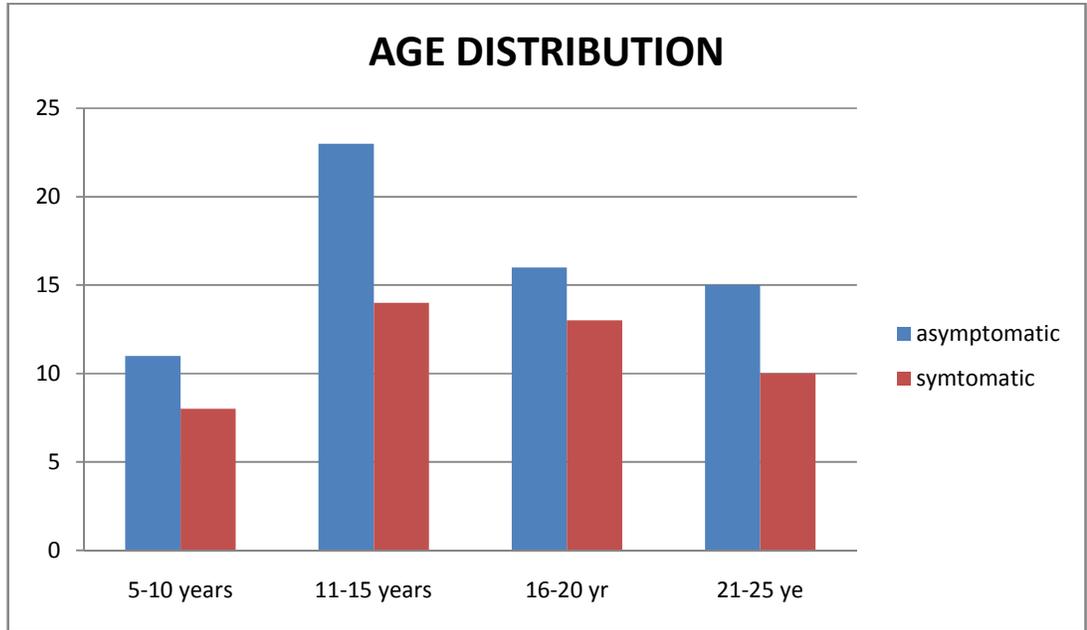
Out of 110 patients 63 were female and 47 were male.

### SEX DISTRIBUTION

S. No.	Sex	Numbers	Percentage %
1	Female	63	57.28%
2	Male	47	42.72%
Total		110	

### Age distribution

S.No.	Age group	Asymptomatic	Symptomatic
1	5 – 10 Year	11	8
2	11 – 15 Year	23	14
3	16 – 20 Year	16	13
4	21 – 25	15	10
Total		65	45



## **SIDE OF PRE AURICULAR SINUS**

Unilateral sinuses noted in 88 patients

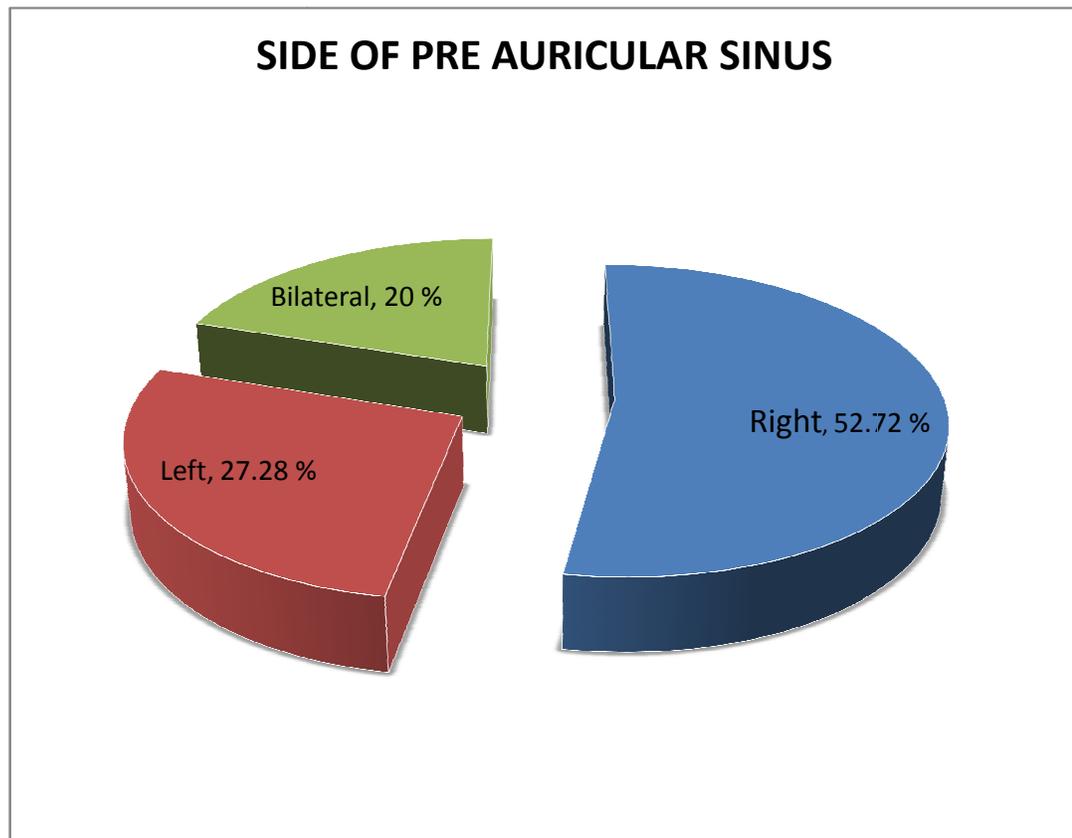
In 58 (52.72%) of patients pre auricular sinus was located on right side  
and for

30 (27.28%) patients it was located on left side.

Bilateral presentation was observed in 22 (20%) patients.

## **SIDE OF PRE AURICULAR SINUS**

<b>S. No</b>	<b>Side of Preauricular sinus</b>	<b>Number of Patients</b>	<b>Percentage %</b>
1	Right	58	52.70%
2	Left	30	27.30%
3	Bilateral	22	20.00%
Total		110	



#### **Location of pre auricular sinus:**

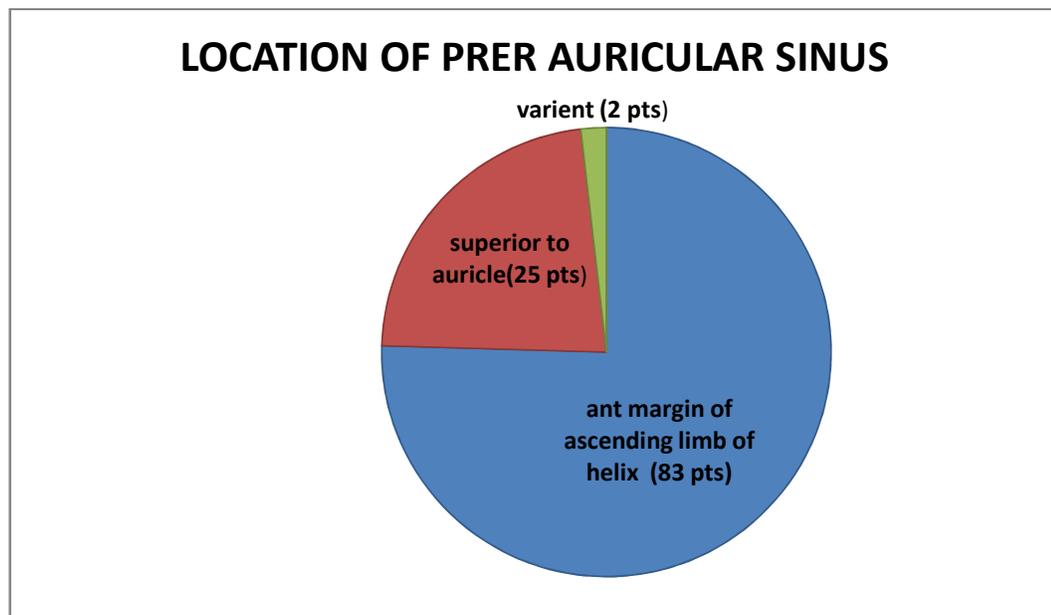
In our study the pre auricular sinus was located at the

Anterior margin of ascending limb of helix in 84 patients. Next common location observed was superior to auricle in 25 patients. Variant type (Sinus opening located posterior to the imaginary line that connects the tragus to the posterior margin of the ascending limb of helix) of pre auricular sinus was noted in 2 patients.

In variant type, the sinus opening was present in the centre of crus helix. Both the cases were asymptomatic.

#### LOCATION OF PRE AURICULAR SINUS

S.No.	Location of pre auricular sinus	No of Patients	Percentage (%)
1	Anterior margin of ascending limb of helix	83	75.50%
2	Superior to auricle	25	22.70%
3	Centre of crus helix (variant type)	02	1.80%
Total		110	



**ANTERIOR TO ASCENDING LIMB OF HELIX**



**SUPERIOR TO AURICLE**



## VARIANT TYPE -TYPE 2



### Clinical Presentation

Out of 110 patients 55 were found asymptomatic, 45 (50%) were found symptomatic. Among the symptoms

- Recurrent discharge from the sinus opening was noted in 18 cases
- Abscess/ cellulitis was observed in 15 cases  
Abscess found to be away from the sinus opening in 5 cases Over the sinus opening in 3 cases
- Previous h/o incision and drainage observed in 7 patients

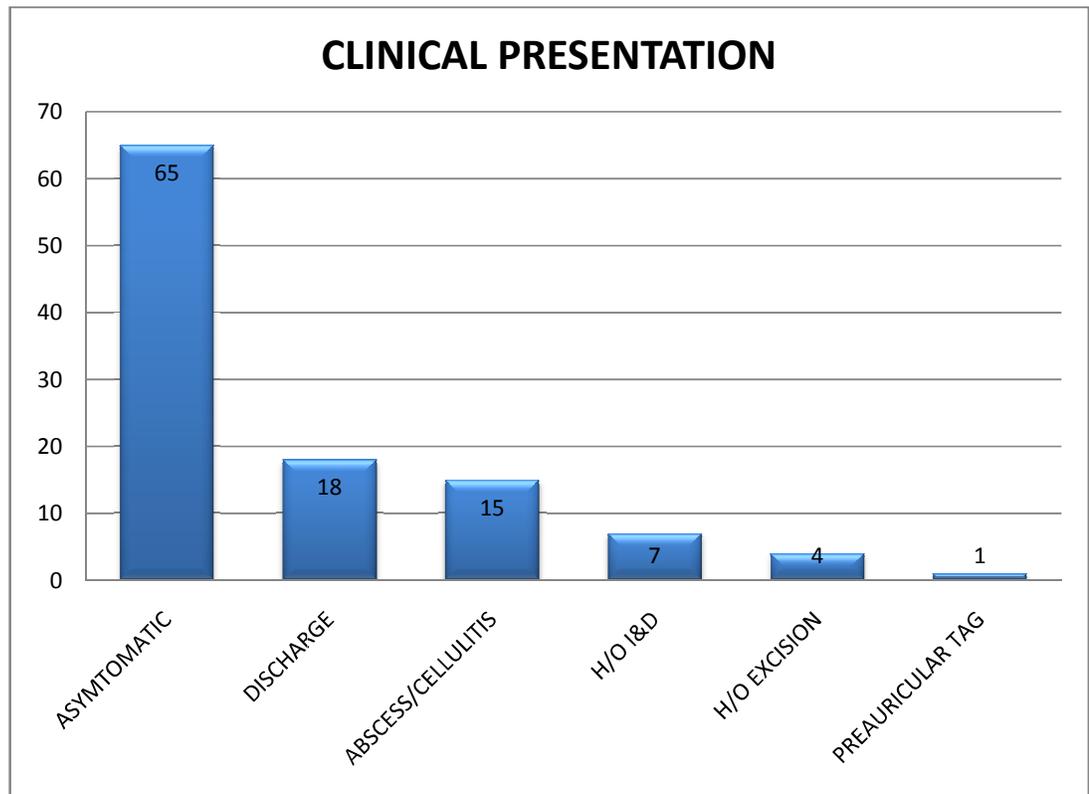
- Previous h/o excision observed in 4 cases
- Associated auricular abnormality (pre auricular tag) was found in one patient.

### **PRE AURICULAR SINUS WITH TAG**



## CLINICAL PRESENTATION

S. No.	Clinical Presentation	No of Patients	Percentage %
1	Asymptomatic	65	59.09
2	Recurrent discharge from sinus opening	18	16.37
3	Abscess/Cellulitis	15	13.64
4	Previous h/o incision & drainage	07	6.36
5	Previous h/o excision	04	3.64
6	Associated auricular abnormality (pre auricular tag)	01	0.90
Total		110	100%



Renal ultra sonography and pure tone audiogram was done in 21 patients who fit under wang's criteria.

No renal abnormality and hearing loss was found.

No associated congenital syndromes were detected in our study.

The symptomatic patients (45) were divided randomly into two groups

Group A (24 patients) and Group B (21 patients) according to the surgical technique used.

Surgical procedures were performed during the period of quiescence and were done under general and local anaesthesia .45 patients were operated for symptomatic lesions.

Group A - standard simple sinectomy was done for 21 patients.

Group B -Supra auricular approach was done for 24 patients

The mean age group during the surgical procedure was 15.5 years. The common indication for the surgery was recurrent discharge from the sinus opening.

Surgery was performed for the first time in 41 cases.

Revision surgery performed for 4 cases.

Seven patients had a history of incision and drainage prior to the surgical Procedure

Surgical procedures were performed during the period of quiescence. Surgical procedure were done under General and local anesthesia (General anesthesia was done for 31 patients and local anesthesia was done for 11 patients.

<b>TYPE OF ANAESTHESIA</b>	<b>GROUP A (Simple sinectomy) n – 21</b>	<b>Group B (supra auricular approach) N – 24</b>
General Anaesthesia	16	15
Local Anaesthesia	05	09
Total	21	24

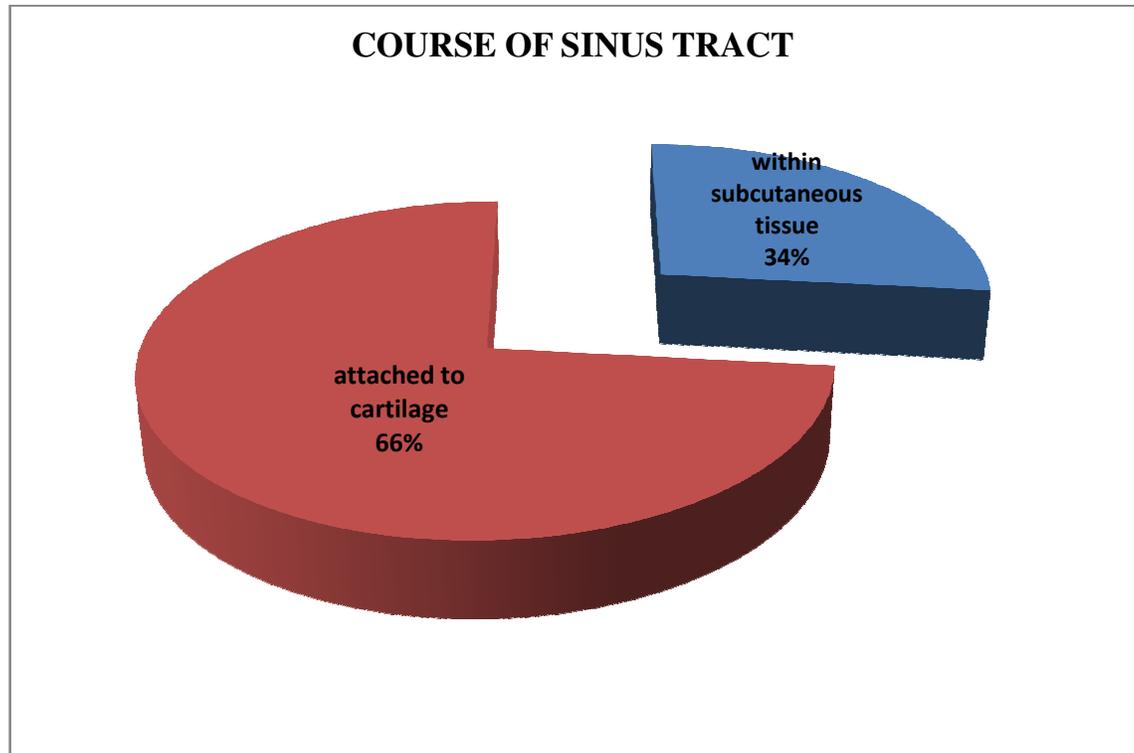
## **RELATION TO AURICULAR CARTILAGE:**

Out of 45 cases pre auricular sinus tract was found to be within the subcutaneous tissue in 12 cases.

The pre auricular sinus tract was found to be attached to the auricular cartilage in 33 cases (7 cases in group a,5 cases in group B)

A small piece of helical cartilage was removed along with the sinus tract in 33 patients(14 cases in group A ,19 cases in group B)

	<b>Group A (simple sinectomy)</b>	<b>Group B (Supra auricular Approach)</b>
Within subcutaneous tissue (n-12)	07	05
Attached to auricular Cartilage (n-33)	14	19
Total	21	24



34 % of patients – sinus tract attached to sub cutaneous tissue

66 % of patients – sinus tract attached to helical cartilage

#### **RECURRENCE RATE:**

Out of 45 cases, operated recurrence was observed in 5 cases.

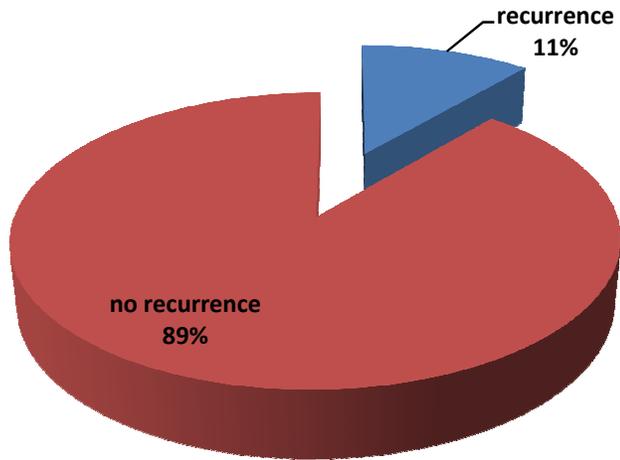
Over all recurrence rate -11.1%

In group A (simple sinectomy) –

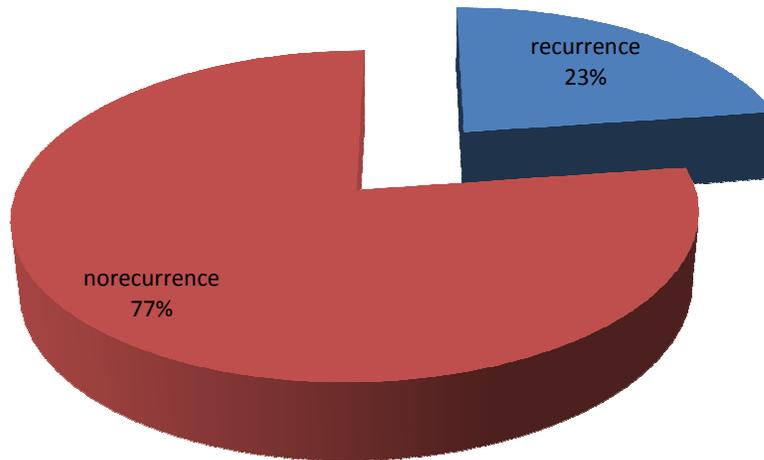
out of 21 patients recurrence was noted 5 cases

In group B - no recurrence was observed.

### OVERALL RECURRENCE RATE

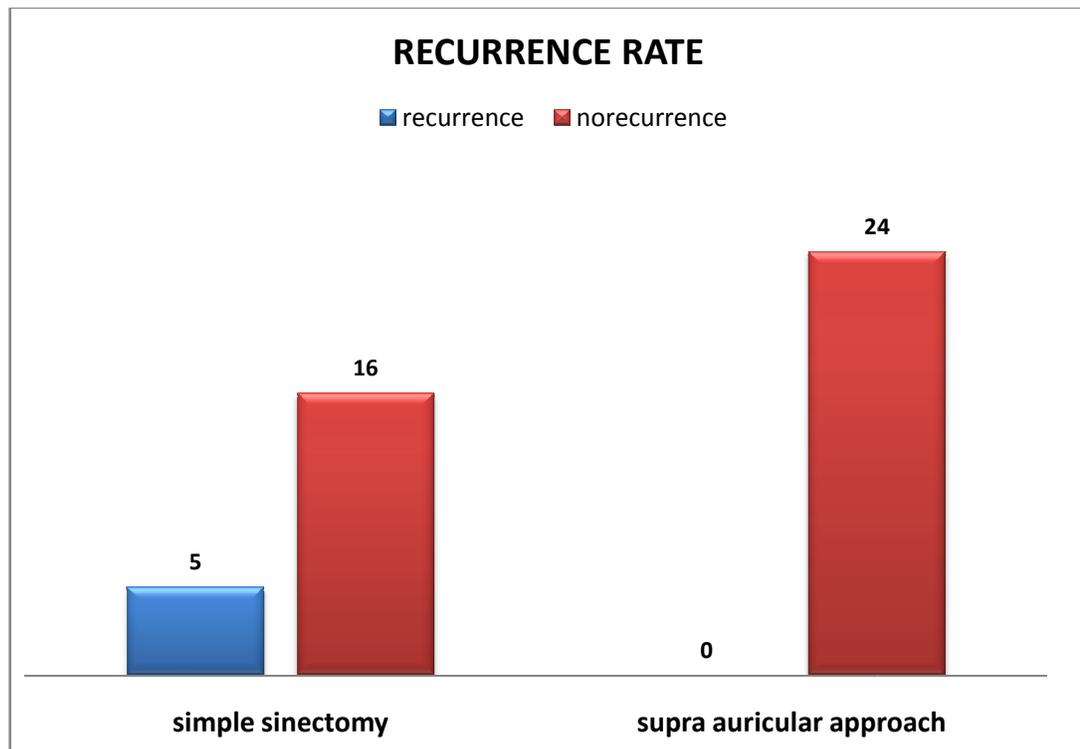


### RECURRENCE RATE-SIMPLE SINECTOMY(GROUP-A)



**Recurrence rate( simple sinectomy Vs Supra auricular approach)**

<b>PROCEDURE</b>	<b>RECURRENCE</b>	<b>NO RECURRENCE</b>	<b>P VALUE</b>
Simple sinectomy (group A) N-21	5	16	<b>&lt;0.05</b>
Supra auricular approach(groupB) N -24	0	24	
Total	5	40	



When compared to standard simple sinectomy.,supra auricular approach technique has a lower recurrence rate

The recurrence rate between the two groups was found to be statistically significant (P<0.05).

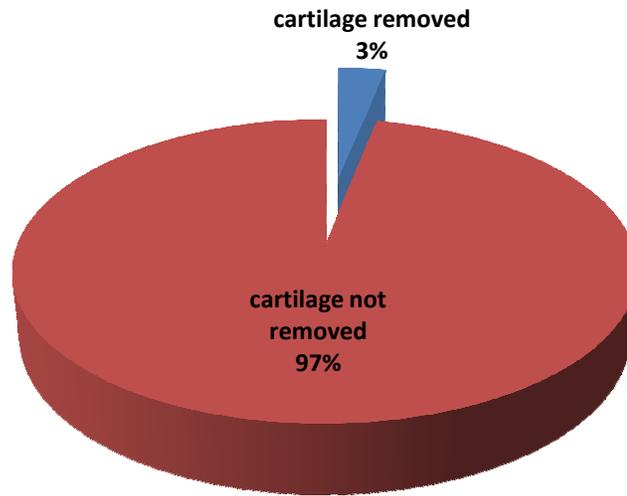
In 33 cases the tract was found to be attached to the helical cartilage and a small piece of helical cartilage was removed along with the pre auricular sinus tract.

Out of 12 patients, recurrence was found among four (33.3%) patients in whom the cartilage was not removed.

Out of 33 patients for whom cartilage was removed recurrence was noted in 1(3%) patient.

<b>Procedure</b>	<b>RECURRENCE</b>	<b>NO RECURRENCE</b>	<b>P value</b>
Cartilage removed( n-33)	1	32	<b>&lt;0.05</b>
Cartilage not removed(n-12)	4	8	
Total	5	40	

**Recurrence rate  
cartilage removed Vs cartilage not removed**



In patients to whom the helical cartilage was removed has a lower recurrence rate when compared to patients to whom the cartilage was not removed.

The recurrence rate was statistically significant with P value < 0.05.

31 cases were operated under general anesthesia and in this group 2 (6.43%) cases recurrences was noted.

14 cases were operated under local anesthesia and recurrence was observed in three cases.

<b>Procedure</b>	<b>Recurrence</b>	<b>No recurrence</b>	<b>P value</b>
General anesthesia (n - 31)	2	29	<b>&gt;0.05</b>
Local Anesthesia (n - 14)	3	11	
Total	5	40	

Chi square equals – 0.936

degree of freedom - 1 P value – 0.3332

p value is more than 0.05 so it is statistically insignificant

Hence surgery performed under general and local anaesthesia has no significant recurrence rate following surgery

## **DISCUSSION:**

Pre auricular sinuses are common congenital malformation of the pre auricular soft tissues commonly seen in the pediatric population. They result from abnormalities in the fusion of the hillocks of His during auricular development. They are blind-ended sinuses that result from incomplete fusion and the inclusion of epithelial tissue forms a skin lining to the sinus.

This condition was first described by van Heusinger in 1864.

Various terminologies have been used to describe this condition. They include pre auricular pit, pre auricular fistula, pre auricular tract, helical fistulae or pre auricular cyst.

These lesions present as a pit like depressions anterior to the root of the helix and superior to the level of the tragus. Variant type of pre auricular sinus has been reported in various studies ((Choi et al in 2007, Yeo et al in 2006, Hong et al in 2012, Ng Wei et. al. 2011) in which the sinus opening is located posterior to the imaginary line of the ascending limb of helix. In our present study we noted that the common location of the sinus opening was in the anterior margin of ascending limb of helix in 83 cases (75.47%).

The sinus opening was present posterior to the imaginary line (Variant type) in 2 cases.

Many studies (Chami 1989, Gur et. al., 1998, Baatenburg 2005, Chang et. al, 2005) reported that males and females, are equally affected.

Currie et. al., 1996, Lam et. al., 2001, have reported female predominance in their study.

In our present study we noted female predominance (57.28%). Pre auricular sinuses are observed as unilateral or bilateral. Bilateral cases are more likely to be inherited and the pattern is of autosomal dominance with reduced penetrance.

It occur more commonly on right side. In our study in 52.7% of patients the sinus opening was located on right side and in 20% it was bilateral.

The opening of the sinus is apparent at birth. Patient may present asymptotically, detected during routine Ear, nose and throat examination. In Asymtomatic patients it can be safely left alone. There may be some sebaceous discharge from the punctum Because the skin is lined with squamous epithelium spontaneous resolution does not

takes place. These lesions are prone to acute infection requiring antibiotic therapy. Patient may present with intermittent scanty discharge from the sinus, cellulitis and abscess formation.

Most common organisms causing infection are staphylococcus aureus (yeo et. al., 2006). If significant fluctuance accompanies infection, incision and drainage may be necessary. Previous history of incision and drainage will produces scaring, fibrosis and obliteration of normal tissue planes and make future excision more difficult.

The abscess is generally formed away from the sinus orifice . According to Ban et. al., 2008 the pre auricular abscess tend to gravitate to the subcutaneous fat layers anterior to the cartilage of the curs helix. The subcutaneous fat layer is thickened and the superficial musculoaponeurotic system thinned in the pre auricular region where the abscess develops. In our study eight patients were presents with abscess formation .out of eight patients the abscess found to be away from the pre auricular sinus opening in 5 cases and in 3 cases the abscess was noted over the pre auricular sinus.

When symptomatic or associated with recurrent infection, surgical resection of a pre auricular sinus is required.

Pre auricular sinus tract is narrow and thin with multiple ramifications. The sinus tract is usually located lateral, superior and posterior to the parotid gland and the facial nerve.

Study by Brian et. al., 2009 showed that the pre auricular sinus tract was in continuity with perichondrium and they advocated the routine removal of small piece of auricular cartilage at the site maximum adherence along with the sinus tract to prevent recurrence.

In our studies we noted that the sinus tract was attached to the helical cartilage in 33 cases (73%). Out of 45 cases pre auricular sinus tract was found to be within the subcutaneous tissue in 12 cases.

Inadequate removal of the sinus tract will lead to further recurrence. To prevent recurrence the sinus must be excised in its entirety.

Various surgical techniques have been described for the excision of the pre auricular sinus includes standard simple sinuotomy, marsupialisation of the pre auricular sinus tract, inside out technique, supra auricular approach and modified drainless minimal supra auricular approach.

Excision of the pre auricular sinus should be performed during the period of quiescence.

The standard simple sinectomy showed higher recurrence rate (1-45%) as reported by (Prasad et. al.,1990 Currie et. al., 1996 Gur et. al., 1998 Yoe et. al.,2006) Prasad et al in 1990 described the new surgical technique, supra auricular approach which has lower recurrence rate when compared to other technique.

In group A (simple sinectomy group) there were 23.9% recurrence rate in comparison of about 42% Prasad et. al., 1990 32% by Lam et. al., 2000, 33.3% by Hassan and Samir 2007, 52.2% by Delgado et. al., 2008.

Group B (Supra auricular approach group) showed no recurrence in our study versus 5% by Prasad et. al., 3.7% in et. al., 9.1% by Hassan and samir and 6.8% by Delgado et. al.,.

Vijayendra et. al., 2005 noted no recurrence in those patients who were operated by supra auricular approach technique.

Pre auricular sinus is associated with renal and ear abnormalities. They are rarely associated with some congenital syndromes.

leung et. al, 1992 Suggested routine renal ultrasonogram for all cases with pre auricular sinus. Their view is not shared by others .Wang et. al.2001, refined the indications for renal ultrasound in

patients with isolated pre auricular sinus . He suggested that routine renal ultra sonography is not indicated for all pre auricular sinus. Kungelman et. al., 2002, and Despande and Waston, 2006 reported their conclusion that routine renal ultra sonography is not indicated.

In our study renal ultrasonography was carried out in 21 patients those fit under wang's criteria. No renal abnormality and hearing loss were found.

Routine removal of auricular cartilage was advised by various author (Gur et. al., 1998, Brian et. al., 2009, Delgado et. al., 2008, Vijaendra et. al., 2005) to prevent recurrence.

In our study 3% recurrence was noted in patients in whom a portion of the cartilage was excised from the base of the tract and 33.3% recurrence rate was noted when the cartilage was not excised.

Delgado et. al., noted the rate of recurrence was 84.6% when the cartilage was not excised and 15.3% when cartilage was excised.

citation	Recurrence Rate	
	Simple Sinctomy	Supra auricular approach
Prasad <i>et. al.</i> , 1990	42% (n - 25)	5% (n - 27)
Lam <i>et. al.</i> , 2001	32% (n - 25)	4% (n - 27)
Hassan and sami,2007	33% (n - 30)	9% (n - 33)
Delgades <i>et. al.</i> , 2008	52% (n - 25)	7% (n - 19)
Our study	24% (n - 21)	No recurrence (n - 24)

## CONCLUSIONS

1. Pre auricular sinuses are more commonly seen on the right side
2. Females are more commonly affected.
3. Rarely associated with congenital syndromes.
4. Supra auricular approach has a lower recurrence rate when compared to simple sinectomy. It can be safely used as a primary procedure and in patients with distorted tissue planes.
5. Removal of small piece cartilage from the base of the pre auricular sinus tract is very important to prevent recurrence
6. No significant alteration in the surgical outcome, between the anaesthesia administered during the study.

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S.No	Name	Age	Sex	Side of Preauricular sinus			Presenting complaints	PTA/USG	Type of surgery	Relation to cartilage	Recurrence
				Right	Left	Bilateral					
1.	Jothi	20	F	✓			Discharge from the sinus	Normal	Simple sinectomy	Cartilage removed	No recurrence
2.	Vincent	14	M	✓			Abscess	Normal	Supra auricular approach		No recurrence
3.	Dayanathi	7	M	✓			Cellulitis	Normal	Simple sinectomy	Cartilage not removed	No recurrence
4.	Fathima	13	F		✓		H/O Incision and drainage	Normal	Supra auricular approach	Cartilage removed	No recurrence
5.	Selvi	16	F	✓			Asymptomatic	Normal			
6.	Punitha	22	F			✓	Asymptomatic	Normal			
7.	Dowlath	12	M			✓	Asymptomatic	Normal			
8.	Jerald	19	M	✓			Abscess	Normal	Supra auricular approach	Cartilage removed	No recurrence
9.	Sornamal	24	F		✓		Asymptomatic	Normal			
10.	Jayapavthran	13	M			✓	Cellulitis	Normal	Simple sinectomy	Cartilage not removed	recurrence+
11.	Jamila	22	F	✓			Abscess	Normal	Supra auricular approach	Cartilage removed	No recurrence
12.	Jayapraba	10	F			✓	Asymptomatic	Normal			
13.	Deepak	9	M	✓			Pre auricular tag	Normal			
14.	Hamshavalli	21	F	✓			Asymptomatic	Normal			
15.	Shanthi priya	10	F		✓		H/O Excision	Normal	Supra auricular approach	Cartilage removed	No recurrence
16.	Hemavathi	14	F	✓			Asymptomatic	Normal			
17.	Mahendran	18	M		✓		Cellulitis	Normal	Supra auricular approach	Cartilage not removed	No recurrence
18.	Mohana	5	F	✓			Asymptomatic	Normal			

19.	Baskar	12	M	✓			Discharge from the sinus	Normal	Simple sinectomy	Cartilage removed	No recurrence
20.	Karisma	15	F	✓			Asymptomatic	Normal			
21.	Malathi	10	F	✓			Asymptomatic	Normal			
22.	Kalaiselvi	19	F		✓		Asymptomatic	Normal			
23.	Mahalakshmi	22	F	✓			Cellulitis	Normal	Supra auricular approach	Cartilage removed	No recurrence
24.	Karpagaselvi	14	F	✓			Asymptomatic	Normal			
25.	Sabeena	18	F		✓		H/O Incision and drainage	Normal	Supra auricular approach	Cartilage not removed	No recurrence
26.	Rajendran	21	M			✓	Asymptomatic	Normal			
27.	Suresh	17	M			✓	H/O Excision	Normal	Supra auricular approach	Cartilage removed	No recurrence
28.	Alphonse mary	25	F	✓			Asymptomatic	Normal			
29.	Kodhai priya	6	F		✓		Asymptomatic	Normal			
30.	Rathi	18	F		✓		Cellulitis	Normal	Simple sinectomy	Cartilage not removed	recurrence+
31.	Rajeswari	17	F		✓		Asymptomatic	Normal			
32.	Rizwan	16	M	✓			Discharge from the sinus	Normal	Simple sinectomy	Cartilage removed	No recurrence
33.	Karthiga	12	F			✓	Asymptomatic	Normal			
34.	Arthy	16	F	✓			Asymptomatic	Normal			
35.	Kathir Kaman	23	M		✓		Asymptomatic	Normal			
36.	Sophia. P	13	F	✓			Abscess	Normal	Supra auricular approach	Cartilage removed	No recurrence
37.	Robinson. A	15	M	✓			Asymptomatic	Normal			
38.	Saroja. D	25	F		✓		Discharge from the sinus	Normal	Simple sinectomy	Cartilage removed	No recurrence

39.	Sujatha rani	18	F	✓			Asymptomatic	Normal			
40.	Kannagi	13	F			✓	Discharge from the sinus	Normal	Simple sinectomy	Cartilage removed	No recurrence
41.	Ananda raj	17	M			✓	Asymptomatic	Normal			
42.	Raja priyan	19	M			✓	Abscess	Normal	Simple sinectomy	Cartilage removed	No recurrence
43.	Ponni.	20	F	✓			Discharge from the sinus	Normal	Supra auricular approach	Cartilage removed	No recurrence
44.	Elizabeth. E	12	F			✓	Asymptomatic	Normal			
45.	Jayabal	22	M	✓			Asymptomatic	Normal			
46.	Jayanthi	8	F	✓			Discharge from the sinus	Normal	Simple sinectomy	Cartilage not removed	recurrence+
47.	Aruna devi	5	F	✓			Cellulitis	Normal	Supra auricular approach	Cartilage removed	No recurrence
48.	Danalakshmi	12	F			✓	H/O Incision and drainage	Normal	Supra auricular approach	Cartilage removed	No recurrence
49.	Malin begam	16	F	✓			Asymptomatic	Normal			
50.	Mariappan	21	M			✓	Asymptomatic	Normal			
51.	Brindhha. P	13	F			✓	Discharge from the sinus	Normal	Supra auricular approach	Cartilage removed	No recurrence
52.	Tamilarasi. S	17	F	✓			Asymptomatic	Normal			
53.	Senthilvelan	6	M	✓			Discharge from the sinus	Normal	Simple sinectomy	Cartilage not removed	recurrence+
54.	Kumararaja	22	M	✓			Asymptomatic	Normal			
55.	Malarkani	13	F	✓			Asymptomatic	Normal			
56.	Selvakumar	23	M			✓	Abscess	Normal	Simple sinectomy	Cartilage removed	No recurrence
57.	Sharmfla. V	17	F	✓			Asymptomatic	Normal			

58.	Vanitha rani	13	F		✓		Asymptomatic	Normal			
59.	Nalsia. S	13	F			✓	Discharge from the sinus	Normal	Simple sinectomy	Cartilage removed	No recurrence
60.	Danush	7	M	✓			Asymptomatic	Normal			
61.	Kathirvel	12	F	✓			H/O Incision and drainage	Normal	Supra auricular approach	Cartilage not removed	No recurrence
62.	Ranjith kumar	12	F		✓		Asymptomatic	Normal			
63.	Kayalvizhi	17	F			✓	Cellulitis	Normal	Simple sinectomy	Cartilage removed	No recurrence
64.	Selvakannan	22	M	✓			Asymptomatic	Normal			
65.	Nirosha. F	19	F				Discharge from the sinus	Normal	Simple sinectomy	Cartilage removed	No recurrence
66.	Monica selvi. A	6	F				Asymptomatic	Normal			
67.	Nobel	8	M		✓		Discharge from the sinus	Normal	Simple sinectomy	Cartilage removed	recurrence+
68.	Saravanaperumal	17	M	✓			Asymptomatic	Normal			
69.	Ajitkumar	14	M		✓		Cellulitis	Normal	Simple sinectomy	Cartilage removed	No recurrence
70.	Marynirmala	24	F	✓			Asymptomatic	Normal			
71.	Prathisha	13	F	✓			Asymptomatic	Normal			
72.	Ganesan	24	M	✓			H/O Incision and drainage	Normal	Supra auricular approach	Cartilage not removed	No recurrence
73.	Vikram prabu	23	M				Discharge from the sinus	Normal	Supra auricular approach	Cartilage removed	No recurrence
74.	Saritha	15	F	✓			Asymptomatic	Normal			
75.	Jagan	24	M			✓	Asymptomatic	Normal			
76.	Vishal	9	M		✓		Discharge from the sinus	Normal	Supra auricular approach	Cartilage removed	No recurrence

77.	Sivani	6	F		✓		Asymptomatic	Normal			
78.	Kabir. M	20	M	✓			Asymptomatic	Normal			
79.	Manikavasagam	12	M	✓			Abscess	Normal	Simple sinectomy	Cartilage removed	No recurrence
80.	Sasikumar	13	M	✓			Asymptomatic	Normal			
81.	Kesavan	21	M	✓			Asymptomatic	Normal			
82.	Suba lakshmi	14	F	✓			H/O Incision and drainage	Normal	Supra auricular approach	Cartilage not removed	No recurrence
83.	Vignesh	24	M		✓		Asymptomatic	Normal			
84.	Fathima	21	F	✓			H/O Excision	Normal	Supra auricular approach	Cartilage removed	No recurrence
85.	Saravanakumar	13	M	✓			Asymptomatic	Normal			
86.	Akash	18	M		✓		Discharge from the sinus	Normal	Supra auricular approach	Cartilage removed	No recurrence
87.	Sarasvathi	25	F			✓	Asymptomatic	Normal			
88.	Arulmurugan	17	M	✓			H/O Incision and drainage	Normal	Supra auricular approach	Cartilage not removed	No recurrence
89.	Mythensha	13	F	✓			Asymptomatic	Normal			
90.	Beneta	19	F	✓	✓		Discharge from the sinus	Normal	Simple sinectomy	Cartilage removed	recurrence+
91.	Sowyma	14	F	✓		✓	Asymptomatic	Normal			
92.	Chandrika	12	M	✓	✓		Asymptomatic	Normal			
93.	Santhosh	11	M	✓	✓		Asymptomatic	Normal			
94.	Sabriza	23	F			✓	Discharge from the sinus	Normal	Simple sinectomy	Cartilage removed	No recurrence
95.	Rajeswaran	14	M			✓	Asymptomatic	Normal			
96.	Uma	24	F		✓		Asymptomatic	Normal			

97.	Naveenraj	5	M	✓			Asymtomatic	Normal			
98.	Amaldeen	12	M	✓			Asymtomatic	Normal			
99.	Jeyanth	10	M				Asymptomatic	Normal			
100.	Raju	25	M			✓	Discharge from the sinus	Normal	Simple sinectomy	Cartilage not removed	No recurrence
101.	Jhansi Ranl	13	F	✓			Asymptomatic	Normal			
102.	Saradha	17	F		✓		H/O Incision and drainage	Normal	Supra auricular approach	Cartilage removed	No recurrence
103.	Aswin	8	M	✓			Asymptomatic	Normal			
104.	Manasadevi	15	F	✓			Asymtomatic	Normal			
105.	Asley	13	M			✓	Asymptomatic	Normal			
106.	Amala	15	F			✓	H/O Excision	Normal	Supra auricular approach	Cartilage removed	No recurrence
107.	Saseena	15	F			✓	Asymptomatic	Normal			
108.	Shanmugam	16	M	✓			Asymptomatic	Normal			
109.	Barathi devi	7	F			✓	Asymtomatic	Normal			
110.	Nivetha	16	F		✓		Asymtomatic	Normal			

## PROFORMA

1. Name :

2. Age :

3. OP/IP No :

4. Sex :

5. Occupation :

6. Address :

7. Date of admission :

8. Date of surgery :

9. Date of discharge :

10. Complaints :

Pit in front of ear

Side	Site	Duration	Number

Pain and swelling around the sinus

Side	Site	Agg. Factor	Rel. Factor

**Discharge from the sinus**

Duration	Nature	Quantity	Smell

**Hard of hearing**

Onset	Duration

11. Past history : Previous history of abscess
12. Family history : Previous history of incision and drainage
13. General examination : Build of the patient  
Anemia

Cyanosis  
Clubbing  
Cardiovascular system  
Respiratory system  
Examination of abdomen  
Examination of neck

14. Examination of Ear : Pre auricular region  
Location of pit  
Presence of swelling  
Erythema/tenderness  
Discharge from the sinus  
: Pinna  
: Post auricular region  
: External auditory canal  
: Tympanic membrane  
: Tuning fork test
15. Examination of throat :
16. Examination of nose :

## INVESTIGATIONS

Urine-	Alb	:	
	Sug		
	Dep		
Blood-	Hb	:	
	TC		
	DC		
	ESR		
	BT		
	CT		
Blood-	Urea	:	
	Sugar		
	Creatinine		
Blood grouping and		:	
Typing			
X- ray chest		:	
ECG		:	
Ultrasound abdomen		:	
Pure tone audiogram		:	
Impedence audiometry			:

## தகவல் படிவம்

தங்களுக்கு செய்த பரிசோதனைகள் மூலம் தங்கள் காதில் நோய் (Pre Auricular Sinus) இருப்பது தெரிய வந்துள்ளது. இந்த நோயைப் பற்றியும், இதற்கான அறுவை சிகிச்சையின் விளைவுகள் பற்றியும் ஆய்வு மேற்கொள்ளப்பட உள்ளது. இதில் தங்கள் நோய் மற்றும் அறுவை, சிகிச்சை குறித்த விவரங்களைப் பயன்படுத்த விருப்புகிறோம்.

தாங்கள் விருப்பினால் மருத்துவ ஆய்விலிருந்து எப்பொழுது வேண்டுமானாலும் விலகிக்கொள்ளலாம்.

இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்களும் பரிசோதனை முடிவுகளும் தங்களின் ஒப்புதலின் மூலம் மட்டுமே ஆய்வில் பயன்படுத்தப்படும்.

ஆய்வாளரின் கையொப்பம்

ஆய்வாளரின் பெயர்

இடம் :

நான் :

## சுய ஒப்புதல் படிவம்

ஆராய்ச்சி நிலையம் : காது, மூக்கு, தொண்டை பிரிவு  
ஸ்டான்லி மருத்துவ கல்லூரி  
மற்றும் மருத்துவமனை  
சென்னை - 600 001.

பங்கு பெறுபவரின் பெயர் :

பங்கு பெறுபவரின் வயது :

பங்கு பெறுபவரின் எண் :

மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டது எனது காது நோய் பற்றிய சந்தேகங்களை கேட்கவும், அதற்கான தகுந்த விளக்கங்களை பெறவும் வாய்ப்பளிக்கப்பட்டது. நான் எனக்கு நடக்கும் அறுவை சிகிச்சையை இவ்வாய்விற்கு பயன்படுத்த தன்னிச்சையாக சம்மதிக்கிறேன். எக்காரணத்தினாலும் எந்தக் கட்டத்திலும் எந்த சட்ட சிக்கலுக்கும் உட்படாமல் நான் இவ்வாய்விருந்து விலகிக் கொள்ளலாம் என்றும் அறிந்து கொண்டேன்.

இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்களையும் பரிசோதனை முடிவுகளையும் மருத்துவர் மேற்கொள்ளும் ஆய்வில் பயன்படுத்திக் கொள்ளவும், அதை பிரசுரிக்கவும் தேவைப்பட்டால் என்னையும் எனக்கு நடக்கும் அறுவை சிகிச்சையையும் புகைப்படம் எடுக்கவும் தான் முழு மனதுடன் சம்மதிக்கிறேன்.

பங்கேற்பவரின் கையொப்பம் : இடம் :

கட்டை விரல் ஒப்பம் : நாள் :

பங்கேற்பவரின் பெயர்

மற்றும் விலாசம் :

ஆய்வாளரின் கையொப்பம் :

ஆய்வாளரின் பெயர் :

**INSTITUTIONAL ETHICAL COMMITTEE,**  
**STANLEY MEDICAL COLLEGE, CHENNAI-3**

Title of the Work : pre auricular sinus -clinical presentation and comparison of simple sinctomy with supra auricular approach technique .

Principal Investigator : Dr.M.Kavitha  
Designation : MS ~~Anatomy~~ <sup>ENT</sup> Post Graduate Department  
: Department of ENT  
Government Stanley Medical College,  
Chennai-1

The request for an approval from the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 04.02.2011 at the Modernized Seminar Hall, Stanley Medical College, Chennai-1 at 2PM

The members of the Committee, the secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

The Principal investigator and their team are directed to adhere to the guidelines given below:

1. You should inform the IEC in case of changes in study procedure, site investigator investigation or guide or any other changes.
2. You should not deviate form the area of the work for which you applied for ethical clearance.
3. You should inform the IEC immediately, in case of any adverse events or serious adverse reaction.
4. You should abide to the rules and regulation of the institution(s).
5. You should complete the work within the specified period and if any extension of time is required, you should apply for permission again and do the work.
6. You should submit the summary of the work to the ethical committee on completion of the work.

  
MEMBER SECRETARY,  
IEC, SMC, CHENNAI

11/2/2011  
Dr. S. MADHAVAN, M.D.,  
Professor and Head  
Dept of Pharmacology  
Stanley Medical College,  
Chennai - 600 001

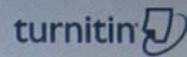
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# PRE AURICULAR SINUS - A

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## PRE AURICULAR SINUS - A STUDY OF CLINICAL PRESENTATION AND COMPARISON OF SIMPLE SINECTOMY WITH SUPRA AURICULAR APPROACH TECHNIQUE

Submitted to the

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY

In partial fulfilment of the requirements

For the award of the degree of

M.S. BRANCH IV  
(OTORHINOLARYNGOLOGY)



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